



2023 Update  
to the  
Mid-America  
Monarch  
Conservation  
Strategy  
2018-2038

Photo: Ed Boggess

# 2023 UPDATE TO THE MID-AMERICA MONARCH CONSERVATION STRATEGY 2018-2038

Developed by: The Midwest Association of Fish and Wildlife Agencies

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## PART ONE – INTRODUCTION

### PURPOSE AND STATEMENT OF PROBLEM

The monarch butterfly (*Danaus plexippus*) occurs in a wide range of habitats and is nearly ubiquitous across the United States, except for Alaska. However, both the western and eastern migratory populations have experienced significant declines since modern monitoring protocols began (1997 and 1994, respectively).

In August 2014, the U.S. Fish and Wildlife Service (USFWS) was petitioned to list the monarch butterfly as a threatened species under the Endangered Species Act of 1973 (ESA). In December 2014, the USFWS issued a 90-day finding that the petition provided enough evidence to show that listing the monarch may be warranted. That prompted USFWS to initiate a Species Status Assessment (SSA) for the global range of the monarch subspecies *Danaus plexippus plexippus* (79 FR 250, December 31, 2014). In 2016, the state wildlife agencies in the 13 states within the Midwest Association of Fish & Wildlife Agencies, as well as those in Arkansas, Oklahoma, Texas (representing the Southeast Association of Fish and Wildlife Agencies), and West Virginia (representing the Northeast Association of Fish & Wildlife Agencies), came together to create a regional habitat strategy for conserving the monarch butterfly. The Mid-America Monarch Conservation Strategy (hereafter, Strategy) was finalized and published in June of 2018, with a commitment to fully review and update the Strategy every five years throughout its 20-year lifespan. **This document represents the first of three planned five-year updates to the Strategy.**

The monarch conservation goal for this Strategy is consistent with the eastern monarch population goal established in the national pollinator strategy (Pollinator Health Task Force 2015) that was subsequently adopted as a trilateral goal by Canada, Mexico, and the U.S. (The White House 2016). That goal was to “increase the Eastern population of the monarch butterfly to 225 million butterflies occupying an area of approximately 15 acres (6 hectares) in the overwintering grounds in Mexico, through domestic/international actions and public-private partnerships by 2020.”

The Species Status Assessment (SSA) of the monarch butterfly, published in 2018 and updated in 2020, included modeling the probability of inevitable extinction (pE) for both the eastern and western monarch populations under various scenarios. These models found that the pE for the eastern population of monarchs in 60 years under current conditions ranges from 48-69%, and under future projected conditions ranges from 56-74% (U.S. Fish & Wildlife Service 2020). The extinction probability for the western population of monarchs is higher in both current and future predicted conditions.

In December 2020, the USFWS found that listing the monarch butterfly as threatened or endangered under the Endangered Species Act was warranted, but precluded by higher-priority listing actions. This finding was reached even when considering the commitments and strategies laid out in the 2018 Strategy. The USFWS plans to re-evaluate the monarch listing finding in Federal Fiscal Year 2024.

The development of the 2018 Mid-America Monarch Conservation Strategy occurred before this 2020 finding that the monarch warrants listing under the ESA. The 2018 Strategy was a collaborative effort between participating states, partner organizations, and the USFWS, and constituted a good faith effort to plan for conservation strategies that could help support the monarch population in a pre-decisional context that might prevent the need to list the monarch as threatened or endangered under the ESA. Since the USFWS has found that monarch butterflies are warranted for listing but precluded by higher-priority listing actions, the purpose of this Strategy has shifted from an attempt to preclude the need to list the monarch, to a strategy to aid in the butterfly’s recovery. This updated document serves to provide participating states and partners with updated monarch conservation science information, estimate progress toward established habitat goals, and reaffirm participants’ commitment to monarch conservation strategies while providing a framework for future monarch conservation work that may be

necessary to recover the species if the USFWS final proposed rule is to list the species as threatened or endangered.

This Strategy focuses on the eastern migratory population of the monarch butterfly. Other populations such as the western population and the non-migratory populations in Florida, along the Gulf Coast, and some other coastal areas are the focus of other recovery plans or strategies. This scope reflects the authorities and resources of the participating state agencies, as well as where the largest potential for conservation impacts can be made on the overall eastern North American monarch population.

The development and implementation of this Strategy is a collaborative process, involving dozens of partners from around the Midwest and south regions. The initiating partners for this Strategy included MAFWA and dozens of other agencies and organizations. A complete list of participants from the original Strategy as well as the participants of this first review are in Appendix A. Many of the individual states and organizations have worked with local partners and constituencies on the development of the state plans and collaborations that will ultimately constitute the primary delivery vehicle for state and partner monarch conservation efforts.

## PURPOSE, VISION, AND GOAL

The Strategy provides a regional framework for coordinated eastern migratory monarch butterfly conservation to occur over a 20-year time horizon (2018-2038). Specific conservation objectives and efforts will be implemented by state and federal agencies, tribal and indigenous groups, partner conservation organizations, and local community members.

**Purpose:** To facilitate cohesive, coordinated, and effective conservation actions needed to sustain the eastern migratory population of the monarch butterfly, including restoring, enhancing, and protecting habitat and providing information, education, and conservation engagement opportunities to interested community members.

**Vision:** A diverse, resilient, and appropriately connected habitat base to support a healthy and robust eastern migratory population of monarch butterflies, sustained by long-term conservation efforts of governmental, non-governmental, and community conservationists.

**Goal:** To achieve native habitat restoration and enhancement to support an average overwintering population in Mexico sufficient to sustain the eastern migratory monarch population.

***The purpose of this 2023 Update to the Mid-America Monarch Conservation Strategy is to integrate updated monarch conservation science, progress, and policy actions to assess Strategy partners' conservation activities, pace, and progress towards meeting stated monarch habitat and population goals.***

The process for developing the original Mid-America Monarch Conservation Strategy is explained in detail in that document. For this 2023 update to the Strategy, a more simplified and streamlined approach was utilized, consisting of a State Monarch Technical Team, a Strategy Board of Directors, a technical coordinator, and a wide reviewer network. The roles of each of these groups/individuals are described in Appendix A.

## DEFINITION OF MONARCH HABITAT AS USED IN THIS STRATEGY

While the habitat needs of monarch butterflies will vary across the species' range and throughout the year, this document uses a general definition that includes both larval and adult food sources necessary to support the monarch life cycle. The Strategy defines monarch habitat as diverse, forb-rich grasslands, mixed woodland-grasslands, or cultivated areas that provide native, regionally appropriate milkweed plants (*Asclepias spp.*) and blooming nectar resources throughout the monarch breeding and migration range. In other words, an area is monarch habitat if it provides host plants for monarch larvae (native milkweed) during the breeding season as well as nectar food sources for adult monarchs whenever the species may be present. This definition assumes that best practices will be used to avoid or minimize pesticide use or other potential mortality impacts within established or enhanced habitat areas and that native plants will be used whenever possible.

## MONARCH BIOLOGY AND DISTRIBUTION

For a brief overview of the eastern North American population of migratory monarch butterflies, refer to the [2018 Strategy](#). For more detailed information on the monarch's taxonomy and biology, see the [North American Monarch Conservation Plan](#).

The geographical range of the eastern migratory population of monarch butterflies spans southern Canada in the north to central Mexico in the south, and the Rocky Mountains in the west to the Atlantic coast in the east. Notably, due to genetic studies on the natal origin of overwintering monarchs and known monarch migratory flyways, the USFWS has identified certain "Monarch Butterfly Conservation Units" of importance, which align closely with the geography of this Strategy (Figure 1.1).

Monarchs both breed and migrate throughout this Strategy's geography, generally spending early spring and late summer to fall in the southern US and late spring through late summer within the Midwest and Northeast. Therefore, it is important to provide key habitat components for this species – nectar resources, larval host plants, roosting sites, and breeding sites – at seasonally appropriate times. This Strategy considers these key needs and their seasonality in its goals and prioritization.



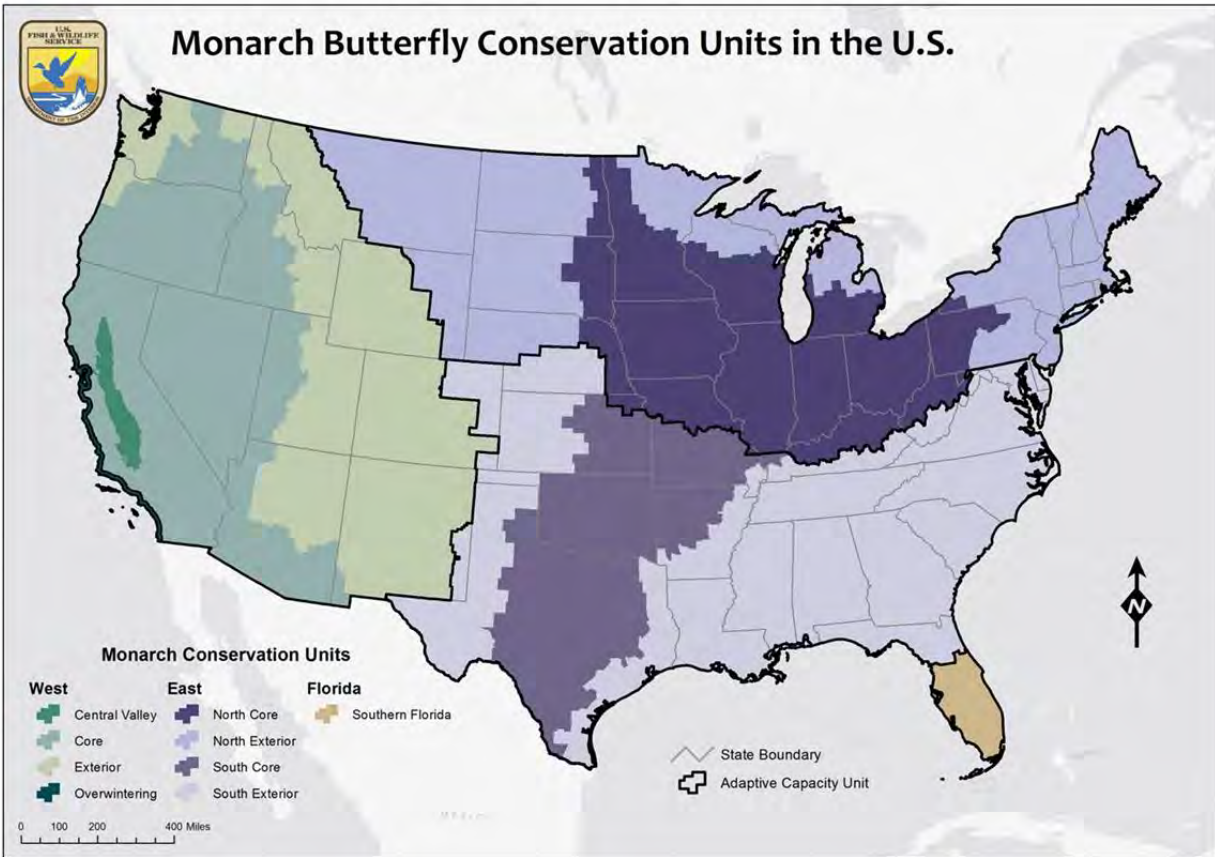


Figure 1.1 - Monarch Butterfly Conservation Units as described by the U.S. Fish & Wildlife Service, March 2017 (source: U.S. Fish & Wildlife Service)

## 2023 UPDATED SUMMARY OF MONARCH RESEARCH

Since the release of this Strategy in 2018, the overwintering monarch population in Mexico has remained relatively stable with the preceding four years (3.46 ha from 2019 – 2022 vs. 2.63 ha from 2015 – 2018, respectively). In 2018-19, the population reached 6.05 ha, exceeding the target for this population; however, the following years were less than half this size. Despite a change in trajectory from 2014 – 2019, there was no statistically significant increase in the population during that time (Thogmartin et al. 2020). Additional research examining the overwintering population trends since the 1970's shows a declining trajectory since nearly the inception of monitoring; this accounts for variation in survey effort across decades (Zylstra et al. 2020). Much research points to herbicides, and the loss of milkweed associated with herbicide-tolerant crops, as a driving factor in this declining trajectory, particularly prior to 2004 (e.g., Pleasants and Oberhauser 2013, Thogmartin et al. 2017, Malcolm 2018). Recently, Boyle et al. (2019) show declines in the eastern migratory monarch population commencing as early as the 1950's, suggesting that, in addition to the direct and indirect impacts of herbicides on monarchs, the consolidation of small farms into larger ones also was a contributing factor in the decline of monarchs and their habitat mid-century.

One study examined trends in the breeding population size since the early 1990's and concluded that it is not declining, but rather the summer population growth is sufficient to compensate for losses incurred during other seasons (Crossley et al. 2022). This, like similar studies on the breeding population



size described in the 2018 Strategy (Davis 2011, Davis and Dyer 2015) has been met with responses from other academic researchers noting that certain geographies in these studies are not representative of the main eastern monarch production region, or that the datasets are not appropriate to make such conclusions (Brower et al. 2012, Pleasants et al. 2017, Bittel et al. 2022). The Crossley et al. (2022) study also suggests that the eastern migratory population of monarchs is experiencing a shift toward a new primary production region and new population level that is lower than the population level of the 1990's, though still stable, which may warrant further investigation.

The overwintering count continues to be the foundation on which large-scale conservation efforts and populations assessments are made. Given this focus, Voorhies et al. (2019) developed models that accounted for future threats as part of the USFWS's Species Status Assessment. The authors estimate the probability of quasi-extinction (pE) of eastern monarchs within 50 years to be 48% given its current trajectory; this is expanded upon within the USFWS's Species Status Assessment (2020) estimating the pE to be 48 – 69% within 60 years. Semmens et al. (2016) concluded that a 5-fold increase in monarch abundance was necessary to halve the quasi-extinction risk, relative to 2014-15 overwintering counts of 1.13 hectares.

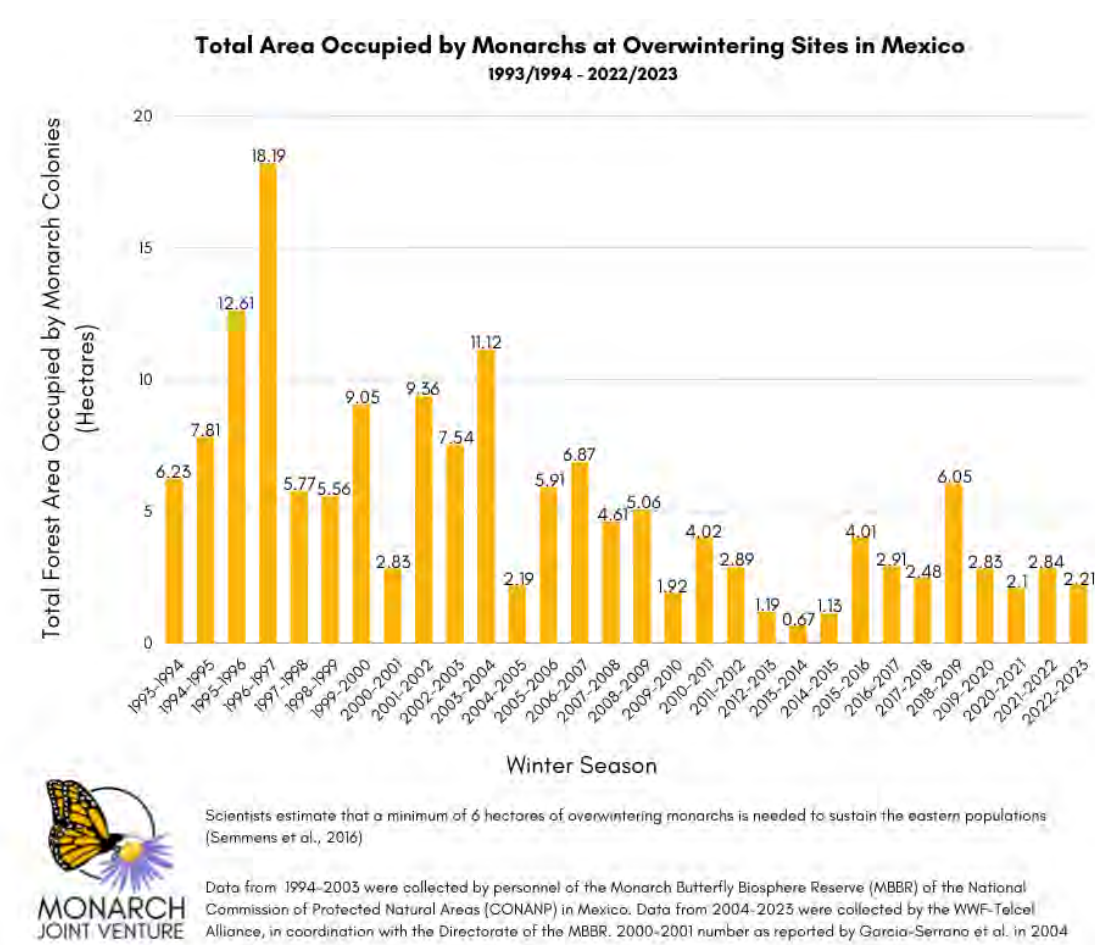


Figure 1.2 - Graph of Mexican overwintering monarch population counts 1994-2023 (source: Monarch Joint Venture)

## THREATS TO MONARCHS

### BREEDING HABITAT LOSS

Plants in the milkweed subfamily (genus *Asclepias*) are the sole host plants for monarch butterfly eggs and larvae, and research indicates that the decline of milkweed host plants is the primary influence on monarch population status (e.g., Oberhauser et al. 2001, Brower et al. 2011, Pleasants & Oberhauser 2013), particularly in the Midwest. The loss of breeding habitat continues to be recognized as a significant factor in recent declines of monarch populations (Stenoien et al. 2018). Additionally, climate change is likely a major driving factor in overwintering population size since 2004, in part because milkweed stem loss has likely stabilized (Thogmartin et al. 2017, Zylstra et al. 2021). In an expert-elicited ranking of threats/influences in the Species Status Assessment, the availability and distribution of milkweed were ranked as the most influential factors on the eastern monarch population (U.S. Fish and Wildlife Service 2020).

Given the importance of milkweed availability throughout the breeding range, conservation targets continue to prioritize adding milkweed to the landscape across a variety of land uses. A recent study suggests that nearly 2.6 billion milkweed stems may be needed to support six ha of overwintering monarchs when accounting for temperature-dependent development times of larvae and the difference between available and total milkweed stems (Solis-Sosa et al. 2021). This study suggests that milkweed will have an optimal impact if over 90% of efforts are allocated to the central US, which in this study is 35.1 - 40.0 degrees N (i.e., including Kansas and Missouri eastward, and excluding much of Nebraska, Iowa, and farther north).

In addition to the observed decline in milkweeds in the Midwest, cropland expansion into grassland, particularly into lands previously enrolled in the Conservation Reserve Program (CRP), has been another identified factor linked to monarch habitat decline (Lark et al. 2020). Commodity price supports, U.S. agricultural policies, and the increased demand for biofuels have recently resulted in expansions of crop production (typically corn and soybeans) into areas previously considered grasslands and other areas not previously considered tillable and sustainable for these cropping systems (Lark et al. 2015). From 2008 to 2012, cropland expansion occurred most rapidly on lands less suitable for cultivation, with up to 42% of the recent expansion coming from lands exiting the CRP and the remaining coming from pasture/rangeland (Lark et al. 2015). CRP enrollment acreage decreased between 2007 and 2020, with a slight increase in 2021 (Zulauf, 2022). This decline was due in part to a reduced enrollment cap and in part to market forces driving decisions to return acreage to crop production, resulting in approximately 12 million fewer acres enrolled in CRP nationwide.

