Welcome!

....

Photo: Marlene Smith



Eastern Monarchs 101

Marlene Smith, Xerces Ambassador

The Xerces Society for Invertebrate Conservation

Northwood Civic Association February 7, 2024





The Xerces Society

The Xerces Society for Invertebrate Conservation is an international nonprofit organization that protects the natural world through the conservation of invertebrates and their habitats

Named for the Xerces Blue butterfly Last seen flying in 1943



Protecting the Life That Sustains Us

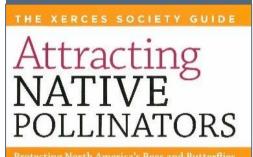
- Conservation
- Advocacy
- Research
- Education



Photos: Paul Jepson; Dick Dewey; Xerces Society/Brianna Borders













The Monarch: An Icon on the Edge

hoto: Marlene Smith

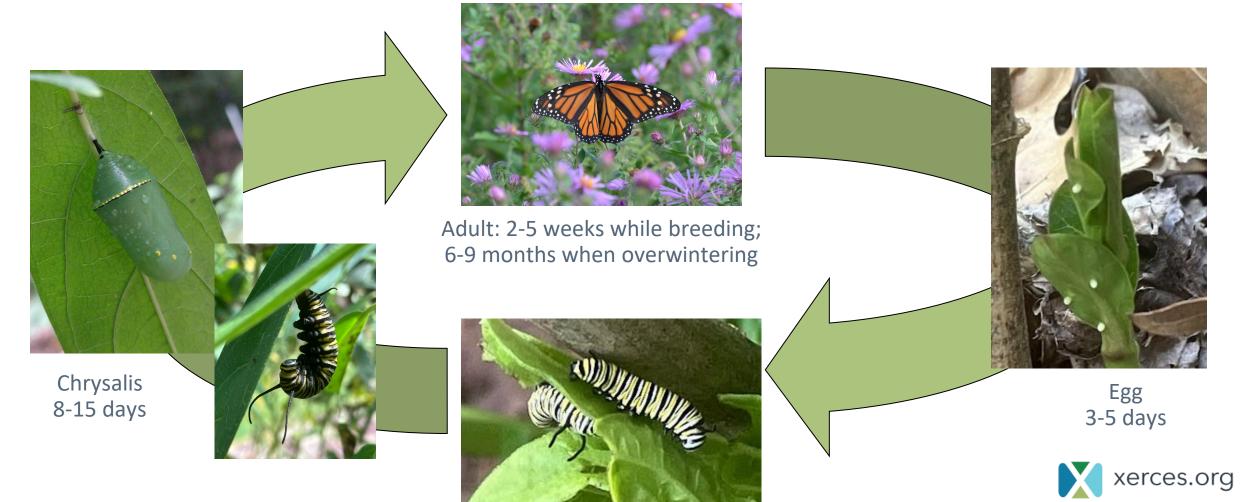
What to expect:

- The Monarch Life Cycle
- Monarch Migration
- Threats to Monarchs
- Host Plants for Monarchs
- Nectar Plants for Monarchs
- What You Can Do
- Resources



Monarch Life Cycle (Danaus Plexippus)

From egg to adult takes approximately 1 month (20-35 days)



Photos: Marlene Smith

Caterpillar 9-16 days

Monarch Eclosing

10-minute time lapse



Video: Bill Smith

For life cycle timeline and more photos, visit https://extension.umd.edu/sites/extension.umd.edu/files/2022-11/Fall 2022 final.pdf



The Amazing Monarch!

Male Monarch



Photos: Marlene Smith

Female Monarch



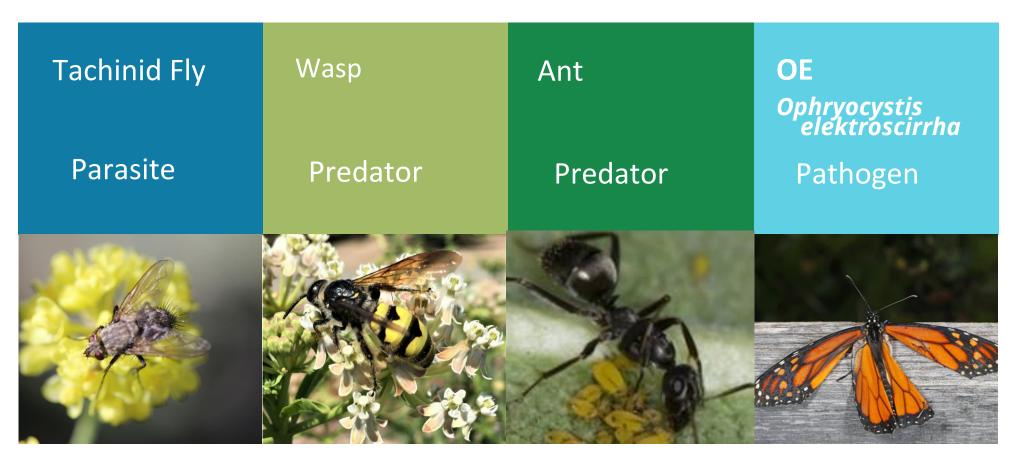
Viceroy (mimicry)



