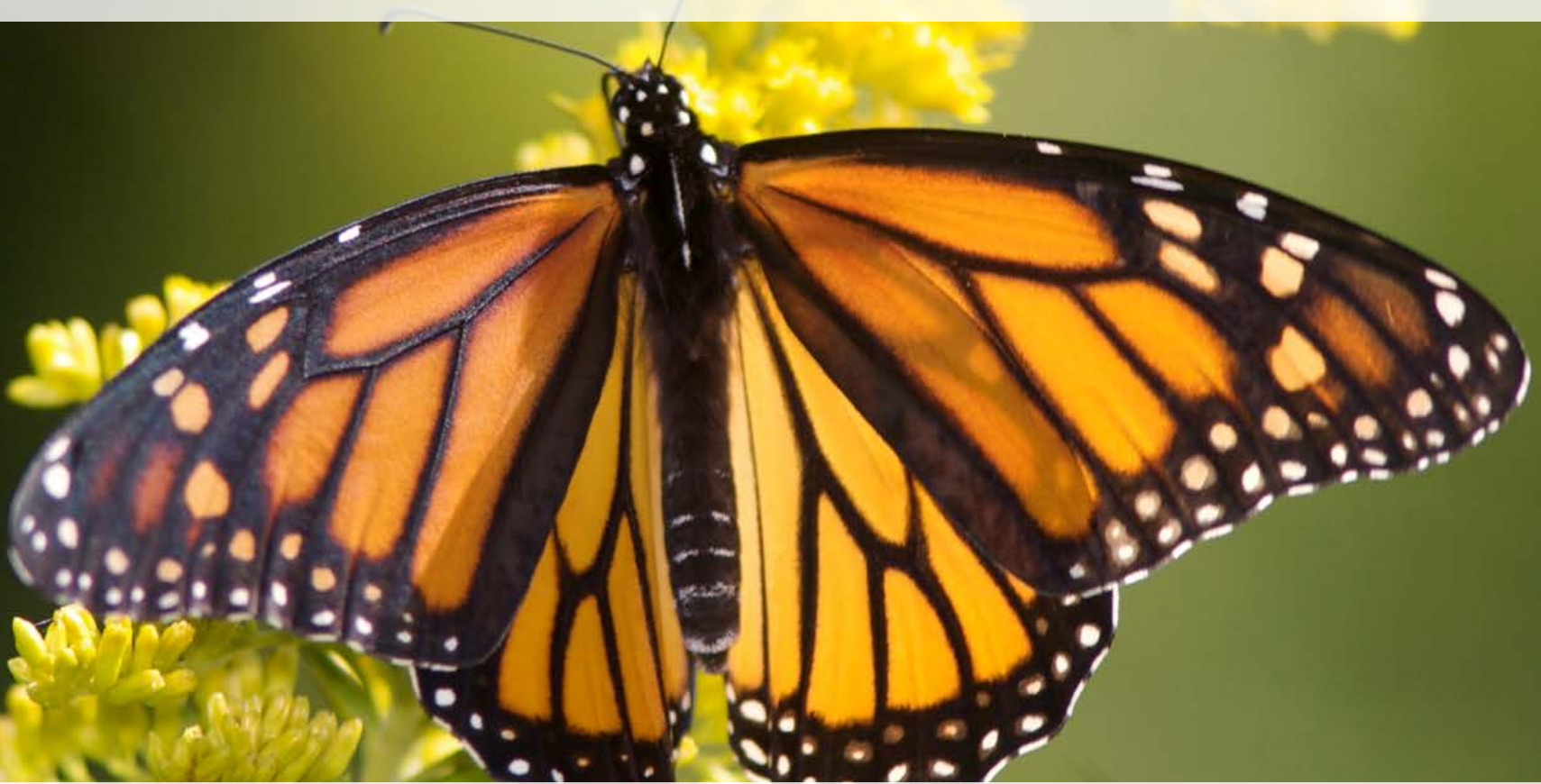


Monarch 101



Presented by **Anne Stine**, The Xerces Society for Invertebrate Conservation



United States Department of Agriculture

Decline in Migratory North American Monarch Butterflies



Photograph courtesy of Samuel.