### FALL AND OVERWINTERING DYNAMICS

In addition to losses of breeding habitat, some recent research has implicated the loss of fall and winter habitat in contributing to eastern migratory monarch population trends. Fall nectar availability may predict migration success and overwintering colony size (Fordyce et al. 2020, Saunders et al. 2019), though other research suggests summer population size is the primary predictor of overwintering population size (Taylor et al. 2020, Zylstra et al. 2021). Additional research more generally documents the loss of habitat on the Mexican overwintering grounds (Nicoletti et al. 2020, Saenz-Ceja and Perez-Salicrup 2021, Lopez-Garcia et al. 2022); though these papers do not make direct links between the loss of overwintering habitat and monarch population size, they raise concerns about the potential impact of climate change, forest cover, and agricultural expansion on overwintering monarchs and their habitat.

## CLIMATE CHANGE

Research continues to show the impact of climate change on monarch population size, breeding, and migration. A warming climate may directly or indirectly impact monarch breeding. First, the ranges of many milkweed species are expected to shift, primarily northward, with some expanding and others contracting (Lemoine 2015, Svancara et al. 2019). This shift could impact the availability of milkweed during the breeding period, depending on if the monarch can track these changes via shifted or expanded migration (Batalden et al. 2007). Furthermore, monarch larvae may grow faster under moderate temperature increases (to 30 degrees C), but not under slightly higher increases (to 31 degrees C, Kharouba and Yang 2021). The nutritional quality of the milkweed may also decrease under high levels of warming (Kharouba and Yang 2021).

Spring temperature and precipitation in the southern US may be important predictors of monarch abundance in the Midwest (Zipkin et al. 2012, Zylstra et al. 2021), with high levels of precipitation and average temperatures predicted to boost populations and cause earlier spring arrivals (Zipkin et al. 2012). Zylstra et al. (2021) show that between 2004 and 2018, spring temperature and precipitation have a greater impact on the monarch population size than summer weather, local herbicide use, or late-winter population size. Crewe et al. (2019) suggest that warming spring temperatures will have a negative effect on the eastern migratory monarch population, while Crossley et al. (2022) suggest that warmer mean annual temperature may boost breeding populations in the Midwest.

Fall monarch migration along the eastern Atlantic coast has shifted 16 - 19 days later from 1992-2020, correlated with increasing fall temperatures in that region (Culbertson et al. 2021). Shifts in migration timing may negatively impact migratory success, given that the monarchs are most successful at reaching the overwintering grounds when the sun angle at solar noon is between 46 and 57 degrees (Taylor et al. 2019).

Climate projections for the Mexican overwintering grounds show a reduction in suitable habitat for monarchs of 49-100% by 2050 or 2090 (Islas-Baez et al. 2015, Ramirez et al. 2015), and reduction in suitable habitat for the monarch's important overwintering plant, *Abies religiosa*, of 88% by 2060 (Saenz-Romero et al. 2012). Climate is currently the major driver of forest loss in the Monarch Butterfly Biosphere Reserve and is expected to continue to have future impacts on overwintering habitat degradation: forest cover losses from climate-related events (wind and rainstorms) have increased since 2012 and are likely to continue (Flores-Martinez et al. 2019).

## PESTICIDES AND TOXINS

Pesticides can cause direct mortality or have sub-lethal impacts on monarchs, such as reduced size or slowed growth. These impacts, particularly when considered across the entire breeding range, may have substantial negative impacts on the monarch population (Pecenka and Lundgren 2015, Saunders et al. 2018). Sublethal doses of neonicotinoids can reduce larval survival and growth, as well as cause incomplete shedding of the pupal case and ultimately death (Krishnan et al. 2021, Krueger et al. 2021, Wilcox et al. 2021). Clothianidin levels in milkweed near treated cornfields are high enough to kill larvae and pupae (Krischik et al. 2015, Bargar et al. 2020, Knight et al. 2021). However, research from the Midwest has shown neonicotinoid levels in milkweed near ag fields at concentrations too low to negatively impact larvae (Hall et al. 2021).

Consuming plant material that contains pesticides can directly impact monarch growth and survival. Consuming sugar water contaminated with neonicotinoids reduced the life spans of adult

monarchs (James 2019). Modeling suggests that aerial application of certain foliar insecticides (e.g., beta-cyfluthrin) will cause high mortality of monarch eggs and larvae (32 - 100%) as far as 60m downwind of the application site; however, mortality rates via other insecticides (e.g., imidacloprid) are only 0 - 2% at 60m downwind (Krishnan et al. 2020).

The presence of pesticides is ubiquitous, occurring on milkweed that grows far from agricultural lands and in levels known to be harmful to monarchs (Halsch et al. 2020). Olaya-Arenas et al. (2020) found 14 pesticides on milkweed in natural habitats adjacent to agricultural lands in Indiana; some were at sufficient levels to have sub-lethal impacts on monarch development. Some research suggests that adult monarchs can avoid ovipositing and nectaring on milkweeds with high levels of pesticides (Olaya-Arenas et al. 2020), while other research does not show a selection preference (Mullins et al. 2021).

Despite the documented negative consequences of pesticides to monarchs, there still may be an overall positive net effect of maintaining habitat near agricultural fields. Grant et al. (2021) used modeling to suggest that monarch habitat in agricultural areas of the Midwest still produces a net gain of monarchs, and that establishing a no-habitat zone around agriculture fields would ultimately result in fewer monarchs than if the buffers were not established.

Studies have shown that roadsides can suffer from heavy metal accumulation from car wear-and-tear and residual leaded gasoline emissions. In northern states, sodium from road salt application can accumulate along roadsides, and exhaust emissions can elevate levels of nitrogen (Snell-Rood et al. 2014). While these chemicals can make their way into the leaves and nectar of plants growing next to the road, research suggests that the concentrations of plant toxins are typically not lethal to pollinators (Shephard et al. 2021), with some exceptions (Shephard et al. 2020). Studies to date suggest that toxic levels of metals, sodium, and other roadside pollutants may be most problematic along very high-traffic volume roads and adjacent to the roadside (Mitchell et al. 2020).

## REARING

The effects of captive rearing and the release of monarchs to the wild continue to be a concern. Indoor rearing of monarchs purchased commercially or captured from the wild, even with access to natural sunlight, may interfere with their ability to properly orient south, which may have implications for successful fall migration (Tenger-Trolander and Kronforst 2020). Monarchs reared under late-summer conditions have lower grip strength, paler orange color, and less elongated forewings than wild-caught fall migratory monarchs (Davis et al. 2020). Rearing and a related problem, the spread of *Ophryosystis elektroscirrha* (OE), have been implicated in the potential loss of tens of millions of monarchs per year during fall migration (Majewska et al. 2022). Thus, continued or extensive rearing and releasing of monarchs presents a potential danger of increasing undesirable traits in wild populations and reducing their fitness.

## DISEASE AND PREDATION

Pathogens remain a threat to monarch populations, in particular the protozoan *Ophryosystis elektroscirrha* (OE). Research since 2018 emphasizes the impact it may have on the population, potentially removing tens of millions of individuals from the population each fall during migration (Majewska et al. 2022). Transmission of OE can occur vertically (adult to larva), from adult to adult, and via the environment when spores shed onto milkweed are consumed by larvae. Infection rates can reach over 70% and reduce populations by over 50% due to reduced male copulation success and fewer lifetime male copulations (Majewska et al. 2019, Babalola et al. 2022).

OE infection prevalence increases over the breeding season and is higher in the southern latitudes, supporting the ‘migratory escape’ hypothesis and the fitness advantages of migration farther north (Flockhart et al. 2018). Additionally, migrant monarchs that encounter resident monarchs in the south are more likely to be infected with OE and to be reproductively active than other migrants (Satterfield et al. 2018). OE infection rates are very low (~1%) in the northeastern region of the breeding range where monarch densities are low (Dargent et al. 2021).

## OTHER FACTORS

Additional factors that could impact monarch populations include increasing severity of weather and catastrophic events, invasive species, traffic mortality, and light pollution. Although there has been much research on the impacts of climate and climate change on monarch populations (see Climate Change section above), few studies explicitly explore the impact of increasing weather severity or adverse weather patterns on monarchs (Wilcox et al. 2019). Those that do suggest adverse weather can impact monarchs at all life cycle stages, and that the timing of the events impacts the severity of the effect (Brower et al. 2017, Hunt and Tongen 2017). Research also indicates that nighttime light pollution can impact monarch behavior, from potentially triggering nighttime flight and impacting flight direction (Parlin et al. 2022), to producing non-migratory individuals by obscuring the photoperiod cues that lead to development of fall migratory monarchs (Guerra 2020).

Invasive species can impact monarchs directly and indirectly. One example of an invasive species that indirectly impacts monarch survival is swallowwort (*Vincetoxicum rossicum*). At high densities, swallowwort can outcompete common milkweed (*Asclepias syriaca*) via its Allee effects (Jackson and Amatangelo 2021). Monarchs may lay up to 25% of their eggs on pale swallowwort in the field, and larvae cannot consume or survive on this plant, demonstrating that it may be an oviposition sink; application of a potential biological control agent, *Hypena opulenta*, does not impact this oviposition choice (Alred et al. 2021). Paper wasps are one invasive predator that directly impacts monarchs; in some urban settings, invasive European paper wasps are the dominant predator of second to fourth-instar monarch caterpillars, and the wasps use butterfly “hibernation boxes” as nesting habitat (Baker and Potter 2020).

Road mortality research indicates that one to three million monarchs may be killed by vehicles during the fall migration each year in the southern migration corridor (Oklahoma to Mexico), as the population’s migration concentrates closer to the overwintering sites (Kantola et al. 2019). A study in northeastern Mexico estimated 196,500 individuals were killed at two highway crossing spots from October 15-November 11, 2018 (approximately two million per year, Alvarez et al. 2019). Despite this mortality, roadsides serve as quality breeding and foraging habitat for monarchs and in many locations, it is likely that there are more monarchs produced on roadsides than killed by vehicles, though further studies are needed on this topic (Phillips et al. 2020).

## PRIORITIZATION OF THREATS FOR THIS STRATEGY

The USFWS analyzes five threat factors when determining whether a species merits listing as either threatened or endangered: modification or curtailment of habitat or range; overutilization for commercial, scientific, research, or education purposes; disease or predation; inadequacy of existing regulatory mechanisms; and other factors affecting the species’ continued existence.

Though many factors have combined to affect populations of monarch butterflies, the most detrimental influences on monarchs appear to be related to habitat (Thogmartin et al. 2017). The

Monarch Species Status Assessment identified the loss and degradation of habitat (from the conversion of grasslands to agriculture, widespread use of herbicides, logging/thinning at overwintering sites in Mexico, urban development, and drought), continued exposure to insecticides, and climate change as the primary drivers affecting the health of eastern North American migratory monarchs (US Fish and Wildlife Service 2020).

The strategies in this document primarily focus on increasing and improving the quantity and quality of habitat across sixteen states constituting core areas of the eastern monarch breeding and migratory ranges. Habitat management is the area of greatest authority and influence for participating parties: state wildlife agencies, state and federal government partners, agro-industry partners, and environmental non-profit organizations. Providing diverse, resilient, and appropriately connected habitats located throughout extensive areas of the eastern migratory monarch range will help to mitigate potential impacts of the identified threats to the eastern monarch population.



## PART TWO – POPULATION AND HABITAT GOALS

### EASTERN MONARCH POPULATION GOALS

This Strategy supports the same eastern migratory monarch population target set forth in the National Strategy to Promote the Health of Honey Bees and Other Pollinators (hereafter, National Strategy; Pollinator Health Task Force 2015) and as endorsed by the leaders of the United States, Mexico, and Canada (The White House 2016): a sustained average occupied area of overwintering grounds in Mexico covering six hectares. This area is deemed sufficient to achieve the Strategy’s goal of supporting an average overwintering population sufficient to sustain the eastern migratory monarch population (Semmens et al. 2016). We have adopted this target until such time as new analyses or data become available to indicate that a different goal or different activities are needed to sustain the eastern migratory monarch population. This Strategy remains an adaptive document that will be adjusted based on future outcomes or new knowledge.

The goal within the National Strategy assumes a density of 37.5 million monarchs per hectare; however, recent research has explored the wide variation in density estimates for overwintering monarchs, which has important implications for both the number of monarchs contained in six hectares of overwintering colonies and the amount of habitat estimated to be necessary to support that target population.

The National Strategy established a preliminary goal of restoration and enhancement of 7 million acres of pollinator friendly habitat nationally for all pollinators, including monarchs (Pollinator Health Task Force 2015). However, since the development of the National Strategy, new information indicates that a larger and more geographically focused conservation effort will be needed for monarch butterflies than the original national pollinator habitat goal.

Research on the habitat needs of the eastern migratory monarch population has primarily focused on milkweed availability in the North Core Monarch Butterfly Conservation Unit (Fig. 1.1) because research shows that it is the largest contributor to the eastern migratory monarch overwintering population (Flockhart et al. 2017). **This Strategy update continues to base its regional goals within the broader framework of establishing an additional 1.3 - 1.8 billion milkweed stems across the eastern monarch breeding range** (Pleasants 2017, Thogmartin et al. 2017a, Thogmartin 2017b). Additionally, the inclusion of nectar resources on the landscape continues to be a priority for both the North and South Core regions.

### NORTH CORE HABITAT POTENTIAL AND GOALS

#### HABITAT POTENTIAL

More than 80% of total eastern migratory monarch population production was estimated to come from the northern range of the eastern monarch population (Flockhart et al. 2017), an area approximating the North Core and north exterior monarch conservation units as described by the USFWS (Fig. 1.1). Based on isotope data, 40 - 50% of wintering monarchs in Mexico are produced in the Midwest “corn belt” (Wassenaar and Hobson 1998, Flockhart et al. 2017). Given this, the North Core will continue prioritizing the restoration and enhancement of breeding habitat (i.e., milkweed) interspersed within a matrix of nectar resources. In particular, common milkweed (*Asclepias syriaca*), swamp milkweed (*A. incarnata*), and butterfly milkweed (*A. tuberosa*) may be particularly important given their growth

habits, geographic spread, seed availability, and significance in monarch larval diet (NRCS and USFWS 2016).

In the 2018 Strategy, the NRCS identified the highest potential for gains in habitat in the Midwest region to be on lands in various USDA cropland retirement programs, particularly lands currently enrolled in Wetland Reserve Program (WRP) and lands to be enrolled in a wetland easement through the Agricultural Conservation Easement Program (ACEP). Additionally, the Conservation Reserve Program has added or emphasized more pollinator-friendly practices over time (e.g., CRP's CP42 Pollinator Habitat planting and CP43 Prairie Strips). There is also substantial potential to add habitat along streams in the Upper Midwest, with a cost-benefit (pollination benefit) ratio of 1:2 (Semmens and Ancona 2019).

## HABITAT GOALS

For the original 2018 Strategy document, the Mid-America Monarch Conservation Strategy Board of Directors adopted the following habitat goal for the North Core geography:

*"The goal of the Mid-America Monarch Conservation Strategy for the North Core is to work with partners to support an average of 6 hectares of overwintering eastern monarch population through an additional 1.3 billion stems of milkweed in the North Core monarch conservation unit by 2038, with a baseline year of 2014 for counting additional conservation efforts."*

This North Core habitat goal was developed through an extensive process involving all states in the North Core monarch conservation unit and support from U.S. Fish & Wildlife Service and U.S. Geological Survey staff. That process and the resulting milkweed stem commitments from participating states are discussed in the original 2018 Strategy document.

In 2022, agencies within the North Core met virtually to discuss the habitat goals described above. They reviewed the "habitat allocation tool" and noted that its calculations are rooted in Thogmartin et al.'s (2017a) work, which is more about *relative increases* rather than exact stem counts. This focus was deemed different from a strictly field-based, stem-counting approach. No new landmark research had been published that would drastically alter the tool's calculations. The group agreed that the outputs should be applied more broadly to support relative increases in quality grassland rather than focusing on minor tweaks that may be beyond the capabilities of the tool and not provide meaningful adjustments. Additionally, some states faced hurdles when first establishing state-level milkweed stem goals. **Thus, the group agreed that no adjustment to the 1.3 billion milkweed stem goal was necessary at this time.**

## SOUTH CORE HABITAT POTENTIAL AND GOALS

### HABITAT POTENTIAL

The South Core region includes portions of Arkansas, Kansas, Missouri, Oklahoma, and Texas. This area provides essential breeding habitat for monarchs arriving from Mexico in the spring. Additionally, it provides essential nectar plants for migrating monarchs in the spring and fall of each year. Data (Flockhart et al. 2013) suggest that fall monarch reproduction in the Southern Great Plains may contribute to the wintering population in Mexico at a higher proportion than previously estimated by Wassenaar and Hobson (1998). Although the contribution of the wintering population with a natal origin in the Southern Great Plains remains in question, data from Flockhart et al. (2013), coupled with data from the Monarch

Larva Monitoring Project (Prysby and Oberhauser 2004, Baum and Sharber 2012, and Tracy et al. 2022) suggest that opportunities to increase fall monarch breeding habitat in the Southern Great Plains warrant further consideration. Notably, Tracy et al. (2022) found that 30% of the monarch reproduction in their study region, which spanned all South Core states except Missouri, occurred in the fall. Preliminary community science data also suggest that fall reproductive activity in Texas occasionally exceeds spring reproduction (Monarch Larva Monitoring Project, *unpubl. data*), potentially making the South Core an important contributor to the overwintering population in certain years.

During the fall migration, much of the eastern monarch population funnels through the South Core area, suggesting that a diversity of fall nectar resources are important in this area to support nectaring during the southward migration (NRCS and USFWS 2016).

## HABITAT GOALS

Habitat for reproduction and migration are equally important within the South Core. Thus, increasing nectar plant species richness, abundance, and connectivity, as well as milkweed-dependent monarch reproduction habitat, is critically important. In 2017 and 2018, a South Core Habitat Allocation Technical Work Group (SCHTWG) began developing habitat goals for this region based on existing vegetation data and expert elicitation. The SCHTWG collaborated with a small group of partners to develop a non-spatially explicit monarch habitat model for the South Core geography, like the “habitat allocation tool” employed in the North Core. This tool was intended to incorporate acreage and milkweed and nectar resource density data for multiple land cover classes across the South Core geography. However, this tool was incomplete as of the 2023 Strategy update and capacity is lacking to bring the model to completion. Thus, habitat goals for this South Core are based on peer-reviewed literature on the factors driving monarch survival and reproduction in the South, on the monarch Species Status Assessment, and individual states’ goals.

All states recognize the need to implement conservation measures enhancing monarch reproduction and survival in their states. Each state has produced a monarch (or pollinator) conservation plan emphasizing the need to work collaboratively across sectors to restore or enhance monarch habitat statewide. Several states have set quantifiable habitat targets. Missouri’s goal to restore or enhance at least 350,000 acres of monarch habitat that contain 200 milkweed stems per acre by 2036 applies statewide and is not restricted to the South Core. Arkansas aims to create, restore or enhance 510,500 acres of native habitats that support monarchs and pollinators by 2023. Kansas will create or enhance well over 425,000 acres of pollinator friendly habitat, which will include 10% of right-of-way acres statewide. These and other South Core states recognize the importance of embedding milkweed within a matrix of nectar resources, and that milkweed (i.e., breeding habitat) is not likely to be a factor limiting monarch reproduction and survival in the southern US. South Core states have identified priority actions or broad outcomes and objectives, which are further outlined below.

*Provide high-quality habitat comprised of a diversity of nectar-producing plants, including regionally-appropriate milkweeds suitable for monarch reproduction*

Habitat availability in South Core states is an important factor in both spring and fall migration (Oberhauser et al. 2017). The size of the monarch breeding population depends on habitat availability and weather during spring migration and breeding, and the overwintering population is driven by the size of the preceding summer’s breeding population (Crewe et al. 2019, Zylstra et al. 2021). Additionally, nectar resources during the fall migration are important, given that monarchs build lipid reserves as they

travel south to overwinter (Brower et al. 2006). Milkweed density and distribution are substantial within the South Core and Southern Great Plains states, estimated between 1.3 and 6.9 billion stems on non-federal rangelands (Spaeth et al. 2022); thus, milkweed abundance is unlikely a limiting factor for monarch reproduction in this region and represents only a part of a broader conservation strategy.