Photo: Seigfreid.JPG, CC

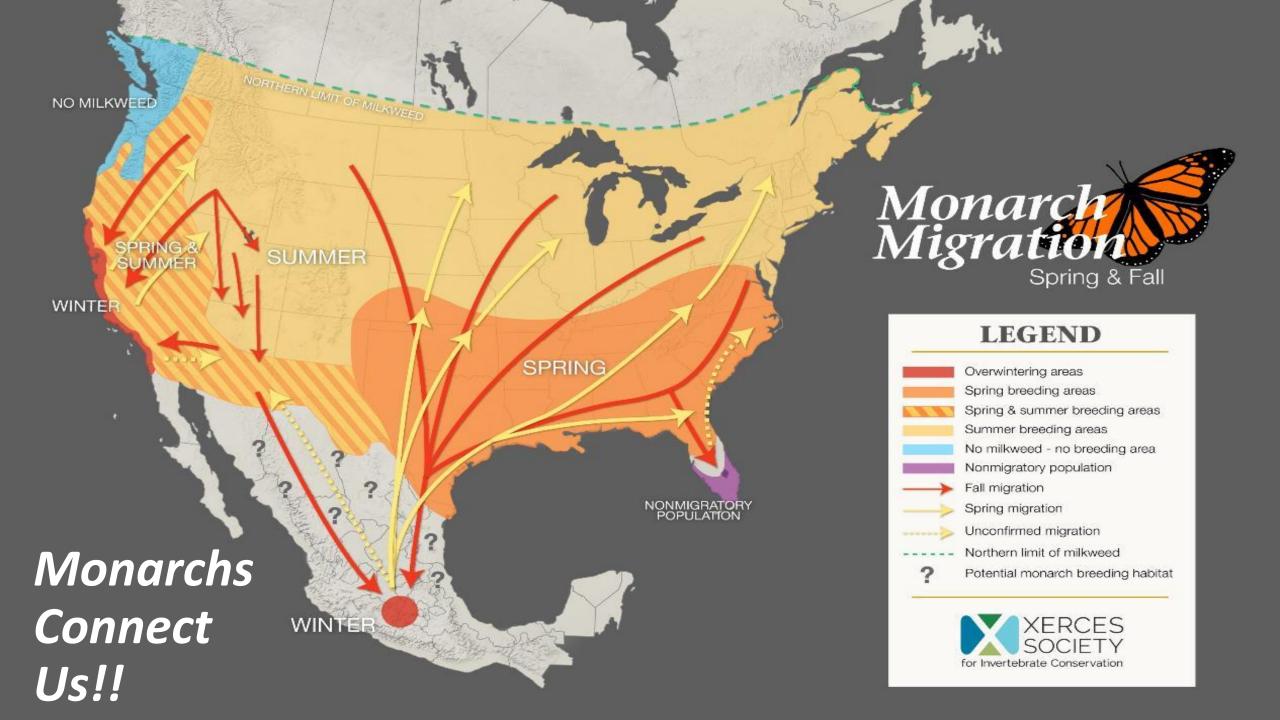


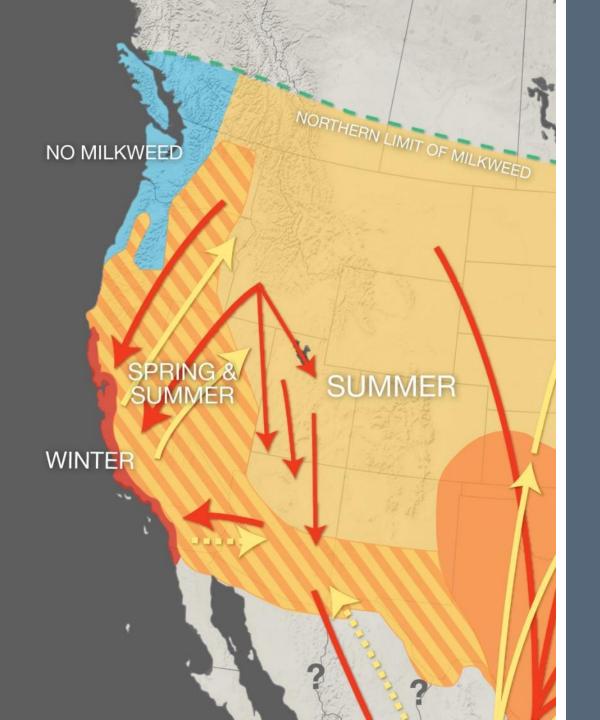
Natural Monarch Enemies



Photoss: Stephanie McKnight, Xerces; Kathryn Prince , Xerces; David Cappaert, Bugwood.org; Judy Gallagher, Flickr (CC BY 2.0)







Western Population

Breeds in western states and into Canada Not in Maritime NW

Overwinters along Pacific Coast from northern California to Baja California

Small numbers may also overwinter in Mexico



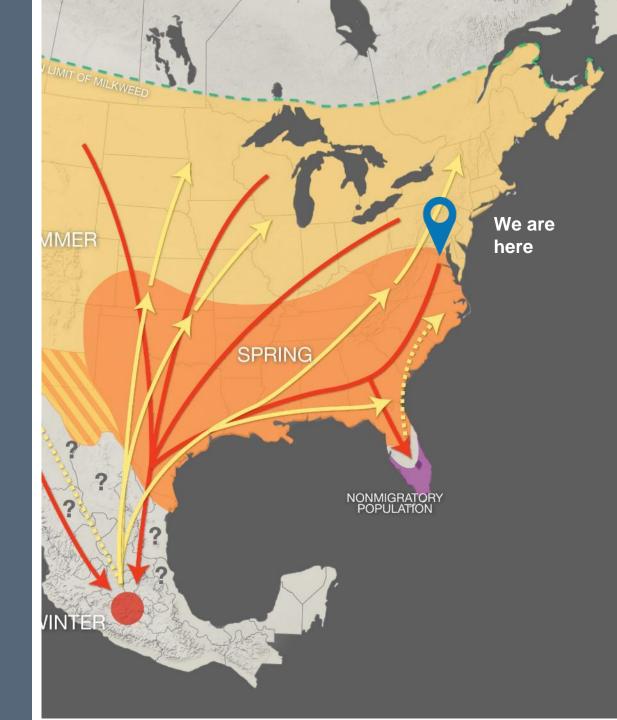
Eastern Population

Breeds across Great Plains, eastern states, and into Canada

Overwinters in mountains of central Mexico

Nonmigratory population in Florida





Overwintering Sites in Mexico

Every year, migratory monarchs travel up to 2,000 miles (3,000 km) from the eastern United States and Canada to spend the winter among the forests of central and western Mexico.