United States Department of Agriculture

Monarch Population Decline

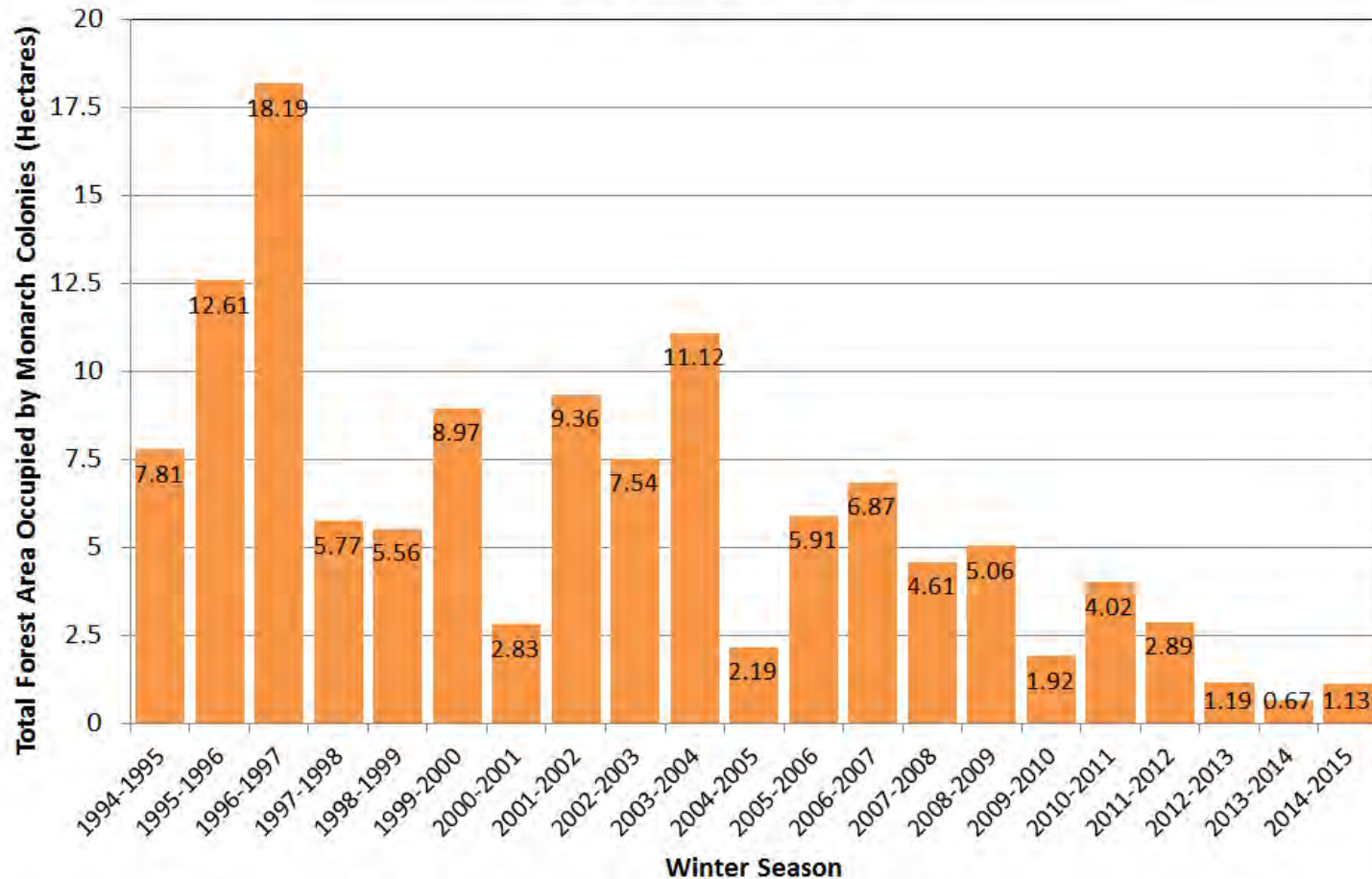
In the 1990s, hundreds of millions of monarch butterflies made the flight each fall from the northern plains of the United States and Canada to sites in the oyamel fir forests north of Mexico City.

In 2014, only 56.5 million made that trip.



The 2013-2014 population represents a 90% decline from the 20-year average.