It is important to create, enhance, and maintain habitat that will support robust reproduction throughout the spring when monarchs first recolonize the southern US, as well as ample nectaring opportunities for the return migration south. Such habitat should include a diversity of nectar resources to ensure sufficient availability in the face of increased climatic stochasticity. The Southern Great Plains grasslands (mixed-grass and tallgrass prairies and Cross Timbers woodland) are important to monarchs, yet include vast areas dominated by exotic pasture grasses and are subject to a wide range of grazing practices. Therefore, many grasslands in the region could be improved for monarchs by encouraging or reintroducing a greater diversity of native forbs including milkweeds and other nectar-producing plants that bloom during the spring (April/May) and fall (August/September/October) migration periods to enhance foraging or reproductive habitat for monarchs. The plant species most suitable for this will vary by state and ecoregion, and are addressed in each state's monarch (or pollinator) conservation plan or its supporting resources.

The availability of native milkweed is also critical to ensure reproductive opportunities. Milkweed species of particular importance throughout much of the region include spider milkweed (*A. asperula*), zizotes milkweed (*A. oenotheroides*), green antelope horn (*A. viridis*), and broadleaf milkweed (*A. latifolia*). These are important for the first generation (Best 2015) and late-summer breeding monarchs (Flockhart et al. 2017, Tracy et al. 2022). Monarchs are not restricted only to grassland habitats; therefore, other native species of milkweeds can be planted in open woodlands, forest edges, riparian habitats, and rights-of-way to enhance the value of these areas as reproductive habitat. Green comet milkweed (*A. viridiflora*), showy milkweed (*A. speciosa*), and swamp milkweed (*A. incarnata*) can be beneficial additions in these habitats. As monarchs move farther north into Kansas and Missouri, other milkweed species (e.g. *A. syriaca*) become important, although *A. viridis* is still important because of its prolonged flowering season and resistance to grazing and herbicide treatments. Additional milkweed species (e.g. *A. latifolia*), and re-growth or new growth of milkweed species with earlier phenologies (e.g., *A. asperula*, *A. viridis*) may be important for fall monarch reproduction. As with nectar plants, species-specific recommendations and best management practices are either denoted in individual state monarch (or pollinator) conservation plans, their supporting resources, or identified as a data gap.

#### *Increase supply of regionally appropriate milkweed and nectar plant materials*

An important component of restoring and enhancing monarch habitat is planting or seeding native plant species. This may occur to restore habitat where it was previously lost, or to supplement or enhance degraded habitat. The supply of seeds and plugs of native milkweeds and nectar plants in this region, however, is not sufficient to meet demand. Thus, the states in this region commit to efforts that will increase the supply of regionally appropriate milkweed and nectar plant materials. Actions to support this effort include identifying the species in short supply, facilitating the collection of native seed on state and other lands, supporting private nurseries and landowners in seed and plant production, and collaborating with local native seed programs or working groups to promote these efforts. Specific efforts will vary based on each states' needs and capacity; agencies will share successes and facilitate efforts across state lines when possible.

#### *Support collaboration and information-sharing across agencies, organizations, and stakeholder groups*

The habitat goals outlined above depend on a network of collaboration across the region, including a variety of stakeholders across many land-use types. The South Core states will continue to cultivate collaboration and partnership to increase support and implementation of the region's habitat goals. Most states' monarch (or pollinator) conservation plans include a dedication to regular meetings or information-sharing. States will communicate management needs and strategies such as best management practices; successes and lessons learned; and opportunities for research, engagement, and funding. Outreach also may extend to the public to promote awareness about monarch and pollinator conservation throughout the state, ultimately educating and empowering a broad audience to further support the habitat goals set forth in this Strategy.

## PART THREE – CURRENT STATUS OF MONARCH HABITAT PROGRESS

### MONARCH CONSERVATION DATABASE FINDINGS

In 2018, the U.S. Fish and Wildlife Service (USFWS) created the Monarch Conservation Database (MCD). The MCD collects information about on-the-ground conservation efforts to benefit monarchs that are planned or implemented since 2014. Community conservationists, non-governmental organizations, businesses, and government agencies can submit **efforts** to the MCD. An effort can either be “completed,” “implemented,” or “planned.” **Efforts are distinct conservation activities associated with a spatial location, and are not general goals or targets.** Efforts can be recorded using GPS coordinates or masked to the county level. Additionally, the land cover type is specified for each effort to facilitate tracking change in milkweed stem density per acre, which is categorized by land use type.

The USFWS used this information to inform the species status assessment by providing an estimate of the change in habitat (i.e., milkweed stems) due to conservation efforts since 2014, which is the baseline year for milkweed stem goals. The USFWS considered both “implemented” and “planned” efforts to project future scenarios within the Species Status Assessment (SSA). In June of 2020, the SSA showed that 4,542,323 acres of habitat conservation efforts had been completed within the continental US and Hawaii, and an additional 1,093,669 acres of habitat efforts were planned for that region.

The states involved in this MAMCS were encouraged to submit updated information regarding their conservation efforts since 2020 to the MCD again by March 2023 for this Strategy’s update and the reassessment of the Monarch SSA planned for early summer 2023. Not all states and partners have entered data into the MCD, and thus recorded habitat information may not represent the full breadth of habitat improvements on the ground.

Collectively, MAMCS states recorded 8,575,229 acres of efforts (completed, implemented, or planned) to benefit monarchs, for an estimated increase of 521,865,945 milkweed stems. Notably, Conservation Reserve Program (CRP) acreage decreased substantially across most states. After accounting for the potential loss of milkweed stems on these CRP acres (under the assumption that expired CRP acres no longer provide habitat), the total net change in milkweed stems across MAMCS states was 381,261,437.

Within the North Core, planned or completed conservation efforts contributed approximately 234,781,901 milkweed stems to the landscape. After accounting for losses of CRP acres, milkweed stem count increased by approximately 267,842,870.

Since 2014, there has been a net loss in acres enrolled in CRP (Figure 3.1). The acreage and milkweed stem estimates provided by the MCD assume that all acres no longer enrolled in CRP (i.e., expired acres) are reverted to cropland. However, studies suggest that 42-60% of CRP acreage is not converted back to crops within at least a year of contract expiration (Roberts and Lubowski 2007, Hendricks and Er 2018). Thus, the progress made to benefit monarch habitat and increase milkweed stems may be more substantial than reflected in these MCD numbers.



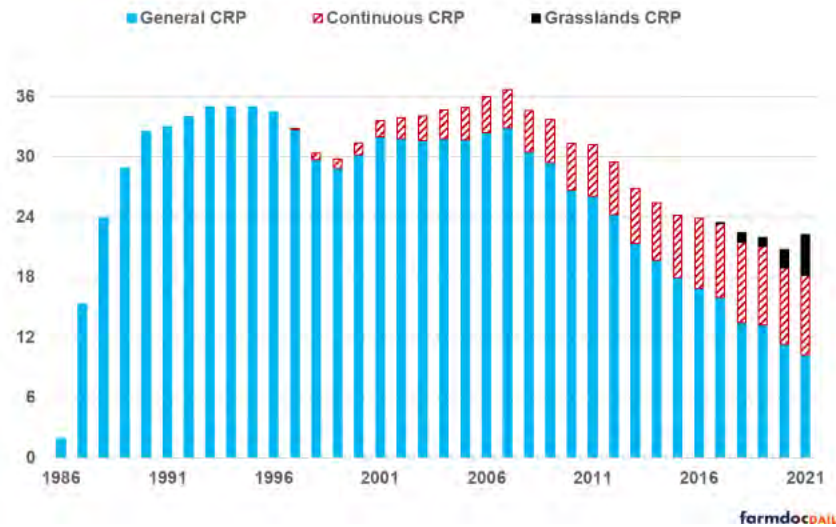


Table 3.1 Summary of the acres and associated milkweed stems entered into the Monarch Conservation Database as of June 2023.

	National <sup>1</sup>	MAMCS States <sup>2</sup>	North Core <sup>3</sup>
Conservation Efforts <sup>4</sup> (n)	145,455	116,892	72,415
Conservation Efforts (acres)	10,457,316	8,575,229	3,523,804
Milkweed Stem Gain (associated with Conservation Efforts)	568,583,559	521,865,945	234,781,901
<b>Net change from 2014 to May 2023</b>			
CRP <sup>5</sup> (acres)	-5,669,084	-2,761,220	-251,227
CRP (milkweed stems)	-399,356,818	-140,605,508	33,060,969
Acres (Conservation Efforts acres + CRP acres)	4,788,233	5,814,009	3,272,577
Milkweed Stems (Conservation Efforts acres + CRP milkweed stems)	169,226,741	381,260,437	267,842,870
<b>Progress Toward North Core Milkweed Stem Goals: 1,300,000,000 stems<sup>6</sup></b>			
% of Goal (Completed and implemented efforts + CRP)			14%
% of Goal (Completed, implemented, and planned efforts + CRP)			17%

<sup>1</sup>Includes all US states

<sup>2</sup>States involved in the Mid-America Monarch Conservation Strategy: Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Texas, Wisconsin. Not all states or partners contributed data to the MCD.

<sup>3</sup>Counties within the North Core Monarch Conservation Unit

<sup>4</sup>Includes completed, implemented, and planned conservation efforts. Efforts are spatially-explicit conservation actions.

<sup>5</sup>Conservation Reserve Program

<sup>6</sup>\*Milkweed stem goal is only relevant to states in the North Core because they have set a quantifiable target within this Strategy.

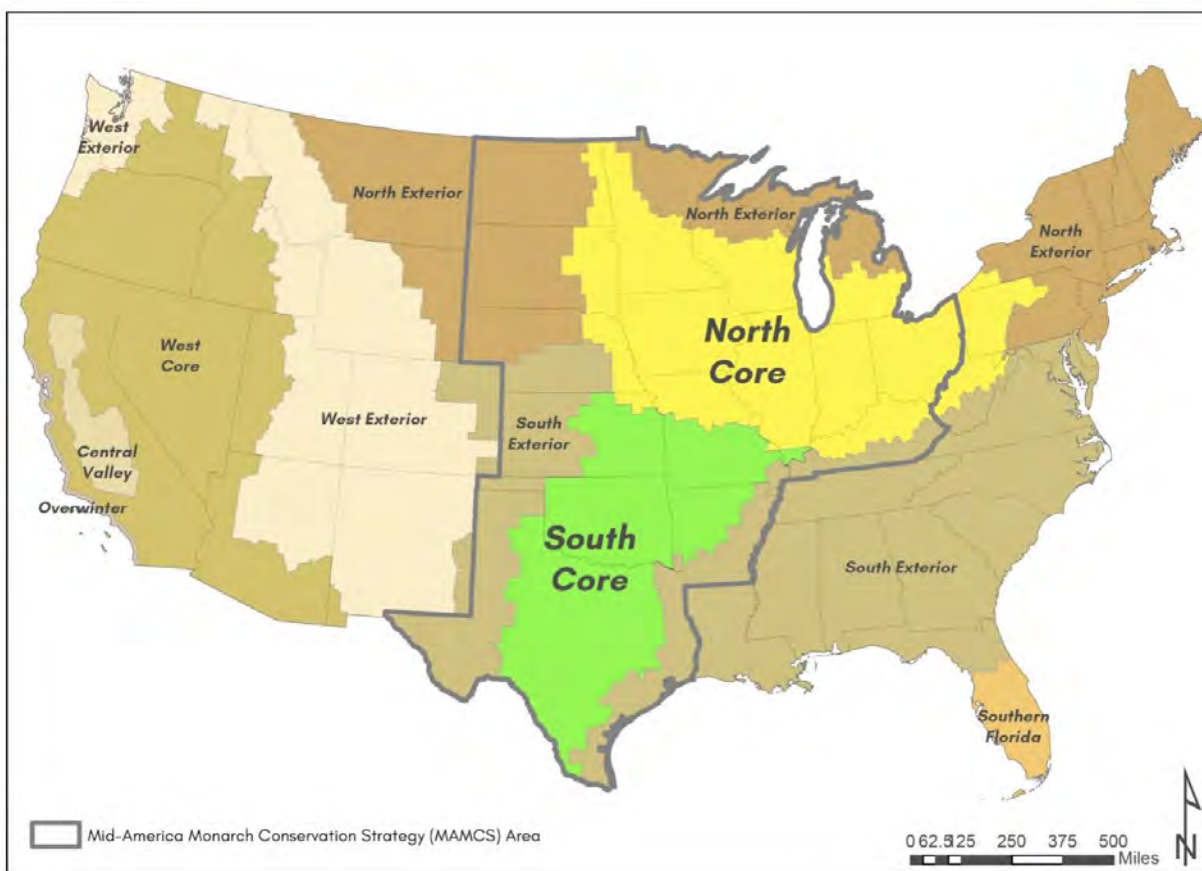


Figure 3.2 Map of boundaries relevant to the Mid-America Monarch Conservation Strategy (MAMCS), including the MAMCS states, and the US Fish and Wildlife Service's Monarch Conservation Units (MCU)

## MONARCH SPECIES STATUS ASSESSMENT FINDINGS

The U.S. Fish & Wildlife Service (USFWS) released the [Species Status Assessment](#) (SSA) of the monarch butterfly in December 2020, alongside a conclusion that the monarch warranted listing under the Endangered Species Act (ESA) but was precluded by the USFWS's work on higher-priority listing actions. The monarch is thus a candidate for listing and its status will be reviewed each year until it is no longer a candidate. The final listing decision and proposed rules are expected in Federal Fiscal Year 2024.

The purpose of the SSA is to assess the species' population and project its viability, not to make recommendations for changing the trajectory of that outlook. The SSA provides a single source for species' biological information needed for ESA decisions and potentially for the development of a recovery plan if a listing is found to be warranted. If the monarch is listed, the USFWS will create a species recovery plan that describes management actions necessary to achieve the species recovery, measurable criteria that would result in determination that the species be delisted, and estimates of the time and cost required to achieve the plan's goal.

The USFWS considered the entire global distribution of the monarch butterfly in its SSA because the language of the ESA does not allow the federal government to list distinct population segments for invertebrates; a subspecies is the smallest listable entity for invertebrate species when making an ESA

listing decision. That said, the SSA did explore the projected population status of the eastern and western North American migratory populations and considered their outcome collectively with other populations. This section summarizes some key findings related to the eastern North American migratory population (hereafter, eastern population), as it is most relevant to this Strategy.

The eastern population is decreasing, and the probability of quasi-extinction (the point at which extinction of that population is inevitable) ranges between 56-74% under projected future conditions in the next 60 years. This range is due to best-case and worst-case scenario estimates, which are primarily estimated by a panel of experts. Note that risk due to catastrophic events (e.g., extreme storms at the overwintering grounds) is not included in these quasi-extinction estimates and poses an additional risk to the population.

The primary drivers of eastern monarch population decline are loss and degradation of habitat, continued exposure to insecticides, and effects of climate change. In addition to considering threats to the population, the SSA also considered conservation efforts, including the Mid-America Monarch Conservation Strategy (2018) and its goal of adding 1.3 billion additional stems of milkweed to the landscape, and efforts recorded in the Monarch Conservation Database (MCD).

The SSA assesses the future condition of the monarch population by splitting key driving factors into five categories: milkweed availability, nectar availability, migratory nectar availability, climate change, and insecticide exposure. For future scenarios of milkweed and nectar availability, the two are combined via the term “habitat,” which is assumed to consist of both milkweed and nectar resources that occur at a 1:1 ratio at a broad landscape scale.

Future milkweed scenarios also included a “best case” and “worst case” scenario, the former of which projected a 22% increase in CRP acres and the latter which projected a 35% decline. It also considered changes in milkweed and nectar resources attributable to broader land cover change, via the USGS FORE-SCE (Sohl et al. 2018) spatial data projections. When conservation effort, CRP, and land cover were considered holistically, overall projected changes in milkweed and nectar habitat by subregion include: +11 to 22% in the Northcentral subregion, -1 to +3% in the Northeast, and -6 to +5% in the South.

Under “best” and “worst” case scenarios, overwintering habitat was projected to either increase by 1% or decrease by 33%, respectively. Additionally, climate change may increase suitable habitat by, at best, 78% in the Northcentral subregion, 72% in the northeast, and 0% in the south. At worst, climate change may result in habitat losses across all three subregions: 29% loss in the Northcentral, 2% loss in the northeast, and 83% loss in the south. Experts also projected a 5% decrease to a 30% increase in the impact of insecticide exposure on monarch populations.

Despite considering “best” case scenarios and the implementation of many conservation plans, the eastern migratory monarch population is projected to decline. Under best-case scenarios, the population growth rate increases slightly from its current status (from 0.960 to 0.975), yet is not sufficient to increase the population. Under worst-case scenarios, the population growth rate drops from 0.960 to 0.917. By year 60, the probability of quasi-extinction ranges from 56-74% under this range of scenarios.

## PART FOUR – ALL HANDS ON DECK: CONTINUED CONSERVATION AND IMPLEMENTATION OF THE MID-AMERICA STRATEGY

### SUMMARY OF SECTORS' ROLES IN MONARCH CONSERVATION

Sectors represent a combination of land use and land ownership factors – as listed below – and are discussed individually to highlight the unique challenges and opportunities in each.

The sectors in this section include private lands (agriculture and conservation), protected natural lands (federal, state, tribal, and private organizations), rights of way (transportation and utility), other energy infrastructure (mined lands and energy generation sites), and urban and developed lands.

The subsections that follow provide a sector-by-sector account of habitat conservation programs and activities that have been developed and are already underway and that could be enhanced with new approaches and supplemented with additional resources.

#### PRIVATE LANDS: AGRICULTURE AND CONSERVATION

This sector includes privately-owned lands that are not urban, not in transportation or utility rights-of-way, and not permanently protected through easements or land trusts. On average, 91% of land in the Mid-America states is privately owned (725,618,260 acres total, US Bureau of the Census, 1991). A significant portion of these private lands are in agricultural production, including farms, orchards, rangelands and pastures, and lands currently enrolled in agricultural conservation programs. Lands in agricultural production make up approximately 59% of the area in the North Core region of the monarch range and 28% of the area in the South Core region of the monarch range.<sup>1</sup> Because of the large amount of private agricultural lands in the core breeding and migratory range of eastern monarch butterflies, habitat conservation and enhancement within these landscapes will be essential to reversing the population decline of this species. Other privately-owned lands addressed in this section include recreational properties and lands managed for conservation purposes that are not in permanent easements. Notably, the large decline in Conservation Reserve Program enrollment since 2014 (see 2023 Updated Summary of Research section) highlights an opportunity to better engage agricultural stakeholders in conservation efforts.

Private agricultural landowners and managers best understand their properties and where opportunities exist to enhance or create habitat for monarchs. A critical need for some of these landowners is access to technical and financial resources that allow them to effectively and efficiently enhance, restore or create monarch habitat. This Strategy supports both financial and technical assistance provided to private landowners via voluntary incentive-based programs. A non-exhaustive list of such programs is provided in Table 4.1.

#### PROTECTED NATURAL LANDS

Millions of acres of natural lands are owned and administered by public entities throughout the eastern portion of the monarch butterfly range. Not all of this land is suitable for monarchs, but these

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<sup>1</sup> Percent land area in agricultural production calculated by USFWS staff using 2019 NLCD data, Pasture Hay and Cultivated Crop cells; these statistics differ from the percentages cited in the 2018 Mid-America Monarch Conservation Strategy due to slight differences in the counties included in the North and South core geography shapefiles and differing base land use/land cover layers

acres present an opportunity for the effective implementation and adoption of monarch and pollinator management actions.

Reaching the goal of additional milkweed stems to be added to the landscape for restoring the eastern migratory monarch population will require more conservation lands to be restored, enhanced and maintained for the benefit of monarchs and pollinators. Specifically, conservation lands should make strategic and concerted efforts to promote the presence of milkweed species as well as diverse nectar resource availability while monarchs are present. Strategies for achieving high-quality monarch habitat on conservation lands will vary by geographic region and existing habitat characteristics of the site, but in general include planting a high-diversity forb and grass mixture that includes native milkweed species, inter-seeding milkweeds into existing grassland or open habitats, and engaging in management practices that encourage milkweed and nectar plant presence and maintain those plants on the landscape at appropriate times.