Monarch butterflies at Mexico's Sierra Chincua butterfly sanctuary





Photo: Xerces Society / Carly Voight

Overwintering Sites

But wait! There's more!!

Although the majority of eastern monarchs migrate to Mexico, there is new evidence that some fly to Florida

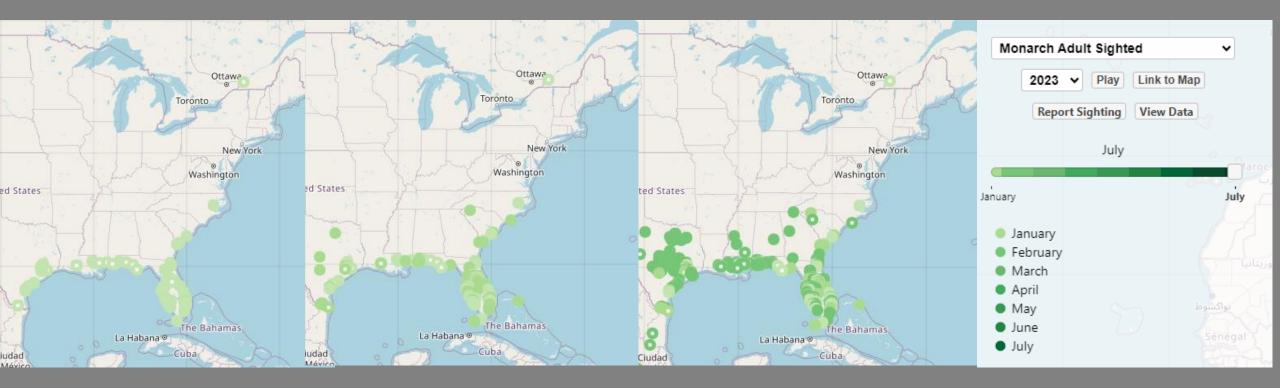
Coastal areas from the South Carolina coast south and along the Gulf, may host monarchs year-round

Monarchs may also migrate to Cuba, the Yucatan, and Guatemala (i.e., the Caribbean, Central and South America)

Monarchs need a "Goldilocks zone" of "just right" cool weather, storm protection, water, sunshine, nectar



Journey North Maps Spring 2023



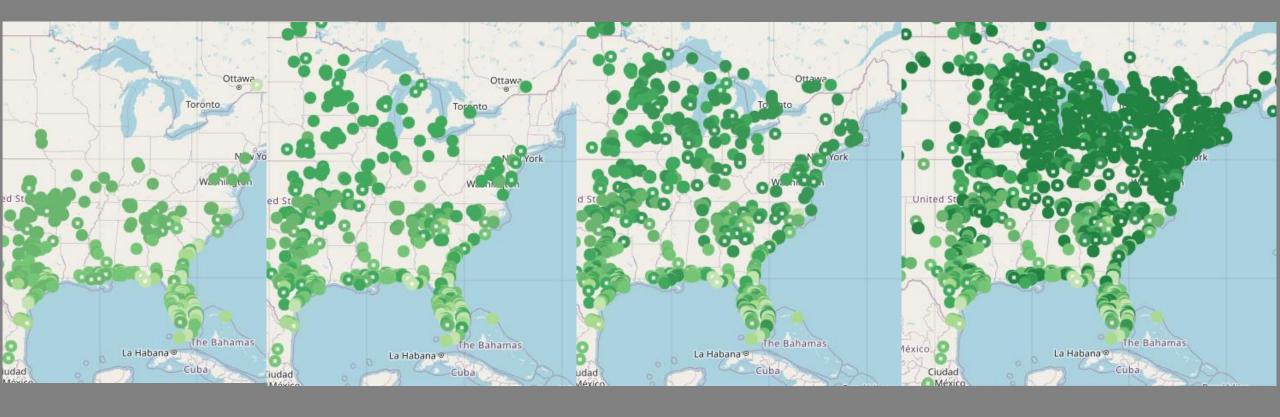
January 2023

February 2023

March 2023



Journey North Maps Spring 2023



April 2023

May2023

June 2023

July 2023



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https://maps.journeynorth.org/

How old is this monarch?





Photo: Marlene Smith

Late season monarch in my habitat.....