**Total Area Occupied by Monarch Colonies At Overwintering Sites in Mexico
1994/1995 - 2014/2015**

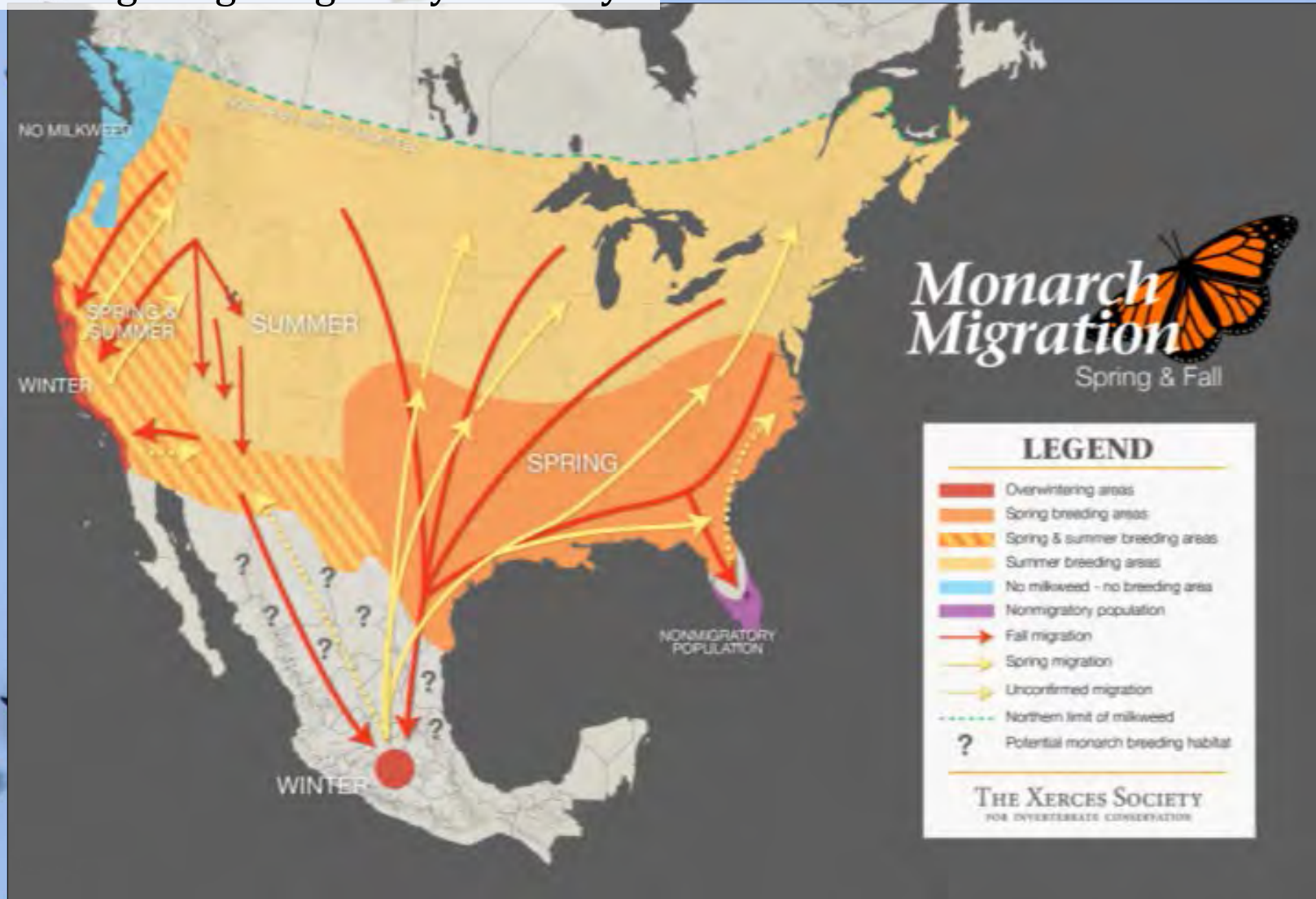


data from 1994-2003 were collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Protected Natural Areas (CONANP) in Mexico. Data from 2004-2015 were collected by the WWF-Telcel Alliance, in coordination with the Directorate of the MBBR. 2000-01 population number as reported by Garcia-Serrano et. al (The Monarch Butterfly: Biology and Conservation, 2004)

Monarch Butterfly Biology



A true long-range migratory butterfly.





United States Department of Agriculture

Monarch Life Cycle

Breeding generations live two to six weeks.

Overwintering generation lives up to nine months.

Photograph courtesy of Andrea Schieber.

Monarch butterfly (*Danaus plexippus*)