Federal and State conservation lands are important opportunities for monarch conservation. Because the governance structure within each state varies, the agencies responsible for managing natural resources and recreation lands differ by state. Additionally, states have or will develop strategies for improving or increasing monarch and pollinator habitat; many of these strategies are referenced within this Strategy. County conservation lands play significant roles in some states with acquiring, restoring and managing land to protect open space. These agencies often have active stewardship programs, reach audiences not reached by state or federal agencies, and provide useful resources such as best management practices and direct assistance in conservation efforts on other lands. Protected private lands provide an opportunity for state agencies to interact with and assist landowners with habitat restoration and enhancement on their own lands. Many states have private land programs that provide technical and financial assistance to private landowners; additionally, they can find assistance via the Pollinator Habitat Help Desk (1-337-HABITAT, [habitat@monarchjointventure.org](mailto:habitat@monarchjointventure.org)). Finally, tribal lands present opportunities for monarch habitat conservation; tribal governments often enter into consultation on natural resource management issues with their counterparts at the state and federal levels. MAFWA supports tribal coordination and consultation with governmental and non-governmental organizations at the state level to seek opportunities to engage with interested tribal entities on potential monarch conservation actions.

## RIGHTS-OF-WAY

Transportation and utility rights-of-way are ubiquitous across the North American landscape, crisscrossing our mountains, grasslands, farms, parks, and cities. Utility rights-of-way comprise about 12 million acres of land in North America (Peterson et al. 2015), while transportation rights-of-way, including roads and railroads represent even more potential acres of wildlife habitat. State DOT-managed roadsides alone consist of over 17 million acres in the United States (US Department of Transportation 2015). Vegetation on most right-of-way lands is managed to prevent the growth of trees and other large woody vegetation, resulting in land that is in a perpetual state of arrested succession, thus held in grassland, meadow, prairie, or shrub-scrub type habitats (Lanham & Whitehead 2011).

This results in an opportunity to provide valuable wildlife habitat to species that depend on early successional plant communities and structures, such as monarch butterflies and other pollinators. Strategies for increasing or improving monarch and pollinator habitat along rights-of-way will vary depending on the ownership, safety concerns and regulations, and competing vegetation management objectives in any location.

In April 2020, the USFWS approved the Nationwide Candidate Conservation Agreement with Assurances for Monarch Butterfly on Energy and Transportation Lands (Monarch CCAA), which is a voluntary conservation agreement designed to encourage energy and transportation organizations to

create and manage habitat for the monarch butterfly. The effort is unprecedented in terms of its cross-sector participation and geographic extent, which spans the entire contiguous 48 states. Since April 2020, 24 energy companies and 16 transportation agencies across 38 states have enrolled in the Monarch CCAA. Together, these organizations have committed to manage more than 850,000 acres of monarch habitat. The agreement is administered by the University of Illinois Chicago. More information can be found on the [Rights-of-Way as Habitat Working Group's website](#).

Best management practices for maintaining quality pollinator and monarch habitat on rights-of-way can be found at the Rights-of-Way as Habitat Working Group's [Resources Library](#), the US Department of Transportation's [Roadside Revegetation website](#), Monarch Joint Venture's [Roadside Habitat for Monarchs](#) page, the National Wildlife Federation's [Roadside Monarch and Pollinator Habitat: A Guide for Communities](#) guidebook, Pollinator Partnership's [Rights of Way webpage](#), and via many state agencies at the local level.

## URBAN CONSERVATION AND ENGAGEMENT

Although urban areas have traditionally been viewed as biological deserts, recent work has discovered surprising potential for biodiversity. For example, urban areas in the North Central and Northeast region may be able to add 29.8 – 271 million stems of milkweed depending on how current baseline milkweed densities are measured, which amount to 2 – 21% of the north core monarch conservation unit goal of 1.3 billion stems of milkweed (Johnston et al. 2019).

Furthermore, the education and outreach possibilities of monarch habitat projects within cities can reach millions of people who might otherwise be unconnected to and unaware of the threats to monarch butterflies specifically, and the role of nature in cities more generally.

General resources for implementing monarch habitat conservation and outreach can be found in the Field Museum, Monarch Joint Venture, and Pollinator Partnership. Additional resources can be found locally via state conservation agencies, state monarch & pollinator conservation plans, and local land trusts or nature centers. Though some resources in table 4.1 may apply to urban areas, there is room for additional urban-specific resources to support pollinator habitat in these areas. For example, Minnesota's Lawns to Legumes program has completed over 670 projects and generated much interest (Gunderson 2022).

## SUMMARY OF RELEVANT REGIONAL AND NATIONAL CONSERVATION OR FUNDING PROGRAMS

**Table 4.1: A preliminary list of conservation and funding programs that could benefit monarchs and their habitat. This is a starting point for state agencies, partners, and private landowners to explore conservation options; other opportunities may exist at the local level (e.g., county conservation districts, local land trusts).**

Program Name (Administering Agency)	TA <sup>1</sup>	FA <sup>2</sup>	Eligible Participants/Lands	Funding Mechanism	Program Goals	Example Pollinator-Friendly Activities/Options
Conservation Reserve Program (USDA Farm Service Agency)	X	X	Farmers, ranchers	Contract, cost- share	Reduce soil erosion, protect Nation's ability to produce food & fiber, reduce sedimentation in waterways, improve water quality, establish wildlife habitat, enhance forest and wetland resources	<ul style="list-style-type: none"> <li>● CP-42: install habitat for honey bees and native pollinators</li> <li>● State Acres for Wildlife (SAFE): install habitat for target wildlife identified by the state, including pollinators</li> <li>● Conservation Reserve Enhancement Program: enhance</li> </ul>



						wildlife habitat and conservation concerns identified by the state
Environmental Quality Incentives Program (USDA Natural Resources Conservation Service)	X	X	Agricultural producers	Contract, cost-share	Improve soil, water, plant, animal, air, and related nature resources on ag land and non-industrial private forestland; meet governmental environmental regulations	<ul style="list-style-type: none"> <li>Working Lands for Wildlife Monarch Butterfly project: restore and enhance monarch habitat</li> <li>General EQIP Fund</li> </ul>
Conservation Stewardship Program (USDA Natural Resources Conservation Service)	X	X	Agricultural producers	Contract, payment to landowner	Improve conservation performance at the operation level	<ul style="list-style-type: none"> <li>Planting monarch habitat</li> <li>Prescribed grazing to promote milkweeds and wildflowers</li> <li>CSP Enhancement E595116Z2: Reducing routine neonicotinoid seed treatments on corn and soybean crops</li> </ul>
Regional Conservation Partnership Program (USDA Natural Resources Conservation Service)	X	X	Agricultural producers		Install and maintain conservation activities in selected project areas	<ul style="list-style-type: none"> <li>A monarch RCPP exists to promote monarch habitat development in the Midwest and southern Great Plains; uses EQIP as the funding source</li> </ul>
Voluntary Public Access and Habitat Incentive Program (USDA Natural Resources Conservation Service)		x	State and tribal governments	Competitive grant	Increase access to public lands for wildlife-dependent recreation	<ul style="list-style-type: none"> <li>Submit grant proposals to target monarch habitat projects</li> </ul>
Agricultural Conservation Easement Program (USDA Natural Resources Conservation Service)	X	X	Agricultural producers	Contract, cost-share	Conserve agricultural lands and wetlands and their related benefits	<ul style="list-style-type: none"> <li>Variety of options for plantings on ACEP projects</li> </ul>
Agricultural Land Easements (USDA Natural Resources Conservation Service)		X	Agricultural producers	Cost-share	Keep lands in agriculture and protects the conservation value of the land	<ul style="list-style-type: none"> <li>Variety of options to consider monarch habitat in the planning process</li> </ul>
Wetland Reserve Easements (USDA Natural Resources Conservation Service)	x	x	Owners of farmed or converted wetland	Cost-share	Restore, protect and enhance enrolled wetlands	<ul style="list-style-type: none"> <li>Variety of options to consider monarch habitat in planning process</li> </ul>
Partners for Fish and Wildlife (US Fish and Wildlife Service)	X	X	Private landowners	Cost-share	Implement local conservation in target geographic areas	<ul style="list-style-type: none"> <li>Variety of options to consider monarch habitat in planning process</li> </ul>
Coastal Program (US Fish and Wildlife Service)	X	X	Private and public landowners	Cost-share	Create coastal systems that are resilient and adaptive to climate change, support ecological integrity, and benefit priority species	<ul style="list-style-type: none"> <li>Variety of options to consider monarch habitat in planning process</li> </ul>
US Forest Service	X	X	Private and public landowners	Varies	Care for the land and serve people	<ul style="list-style-type: none"> <li>Variety of grants and agreements</li> </ul>
State and local programs	X	X	Private and public landowners	Varies	Enhance wildlife habitat, including pollinator habitat	<ul style="list-style-type: none"> <li>Varies by program</li> </ul>
Monarch Butterfly and Pollinators Conservation Fund (National Fish and Wildlife Foundation)		X	501(c) organizations; federal, state, local and tribal governments; educational institutions	Competitive grant	Protect, conserve, and increase habitat for monarch butterfly and other native insect pollinators in specific focal regions	<ul style="list-style-type: none"> <li>Variety of options to consider monarch habitat in planning process</li> </ul>
Seed a Legacy (Bee and Butterfly Habitat Fund)		x	Private, public, and corporately owned lands	Application for cost-shared seed	Establish high-quality pollinator habitat to improve the health of honey bees, monarch butterflies and	<ul style="list-style-type: none"> <li>Plant 50% of enrolled acres into a seed mix designed for honey bee forage, and 50% into a seed mix designed for monarch nutritional needs</li> </ul>

					other pollinators in a focal region of the Midwest	
Conservation Easements (Ducks Unlimited)			Private and public landowners	Funded by landowner	Protect key natural habitats while continuing to use the area for economic gain or recreation	<ul style="list-style-type: none"> <li>Variety of options to consider monarch habitat in planning process</li> </ul>
Monarch Habitat Exchange (Environmental Defense Fund)		X	Agricultural producers	Sale of habitat 'credits'	Market-based solution for restoration and conserving high-quality monarch habitat on private working lands	<ul style="list-style-type: none"> <li>Consider monarch habitat in planning, and evaluate outcomes with Monarch Habitat Quantification Tool</li> </ul>
Partner Grants (Monarch Joint Venture)		X	Monarch Joint Venture partner organizations	Competitive grant	Support outreach, research, and habitat improvements to benefit the monarch butterfly and its habitats	<ul style="list-style-type: none"> <li>Variable</li> </ul>
Pollinator Habitat Help Desk (Monarch Joint Venture)	X		Anyone interested in land management at any scale	n/a	Technical guidance to improve decisions related to monarch habitat restoration and enhancements	<ul style="list-style-type: none"> <li>Variable</li> </ul>
Super Fund (National Wild Turkey Federation)		X	National Wild Turkey Federation chapters	Competitive grant	Improve habitat that benefits wild turkey, which can also include grassland projects	<ul style="list-style-type: none"> <li>Variable</li> </ul>
State Pollinator Habitat Programs (Pheasants Forever)		X	Pheasants Forever chapters		Improve habitat that benefits wild pheasant, which can also include grassland projects	<ul style="list-style-type: none"> <li>Corners For Wildlife (NE)</li> <li>Habitat Share (NE, OH)</li> <li>Roadside Pollinator Habitat Programs (IL, OH)</li> <li>Ameren Energy Pollinator Partnership (IL)</li> <li>Saline Soils Initiative (SD)</li> <li>Prairie Partners (IA)</li> <li>Precision agriculture specialists (various)</li> </ul>
The Xerces Society	X	X	Varies by project	Varies by project	Provide technical and financial assistance to landowners to improve habitat for monarch butterflies and other pollinators	<ul style="list-style-type: none"> <li>Projects vary by state and funding; visit <a href="http://xerces.org/pollinator-resource-center">xerces.org/pollinator-resource-center</a> to learn more</li> </ul>
Living Acres Program (BASF)		X	Farmers, golf courses, and other agriculture advocates	Free milkweed stems	Preserve monarch habitat in non-crop areas next to high production agriculture	<ul style="list-style-type: none"> <li>Plant free milkweed stems on target acres</li> <li>Learn about pollinators</li> </ul>
Farmers for Monarchs (Keystone Monarch Collaborative)	X		Agricultural producers	n/a	Technical assistance and best management practices for restoring and enhancing pollinator habitat on and near agricultural lands	<ul style="list-style-type: none"> <li>Variable</li> </ul>
Honey Bee Health Coalition	X		Beekeepers, growers, researchers, government agencies, agribusiness, conservation groups	n/a	Best management practices for improving habitat for pollinators on and near agricultural sites	<ul style="list-style-type: none"> <li>Variable</li> </ul>
<sup>1</sup> Technical assistance <sup>2</sup> Financial assistance						

## IMPLEMENTATION AND NEXT STEPS

The original 2018 Mid-America Strategy includes a section on adaptive management and a section on implementation of the strategy. The adaptive management section details the types of new information and data that might necessitate adjustments to the conservation strategies and approaches outlined in the document. The implementation section describes several ongoing activities and group structures that would ensure regular reviews of relevant monarch conservation science and opportunities to revisit or adjust goals and approaches if necessary.

Since the publication of the 2018 Strategy document, the Mid-America State Monarch Technical Team has continued to meet regularly. This team consists of fish & wildlife agency technical staff from all participating Mid-America states, plus invited representatives from the USFWS, National Wildlife Federation, and Pheasants Forever. This team continued to meet bi-monthly or monthly to discuss implementation of the Strategy, share updates on monarch conservation efforts and issues, review new monarch research on an annual basis, and work together to create this Strategy update document.

During the creation of this Strategy update document, the State Monarch Technical Team members discussed what ongoing activities and adaptive management strategies they would like to continue into the next 5 years of the life of the Mid-America Strategy document. **Team members agreed that a commitment to informal reviews of new monarch science on an annual basis and a more structured review and update process every 5 years should be kept in place**, at least for the time being. However, the Service is expected to release a final proposed listing decision for the monarch butterfly in federal fiscal year 2023. This listing decision will likely impact the structure, purpose, and function of the Mid-America State Monarch Technical Team moving forward. **Thus, the State Monarch Technical Team and other committees of MAFWA will reconvene after the monarch listing decision to define what regional monarch conservation collaboration will look like in the Mid-America region.**

## PART FIVE – SUMMARY OF STATE PLANS AND ACCOMPLISHMENTS

The following section contains information from each of the states in the Mid-America region, summarizing the monarch conservation work within their state that has occurred since 2018. State updates are provided in alphabetical order.

### ARKANSAS

#### Monarch Habitat Goals

The State of Arkansas's goals for monarch habitat are outlined in the Arkansas Monarch and Pollinator Conservation Plan. Overall, the goal is to provide high quality habitat comprised of nectar producing plants, including milkweeds that will be available to monarchs throughout the growing season on over 500,000 acres by the year 2023. Participation from many partners, representing several land use sectors will be necessary to reach this goal.

#### Progress Towards Goals

Arkansas's goal for habitat restoration on public land was 500,000 acres by 2023. From 2018 to 2021, 948,610 acres have been restored, far surpassing our original target.

Arkansas's goal for habitat restoration on private land was to restore, enhance, and create habitat on 3,500 acres by 2023. From 2018 to 2021, 82,471 acres were restored. This includes maintaining habitat with prescribed fire.

The goal for habitat restoration on rights-of-way was 7,000 acres. From 2018 to 2021, 34,781 acres were restored and maintained.

Total acres created, maintained, and restored through 2021 across sectors is 1,065,863.

These are the goals stated in the Arkansas Monarch and Pollinator Conservation Plan that are set through 2023. Partners report their information on acres restored or maintained directly to the Arkansas Monarch and Pollinator Coordinator so progress toward the goals in the Plan can be tracked. Partners are also encouraged to submit acres directly into the Monarch Conservation Database.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

Arkansas has been working on monarch-specific conservation activities since 2018. In May 2018, the Arkansas Monarch Conservation Partnership finalized the [Arkansas Monarch and Pollinator Conservation Plan](#). As a result of the plan, a full-time partnership position with Quail Forever was created and funded by the Natural Resources Conservation Services (NRCS). This position serves as the state monarch and pollinator coordinator and is tasked with overseeing the implementation of the plan. In addition, biologists with the Arkansas Game and Fish Commission and Arkansas Natural Heritage Commission assist with driving implementation.

#### Future Plans

The initial Arkansas Monarch and Pollinator Conservation Plan was a 5-year plan. The partnership will be publishing the revised plan in 2024. In addition, the Arkansas Wildlife Action Plan will be revised in 2025. The insect taxa team will be updating conservation ranks for pollinator species as part of this revision. We anticipate the addition of several native bee species as species of greatest conservation need.

In addition to habitat goals, Arkansas's plan also includes goals for outreach and education and research. High priority goals for research include collecting baseline information on native bee distribution and abundance and identifying areas of hot-spots and migration corridors for monarchs.

In collaboration with the University of Arkansas, the University of Central Arkansas, the AGFC, Quail Forever, and ANHC, an effort was started in 2022 to survey native bees statewide. This effort has yielded a lot of data and one new species record so far for the state.

To collect occurrence data for monarchs, the AGFC launched the Arkansas Monarch Mapping Project on iNaturalist in 2017. This citizen science effort has provided 1,071 observations of adult monarchs, caterpillars, and eggs. Importantly, the data help to understand when monarch migrations peak, allowing habitat managers to time activities to promote nectar resources. Also, these data show that breeding, as evidenced by caterpillar observations, takes place in higher numbers in the fall as opposed to the spring.

For outreach and education, between 2018 and 2022, 195 outreach presentations were given. These reached 6,834 people. In addition, 53 tabling events/exhibits were completed. Several projects have been funded to research pollinator SGCN through the state wildlife grants and section 6 programs. These include:

- Baseline Distribution, Habitat Requirements, and Population Status of Native Bees in Arkansas
- Determining Distribution, Habitat Requirements, Life History, and Population Status of Georgia/Helicta satyr (*Neonympha areolatus/Neonympha helicta*), King's hairstreak (*Satyrium kingi*), and Meske's skipper (*Hesperia meskei*) in Arkansas
- Range, population size, and habitat utilization of the Texas frosted elfin (*Callophrys irus hadros*)
- Delineating Occurrence of Linda's Roadside-Skipper (*Amblyscirtes linda*) in Arkansas

## ILLINOIS

### Monarch Habitat Goals

Illinois' monarch habitat goals are outlined in the [Illinois Monarch Action Plan](#), including Goal 4 which states that 150,000,000 milkweed stems will be added to the landscape along with appropriate nectar sources by 2038 (compared to a 2014 baseline). To accomplish this goal, participation from agriculture, natural lands, rights-of-way, and urban stakeholders is necessary. This summary serves as documentation of efforts thus far and planned next steps.

### Progress Towards Goals

- The Illinois Monarch Project launched an [annual pledge](#) campaign to invite individuals and organizations across Illinois to take action and help document progress toward the goals set forth in the Illinois Monarch Action Plan. As of the end of 2022, the Illinois Monarch Pledge had been taken by 1,132 individuals and 93 organizations. These individuals and organizations have voluntarily pledged to add over 100,000 milkweed stems to the landscape. In addition to planting milkweed, pledge takers also have the option to choose from a variety of other activities, including reducing herbicide use, hosting or volunteering at monarch butterfly education or conservation events, registering a Monarch Watch Waystation in Illinois, and encouraging mayors to sign the Mayor's Monarch Pledge. Pledge takers indicated that their planned outreach activities would reach over 13,000 individuals.
- There are currently eight energy companies and transportation agencies in Illinois enrolled in the voluntary Monarch Candidate Conservation Agreement with Assurances (CCAA) program. As of 2022, these organizations manage 46,867 acres of monarch habitat in Illinois. The habitat acres associated with Monarch CCAA enrollment are reported to the Monarch

Conservation Database on an annual basis and are expected to continue to grow as additional and energy and transportation companies enroll in the Monarch CCAA.