October 19, 2023

October 20, 2023 (on blue mist flower)





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Photos: Marlene Smith

Eastern Monarch Population Status

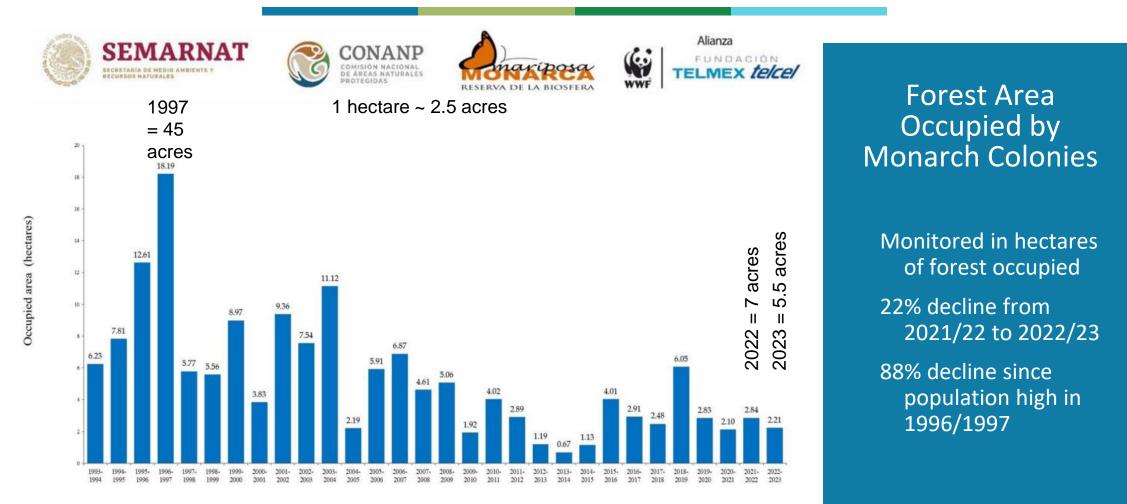


Figure 2. Forest area occupied by the monarch butterfly colonies in Mexico from 1993-1994 to 2022-2023.



Monarchs in the News!

Article Open access Published: 27 June 2023

Overwintering and breeding patterns of monarch butterflies (*Danaus plexippus*) in coastal plain habitats of the southeastern USA

Michael R. Kendrick [™] & John W. McCord

<u>Scientific Reports</u> **13**, Article number: 10438 (2023) Cite this article

ARTICLE | VOLUME 25, ISSUE 5, 104310, MAY 20, 2022

Oriented migratory flight at night: Consequences of nighttime light pollution for monarch butterflies

OUR WORK GET INVOLVED ABOUT US

Troubling news for monarch

Presence of monarch butterflies in their wintering habitat drops 22% in one year

butterfly populations

Adam F. Parlin ³ • Samuel M. Stratton ³ • Patrick A. Guerra <u>A</u> ⁴ <u>D</u> • Show footnotes

III STORIES

Open Access • Published: April 27, 2022 • DOI: https://doi.org/10.1016/j.isci.2022.104310 •

DO NORTH AMERICAN MONARCH BUTTERFLIES TRAVEL TO CUBA? STABLE ISOTOPE AND CHEMICAL TRACER TECHNIQUES

Lincoln Brower

2004, Ecological Applications

JOURNAL ARTICLE

Migration of Eastern North American monarch butterflies via the South-east and the Atlantic: evidence from stable isotopes, thin layer chromatography, DNA and phenotype Get access >

Cristina Dockx ⊠, Keith A Hobson, Marcus Kronforst, Kevin J Kardynal, Carmen Pozo, Jack Schuster, Delbert A Green, II, Margaret Dix, Sumitha Nallu, Steve Lynch

Biological Journal of the Linnean Society, Volume 139, Issue 3, July 2023, Pages 294–325, https://doi.org/10.1093/biolinnean/blac146

Published: 16 June 2023 Article history v

Rethinking Monarchs: Does the Beloved Butterfly Need Our Help?

WWF

The Eastern monarch butterfly has long been thought to be in peril, but new studies indicate that its U.S. populations are not in decline. Scientists say the biggest threat the species faces is from well-meaning people who rear the butterflies at home and release them.

BY JANET MARINELLI · JANUARY 15, 2024

Human-Related Threats to Monarchs

- Loss of overwintering sites; critical part of annual life cycle
- Loss of milkweeds; primary food for caterpillars
- Loss of nectar for adults; need nectar-rich flowers to fuel breeding and migration
- Overuse of pesticides



Photos: Xerces Society / Candace Fall



Loss of Overwintering Sites

Overwintering sites are critical part of annual cycle

Mexico Logging Extreme weather

California Development Neglect of groves Eucalyptus aging



Photos: Lisa Massie



Loss of Breeding Habitat

Milkweeds are primary food for caterpillars

Milkweed has been lost from the landscape due to:

Meadows and prairies being converted to agriculture or urban development

Herbicide use on farms

Insecticide contamination

Non-native milkweed growing in gardens

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Photos: Xerces Society / Stephanie McKnight; Xerces Society / Candace Fallon



Loss of Nectar Sites

Need nectar-rich flowers to fuel breeding and migration

Quantity reduced due to habitat loss and herbicide use

The need for nectar plants varies by region based on the timing of the migration

Spring & fall nectar plants are needed further south Summer nectar plants are needed further north ²hotos: Joel Olives, Flickr; Scott Seigfried







Photo: Xerces Society/Matthew Shepherd

Pesticides

Insecticides are everywhere, often at levels that are harmful to pollinators

Don't use them unless no alternative

Avoid systemic products

Read guidance carefully

Even when label instructions are followed, there is limited protection for pollinators



Provide What Monarchs Need – Habitat!