Egg



Pupa



First Instar



Fifth Instar

Egg → Adult ≈ One Month

Host Plants



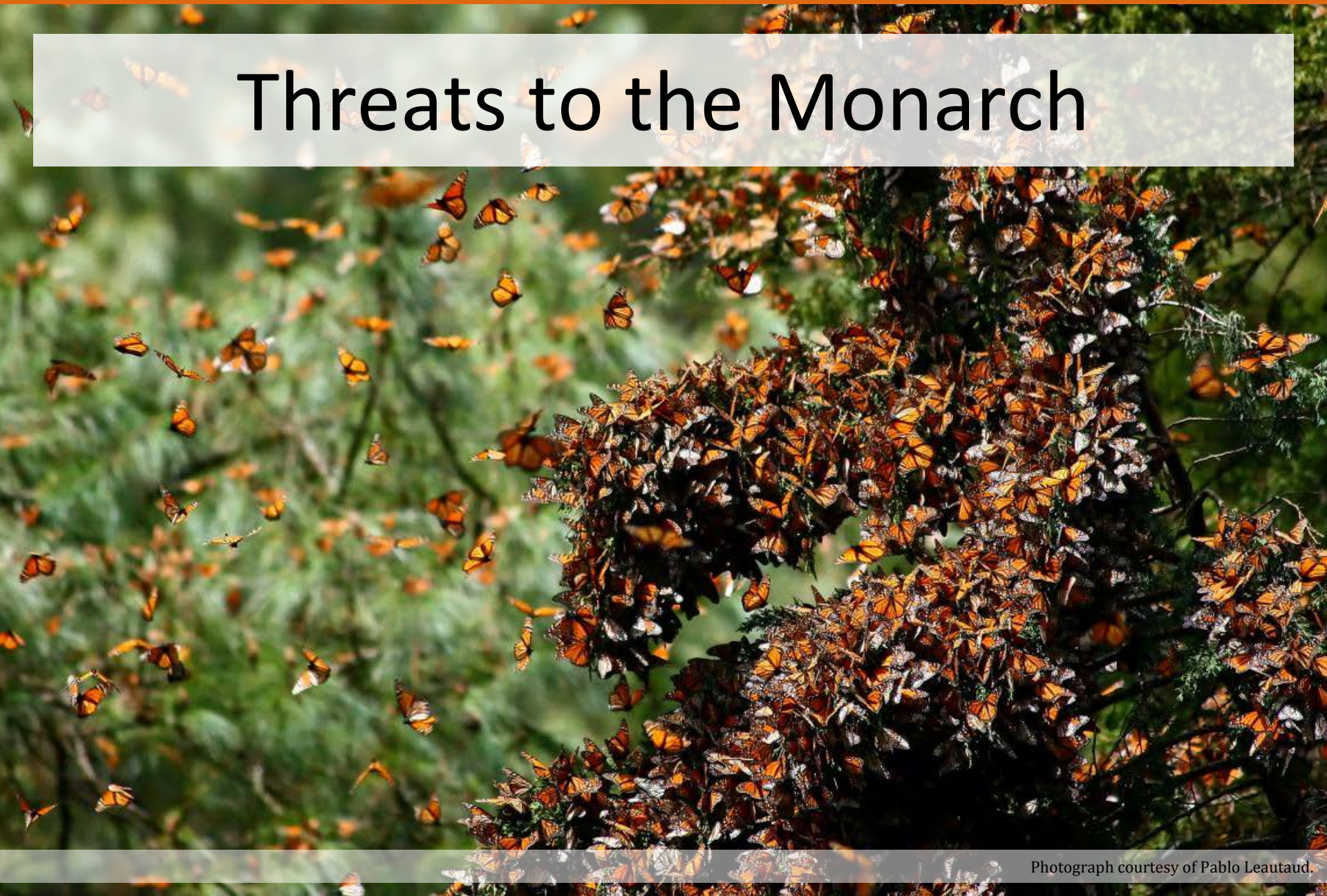
Nectar Plants





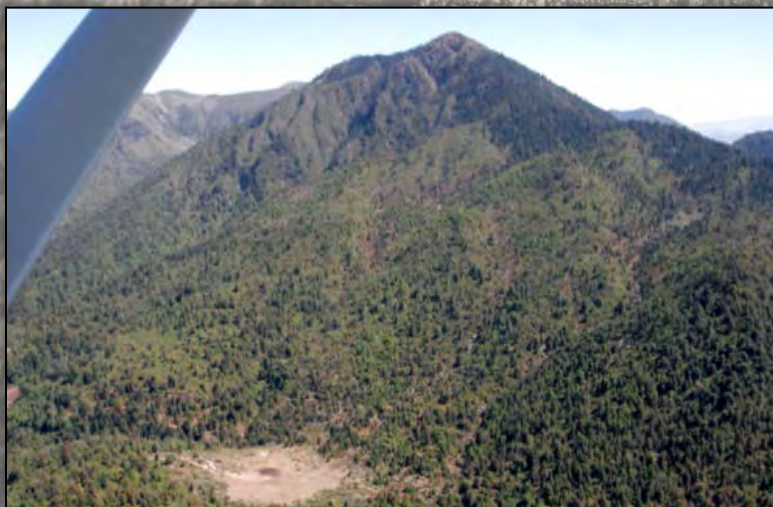
United States Department of Agriculture

Threats to the Monarch

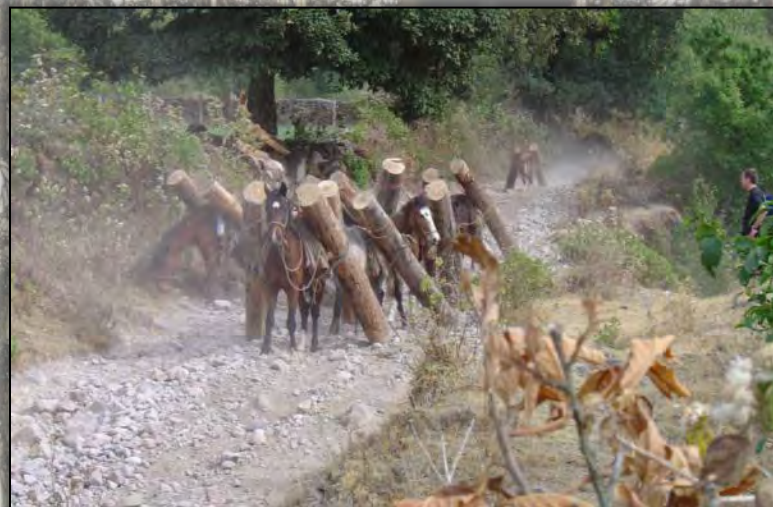


Photograph courtesy of Pablo Leautaud.