- Illinois Department of Transportation changed [mowing plans](#) to support more roadway habitat for migrating monarchs.
- Between 2018 and April, 2023, the Illinois Department of Natural Resource-Division of Natural Heritage has conducted prescribed fire on 79,253 acres of grassland, savanna, and woodland habitat. Additionally, 50,237 acres of grassland have been managed, and 13,653 acres of savanna and woodland have been managed.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

- Illinois' Monarch Action Plan was launched in September 2020. The Illinois Department of Natural Resources (IDNR), Illinois Department of Transportation (IDOT), Illinois Environmental Protection Agency (IEPA), and Illinois Department of Agriculture (IDOA) solidified their commitment to protecting monarch butterflies and other pollinators by signing the Illinois Monarch Action Plan. The plan details the strategies and actions to achieve Illinois' goal to add 150,000,000 milkweed stems by 2038. The plan was developed by members of the Illinois Monarch Project Technical Steering Committee, who sought input from a diversity of sectors and stakeholders all working to support monarch butterfly habitat.
- May was officially designated as Monarch Month in Illinois in 2019.
- 3,270 Monarch Watch Waystations have been created in Illinois.
- Between October 2020 and May 2021, the Illinois Monarch Project hosted five virtual "state summit" events to launch the implementation phase of the Illinois Monarch Action Plan, engaging nearly 400 people. The virtual summit focused on sharing resources for implementing pollinator habitat, engaging monarch ambassadors, and sharing success stories across the state.
- The [Route 66 Monarch Flyway](#) initiative is a 66 mile-wide corridor stretching from Chicago to St. Louis. The project seeks to bring the unique aspect of Route 66 to Illinois' efforts to help the monarch butterfly by planting native wildflowers and restoring habitat projects within the corridor. The initiative is led by a dedicated committee with representation from Pheasants Forever, Illinois Farm Bureau, McLean County Soil & Water Conservation District, National Parks Service, Chicago Zoological Society, and the Illinois Route 66 Scenic Byway.
- The Illinois Monarch Project's Community Engagement Committee meets regularly to coordinate communications, education, partnership, and programming opportunities related to monarch conservation in Illinois. The committee manages the [Illinois Monarch Project's](#) website and social media accounts, develops communications toolkits to ensure alignment in messaging and engagement across sectors, and in June 2022 hosted the first Illinois Monarch Project Wings of Dreams BioBlitz to encourage Illinoisans to participate in community science. The week-long campaign collected 1,748 observations of 843 species in Illinois. The committee expects to launch another BioBlitz in June 2023.
- Between 2019 and 2022, the Keller Science Action Center at the Field Museum led a community science project whereby participants across the Chicagoland region monitored their milkweed plants for monarch eggs and caterpillars. Over 400 individuals participated during that time and participants submitted over 5,900 observations.
- Between October 2019 and September 2022, the Illinois Natural History Survey used Integrated Monarch Monitoring Program's protocols to quantify floral resources on 49 grasslands on 29 IDNR properties. Milkweed abundance for nine species were estimated through this process. Two of the key findings were that the majority of non-adult monarchs



observed (>93%) were on Common Milkweed rather than Whorled Milkweed despite checking approximately the same number of each species, and that more non-adult monarchs were observed per plant at sites in the northern portion of the state and at sites with lower milkweed densities. This work also confirmed that restored grasslands are lacking floral resources in the early parts of the season and late in the season and that *Asclepias verticillata* (Whorled Milkweed) was rarely used for oviposition by Monarchs.

### Future Plans

Since the Illinois Monarch Action Plan was finalized, the Illinois Monarch Project has been in a period of transition from the planning phase to the implementation phase. A centralized tracking and reporting mechanism has not yet been developed. Therefore, the summary provided is likely an underestimation of actual conservation efforts completed in recent years.

The state coordinator position for the Illinois Monarch Project was funded by the Illinois Department of Natural Resources through a State Wildlife Grant that ended in 2020. Currently, the Illinois Department of Natural Resources is working to secure another contractual state coordinator position to help convene key stakeholders across the state, facilitate setting of interim priorities to achieve goals and objectives from the Illinois Monarch Action Plan, and assist with measuring progress towards the habitat goals.

## INDIANA

### Monarch Habitat Goals

The State of Indiana does not have an established goal to add milkweed stems to the landscape. However, our 2019-2024 Strategic Plan Goal 2 Objective 1, which indicates that we are to create or improve 41,600 acres of grassland or pollinator habitat by the end of calendar year 2024 is consistent with increasing or improving monarch habitat across Indiana.

Creating and improving grassland and/or pollinator habitat is an integral part of our private lands work as well as our Fish & Wildlife Area habitat maintenance.

### Progress Towards Goals

Since 2019, the Division of Fish & Wildlife has created or improved nearly 44,000 acres of grassland and/or pollinator habitat. We have two primary tracking geodatabases; one for the Office of Public Lands and one for the Office of Private Lands within the Division.

### Current Monarch Conservation Activities and Monarch/Pollinator Plans

Our monarch conservation efforts to date include:

*IN Department of Natural Resources (DNR), Division of Fish & Wildlife*

- An [Indiana Monarch Conservation Plan](#) was finalized in August 2018. It was collaboratively developed through the Indiana Monarch Steering Committee, comprised of members from IN Department of Natural Resources, Indiana Wildlife Federation, USDA Forest Service, U.S. Fish and Wildlife Service, The Nature Conservancy, as well as public universities and private businesses.
- Indiana DNR Division of Fish & Wildlife participated in the NFWF-funded project, “Monarch Wings Across the Eastern Broadleaf Forest Seed Collection: An Ecoregional Approach” 2017 through 2019. Highlights from this project include:

- In 2018, lead volunteers in Indiana were trained to organize the responsible collection of 20 target monarch nectar and host plant species, train other volunteers, and organize the data collection, seed drying, and shipping processes.
- Nine sites across Indiana received collected seed to establish or augment existing monarch habitat in 2019.

#### *IN DNR, Division of Nature Preserves*

- Division of Nature Preserves managed over 4000 acres of monarch habitat restoration, enhancement and maintenance on IN DNR ground. These acres include roughly 2,400 acres of prescribed fire since 2018.
- Also, 94.6 acres of pollinator restorations were planted and 102 acres of mitigation acres enhanced.

#### *The Indiana Chapter of the Nature Conservancy*

TNC projects that have reasonably significant impact on local pollinator and monarch populations:

- The Efrogmson Restoration at Kankakee Sands – Over 8,000 acres of agricultural land has been restored with 621 species of vascular plants seeded using local genotypes into the greater restoration. Eight species of milkweeds are included in these restorations.
- Milkweed Trail Development at Kankakee Sands - To increase pollinator outreach, we will create and install interpretive trails at Kankakee Sands that highlights the eight species of milkweeds at the site. Interpretive signage explains pollinator declines and the role that ecological restoration can play in reversing this trend.
- Prairie Border Nature Preserve – TNC has restored approximately 300 acres of agricultural land to emergent wetland, wet prairie, mesic prairie and dry sand prairie and included in excess of 200 locally sourced plant species including four species of *Asclepias*.
- Houghton Lake Nature Preserve - TNC restored approximately 150 acres of adjacent row crop land to wetland, mesic and dry prairie. The planting included approximately 150 plant species with four species of *Asclepias*.
- Douglas Woods Nature Preserve - Almost 700 acres of row crop land has been hydrologically restored to create an upland - pothole mosaic at this 1,400-acre site. Each of the 30+ pocket wetlands restored across the site has been seeded or plugged to create a forb-rich wetland border to enhance pollinator habitat. All reforested habitats were seeded with herbaceous cover species enhance monarch habitat for 10-15 years until canopy closure.
- Wallier Woods – 80 acres of agricultural field was reforested using an herbaceous cover mix that included *Asclepias* to provide 10-15 years of monarch/pollinator habitat while our saplings mature.
- Powerline ROW Vegetation conversion –In 2016 we initiated a strategy to enrich these ROWs by planting low diversity forbs and native grasses into these areas, including common milkweed. The focus areas have been Big Walnut and Greens Bluff.
- Co-hosted the fifth annual Festival de la Monarca in 2022 in conjunction with the city of East Chicago. This celebration welcomes the monarch butterflies as they journey through northwest Indiana on their way to Michoacán, Mexico. It is intended to increase conservation awareness in in this diverse urban area.

#### *Indiana office of the US Fish & Wildlife Service*

- Indiana Private Lands Office (PLO) - The Partners for Fish and Wildlife Program completed a total of 115 habitat projects totaling more than 1,260 acres benefitting monarchs and other pollinators between FY18-22, mostly with private landowners. Most projects involved native prairie restoration or enhancement, although some wetland and forested habitat projects were included as well. Total cost of the projects was approximately \$1.18 million, with

\$384,000 coming from the PFW program and the remainder provided by landowner and/or other conservation partners. Also, the PLO is involved in a number of habitat and outreach projects at more than 10 local schools and city and county parks, which included educational opportunities through outdoor labs, signage, and volunteer planting days. PLO staff also participated in more than a dozen field days and habitat workshops for private landowners and the general public focusing on monarch and pollinator habitat. The PLO was also involved in the Monarch Wings Across the Eastern Broadleaf Forest NFWF grant to focus on seed collection and habitat restoration in coordination with Pollinator Partnership. PLO staff participated on the Indiana Monarch Conservation Plan Steering Committee, providing recommendations and guidance in the finalization of the Indiana Monarch Conservation Plan. A PLO biologist provided technical assistance in support of a partnership between the U.S. Golf Association and Purdue University to develop methods for effective establishment of pollinator habitat in turf grass settings on golf courses, with the goal of encouraging more courses to establish pollinator habitat.

- Big Oaks National Wildlife Refuge - The refuge restored approximately 24 miles of roadside to pollinator habitat during 2018-2022. Fescue along these roads were treated with herbicides and mowing was reduced to a dormant season fall mowing along these perimeter roads. The roadsides were also seeded and native plant plugs were used to aid in a diverse natural seed bed to improve pollinator and monarch habitat. These areas were monitored for 2 years with Director Fellow projects. We also assisted the Pollinator Partnership with native seed collection on the refuge during this time period. We also treated woody intrusion and invasive species on 1900 acres during this time period with herbicides and annually treated pollinator areas (average ~5000 acres/year) with prescribed fire to revitalize milkweed and pollinator plants.
- Patoka River National Wildlife Refuge - Refuge staff have worked with their cooperative farmers to establish 100' buffers around all refuge ag lands for pollinators, as well as managing reclaimed coal mine lands for diverse forb communities and milkweed. Prairie restoration with a high forb component has occurred on 10 acres per year on one farm unit over the last few years. A demonstration prairie management plot was initiated in 2022 at a high public use area. The site was treated with herbicide this year to remove invasive plants and will be planted to native grasses and forbs next year to use as an educational area in the future. Volunteers have restored one of two existing pollinator gardens at trailheads. We also assisted the Pollinator Partnership with native seed collection on the refuge during this time period. The refuge utilizes both prescribed fire and herbicide treatments to assist with invasive species management on grassland and restored prairie sites.
- Indiana Ecological Services Office - The Indiana ES staff have been involved with several outreach efforts focusing on monarchs and pollinators, including hosting a booth at BugFest in Bloomington and a native bee identification workshop with ES biologists from around the Midwest. In the transportation/ROW area, there were several Indiana companies/agencies who signed onto the Monarch Candidate Conservation Agreement with Assurances (CCAA) during that period, including Hoosier Energy, INDOT and NiSource.

*IN NRCS:*

- Environmental Quality Incentive Program (EQIP) Initiative prioritizing monarch habitat in an agricultural landscape as part of the Working Lands for Wildlife Monarch Habitat (WLFW Monarch).
- Conservation Reserve Program (CRP) - Monarch Plantings as part of CRP

- Conservation Security Program (CSP) - Conservation Enhancements to plant monarch habitat within the agricultural landscape.
- Agriculture Conservation Easement Program - Wetlands Reserve Easements - Targeted effort to encourage the planting of monarch habitat on existing WRP and new WRE sites around the state.
- Conservation Technical Assistance - Providing technical support and guidance to landowners interested in planting monarch habitat. Not necessarily tied to program financial assistance funds.

#### *Purdue Extension*

- Purdue Extension has established some plots of pollinator seed mixes at Lugar Farm and has begun some different management strategies.

#### Future Plans

Heading into the 2025 State Wildlife Action Plan revision process, we will be evaluating the interest in reviving the work focused on monarch conservation in the state.

## IOWA

#### Monarch Habitat Goals

The State of Iowa's goal is to add 126,533,589 to 187,843,841 milkweed stems, along with appropriate nectar sources to the landscape by 2038, creating monarch habitat improvements on approximately 479,564 to 830,593 acres of land. Participation from many partners, representing several land use sectors will be necessary to reach this goal.

#### Progress Towards Goals

As of December 31, 2020, Iowa has added approximately 35,298,631 stems of milkweed by managing, enhancing, or creating habitat on 431,238 acres in Iowa. These numbers are expected to increase at the end of January 2023 when partners have added additional accomplishments into the USFWS Monarch Conservation Database. The Iowa Monarch Conservation Consortium maintains a Dashboard showing accomplishments by county which can be accessed [HERE](#). The seed densities in Iowa CRP planting went in at a slightly lower than anticipated milkweed rate and we are evaluating whether we need to change our acreage goals for Iowa but we do not anticipate changing the stem goals.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

Iowa has been working on monarch-specific conservation activities since 2015. Our monarch conservation efforts since 2018 include:

- Conducting more than 50 meetings, workshops, and field days in communities across Iowa. In addition, we've given more than 85 media interviews, published 75 articles on the Consortium's website, released 22 videos, and acquired more than 900 followers on social media platforms.
- The Iowa State University monarch research team has published over 26 papers in scientific journals related to monarch conservation.

#### Future Plans

Iowa will be reviewing our State Plan in 2023 as well in addition to continuing the habitat work. We expect to create an addendum with recent relative research findings that could impact the goals of

Iowa's Plan, progress made to date and an updated commitment to stem and acre goals. It is possible that acreage goals could change but we do not expect stem goals to change at this time.

[New research on monarchs](#) published by ISU scientists in [BioScience](#) offers encouraging insights for revival of monarch populations. These findings are based on the results of a six-year, multi-disciplinary research project designed to determine how habitat fragmentation, spatial configuration of habitat, habitat quality, and pesticide use in a landscape dominated by corn and soybean production interact with patterns of monarch movement and life stage survival to influence the size of the eastern monarch's breeding population.

## KANSAS

### Monarch Habitat Goals

The Kansas Monarch Conservation Plan was finalized and published online in September 2019. It was developed through a joint effort by the Kansas Monarch Task Force, whose work began in June 2017 with a statewide planning process involving over 60 attendees from across industrial sectors and specialties. The plan developed by Task Force members is centered on a 20-year objective to conserve, restore/enhance, and establish new pollinator habitat on private, public, and urban lands through non-regulatory voluntary efforts and actions across the state. The Kansas Monarch Conservation Plan serves as a guiding document to support the ongoing efforts and new conservation actions of a broad range of stakeholders—recognizing it will take a multi-sector approach to achieve monarch conservation goals.

Existing rangeland monitoring data indicates that milkweed abundance is unlikely to be a limiting factor for the species in Kansas. Owing to this, the Kansas Monarch Conservation Plan focuses more heavily on grassland habitat establishment, management, and protection to ensure viable migratory nectar resources and breeding habitat are maintained in the center of the population's migratory corridor.

### Progress Towards Goals

Kansas was not able to hire or create a specific position to coordinate and track Monarch conservation efforts across the state. As such, we cannot provide a complete listing of all relevant conservation actions implemented by Kansas Monarch Task Force members. However, this agency has partnered with Kansas Department of Transportation to convert non-native vegetation within several rights-of-way and rest areas to pollinator habitats in eastern and central-Kansas. In 2018, Kansas Monarch Task Force members attended the Kansas County Highway Association's conference to discuss right-of-way maintenance practices with KCHA members. Additionally, three Right-of-Way management companies in Kansas have obtained Certificates of Inclusion in the Rights-of-Way as Habitat Working Group's Monarch CCAA. While our estimates are likely low for Department-led efforts and activities benefitting Monarchs, we have implemented at least:

- Kansas Department of Wildlife and Park (KDWP) Education Section estimates that they have engaged at least ,7083 people with Monarch/pollinator-specific programs, displays, and events since 2018.
- Approximately 63,900 acres worth of habitat improvements directly benefitting Monarch on private lands since 2019 through our statewide Habitat First program and a targeted initiative in South Central Kansas.
- KDWP Public Lands Division staff has changed their habitat improvement tracking strategy since 2018. In 2018, they conducted almost 56,000 acres of habitat improvement projects with a benefit to Monarchs. Since that time, they have tracked man-hours of habitat

improvement projects—averaging 22,350 hours of habitat improvement work for fiscal years 2019-2022.

- Many KDWP-managed State Parks, Nature Centers, and Wildlife Areas have established pollinator habitats on their managed lands.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

- The [Kansas Monarch Conservation Plan](#) was published in 2019.
- Kansas Monarch Task Force email listserv is still active and used to disseminate new information and opportunities to interested parties.
- A recent revision of the Kansas State Wildlife Action Plan added 45 Lepidopteran and bee species as well as native plants (including *Asclepias meadii*) to the regional Species of Greatest Conservation Need lists—increasing awareness of pollinator conservation issues in the state.
- KDWP purchased 20,000 native wildflower seed packets, containing multiple *Asclepias* species. Each packet provides enough seed to establish 100 square feet of pollinator habitat. These were given out at State Parks and other public events, and met with such success that another 10,000 packets recently were purchased for distribution.
- Many state agencies and NGO groups have prioritized pollinator conservation and habitat projects throughout the state.
- KDWP Private Lands and Public Lands staff delivered habitat creation, restoration, and management plans and activities to benefit Monarch across the state.
- KDWP funded a statewide multi-year research project investigating Conservation Reserve Program management practice (i.e., grazing) impacts on bird and insect abundance.
- Research and habitat creation opportunities provided through KDWP Chickadee Checkoff donation program.

#### Future Plans

- Continued engagement on Monarch conservation with a focus on ensuring suitable grassland habitat exists throughout the state.
- Work on private and public lands to create, manage, and restore native grassland habitats.
- Continued research and conservation funding through non-game habitat funding sources and the state's Chickadee Checkoff donation program.
- Revision of the Kansas State Wildlife Action Plan will continue to advocate for native pollinator conservation and increase the public's awareness of pollinator conservation issues.

## KENTUCKY

### Monarch Habitat Goals

The State of Kentucky's goal is to add 54 million milkweed stems, along with appropriate nectar sources to the landscape by 2038, creating habitat for the monarch butterfly on thousands of acres of land. Participation from partners in varied land use sectors will be critical in progressing towards this goal.

The Kentucky Monarch Conservation Plan outlines strategies to implement monarch habitat on public and private lands statewide, while forming partnerships to ensure continued management and restoration of existing habitat.

### Progress Towards Goals

The Kentucky Department of Fish and Wildlife Resources has tracked monarch habitat progress in the Monarch Conservation Database (MCD) since 2018, adding 42,732 acres across 1,652 efforts to the database. The MCD's milkweed modeling estimates a 3,008,334-milkweed stem gain across these acres for the state. Over 20 different agencies, organizations or entities have played a role in the creation of habitat entered into the database.