"Bring Back the Pollinators" principles can be adopted anywhere by adding:

- Host milkweed for caterpillars and nectar plants for adults
- Shelter / hanging space for chrysalises
- Avoiding pesticides
- Sharing the word by adding a sign



Photo: Matthew Shepherd





Photos: Marlene Smith

Plant Milkweed

Plant Milkweeds for Eggs & Caterpillars

Eggs are laid on milkweed, the only host plant for Monarch caterpillars

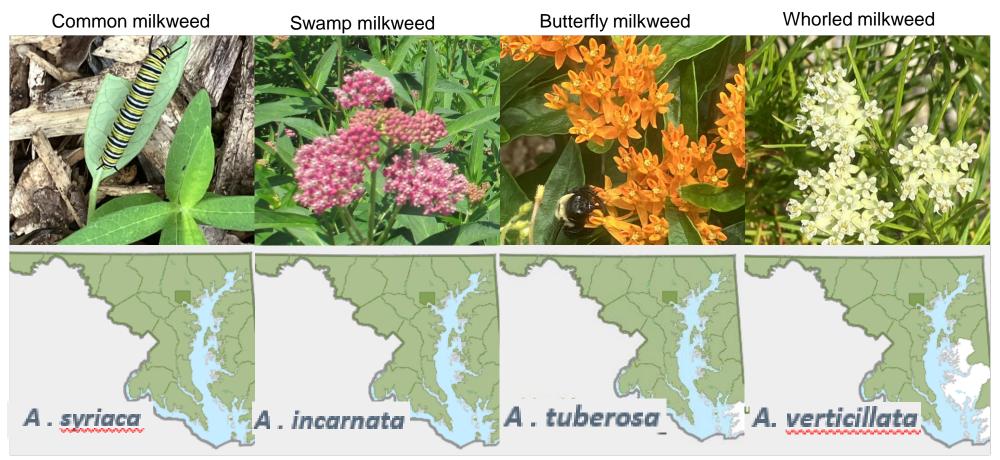
Caterpillars feed on milkweed and will move to fresh plants as needed

No milkweed = No monarchs



The Right Type of Milkweed

Regionally appropriate, native milkweeds



Photos: Marlene Smith / Maps: Maryland Biodiversity Project



The Wrong Type of Milkweed

Tropical milkweed, A. curassavica, is non-native and shouldn't be planted

- Evergreen
- Grows through winter, disrupts breeding and migration cycle
- Harbors/supports OE parasite of monarchs



Photo: Matthew Shepherd



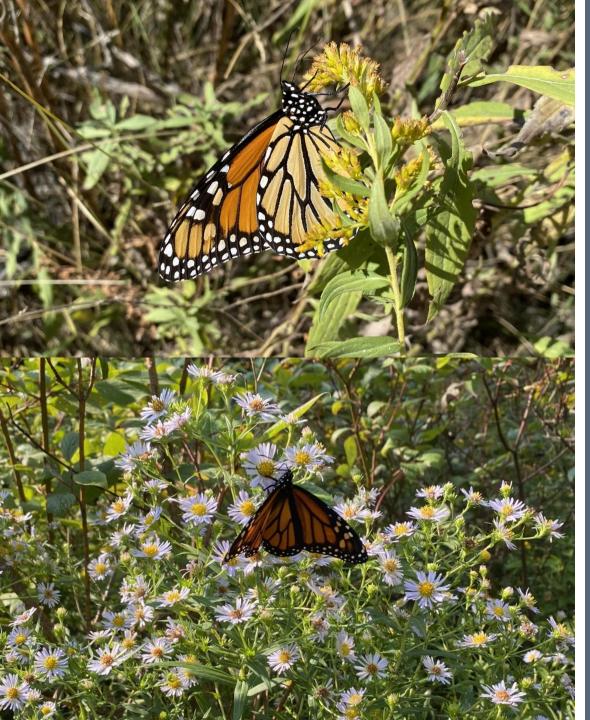


Plant Nectar Plants

Early spring, summer, and fall flowering plants are important for adults during spring and fall migration

- Plant for all pollinators, including monarchs.
- Aim to provide an "ongoing pollinator buffet".
- Consider color, diversity, and bloom sequence (plant a 3x3 garden, which means 3 plants of 3 species for 3 seasons)
- Landscape context (even small spaces matter)
- Plant native plants!





Photos: Lisa Massie

Native Plants

Have evolved in our region and are adapted to our climate

Thrive with minimal maintenance and require significantly less irrigation than non-native plants

Over 90% of herbivore insects are specialists and rely on specific native plants for food



Monarchs Prefer Native Plants

Provide bloom throughout the breeding and migration seasons

Summer Bloomer	Summer Bloomer	Summer to Fall Bloomer	Summer to Fall Bloomer
<i>Asclepias incarnata</i> Swamp milkweed	Monarda fistulosa Wild bergamot	Solidago caesia Wreath goldenrod	<i>Liatris spicata</i> Dense blazing star



Photos Marlene Smith

Provide Shelter for Pupation



Photos Marlene Smith

Photo Xerces Society / Edward K. Boggess



We All Can Make Space for Monarchs

Gardens, Parking Strips, Office Landscapes, Natural Areas



Photos: Matthew Shepherd, Mace Vaughan, Kathryn Prince, Rod Gilbert





Infographic: Hungarian Entomological Society

Biodiversity is Key

Biodiversity refers to the number of different species present in the community

Communities with high biodiversity survive environmental change well



Bee's (or Butterfly's)-Eye View of a Neighborhood



Graphic: Xerces Society / Sara Morris



The "imperfect garden"



Video: Marlene Smith

Video: Alina Harris



Photo: Lisa Massie

Captive Rearing

Okay to rear a few for pleasure / fascination

- Captive rearing is not a successful conservation strategy
- Problems with OE parasites
- Adults can be less fit or smaller



Photo: Tricia J, Flickr



What More Can You Do?