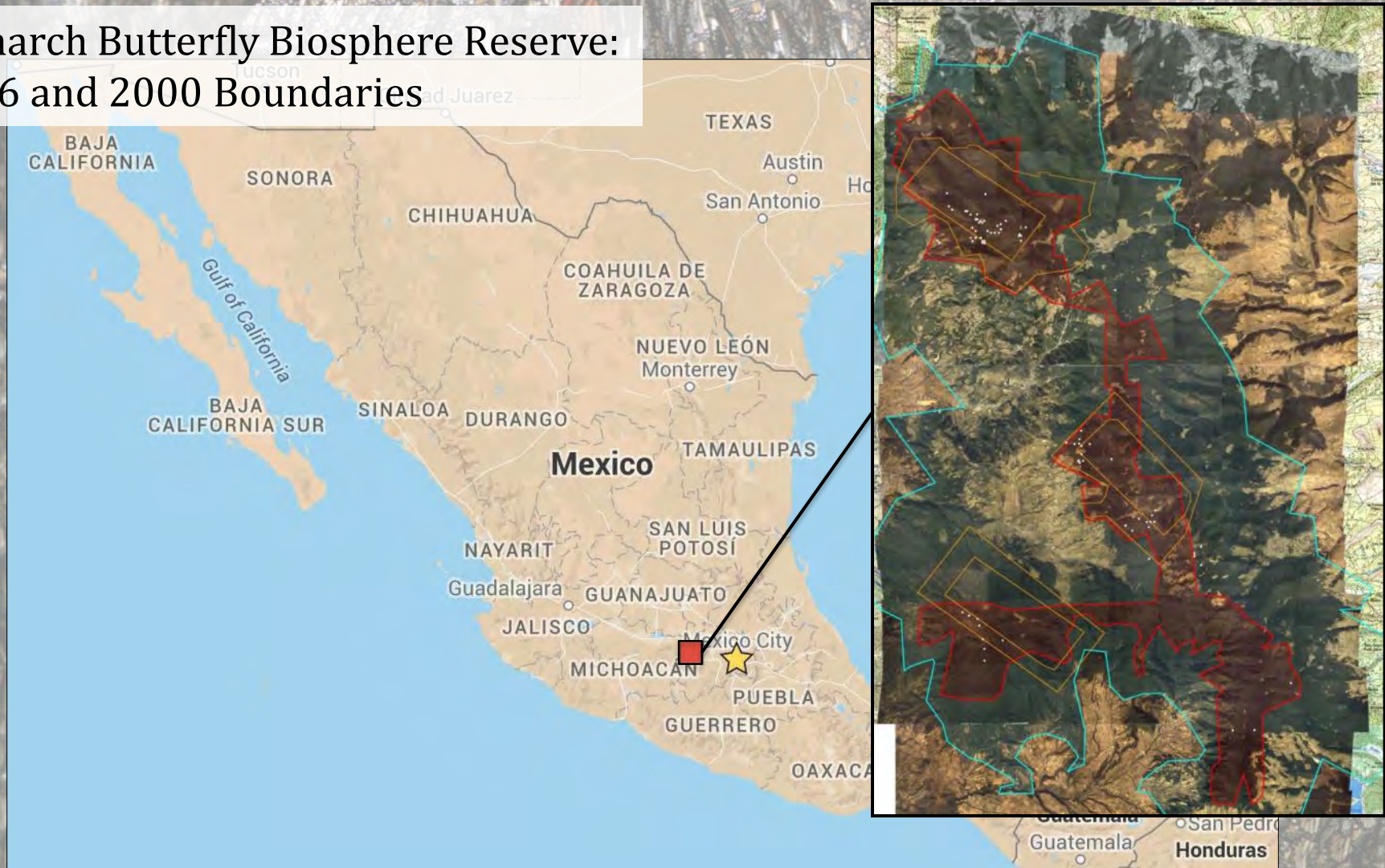
Deforestation



Forest Degradation



Monarch Butterfly Biosphere Reserve: 1986 and 2000 Boundaries





United States Department of Agriculture

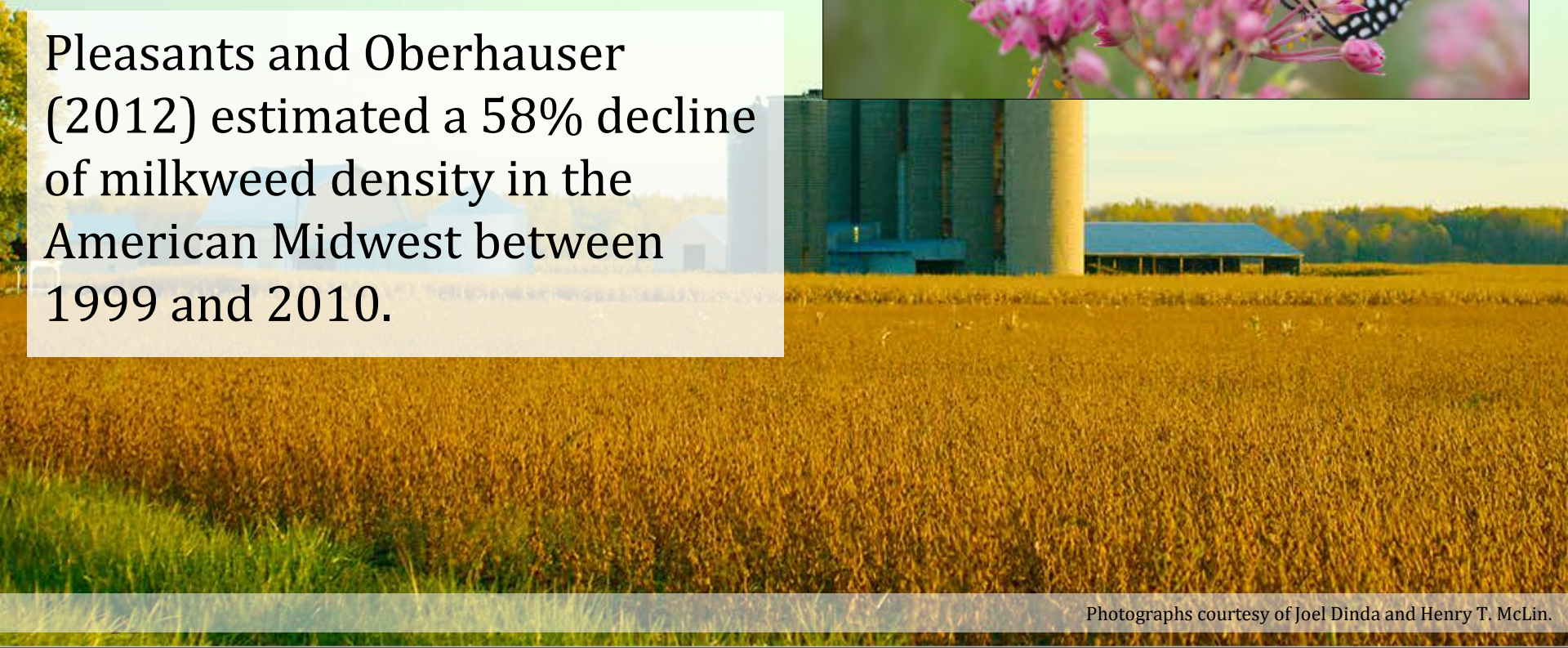
Threats: Habitat Loss in the United States



Photographs courtesy of Brianna Borders, The Xerces Society, Carol Von Canon, and Steven Katovich, USDA Forest Service.