### Current Monarch Conservation Activities and Monarch/Pollinator Plans

- The Kentucky Monarch Conservation Plan was published in 2018, following the Kentucky Monarch Summit in 2016 (Plan can be found at: [fw.ky.gov/Wildlife/Documents/ky\\_monarch\\_plan.pdf](http://fw.ky.gov/Wildlife/Documents/ky_monarch_plan.pdf))
- The Kentucky Monarch and Pollinator Stakeholders group meets annually (ranging from 35-60 attendees) to discuss pollinator conservation issues and efforts in the state
- The Monarch Watch Milkweeds for Restoration Projects Grant has been received by members of the Kentucky Pollinator Stakeholder group for three different projects, adding over 2,000 milkweed stems to public parks and right of way lands
- Kentucky is currently undertaking a Pollinator in Every County Project to establish a ½ acre monarch habitat demonstration site in all 120 counties
- Kentucky's rights-of-way managers have been a leading force in converting right of way acreage to pollinator habitat, while training employees to recognize and preserve existing habitat
- State agencies and non-profit organizations have prioritized pollinator habitat restoration and management, and continue to establish partnerships to manage monarch and pollinator habitat throughout the state
- Education and outreach has been provided to the public by a variety of different garden clubs, agencies, and organizations- over 3,000 native habitat seed packets have been handed out, over 5,000 monarch habitat pamphlets, hundreds of monarch life cycle posters, and dozens of presentations given throughout the state on conserving the monarch butterfly
- Kentucky has hosted two Monarch Larva Monitoring Project and one Integrated Monarch Monitoring Program workshops

### Future Plans

Kentucky's State Wildlife Action Plan (SWAP) is currently undergoing its 2023 revision. The updated SWAP will list the monarch butterfly as a Species of Greatest Conservation Need and include a section on insects for the first time in plan history for Kentucky.

## MICHIGAN

### Monarch Habitat Goals

Over the past eight years the State of Michigan has worked with a diverse group of organizations to develop and implement the Michigan Monarch Conservation Strategy (MMCS). The MMCS identifies goals and strategies to create, restore, and enhance habitat to support the monarch butterfly. Plan implementation requires active engagement from a diversity of state and federal agencies, non-profits organizations, other partners, and landowners from all sectors.



### Progress Towards Goals:

The Michigan Department of Natural Resources (DNR) and many of our conservation partners have actively implemented monarch conservation activities since 2015.

- DNR and U.S. Fish and Wildlife Service (USFWS) partnered with U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) to establish an annual \$100,000 fund pool for monarch habitat in the Environmental Quality Incentives Program (EQIP).
- DNR, in partnership with USDA, developed the Conservation Reserve Program State Acres For Wildlife Enhancement (CRP SAFE) Pheasant and Monarch and Pheasant Recovery program. This program targets enrolling 20,000 acres of diverse native grassland habitat in priority areas identified in Michigan's State Wildlife Action Plan (SWAP) and the USFWS. Required seed mixes include milkweed species and diverse nectar producing forbs identified as high or very high value in the NRCS Monarch Plant List for Midwest and Great Lakes.
- Michigan Department of Agriculture and Rural Development, USFWS, and DNR, in partnership with USDA developed the CRP SAFE Michigan Native Pollinator Planting. This program targets enrolling 2,500 acres of habitat for native bees and other pollinators. Focal area includes west Michigan's "fruit belt" along Lake Michigan.
- DNR restored 20,726 acres of grassland habitat on southern Michigan State Game Areas from 2011 to 2022.
- The Michigan Pheasant Restoration Initiative (MPRI) is a 10-year grass roots conservation effort that started in 2011 and has a goal of restoring, enhancing, or maintaining grassland habitat on public and private lands. Cumulatively, the MPRI partners impacted over 67,000 acres of grassland habitat from 2011 to 2022.
- The USFWS's Partners for Fish and Wildlife Program and Monarch Initiative restored over 5,876 acres of pollinator habitat between 2015-2022.
- DNR provides 29 no-till drills to county conservation districts to offer landowners access to grassland planting equipment. In the past 10 years, 34,800 acres of grassland habitat were established using the drills.

### Current Monarch Conservation Activities and Monarch/Pollinator Plans

- DNR hosted representatives from 35 conservation organizations at two summits in 2016-2017 to develop the Michigan Monarch Conservation Strategy. The strategy developed goals and strategies for habitat, education and outreach, monitoring and research, and policy barriers to monarch conservation. The strategy was updated in 2022 by members of the Michigan Monarch Working Group. Working group members include the following organizations:
  - Michigan Department of Natural Resources
  - Michigan Department of Transportation
  - Michigan Farm Bureau
  - Michigan Natural Features Inventory
  - Michigan State University
  - Michigan State University Extension
  - Monarch Joint Venture
  - National Wildlife Federation
  - Pheasants Forever
  - Pollinator Partnership
  - US Fish and Wildlife Service

- US Forest Service
- USDA Natural Resource Conservation Service

DNR created a communication strategy in 2015 which identified four goals:

- Educate public on monarch conservation and provide a call for action.
- Provide a platform for students to understand monarch lifecycle and contribute to monarch conservation.
- Trigger the conservation funding story.
- Be a leader in Michigan Monarch Conservation.

Michigan's current State Wildlife Action Plan (SWAP) identifies monarchs as a species of greatest conservation need. The SWAP also highlights conservation actions beneficial to monarchs including promoting enrollment in farm bill programs, assistance and incentives to landowners, and increasing milkweed and forb diversity in grasslands.

In 2022 the DNR received a Great Lakes Restoration Initiative grant from the Environmental Protection Agency. Scientists from Michigan Natural Features Inventory will help identify threats, stressors, and priority areas for pollinator conservation efforts in Michigan. Based on this work, pollinator and monarch habitat will be completed at priority state game areas and nearby private lands.

#### Future Plans

Michigan's monarch conservation planning and implementation efforts to date show a strong commitment to habitat restoration and outreach by our many partners.

- The Michigan Monarch Working Group will continue to implement goals identified in the Michigan Monarch Strategy.
- Partners will be encouraged to increase reporting utilizing the USFWS Monarch Conservation Database.
- Habitat restoration activities will continue on priority public lands and private lands in agricultural areas.
- DNR will work with partners to update Michigan's Wildlife Action Plan in 2025. Monarchs are expected to remain on the list of species of greatest conservation need.
- The Michigan Pheasant Restoration Initiative will be re-branded as the Michigan Grassland Initiative to attract new partners and ensure focus on a diversity of grassland wildlife, including monarchs.

## MINNESOTA

### Monarch Habitat Goals

The State of Minnesota's goal is to add 187,200,000 milkweed stems, along with appropriate nectar sources, to the landscape by 2038, representing monarch habitat improvements on approximately 800,000 acres of land. Participation from many partners representing several land use sectors will be necessary to reach this goal.

### Progress Towards Goals

The Minnesota Department of Natural Resources (DNR) and Minnesota Department of Transportation (MnDOT) both track progress towards the acreage goal via data entries in the Monarch

Conservation Database. MnDOT also does milkweed surveys through its participation in the Monarch CCAA. The Board of Waters and Soil Resources tracks acreage gains for its private land protection and pollinator habitat programs. The Interagency Pollinator Protection Team (IPPT) is currently developing indicators to more comprehensively track statewide progress on pollinator initiatives addressing habitat, education, outreach, and pesticides.

#### Current Monarch Conservation Activities

##### **Statewide coordination and funding**

- Minnesota takes a unique approach to pollinator protection at the state level. The Interagency Pollinator Protection Team (IPPT) was first established in 2016 by executive order, which instructs the team to publish an annual report on the status of pollinator issues in the state. The IPPT is comprised of representatives from 10 state agencies, and is coordinated by a staff member of the state's Environmental Quality Board (EQB). The EQB itself is comprised of agency heads who meet monthly and are regularly briefed on IPPT activities, meaning that pollinator protection in Minnesota is a prominent topic that is continually revisited by those at the highest level of state agency leadership. In 2022, the IPPT began drafting an action framework to guide the strategic alignment of resources, policies, and programs to help Minnesota's pollinators. The IPPT solicited public and expert input on the draft, and will be finalizing the framework in 2023, with an implementation plan to follow in 2024.
- Minnesota also has unique sources of funding for habitat protection, restoration, and enhancement:
  - In 1988, Minnesota voters approved a state constitutional amendment to divert Minnesota State Lottery revenue to the Environment and Natural Resources Trust Fund (ENRTF). Since 1991, the ENRTF has provided approximately \$700 million to over 1,700 projects around the state, including the Lawns to Legumes statewide pollinator habitat program.
  - In 2008, Minnesota voters again changed the state constitution by approving the Clean Water, Land and Legacy Amendment, which committed sales tax revenue to a habitat conservation fund. A portion of this fund is allocated to prairie conservation, and averages about \$40 million per year for grassland and wetland protection and restoration and \$10 million per year for enhancements.
- Pollinator Coordinators – The Interagency Pollinator Protection Team is coordinated by a full time staff person at the state's Environmental Quality Board. The Minnesota Department of Natural Resources also has a full time Pollinator Conservation Coordinator who represents the Minnesota DNR on the Interagency Pollinator Protection Team, and participates in pollinator policy and conservation initiatives internal and external to Minnesota DNR.
- The following sections describe the pollinator conservation activities of individual state agencies. The major land managing agencies are the Minnesota DNR and the Minnesota Department of Transportation, while smaller agencies like the Board of Water and Soil Resources run the highest profile programming specific to pollinator habitat improvement on private lands. The Environmental Quality Board holds a coordination role in pollinator protection and conservation in the state, ensuring that pollinator activities across agencies are complementary and synergistic.

##### **Minnesota Department of Administration (Admin)**

- Lease Language – Admin modified its commercial building lease terms and conditions of its leases with private landlords to include language requiring the use of pollinator friendly

plants and prohibiting the use of certain pesticides unless no other suitable product is available. These “Green Leases” are incorporated across the state as leases on buildings expire.

- Updated Design Guidelines – Admin requires that landscape products for all state building construction and renovation projects must be neonicotinoid-free. This will impact new construction and major renovations for facilities and any enhancements on memorials and ceremonial grounds.
- State Capitol Pollinator Gardens & Landscaping Plan – Admin placed educational signage around pollinator gardens at the Capitol Complex, to help engage visitors to the Capitol with the pollinator issue. Also, Admin updated its landscaping plan to include only neonicotinoid-free plants on the Capitol Complex. Additionally, Admin has installed 11 pollinator gardens at various locations throughout the 140-acre Capitol Complex and at the Governor’s Residence.
- Pollinator-friendly Procurement Options – The central procurement office has contract options available for state agencies and local units of government to purchase seed mixes that are neonicotinoid-free and have been selected based on their benefits to a wide range of pollinators and beneficial insects. Currently state agencies and stakeholders are in the process of finalizing twelve seed mixes and accompanying guidance information specific to establishing pollinator habitats.

#### **Board of Water and Soil Resources (BWSR)**

- BWSR’s Living Landscapes Initiative improves pollinator habitat and raises awareness. BWSR administers programs to help declining populations of pollinators, other wildlife, and plant species. These programs highlight the role of biodiversity in meeting BWSR’s soil and water conservation goals. <https://bwsr.state.mn.us/practices/pollinator/index.html>
- Lawns to Legumes- This groundbreaking program and movement, the first of its kind in the nation, aims to protect the federally endangered rusty patched bumblebee and other at-risk pollinators, including the monarch butterfly. The program offers workshops, coaching, planting guides and cost-share funding for installing pollinator-friendly plantings in residential lawns and community spaces. Any resident in the state can apply for funding and assistance that has an area for planting. Since 2019, BWSR awarded over 2,700 grants to Minnesotans to install pollinator plantings in their residential spaces. There are 26 Demonstration Neighborhood grantees working across the state to establish community pollinator projects and corridors, raise awareness for pollinator protection, and showcase best practices. The program’s public outreach campaign strives to promote public adoption of residential pollinator habitat and has reached thousands of residents and has inspired many DIY projects throughout the state. <https://bwsr.state.mn.us/l2l>
- Habitat Enhancement Landscape Program- This new program provides cost-share funds to restore and enhance strategically located diverse habitats across Minnesota to benefit pollinators, beneficial insects, and biodiversity. During the first year of this pilot program, BWSR awarded grants to 11 organizations, and a second round of funding will be awarded in 2023. <https://bwsr.state.mn.us/Habitat-Enhancement-Landscape-Pilot-%28HELP%29>
- Habitat Friendly Solar Program- This program supports the establishment of habitat at solar sites for pollinators, songbirds, and other species in addition to project co-benefits such as water management, grazing and soil health. Support is provided through a combination of technical resources, collaboration with conservation partners and project assessment forms. Over 55 sites across Minnesota have met the program’s habitat standards, providing

pollinator habitat and renewable energy on over 1,300 acres. In 2021, Monarch Joint Venture and Fresh Energy conducted a study and published a report on Monitoring Pollinators on Minnesota Solar Installations. In 2022, BWSR convened the second Habitat Friendly Solar Summit, bringing together a diverse group of practitioners to discuss shared goals of pollinator-friendly practices and co-benefits of community and utility-scale solar projects. <https://bwsr.state.mn.us/minnesota-habitat-friendly-solar-program>

- State Seed Mixes- BWSR and partner organizations have been working on the update of state seed mixes (last updated in 2009) to further address climate change and declining pollinator species. This includes around 70 seed mixes as well as new fact sheets for each mix and guidance on species substitutions and methods to adjust mixes for site conditions. Several new and updated seed mixes are pollinator focused. Staff are collaborating with NRCS to ensure that mixes are working with NRCS Practices Standards when appropriate.
- The BWSR Pollinator and Biodiversity Toolbox is a web application that provides guidance on implementing pollinator habitat on conservation lands, natural areas, and residential areas.
- Habitat Restoration and Protection through Conservation Easements - BWSR administers several conservation easement programs that provide monarch butterfly and other pollinator habitat, such as the Reinvest in Minnesota program which protects, restores and enhances habitat on private lands through permanent conservation easements. The program focuses on restoring wetlands, adjacent native grassland and wildlife habitat complexes on environmentally sensitive agricultural lands. Protection of existing high quality or at-risk habitat is also a program goal. To date, over 7,216 easements have been acquired on over 315,379 acres. <https://bwsr.state.mn.us/what-programs-are-available>

#### **Minnesota Department of Transportation (MnDOT)**

- Monarch Candidate Conservation Agreement with Assurances (CCAA) – MnDOT has enrolled over 250,000 acres of lands the agency owns or manages under the agreement. MnDOT continues to implement the terms of the agreement across Minnesota on Interstate, U.S., and Minnesota highways.
- Monarch Highway – MnDOT is part of the interstate Monarch Highway effort, which will provide joint educational materials, vegetation management practices, and strategies for pollinator seed mixes for states along the I-35 corridor from Minnesota to Texas. Select rest areas feature new interpretative information and native plantings in support of the Monarch Highway.
- Prescribed Fire Program – MnDOT has increased its internal capacity to use prescribed fire on roadsides and other parcels it owns or manages (e.g., wetland easements, scenic easements) to maintain and enhance native plants that depend on early successional habitats. MnDOT consults with state and federal agencies to minimize impacts to sensitive habitats and imperiled pollinators.
- Vegetation and Pollinator Research – MnDOT continues to fund research related to vegetation management practices and pollinator conservation. MnDOT also participates in national and international research efforts to improve conservation outcomes. Learn more about the MnDOT Office of Research and Innovation.
- Use of Native Vegetation – MnDOT has sustainability goals to increase the percentage of native vegetation used in seeding and landscape plantings. Progress toward this goal has resulted in an average of almost 1,000 acres of native seeding per year over the past ten years. See the MnDOT Sustainability Reporting for up-to-date information on these goals.

- Integrated Roadside Management – MnDOT practices Integrated Roadside Vegetation Management (IRVM) and uses native vegetation to support roadway infrastructure function. Using native vegetation has the added benefit of creating and maintaining pollinator and other wildlife habitat. Learn more about MnDOT roadside vegetation management.

#### **Minnesota Department of Natural Resources**

- Prairie Conservation Plan – The Minnesota Prairie Conservation Plan was developed by federal and state agencies and local conservation organizations, and most recently revised in 2018. It identifies core conservation areas and creates a vision of a connected landscape from Canada to Iowa that forms a north-south corridor ideal for migratory insects, including the monarch butterfly. The plan created Local Technical Teams representing prairie core areas in the state, enabling practitioners and partners to collaborate on local land acquisitions and restorations. The plan has given the DNR and conservation partners a roadmap for prioritizing acquisitions in prairie areas.
- Habitat Restoration on DNR-Managed Lands – Since 2014, the MN DNR restored or enhanced over 300,000 acres of grassland and wetland in Wildlife Management Areas (WMAs); 95,000 acres in State Parks, and 30,000 acres in Scientific and Natural Areas.
- Diverse Restoration Seed Mixes – Through purchase and harvest on native prairies, DNR land managers use seed mixes with 60-100+ species, including milkweed, in restoration projects.
- Pollinator Objectives in the State Wildlife Action Plan – Minnesota’s Wildlife Action Plan 2015-2025 identified the monarch butterfly and several other native pollinators as Species in Greatest Conservation Need (SGCN). The plan promotes a Wildlife Action Network that represents quality habitats for SGCN throughout the state. Pollinator-specific projects that have been funded by State Wildlife Grants include a \$300,000 prairie enhancement and monitoring project for monarch butterfly and regal fritillary, and a \$120,000 habitat enhancement project intended to support Karner blue butterfly (currently extirpated from the state). In 2021, the SWG-funded SPICE project (Sustaining Prairies In a Changing Environment) added bee and butterfly surveys to its long-term monitoring protocol. Minnesota’s SWAP is currently undergoing a 10-year revision.
- Pollinator BMPs – Best management practices for creating, restoring and enhancing habitat for native insect pollinators on DNR-managed lands and state-funded prairie restoration projects. The BMPs are currently undergoing revisions with input from agency land managers and natural resource specialists.

#### **Minnesota Department of Agriculture (MDA)**

- Environmental Protection Agency Grant – The MDA was awarded a “Protecting Pollinators with Integrated Pest Management in Minnesota” grant in 2019 to increase education about pollinators and IPM through in-person events, educational videos, online media, and printed materials. The grant was finalized at the end of 2021.
- Neonicotinoid label review and guidance - Based on the recommendations from the special registration review of neonicotinoid insecticides, the MDA reviewed product labels for top selling neonicotinoid insecticide products in Minnesota. After reviewing neonicotinoid labels, the MDA requested EPA to make changes to some of the labels and developed a label interpretation guide.
- Pollinator labeling law - All plants for sale in MN that are listed or labeled as pollinator friendly must not contain a concentration of systemic insecticides in its flowers greater than

the no observed adverse effect level (Minn. Stat. Chapter 18H.14(e)). The MDA inspects for compliance with this law.

- Minnesota Ag Water Quality Certification Program (MAWQCP) – The MAWQCP certifies farmers for managing the land within their operation in a way that protects water quality. The MAWQCP also has three Endorsements available to water quality certified producers: Soil Health, Integrated Pest Management, and Wildlife. Endorsements provide additional recognition to water quality certified producers who are going above and beyond to implement conservation on their farms. Many conservation practices targeting water quality have benefits for other conservation goals, such as pollinators.
- Two neonicotinoids designated as Surface Water Pesticides of Concern - Clothianidin and imidacloprid have been designated by the Commissioner of Agriculture as “Surface Water Pesticides of Concern.” The designation requires the MDA to develop BMPs for specific chemicals. Many surface water BMPs for neonicotinoids can also have a positive effect for pollinators.
- Presentations and events – The MDA has organized or participated in a variety of events for farmers, gardeners, politicians, and the general public to educate about integrated pest management, and how to protect pollinators and their habitat.
- Articles and social media – The MDA has written and shared a variety of articles and social media posts discussing and encouraging the protection of pollinators and their habitat.
- Pollinator best management practices (BMP) – The MDA has produced BMP guides for various landscapes, including residential, agricultural, and right-of-way lands. Including some in Spanish and Hmong languages.
- Neonicotinoid BMPs – The MDA has produced BMP guides for the use of soil, foliar, and seed treatment neonicotinoids as well as for home and residential use of neonicotinoids.
- The MDA State Fair Booth - The MDA has utilized a large portion of its booth space for 3 years to conduct pollinator outreach and education. The booth is well attended and has resulted in many handouts and BMPs being distributed. One effort at the state fair booth involved a “pollinator pledge.” By making this pledge, people agreed use pollinator friendly practices.
- Pollinator BMPs in Pesticide Applicator Training – The MDA includes information about best management practices to prevent harm to pollinators in pesticide applicator education programs. The MDA works with the University of Minnesota to prepare pesticide manuals and license pesticide applicators. Three short professional-produced videos about protecting pollinators are being used in pesticide recertification and will reach at least 11,000 pesticide applicators.