Photo: Marlene Smith



Xerces Community Science

Monarch Nectar Plant Observations

Please share your monarch butterfly nectar plant observations with the Xerces Society!

Observations must include at least one photograph of the monarch and/or nectar plant.

Learn more about this project here: <u>https://xerces.org/monarch-nectar-plants/</u>.



If you have monarchs nectaring on native plants, scan this QR code to report.





Xerces Community Science

Nectar Plant Observations									
Plant species scientific name Start typing your species scientific name. If it is not listed, selec	lec Choose the best ecosystem type in which your observation occurred								
-Please select-	Beach Cultivated crops Locality Please describe the location								
Common name (optional)	Edge of lake or river Forest e								
	Garden/developed open space (
Location* Select how you would like to share the location of your observ	Hay/pasture Herbaceous we Time frame* What is the time frame of your observation?								
Select a point on a map	O Shrubland O Woody wetland O Specific date								
Record a state and county	Habitat Choose the best habitat type in which your observ								
	Rural Suburban Total nectaring* The number of monarchs observed on this species. If you don't remember how many you saw, please estimate to the best of your ability.								
	12 ³								

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xerces.org

Community Science

Other Organizations

Monarch Watch Monarch Joint Venture Journey North Project Monarch Health Monarch Larva Monitoring Project iNaturalist

Photo: Monarch Watch

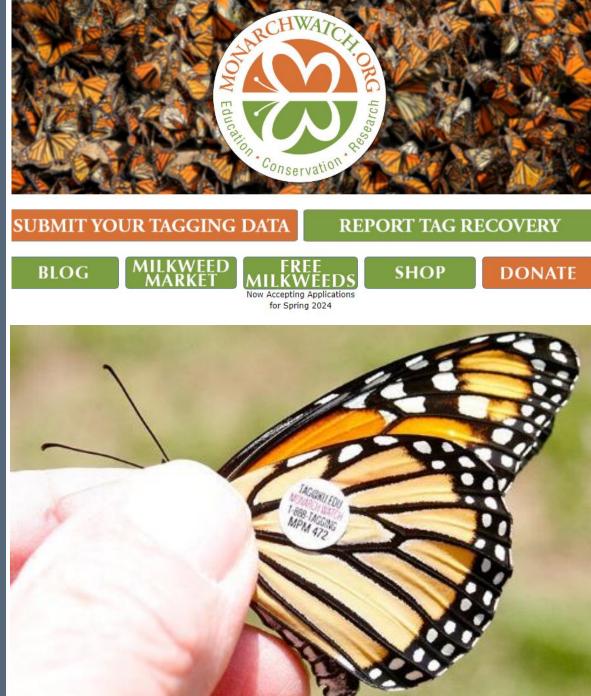






Photo: Xerces Society / Suzanne Granahan

Bring Back

the Pollinators

Sign the Pollinator Protection Pledge and follow the four principles: Grow pollinator-friendly flowers Provide nests & egg-laying sites Avoid using pesticides

Share the word

BringBackThePollinators.org





AN INITIATIVE OF THE XERCES SOCIETY



Bee City USA & Bee Campus USA bring people together to make their communities better places for pollinators—native bees, in particular—by increasing the abundance of native plants, providing nest sites, and reducing pesticides.

Affiliates commit to create habitat, reduce pesticide use, and host outreach activities.

Driven by local desire to help pollinators.







X Kids Program

Activity booklet with badge upon completion Target = grades 3–5 Individuals and groups Available in English and Spanish



Questions? xkids@xerces.org



ITTE



Learn More About Monarchs



Download from <u>xerces.org</u>

Guidelines & reports Fact sheets & brochures PROTECTING POLLINATORS FROM PESTICIDES Buying Bee-Safe Plants Maintaining Diverse Stands Monarch Habitat on Farms in of Wildflowers Planted for Pollinators Pollinator-Friendly Parks California's Central Valley ENHANCING OUR COMMUNITIES BY SUPPORTING NATIVE POLLINATORS IN OUR PARKS AND OTHER PUBLIC SPACES ESTABLISHING POLLINATOR MEADOWS course, new option now other relations deane in tene, Amerikada, Mariawahadherd Sendi Kasa Sendi P Silaren Sesara ta Angelatasa Bathel Protoan lem MacaYaa coxists as an Maney Loc recomment Anno 58 octained NATIVE MILKWEED PLANTING AND ESTABLISHMENT Mid-Atlantic Native Meadows Guide ines for Panning, Preparation, Design, IN THE WESTERN UNITED STATES installation, and Maintenance Western Menarch Management Windows Timing Management in Monarch XERCES SOCIETY Breeding Habitat Conservation Status and Ecology of the MILKWEEDS OF THE MID-ATLANTIC Monarch Butterfly in the United States 88 Mid-Atlantic NAME HAD to ande tange of names, notaring ment report annual size in cadante set hype durate to ande tange of names, notaring ment return annual size in cadante set hype durate tabilité. As require tout pleas to names General pleasant annualize, millered ple e visited/(10)-cole (an avera) Represent management that alone avitament to sport women for the game par balances temperative monitore and take in the to milkaweds in maduides in the Mith-Atlantic Region is epin units maps. Adult sectors for depend on directed and in the fixed during all steps of the pass, fixed, spring, sector bunching to bit segments and overwepering. New Sector Bandling to bit segments and overwepering. (10) which for all had beaches a basis would be basis manufactured and the for structure as the contrasts of many static part and which is the state and that a work would be ensure as the part and which would be account of many state with the count of summative solution work are a she wast and brind a manual states from some b) Do see private a service a service to the service of the ser MONARCH CONSERVATION particle when provide A Guide to Saving America's Butterfly The research the behavior and the second structure of the second structure of the behavior based structure of the second structure of the second structure structure of the second structure structu www.xerces.org The species to this path are adoptite to growing realization final action the Mol Alastic, Plane count repeat Stars, the Torie of South America, Starb, Kanathan Path Alas Depts Storeg Antimoto or the ISDA FEATUR Andress NatureServe THE XERCES SOCIETY Amploy theory in the costs, cP videoline has been building bearance of milloweed, the testimita-beed building being the has momental dis-needs tollithered for needs to highly the free predicted and bettered proves in which as overhilder. database Organigheature databases in poor aine. Because of the memoryly magniney at to protect and answer habout scream CARNEN XERCES xerces.org In since you, if "and in core in formations account what you than a for the procession for matching to be that will be rearranged by magnetized. MONARCH