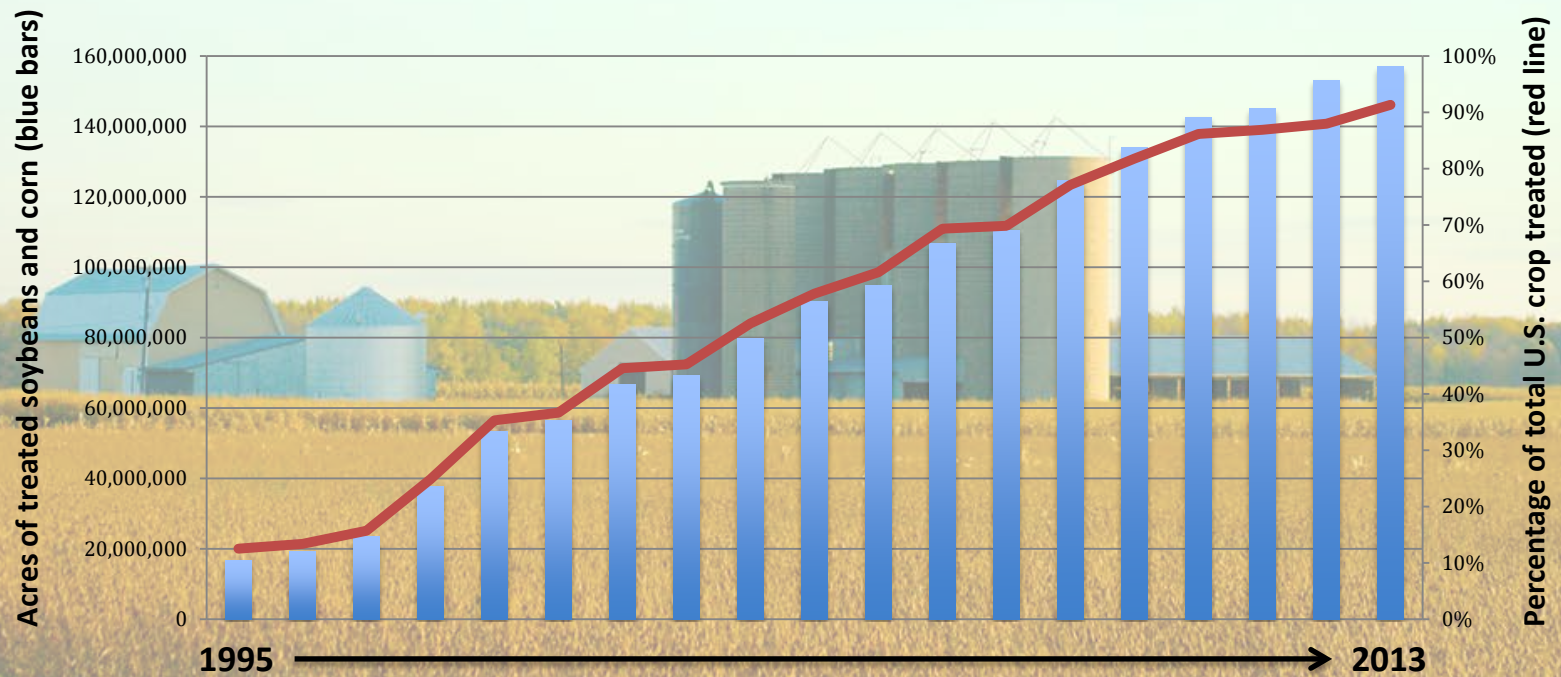
Widespread reduction of breeding habitat in the United States due to large scale agricultural monoculture, especially of glyphosate resistant crops.

Pleasants and Oberhauser (2012) estimated a 58% decline of milkweed density in the American Midwest between 1999 and 2010.