#### **Minnesota Department of Education**

- The Department of Education maintains a traveling exhibit on pollinators developed in collaboration with the Minnesota Pollution Control Agency. This traveling exhibit is displayed at libraries across the state, to help promote understanding and awareness of pollinator issues.

#### **Minnesota Department of Health**

- The Department of Health studies the impact of pesticides on human health and considers human health impacts that would arise from any alternatives to neonicotinoids.

#### **Minnesota Pollution Control Agency (MPCA)**



- Conducts pollinator education through a traveling library exhibit in partnership with the Minnesota Department of Education and EQB.
- Works with BWSR to use closed landfills as seed mix test sites.
- Allow opportunities for organization/groups to lease Closed Landfill Program property for the purpose of reconstructing pollinator habitat on the site.

#### **Minnesota Zoo**

- Maintains monarch and pollinator-friendly landscaping across portions of its 485-acre campus
- Participates in the Monarch SAFE (“Saving Species from Extinction”), an initiative to coordinate Monarch conservation and engagement across accredited members of the Association of Zoos and Aquariums.
- Hosts the Pollinator Conservation Initiative, which rears, breeds, and releases two U.S. and Minnesota threatened and endangered species of prairie butterflies and studies mechanisms for their decline in the wild.
- Conducts research on pesticide drift risk and other possible threats.
- Provides pollinator conservation education and outreach to 1.3 million visitors/year, including the free distribution of “Plant for Pollinators” and “Your Butterfly Neighbors” pamphlets (English and Spanish versions, plus online resources).

## **MISSOURI**

### **Monarch Habitat Goals**

Per the Missouri Monarch and Pollinator Conservation Plan, Missouri’s objective is to conserve and manage existing monarch and pollinator habitat and create 385,000 acres (19,000 acres per year) of additional habitat with 200 milkweed stems/acre by 2036.

### **Progress Towards Goals**

As of December 31, 2022, Missouri has enhanced, managed, or created nearly 470,000 acres of monarch/pollinator habitat and has uploaded approximately 9,000 records into the USFWS Monarch Conservation Database (MCD). Due to lack of volunteers, Missouri has not been able to fully inventory the aforementioned acreage to determine milkweed stem density; therefore, we rely upon Wayne Thogmartin’s algorithm, currently used in the USFWS MCD, to determine the number of milkweed stems/acre.

### **Current Monarch Conservation Activities**

Missourians for Monarchs is comprised of 45 organizations with a steering committee to provide direction for implementation of the statewide Missouri Monarch and Pollinator Plan. Monarch conservation activities occur both collaboratively among partners and individually. To date, these efforts include:

#### *Governance and Funding*

- Through partner funding and support, the Collaborative continues to fund a full-time Monarch and Pollinator Coordinator and a part-time Communications Coordinator.
- In an effort to further support monarch and pollinator initiatives, partnering among the Collaborative members has funded thirteen Farm Bill Wildlife Biologist positions, three Wetland Specialists, four Coordinating Wildlife Biologist positions to help deliver Farm Bill

programs to landowners, and four Habitat Strike Team positions, to assist with prescribed burns and removal of invasive plant species.

- To date, the Collaborative and its partners have
  - Secured \$200,000 grant from the National Fish and Wildlife Foundation in 2015 or restoration of 333 acres of habitat at two National Wildlife Refuges in Missouri
  - Received of \$229,868 grant from the National Fish and Wildlife Foundation in 2015 to create 1,400 acres of restored monarch habitat on both public and private lands
  - Provided \$250,000 to incentivize USDA Conservation Reserve Program plantings for monarchs along the Interstate 35 corridor
  - Obligated of over \$500,000 of non-grant funding for monarch habitat efforts
- The Collaborative developed a cost share folder for pollinator enthusiasts interested in financial incentives from State, Federal and NGO funding partners.
- In 2020, the Collaborative finalized a complete update of the Missouri Monarch and Pollinator Conservation Strategy.

#### *Habitat Conservation, Enhancement, Management and/or Restoration*

- To date, Collaborative partner programs, such as, Landowner Assistance Program (LAP) provides cost share to establish over 2500 acres of diverse grassland habitat.
- Since its inception, Collaborative partners have provided technical assistance and recommendations to over 50,000 private landowners
- Protecting monarch habitat on original and restored prairie through invasive species removal and prescribed burning
- Establishing pollinator habitat in transmission rights of way
- Restoration of pollinator habitat on 32 acres in north-central Missouri at Associated's Thomas Hill Energy Center
- Restoration of pollinator habitat on dozens of sites across the state
- As of 2022, three field seasons of Habitat Monitoring/Inventory have been conducted using volunteers and various Collaborative partner staffing.
- Providing financial and technical assistance to deliver monarch and pollinator conservation through the Monarch Butterfly Habitat Development Project, which is a component of the Environmental Quality Incentives Program (EQIP)
- Promoting native host (milkweed) and nectaring plants through the Missouri Prairie Foundation's Grow Native! Program's "Monarch Café" and "Pollinator Buffet" plant tags
- Utilizing various partnering strategies, including a recently established, Habitat Strike Team, Collaborative members have been able to protect monarch habitat on original and restored prairie through invasive species removal and prescribed burning
- Collaborate With federal partners to adapt CRP and NRCS specifications to include milkweed in wildlife friendly mixes (3-4% milkweed)
- Various Collaborative partners have been conducting pollinator research on several issues including neonicotinoids, insecticide-free food plots and insect recolonization of grasslands
- Milkweed production plots have been established at George O. White State Forest Nursery to allow the milkweed grown to be used for public land plantings
- Planting milkweed at state nursery for use on public lands
- Several Collaborative partners participate and assist with various NRCS programs benefiting monarchs, such as:

- Environmental Quality Incentive Program (EQIP) Initiative prioritizing monarch habitat in an agricultural landscape as part of the Working Lands for Wildlife Monarch Habitat (WLFW Monarch).
- Conservation Reserve Program (CRP)- Monarch Plantings as part of CRP
- Conservation Security Program (CSP) - Conservation Enhancements to plant monarch habitat within the agricultural landscape.
- Agriculture Conservation Easement Program - Wetlands Reserve Easements- targeted effort to encourage the planting of monarch habitat on existing WRP and new WRE sites around the state.
- Conservation Technical Assistance - providing technical support and guidance to landowners interested in planting monarch habitat. Not necessarily tied to program financial assistance funds.

#### *Outreach and Education*

- In June 2016, the Collaborative worked to enhance public awareness and education of monarch conservation by hosting a series of events during Pollinator Week, June 19-25. This included media relations efforts to receive press coverage for the announcement of a gubernatorial proclamation of Pollinator Week, a private reception/dinner for key stakeholders, and a public education event attended by more than 1,400 individuals.
- In July 2017, the Collaborative, in partnership with the City of Columbia, hosted a monarch monitoring event. In addition to those who personally attended, media coverage encouraged others to participate in this citizen science endeavor.
- Missourians for Monarchs has established a presence in social media to deliver monarch conservation information. From September 2016 to September 2017, the Collaborative's followers on Facebook doubled.
- The Collaborative received a \$7,500 grant from the Monarch Joint Venture to create a video promoting the installation of monarch and pollinator habitat.
- In 2017 Missourians for Monarchs' website was established to serve as a clearinghouse for monarch conservation information. In 2019, the website was fully overhauled and has been updated every year with new features and abilities, including a Volunteer Portal for Habitat monitoring in 2021
- In 2022, Missourians for Monarchs (M4M) re-organized and expanded their "Resources/Downloads" section to include over 100 additional links to partner educational materials. Additionally, a new section was added to the home page to include M4M's Social Media Feeds.
- The year 2022 saw an 8% increase in Facebook followers and 20% increase in Instagram followers
- Provide over \$10,000 to fund mini-grants for 4-H Monarch Habitat Demonstration plots
- Co-hosting Pollinator Plots field days through the PF/QF Youth Pollinator Habitat Program
- Creating monarch habitat demonstration gardens about the city of Branson and hosting educational events.
- Installed habitat demonstrations with Missouri Cattlemen's Association, Association of Missouri Electrical Cooperatives and the University of Missouri's A.L. Gustin Golf Course
- Host numerous educational events
- The Collaborative recently authored three Best Management Practices documents designed to help production landowners implement pollinator practices on their property while maintaining profitability.

- Collaborative staff have either presented or hosted Exhibition Booths at over 75 events, delivering the message of monarch conservation to audiences across the state
- Collaborative staff and MDC coordinated the first Book Reading event with students across Missouri, including previously under-served communities. Several Collaborative partners engaged with teachers to virtually read books to several student classrooms. This first-time endeavor reached over 200 students!
- Four Collaborative members continue regular engagement with the Mid-America Monarch Strategy and the Collaborative's Monarch and Pollinator Coordinator serves on two MAFWA Working Groups.

### Future Plans

- M4M is currently updating the Missouri Monarch and Pollinator Conservation Strategy, with an anticipated completion date of June 2023.
- Habitat enhancement, management, and creation will continue across all Collaborative partners
- Due to volunteer constraints and the amount of acreage to monitor/inventory, in 2022, the Collaborative decided to utilize the same algorithm currently used by USFWS's Monarch Conservation Database as the metric of measurement for the number of milkweed stems per acre. The Collaborative, and its members, will still monitor established monarch/pollinator habitat; however, the overall goal for Habitat Monitoring will now be to assess the quality of established habitat, rather than the number of milkweed stems per acre.

## NEBRASKA

### Monarch Habitat Goals

The State of Nebraska's goal is to add at least 62.5 million milkweed stems, along with appropriate nectar sources, in the eastern tallgrass prairie ecoregion by 2035. Additional milkweed stems and conservation practices represent monarch habitat improvements on thousands of acres of land. Participation from many partners, representing several land use sectors, is necessary to make progress in reaching this goal.

### Progress Towards Goals

Nebraska has entered approximately 97,700 acres of habitat into the MCD since 2014. This is likely a low estimate for the management occurring in Nebraska because the MCD is conservative in how management is counted to avoid the risk of double counting. It also only includes land from a limited number of partners (e.g., Northern Prairies Land Trust, the Crane Trust, Audubon) in Nebraska, in addition to the Nebraska Game and Parks Commission and some private landowners.

### Current Monarch Conservation Activities and Monarch/Pollinator Plans

[Nebraska's Monarch and Pollinator Plan](#) is "Conservation Strategy for Monarchs (*Danaus plexippus*) and At-Risk Pollinators in Nebraska." Nebraska Game and Parks Commission currently has an 11-month Pollinator Ecologist position. We are pursuing making that position permanent. For 2023, this position oversees a six-month technician, two student interns, and roughly 40 volunteers.

Nebraska has been working on monarch-specific conservation activities since 2016. Our monarch conservation efforts to date include:

### Research

- Led a community science monarch and regal fritillary project. In the first three years of the project:
  - Over 850 surveys have been completed.
  - Over 60 volunteers have been trained and completed surveys.
  - Nearly 200 unique blooming forb species have been identified.
- Reported information to US Fish and Wildlife Service to help with the listing decisions for Monarch and Regal Fritillary.
- Sample migratory monarchs for the protozoan parasite *Ophryocystis elektroscirrha* (OE) for Project Monarch Health.
- Published ["Comparison of Two Milkweed \(\*Asclepias\*\) Sampling Techniques on Eastern Nebraska Grasslands"](#)
- Tagged hundreds of migrating monarchs each fall for Monarch Watch.
- Survey for the Nebraska Bumble Bee Atlas.

### Outreach and Education

- Created a 30-minute pollinator educational program geared toward third to fifth graders.
- The Nebraska Monarch and Pollinator Initiative Facebook page has reached over 1000 likes and followers
- Hosted five virtual and two in-person training sessions for the monarch and regal fritillary survey in the first three years with over 300 total participants.
- Presented at three Nebraska Game and Parks Commission Outdoor Expos yearly, reaching roughly 1,000 grade school students in the last 3 years. We also tagged monarchs at the Missouri River Expo's public days each year with attendance around 1,000 individuals per year.
- Participated in and assisted with organizing numerous BioBlitzes across Nebraska.
- Led a butterfly release at two libraries with about 200 total attendees.

### Future Plans

- Continue monarch and regal fritillary surveys into the foreseeable future.
- Continue to assist with Monarch Watch and Project Monarch Health.
- Continue to support the Nebraska Bumble Bee Atlas (Xerces and University of Nebraska - Lincoln).
- We are in the early stages of planning a survey for all native bees in Nebraska to begin once the national protocols are set.
- We have tentatively scheduled a monarch/pollinator summit for October of 2023 to coincide with the annual Nebraska Natural Legacy Conference. We will be discussing a state pollinator plan update at this meeting.
- Update the Nebraska State Wildlife Action Plan, the Nebraska Natural Legacy Project, by October 2025. This process formally started in January of 2023.

## NORTH DAKOTA

### Monarch Habitat Goals

The State of North Dakota's goal is to add 35 million milkweed stems, along with appropriate nectar sources to the landscape by 2038, representing monarch habitat improvements on approximately

150,000 acres of land. Participation from partners and adequate funding will be necessary to reach this goal.

#### Progress Towards Goals

The North Dakota Game and Fish Department (NDGFD) planted nearly 9,000 acres of grassland/rangeland to increase monarch habitat. Approximately another 10,000 acres were managed under a conservation burning, mowing, or grazing plan to improve monarch habitat. The combined efforts of many organizations have provided approximately 250,000 acres of habitat creation/improvement in North Dakota since 2014, equating to over 30,000,000 new milkweed stems according to data submitted to the MCD.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

- Developed the North Dakota Monarch Butterfly and Native Pollinator Strategy in 2016 and updated it in 2018 to include partner updates on pollinator conservation progress. More than 14 partners contribute efforts including state, federal, university, non-governmental, and agriculture organizations. <https://gf.nd.gov/gnf/conservation/docs/nd-monarch-butterfly-native-pollinator-strategy.pdf>
- NDGFD is partnering with Natural Resources Conservation Service's Plant Materials Center (PMC) to assist educational organizations in developing urban pollinator gardens. The Urban Pollinator Program (UPP) will facilitate outdoor pollinator learning sites on as many school and community grounds as possible. <https://gf.nd.gov/education/urban-pollinator-program>
- NDGFD and PMC have provided over 3,000 plants to 33 schools across the state from 2018 to 2022, including milkweed.
- NDGFD has offered free wildlife food plot seed to landowners since 2019. The mix includes a variety of flowering plants for insects, for up to a 5-acre planting.
- NDGFD has transitioned to using neonicotinoid-free seed on all its food plots on Wildlife Management Areas.
- NDGFD developed a Conservation Reserve Enhancement Program (CREP) Riparian Project, available for landowners to enroll in CRP, including pollinator practices CP42 and CP42B. <https://gf.nd.gov/plots/landowner/crep>
- NDGFD is providing funding for Audubon Dakota's Urban Woods and Prairies Initiative. This program enhances and creates natural areas for people and wildlife, including high diversity prairie restoration, along riparian areas in the urban cities of Fargo, Grand Forks, Bismarck and Minot.
- NDGFD has reached out to the ND Weed Control Association and the ND Agriculture Department to encourage counties to remove Common Milkweed from their county noxious weed lists. Three counties currently list this native plant as a noxious weed: Renville, Sheridan, and Wells (down from four).
- NDGFD launched the Meadowlark Initiative (<https://gf.nd.gov/meadowlark-initiative>) in 2020 to revitalize, recreate, and protect native grasslands and the species, ranchers, and communities that are interdependent on them. To kick-start this initiative, the NDGFD engaged and enlisted a coalition of conservation partners and stakeholders on a USDA Regional Conservation Partnership Program (RCP) grant proposal.
  - One of the RCPP goals is to evaluate the impact of grassland restoration via the Meadowlark Initiative on native pollinators.
- NDGFD has partnered with Bismarck's Downtown Business Association and the city of Minot, along with many other partners, to fill planters in downtown Bismarck and Minot with flowers and grasses that are beneficial to pollinators (including educational signage).

### Future Plans

North Dakota plans to enact the following strategies for monarch/pollinator conservation.

- Continue all current efforts to create and improve monarch and pollinator habitat on public and private lands throughout the state.
- Undertake a comprehensive review of invertebrates for the 2025 SWAP update.
- Update pollinator webpage to include how-to videos on creating and managing pollinator gardens.
- Provide free seed for urban pollinator gardens- both grasses and forbs, including milkweed.

### Past (Completed) Efforts

- NDGFD has established high diversity pollinator demonstration plots at several locations, including the Bismarck office, WMAs, and the Conservation and Outdoor Skills Park at the North Dakota State Fair.
- The ND Game and Fish Department (NDGFD) partnered with ND Parks and Recreation Department to assemble more than 10,000 monarch butterfly seed packets to be provided free with the 2019 state park pass, which featured a monarch.
- NDGFD, ND Department of Transportation, and North Dakota Wildlife Federation partnered to develop a pollinator interpretive site at an I-94 rest area.
- NDGFD and the US Forest Service partnered to develop a pollinator interpretive plot near a campground and hiking trail at Sheyenne National Grasslands, known as the Jorgen's Hollow prairie restoration project.
- NDGFD has produced multiple informational videos on pollinators, including monarch specific videos, which were aired on TV stations throughout North Dakota. See examples on this webpage <https://gf.nd.gov/pollinators>
- In 2019, 2020 and 2021, the NDGFD conducted milkweed and Monarch field evaluations on WMA's and PLOTS acres to better understand the value and benefit of existing habitat and new herbaceous plantings for Monarch conservation and recovery efforts.
- NDGFD, ND Department of Agriculture, and several other agriculture and industry partners cooperatively funded a statewide pollinator inventory and research conducted by North Dakota State University from 2017 to 2020.
- NDGFD, through a US Fish and Wildlife Service Section 6 grant, awarded funds to North Dakota State University to research enhancing floral resources in grasslands with low plant diversity to conserve native pollinator populations and benefit other grassland dependent organisms.
- NDGFD, through a US Fish and Wildlife Service Section 6 grant, awarded funds to the North Dakota Natural Resources Trust to conduct surveys on the federally listed Dakota Skipper butterfly.
- NDGFD partnered with North Dakota Natural Resources Trust on its Bakken Development and Working Lands I and II Projects to match conservation partner and North Dakota Outdoor Heritage Fund grant dollars to renovate and reestablish high diversity native grass/forb grasslands.
- NDGFD cooperated with the North Dakota Water Commission to provided match dollars with EPA-319 and ND Outdoor Heritage grant funds for planting water quality buffers using high diversity pollinator habitat.

## OHIO

### Monarch Habitat Goals

Ohio's goal is to add 95 million milkweed stems, along with appropriate nectar sources to the landscape by 2035, representing monarch habitat improvements on approximately 1.85 million acres of land. This goal is a step-down for Ohio based on the monarch population target stated in the National Strategy to Promote the Health of Honey Bees and Other Pollinators (Pollinator Health Task Force 2015). Participation from many partners, representing several land use sectors will be necessary to reach this goal.