Pollinator Conservation Resources: Mid-Atlantic Region

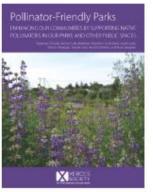


⁽Photo: Xerces Society / Mace Vaughan)

Welcome to our Pollinator Conservation Resources for the Mid-Atlantic Region! Here you'll find region-specific collections of publications, native plant and seed suppliers, and other resources to aid in planning, establishing, restoring, and maintaining pollinator habitat—as well as materials to help you learn about the species of invertebrates and native plants you might encounter. For more resources, see our <u>Publications Library</u> or learn about our <u>Pollinator Conservation Program</u>.



Pollinator-Friendly Parks

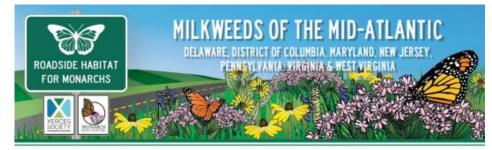


To support the work being done by park managers across the country, the Xerces Society has recently released <u>Pollinator-Friendly Parks</u>: Enhancing Our Communities by Supporting Native Pollinators in Our

https://xerces.org/pollinator-resource-center/mid-atlantic



Milkweeds of the Mid-Atlantic



Milkweeds (Asclepias spp.) are herbaceous perennial plants named for their milky sap. These plants occur in a wide range of habitats, including intact natural communities on roadsides and highly disturbed roadsides. As required host plants for monarch (*Danaus plexippus*) caterpillars, milkweeds play an essential role in the butterfly's life cycle (see reverse). Vegetation management that allows milkweeds to persist can support monarchs. This guide can help you recognize the most common native species found on roadsides in your region.



The most common milkweeds in roadsides in the Mid-Atlantic Region (in alphabetical order):



PLANT: Upright, unbranched stems; smooth. LEAVES: Opposite; ovalshaped; wavy margins; base of leaves clasp stem. HABITAT: Grasslands, open woodlands and edges. SOILS: Sandy, rocky; dry. BLOOM: Jun-Jul, light to dark pink with cream or light green.



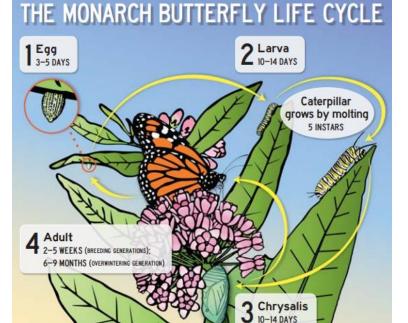
PLANT: One to many stout, upright, unbranched stems; usually with short dense hairs. LEAVES: Opposite; oval-shaped; hairy underneath. HABITAT: Grasslands, old fields, open woods, flood plains, disturbed areas. SOILS: Sandy to loamy, dayey or rocky; dry-wet. BLOOM: Jun-Aug, light purple or pink.



PLANT: One to many upright branched stems; smooth or with short hairs. LEAVES: Opposite; lance-shaped or narrow; with few short hairs. HABITAT: Moist grasslands and ditches, edges of ponds, swamps, lakes, streams. SOILS: Silly to loamy or clayey; moist-met, tolerates some mesic. BLOOM: Jul-Aug; lightto dark pink or rose purple.



PLANT: One to many spreading to upright stems; with short hairs; lacks milky sap. LEAVES: Alternate; lance-shaped; hairy underneath. HABITAT: Grasslands, old fields, open woods, pine barrens, disturbed areas. SOILS: Sandy, loamy, rocky. dry-mesiz. BLOOM: Lun-Aug, orange to red or yellow.



https://xerces.org/publications/fact-sheets/roadsidehabitat-for-monarchs-milkweeds-of-mid-atlantic



Monarch Nectar Plants: Mid-Atlantic



of a spin Work of the first howard should be also and for by patients

The Mol-Allantic region encompanies the states of North their entry range. Adult esseanchi-depend on diverse accter cardina, Veginia, West Veginia, Maryland, Delawars, and anusce for food diaring all stages of the year, from spring.

https://xerces.org/publications/plant-lists/monarchnectar-plants-mid-atlantic



Bloom	Common Name	Scientific Name	Flower Color	Max. Height	Water Needs	Notes			
	Forbs			(Feet)	Low, Medium, or High	All species are perennials unless otherwise noted. Monarchs are present April through July and again from late August to November in the Mid-Atlantic.			
1 2 Summer 3 4	Common milkweed	Asclepias syriaca	Pink	8	М	Monarch caterpillar host plant. Drought tolerant. Considered undesirable in livestock forage.			
	2 Joe-pye weed	Eutrochium fistulosum	Pink/purple	7	М	Great nectar plant that attracts many pollinator species.			
	3 Swamp milkweed	Asclepias incarnata	Pink	4	М	Monarch caterpillar host plant.			
	4 Wild bergamot	Monarda fistulosa	Purple/pink	3	L	Aromatic foliage. Flowers attract butterflies, bees, and hummingbirds.			
and widequired insertiolds are not probably also contributing. Plant Alian (http://bosed.ast/lago), or the URDA PLANTS									

xerces.org

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is meanth deltars. Because of the monanchi mignatory database (http://plasta.unda.gov) for details on specied

He cycle, it is important to protect and mitter habitat across distributions in your area.