### Current Monarch Conservation Activities and Monarch/Pollinator Plans

Ohio has been working on monarch-specific conservation activities since 2014. Our monarch conservation efforts to date include:

- In 2014, the Ohio Pollinator Habitat Initiative (OPHI) was created by the U.S. Fish and Wildlife Service and the Ohio Department of Natural Resources (ODNR) – Division of Wildlife. The partnership now includes more than 75 diverse partners including Ohio Department of Transportation (ODOT), The Ohio State University, Pheasants Forever, Ohio Department of Agriculture Soil & Water Conservation, Ohio State University Extension, and Monarch Joint Venture. The mission is to “create and improve pollinator habitat across the State of Ohio and increase and improve pollinator conservation for all Ohioans.” The motto is “All you can, where you can.”
- Monarch butterfly was added to the 2015 Ohio State Wildlife Action Plan as a Species of Greatest Conservation Need.
- Starting as a 7-county area pilot project in 2015, OPHI in cooperation with Ohio Soil and Water Conservation Districts (SWCDs) along with multiple state partners including ODNR, Ohio Department of Rehabilitation and Correction (ODRC), Waste Management, Ohio Environmental Protection Agency, and ODOT have organized an annual milkweed pod collection. The program expanded statewide in 2016 with 19M milkweed seeds (2,500 gallons of pods) collected. Seeds are used in the DRC horticulture program to grow plants for statewide OPHI projects, provided to SWCDs for public distribution, or are packaged with other forbs for OPHI public events.
- ODNR participated in the planning of the October 2015 conference in Iowa to initiate the Midwest states collaborative monarch conservation effort.
- ODNR partnered with the Midwest Association of Fish and Wildlife Agencies and the National Wildlife Federation on two grants to fund the production of this strategy. ODNR provided cash match and staffing on the executive and technical committees.
- OPHI partners have participated in 60+ outreach events to promote awareness of monarch and pollinator declines and actions to reverse the decline.
- OPHI has created a successful social media presence through Facebook and Twitter to reach a broad audience sharing information and news from OPHI.
- The OPHI web site has information about habitat creation projects and educational resources about pollinators.
- OPHI hosted the first annual symposium August 31, 2016 with more than 400 attendees participating.
- The Ohio Department of Transportation has created more than 400 acres of roadside pollinator habitat and a statewide roadside pollinator habitat creation and maintenance handbook.
- In 2018, the Ohio Department of Transportation is implementing its Integrated Roadside Vegetation Management plan that includes a delayed mowing schedule and selective specific herbicide practices. This plan will directly benefit monarchs, pollinators, and other wildlife.



- The U.S. Fish and Wildlife Service’s Ecological Services Field Office, Ottawa National Wildlife Refuge, and the Ohio Private Lands Office have contributed in the conservation efforts taking place in Ohio through the OPHI. Goals are to promote pollinator conservation through education and outreach, establish more upland pollinator habitat in strategic locations across the state while at the same time increasing valuable nectar plants during all blooming periods and adding milkweed stems across the Ohio landscape to benefit the monarch butterfly and other pollinators.
- The Service’s Private Lands Office in Ohio, the Partners for Fish and Wildlife Program, has been restoring upland pollinator habitat during its 30-year history. From 2014 to 2017, the Program has worked with numerous conservation partners in Ohio to restore 1,360.45 acres (88 sites) of upland pollinator habitat on private land.
- A new U.S. Department of Agriculture (USDA) conservation program was established in Ohio called Monarch SAFE (State Acres for Wildlife Enhancement) that has an allotment of 30,000 acres in 44 counties.
- The USDA Conservation Reserve Program (CRP) has a pollinator practice in Continuous CRP for pollinator/Monarch habitat.
- The USDA Conservation Program Environmental Quality Incentives Program (EQIP) has a monarch initiative program.
- For the last couple of years ODNR has monitored USDA programs for milkweed and contacted landowners willing to have milkweed planted, or if it exists, landowners that will allow harvest of milkweed pods.
- The Wetland Reserve Easement Program includes planting milkweed on newly restored sites.
- Since 2015, more than 12,000 acres of monarch and pollinator habitat and more than 25 million milkweed seeds were planted. To get involved in Ohio’s monarch conservation initiative, see <http://www.ophi.info/home.html> “How to get involved.”

#### Future Plans

Ohio DNR and its partners will continue to work toward achieving milkweed stem and nectar source goals with the following actions:

##### *Private Agricultural Lands*

- Provide assistance to agricultural landowners and owners of recreational lands and hobby farms on ways to integrate monarch and pollinator conservation with land management practices.
- Increase target milkweed stem density in CP-42 plantings.
- Work with existing landowner assistance programs to include requirements to integrate monarch and pollinator conservation with land management practices.

##### *Protected Natural Lands*

- Plant and maintain milkweed and floral/nectar resources in grasslands and on other managed lands.
- Establish best management practices that include recommendation for seed mixes, establishment of milkweed and prairie plants, mowing, prescribed burning, pesticide mitigation, and other specific guidelines.
- Set up demonstration sites to portray use of monarch and pollinator habitats.

##### *Rights-of-ways and Energy Infrastructure*

- Work with local governments and ODOT to provide monarch-friendly mowing practices and habitat enhancement opportunities with consideration of limitations of rights of ways.

### *Outreach and Education*

- Increase monarch conservation educational programming for targeted audiences.
- Provide technical assistance/ guidelines for small scale habitat development (gardens and urban greenspaces).
- Work with parks and nature centers to provide information on monarch and pollinator decline and habitat enhancement demonstration projects.

## OKLAHOMA

### Monarch Habitat Goals

The Oklahoma Monarch and Pollinator Collaborative (OMPC) was created in November of 2016 following the Oklahoma Monarch Summit hosted by the National Wildlife Federation and its state affiliate the Conservation Coalition of Oklahoma. The OMPC is a partnership comprised of more than 40 organizations, agencies, and Native American tribes, and conducts public outreach under the name Okies for Monarchs. In 2018, the OMPC completed the Oklahoma Statewide Monarch Conservation Plan. This plan promotes the restoration, enhancement, and maintenance of prairies, woodlands, and other important native plant communities that provide habitat for pollinators including the Monarch; however, it does not contain specific acreage goals or milkweed stem goals as many of the North Core state plans do. The OMPC Statewide Monarch Conservation Plan recognizes that milkweed availability in Oklahoma is unlikely to be a limiting factor for Monarch populations due to the state's large acreage of rangeland and abundance of milkweed, particularly Green Milkweed (*Asclepias viridis*). While the conservation plan encourages the retention of milkweeds, it places a greater emphasis on enhancing the abundance and diversity of native floral resources, especially during the Monarch's Spring and Fall migration seasons. The OMPC provides technical resources to its member organizations and landowners through its website, <https://www.okiesformonarchs.org/>, and through three online publications: the *OMPC Statewide Monarch Conservation Plan*, *Best Management Practices for the Monarch Butterfly in Oklahoma Rangelands*, and *Best Management Practices for the Monarch Butterfly in Oklahoma Rights-of-Way*.

### Progress Towards Goals

Because the Oklahoma Monarch and Pollinator Collaborative Statewide Monarch Conservation Plan does not have explicit habitat goals, there currently is no single point of contact or clearing house for tracking habitat accomplishments by the member organizations; however, individual partners track these. As of February 2023, Okie for Monarchs has registered 497 Monarch Waystations and Pollinator Habitats through its outreach efforts and 3,372 Oklahoma had signed the Monarch pledge suggesting that many more unregistered pollinator habitats have been planted or planned. Approximately 1,133,000 acres occupied by native plant communities are managed by four natural resource agencies (Oklahoma Department of Wildlife Conservation, U.S. Forest Service, U.S. Fish and Wildlife Service, and the Oklahoma Department of Tourism and Recreation), the Department of Defense, and The Nature Conservancy. Another 35,000 acres are managed under permanent conservation easements by land trusts and The Nature Conservancy, while approximately 327,000 acres of native grassland plantings are currently enrolled in the NRCS's Conservation Reserve Program or under grassland easements. Currently, approximately 15,000 acres out of a total of 65,000 acres of highway right-of-way are managed as pollinator habitat and the Oklahoma Department of Transportation is working to increase the percentage of its right-of-way that is suitable for pollinators such as Monarchs. The Natural Resources Conservation

Service (through its EQIP funding) and the U.S. Fish and Wildlife Service (through its Partners for Fish and Wildlife program) are providing technical assistance and cost-share funding to private landowners who wish to enhance the value of rural and agricultural lands for pollinators. This includes a new CRP SAFE project that launched in 2022. Through these cost-share programs, at least 516 farmers and ranchers had implemented pollinator habitat plantings by the end of calendar year 2022. In suburban areas, the Oklahoma City Zoo and The Nature Conservancy are providing grants to schools and public parks to develop pollinator habitats and Monarch Waystations. A growing tribal alliance has emerged since 2016 and is enhancing native floral diversity and conserving pollinator habitats on tribal lands. And the Oklahoma and Prairies Joint Venture is providing cost-share funding through its Grassland Improvement Program (GRIP) to increase native herbaceous plant diversity in rangelands and grasslands within three focal areas in the central third of Oklahoma.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

The Oklahoma Monarch and Pollinator Collaborative has been working on monarch-specific conservation activities since early 2017. Our monarch conservation efforts to date include:

- Organizing the Oklahoma Monarch Summit in November 2016, and launching the OMPC that same month.
- Prepared the [OMPC Statewide Monarch Conservation Plan](#) in September 2018.
- Launched the Okies for Monarchs website in 2018 and began hosting quarterly outreach activities across the state to raise awareness for the need for conserving and restoring pollinator habitats. Released regional planting lists of native milkweeds and nectar sources for Monarchs that are tailored to Western, Central, and Eastern Oklahoma.
- Hosted the first Monarch Habitat Improvement Workshop in May 2019 at the Oklahoma City Zoo and launched the Living Classrooms Grants program to promote pollinator gardens in schools and public spaces.
- Developed two technical assistance publications in 2020: Best Management Practices for the Monarch Butterfly in Oklahoma Rangelands and Best Management Practices for the Monarch Butterfly in Oklahoma Rights-of-Way
- In 2022, the Conservation Reserve Program State Acres for Wildlife Enhancement project “Habitat Restoration for Northern Bobwhite and Monarch Butterfly Populations in the Mixed-grass and Tallgrass Prairie Regions of Oklahoma” was developed and opened for enrollment.
- Throughout the period from 2016 through 2023, technical assistance and cost-share funding was provided to private landowners for the enhancement of nectar resources for pollinators, Monarchs, and other grassland wildlife through the U.S. Fish and Wildlife Service’s Partners for Fish and Wildlife program, the Oaks and Prairies Joint Venture’s Grassland Improvement Program, and the Natural Resources Conservation Service in partnership with Pheasants Forever/Quail Forever and the Xerces Society.

#### Future Plans

Technical assistance and cost-share grant programs will continue for ranchers, farmers, rural landowners, schools, and public parks.

The OMPC, under the name Okies for Monarchs, will continue to host quarterly outreach events across the state.

The Oklahoma Department of Wildlife Conservation will conduct the next comprehensive revision of the Oklahoma Wildlife Action Plan in 2024/2025 that will add the Monarch as a state species of greatest conservation need (SGCN) regardless of the outcome for the USFWS’s final listing decision. In the current Oklahoma State Wildlife Action Plan (dated 2015), there are 12 pollinators on the SGCN list, but the Monarch is not included due to its widespread distribution and relative commonness.

## SOUTH DAKOTA

### Monarch Habitat Goals

South Dakota's goal is to add 68 million milkweed stems, along with appropriate nectar sources to the landscape by 2038, representing monarch habitat improvements. Participation from many partners, representing several land use sectors will be necessary to reach this goal.

### Progress Towards Goals

SD Game, Fish and Parks (SDGFP) completed the following habitat additions to benefit monarchs and other native pollinators:

- 2018: 7,632 acres planted on state game production areas (GPA) to increase blooming nectar plants to enhance habitat and nectar resources; 278 acres planted on state game production areas to increase milkweed and blooming nectar plants; and 3,305 acres planted on private lands to increase blooming nectar plants through cost-share habitat partnerships.
- 2019: 1,032 acres planted on state GPAs to increase blooming nectar plants and 86 acres planted on state GPAs to increase milkweed and blooming nectar plants.
- 2020: 1,433 acres planted on state GPAs to increase blooming nectar plants and 60 acres planted on state GPAs to increase milkweed and blooming nectar plants.
- 2021: 419 acres planted on state GPAs to increase blooming nectar plants, 60 acres planted on state GPAs to increase milkweed and blooming nectar plants, and 3059 acres planted on private lands to increase blooming nectar plants through cost-share habitat partnerships.
- 2022: 1,684 acres planted on state GPAs to increase blooming nectar plants and 3221 acres planted on private lands to increase blooming nectar plants through cost-share habitat partnerships.

All habitat work completed by SDGFP from 2018 through 2022 has been entered into the Monarch Conservation Database.

South Dakota has not conducted a habitat inventory to determine current milkweed acreage.

### Current Monarch Conservation Activities and Monarch/Pollinator Plans

South Dakota has been working on monarch-specific conservation activities since 2017. Our monarch conservation efforts to date include:

- Hosted the South Dakota Monarch Summit in October 2017.
- Prepared the South Dakota Monarch Conservation and Management Strategic Plan in 2018. [https://gfp.sd.gov/userdocs/docs/SD\\_Monarch\\_Strategic\\_Plan\\_Nov\\_2018.pdf](https://gfp.sd.gov/userdocs/docs/SD_Monarch_Strategic_Plan_Nov_2018.pdf)
- Partnered with Pheasants Forever to submit a Collaborative Conservation Grant or Agreement proposal to NRCS to fund a South Dakota Monarch & Native Pollinator Coordinator position. This proposal was successful, and a Pheasants Forever employee, Catherine Beall, has been serving in that role since March 2021. If not renewed, funding for this position will end in March 2024. Catherine is responsible for leading the implementation and execution of the state monarch plan.
- The South Dakota Monarch and Native Pollinator Coordinator is leading the planning for a second South Dakota Monarch and Native Pollinator Summit, to be held in March 2023. Planning partners include SD Game, Fish and Parks and U.S. Fish and Wildlife Service. The summit will share research and monitoring results and feature breakout sessions to help prioritize strategies

identified during the first summit and captured in the state monarch plan, but with an expanded focus on additional native pollinators.

#### Future Plans

SDGFP will begin a major Wildlife Action Revision during 2023 for completion during 2025. The monarch is currently a state species of greatest conservation need (SGCN). The MAFWA Regional SGCN list will be reviewed for potential additional pollinator species to consider for South Dakota's list.

SDGFP is open to partnerships with other entities for research, monitoring, and outreach related to native pollinators.

## TEXAS

#### Monarch Habitat Goals

In 2016, Texas Parks and Wildlife completed the Texas Monarch and Native Pollinator Plan. This conservation plan details specific actions; however, it does not contain specific acreage goals or milkweed stem goals as do many of the North Core states. State conservation status assessments of Monarch completed in 2022 affirmed that milkweed availability in Texas is unlikely to be a limiting factor for Monarch populations due to the state's large acreage of rangeland and abundance of milkweed. While milkweed species remain a component of restoration and conservation actions, a greater emphasis has been placed on maintaining and increasing the availability of native floral resources during the fall migration season when resources are often more limited.

#### Current Monarch Conservation Activities and Monarch/Pollinator Plans

The Texas Monarch Consortium completed and published its state [Monarch and Native Pollinator Plan](#) in 2016 and hosted the Texas Monarch Symposium in 2017 in partnership with the National Wildlife Federation (NWF), MAFWA, AFWA and Pheasants Forever & Quail Forever. This plan outlines actions by TPWD and other stakeholders that will contribute to monarch and overall native pollinator conservation in Texas by highlighting four broad categories of monarch and native pollinator conservation: habitat conservation, education and outreach, research and monitoring, and partnerships. Efforts to re-engage the consortium members to update the plan in 2022 were unsuccessful and following the listing decision there are discussions that a broader State Pollinator Management Plan should be developed. This new document would move beyond the monarch centric focus of previous efforts and expanding to focus on holistic management practices that benefit suites of species across the landscapes of Texas. This focus on implementing conservation actions at a larger scale is also driven by recent state assessments of the species in a partnership between NWF, TPWD and a panel of state and regional species experts. This assessment utilized the NatureServe methodology and the final assessed rank of monarch butterfly in Texas was S4 (Apparently Secure). This higher assessed rank is likely driven by the size of the current population, the extent of its range across most of the state and the broad availability of habitat and larval host plants. Monarch has not been designated as an SGCN in Texas in the past, but it now qualifies for inclusion based on new criteria in the upcoming State Wildlife Action Plan revision anticipated for approval in 2023.

#### Future Plans

- TPWD will continue to provide technical resources to land managers through its [Management Recommendations for Native Insect Pollinators in Texas](#).

- TPWD will continue to engage with partners and landowners in Texas to develop a pollinator habitat management plan for the state as well as update its habitat management recommendation resources. This plan will outline specific actions that can be taken to benefit pollinators around the state and ways to monitor for effectiveness.
- TPWD will continue to incorporate the needs of pollinator species, including monarch, into its broader habitat management recommendations.
- TPWD will continue to engage with the USFWS following the outcome of the listing decision in the fall of 2023. We will coordinate with species leads and partners to outline appropriate next steps to ensure monarchs and the habitats on which they depend persist on the landscape in Texas.

## WISCONSIN

The Wisconsin Monarch Collaborative is currently undergoing a re-organization. With the departure of our coordinator in 2022 the collaborative leadership reevaluated the structure and function of the Collaborative. Mission and vision statements and a membership roles and responsibilities document were created and formally adopted. The coordinator position will transition from Wisconsin DNR to the Natural Resources Foundation of Wisconsin and will be refilled this summer, at which point working groups will restart and milkweed data will be compiled and entered into the MCD. While the Collaborative has paused to regroup, interest in monarch butterfly conservation remains high amongst Wisconsinites and habitat creation continues across the state.

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## APPENDIX A – 2023 AND 2018 MID-AMERICA MONARCH CONSERVATION STRATEGY PARTICIPANTS

*Authors of the 2023 update to the Mid-America Monarch Conservation Strategy include:*

Mid-America State Monarch Technical Team  
Midwest Association of Fish & Wildlife Agencies  
Monarch Joint Venture  
Arkansas Game and Fish Commission  
Illinois Department of Natural Resources  
Indiana Department of Natural Resources  
Iowa Department of Natural Resources  
Kansas Department of Wildlife and Parks  
Kentucky Department of Fish and Wildlife  
Michigan Department of Natural Resources  
Minnesota Department of Natural Resources  
Missouri Department of Conservation  
National Wildlife Federation  
Nebraska Game and Parks Commission  
North Dakota Game and Fish Department  
Ohio Division of Wildlife  
Oklahoma Department of Wildlife Conservation  
Pheasants Forever and Quail Forever  
South Dakota Game, Fish, and Parks  
Texas Parks and Wildlife Department  
Wisconsin Department of Natural Resources

*The drafting and finalization stages of this update document were guided by:*

Mid-America Monarch Conservation Strategy Board of Directors  
Arkansas Game and Fish Commission  
Association of Fish & Wildlife Agencies  
Illinois Department of Natural Resources  
Indiana Department of Natural Resources  
Iowa Department of Natural Resources  
Kansas Department of Wildlife and Parks  
Kentucky Department of Fish and Wildlife  
Keystone Monarch Collaborative  
Michigan Department of Natural Resources  
Midwest Association of Fish & Wildlife Agencies  
Minnesota Department of Natural Resources  
Missouri Department of Conservation Monarch Joint Venture  
Monarch Joint Venture  
National Wildlife Federation  
Nebraska Game and Parks Commission  
North Dakota Game and Fish Department  
Ohio Division of Wildlife

Oklahoma Department of Wildlife Conservation  
Pheasants Forever and Quail Forever  
South Dakota Game, Fish, and Parks  
Texas Parks and Wildlife Department  
Wisconsin Department of Natural Resources  
United States Department of Agriculture – Natural Resources Conservation Service  
United States Fish and Wildlife Service

*The following states and organizations participated in the development of the original 2018 Mid-America Monarch Conservation Strategy. A full list of participants for that effort is included in Appendix A of the original Strategy document.*

#### **PARTICIPATING AGENCIES IN THE 2018 MID-AMERICA STRATEGY PROJECT**

##### **Member states of the Midwest Association of Fish and Wildlife Agencies:**

Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin

##### **Additional states from other regional Associations of Fish and Wildlife Agencies:**

Arkansas (SEAFWA), Maryland (NEAFWA), New York (NEAFWA), Oklahoma (WAFWA/SEAFWA), Pennsylvania (NEAFWA), Texas (WAFWA/SEAFWA), and West Virginia (NEAFWA/SEAFWA)

##### **Federal Agencies:**

U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Department of Agriculture (including Farm Service Agency and Natural Resources Conservation Service), U.S. Geological Survey

##### **Non-Governmental Organizations:**

Association of Fish & Wildlife Agencies, Environmental Defense Fund, Keystone Policy Group Monarch Collaborative, Monarch Joint Venture, National Fish and Wildlife Foundation, National Wildlife Federation, Pheasants/Quail Forever, Rights-of-Way as Habitat Working Group