Native Plants for Pollinators & Beneficial Insects:





Resources

These plants are attractive transforments of pullbacture, providing pullbacture and instanits lease and bacterilate, as well as how, hereine, surger and reactive, herein plants pertain additional resources, supporting are planted bacterilate and earlies, and https://xerces.org/publications/plant-lists/native-plantsfor-pollinators-and-beneficial-insects-mid-atlantic

SCIENTIFIC NAME	COMMON NAME	BLOOM	LIFE	FORM	SUN	SOIL	ADDITIONAL DETAILS ①
Acer rubrum	Red maple	Mar-Apr	Р	+	Ø Ø	w	🐛 🕸 🐨
Amelanchier canadensis	Canadian serviceberry	Apr-May	Р	† a	Ø Ø	М	🐛 🎕 📽
Asclepias incarnata*	Swamp milkweed	JUN-SEP	Р	\$0	Ø Ø	w	⊾ 🕸 🐨 🖊 🛞
Asclepias syriaca	Common milkweed	JUN-AUG	Р	\$0	Ø Ø	D-M	L 🌣 🐨 1/ 8
Asclepias tuberosa	Butterfly milkweed	Jun-Aug	Р	\$0	Ø Ø	D	L 🎕 🐨 1/ 8
Baptisia tinctoria*	Yellow wild indigo	JUN-AUG	Р	ŝ	\$	D	٤. 🕸





Local Native Plant Sources



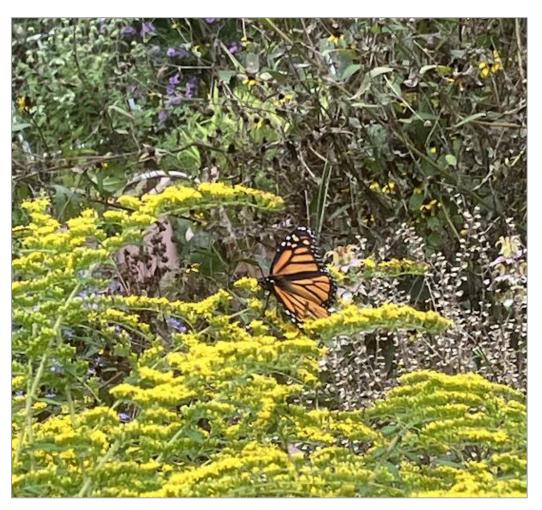


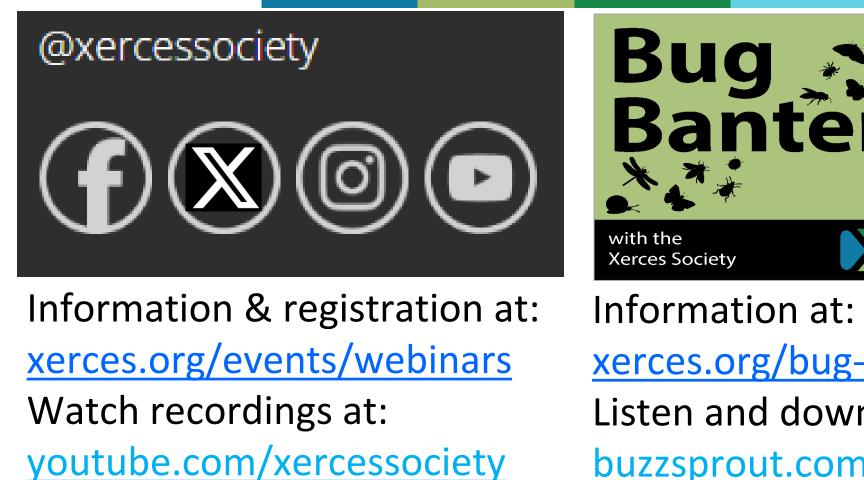
Photo: Marlene Smith



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Map: Maryland Native Plant Society

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Make a Difference!

We are a donor-supported nonprofit. The work we do depends on everyone! Make a difference for the invertebrates you love by becoming a Xerces member today!





Xerces is 501(c)(3) *nonprofit and contributions are tax-deductible.*





Take Away Messages

- Monarchs are AMAZING creatures!
- We are still learning about their migrations and over wintering sites.
- What you do in your space matters!
- Enhancing habitats and reducing pesticides provides direct benefits to your space and are vital in reversing monarch declines.
- You can contribute to monarch knowledge through community science programs.



Thank You to Xerces' Partners

We don't work in isolation—the Xerces family is large and diverse

- Over 17,000 Xerces Society members in 15+ countries.
- Scores of private foundations that provide funding.
- More than 100 scientists at universities around the world.
- Dozens of federal, state, and local agencies.
- Hundreds of farmers and land managers that have worked with us on habitat projects.
- Over 50 companies supporting us.
- Thousands of people who act to protect invertebrates in their neighborhoods.



Questions?

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Photo: Marlene Smith