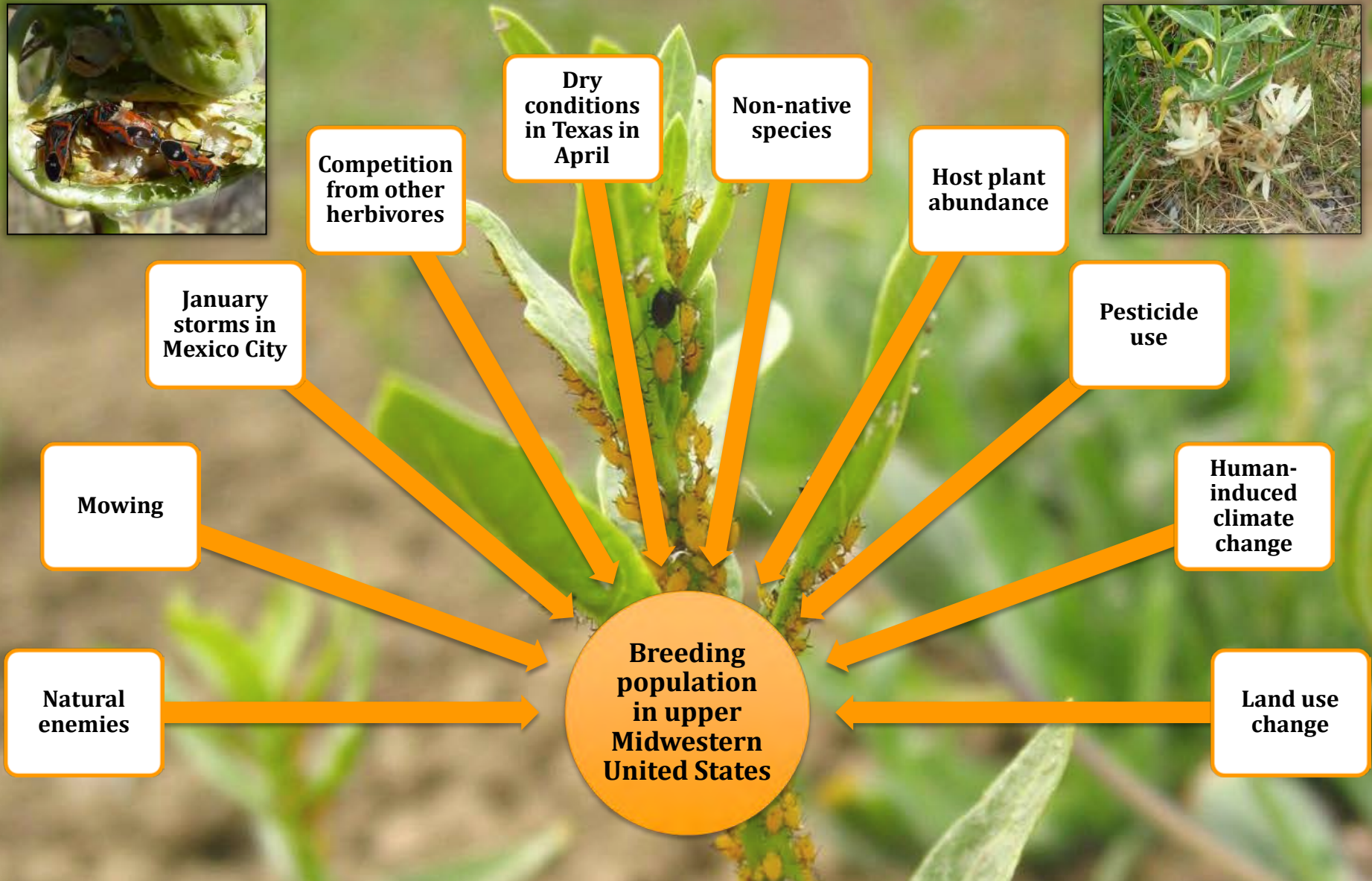


Acres of crops treated with glyphosate:

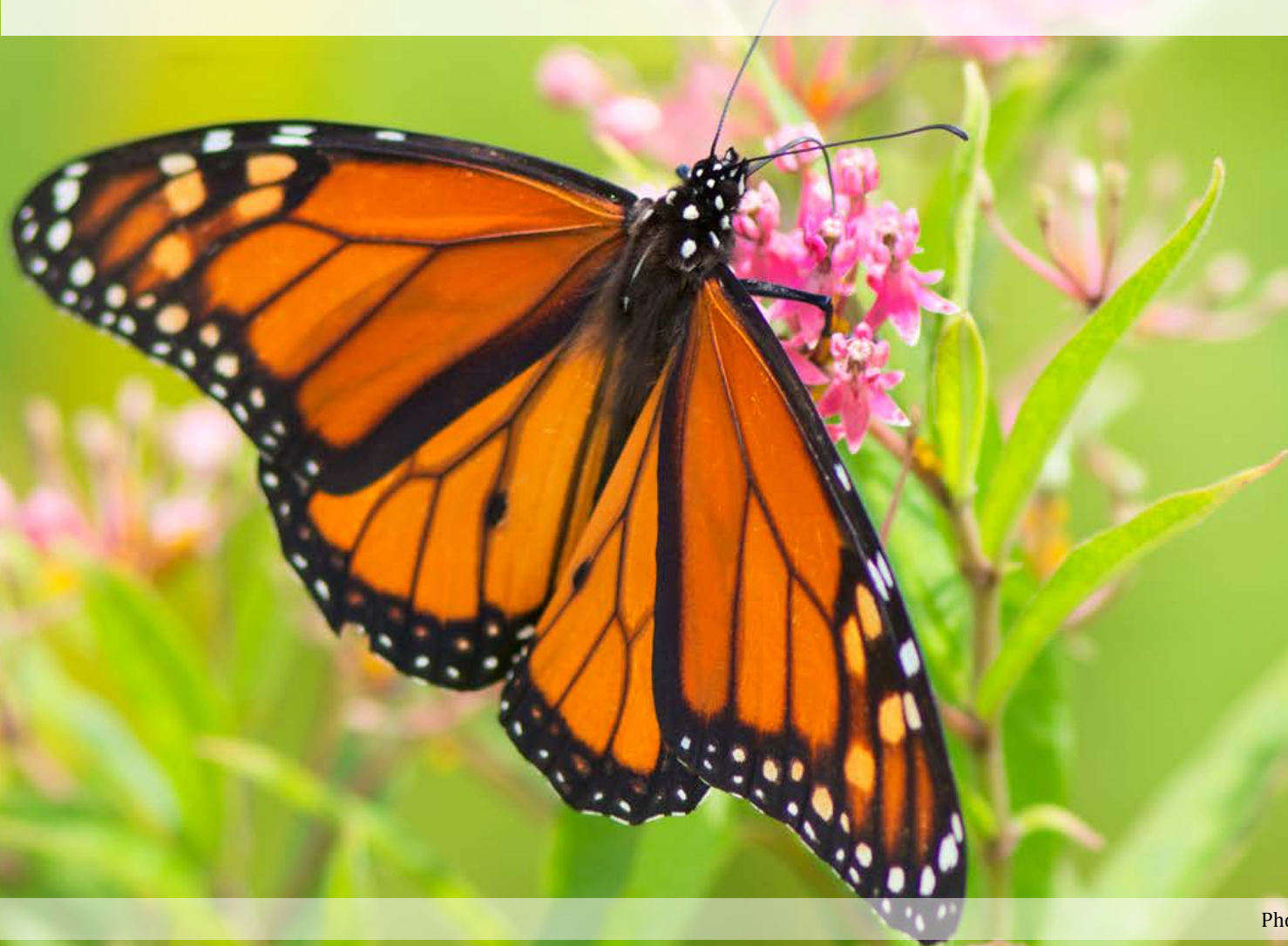
- 1995: 20 million
- 2013: >155 million



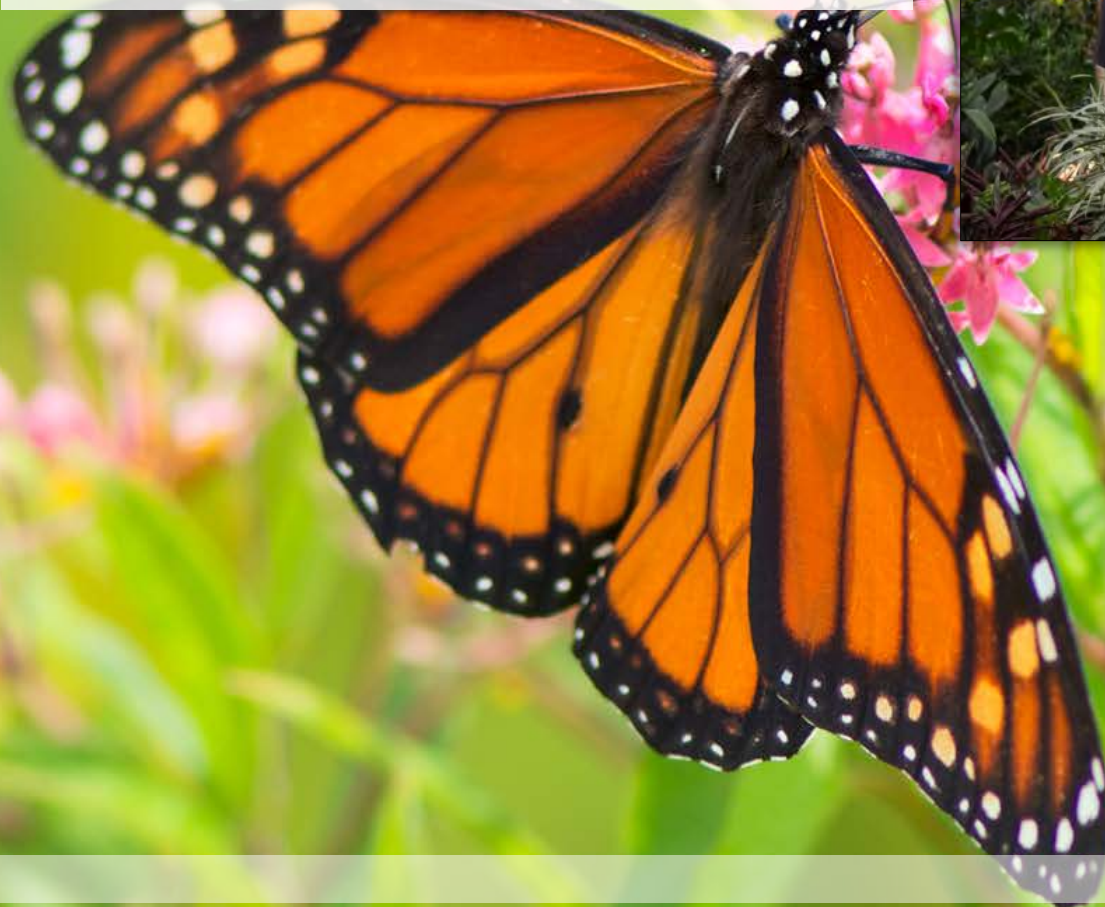
Factors Influencing Monarch Populations



Monarch Conservation



President Obama, President Peña Nieto, and Prime Minister Stephen Harper discussed the issue during the February 2014 North American Leaders' Summit in Mexico.



June 2014:
Presidential Memorandum¹
***Creating a Federal Strategy to
 Promote the Health of Honey Bees
 and Other Pollinators***

“Pollinator losses have been severe. The number of migrating Monarch butterflies sank to the lowest recorded population level in 2013-14, and there is an imminent risk of failed migration.”

“...it is critical to expand Federal efforts and take new steps to reverse pollinator losses and help restore populations to healthy levels.”

¹<http://www.whitehouse.gov/the-press-office/2014/06/20/presidential-memorandum-creating-federal-strategy-promote-health-honey-b>



The Presidential Memorandum assigned tasks to federal agencies:

U.S. Fish and Wildlife Service

- **Develop a “High Level Monarch Working Group”.**

Partners: Agency heads—Forest Service, National Park Service, Bureau of Land Management, Federal Highway Administration, USDA’s Natural Resources Conservation Service, and others. *Two ex-officio members:* Scott Hoffman Black, The Xerces Society, and Karen Oberhauser, University of Minnesota.

- **Work with agencies and NGO’s in the United States, Mexico, and Canada to update and revise the North American Monarch Conservation Plan.**

Partners: Monarch Joint Venture, World Wildlife Fund Mexico.



The Presidential Memorandum assigned tasks to federal agencies:

U.S. Geological Survey

- **Develop a recovery plan for the eastern population of monarchs.**

Partners: Monarch Joint Venture, Make Way for Monarchs, Monarch Watch, The Xerces Society, leading scientists.

U.S. Forest Service

- **Develop an assessment of monarch status.**

Partners: NatureServe, The Xerces Society.

U.S. Department of Agriculture

- **Provide incentives for monarch conservation on private lands.**

Partner: The Xerces Society.



NRCS strategy:

1. Educate staff and field office personnel
2. Establish and manage monarch habitat

In north: plant milkweed & wildflowers

In south: land management

Goal: increase milkweeds and other
native nectar plants

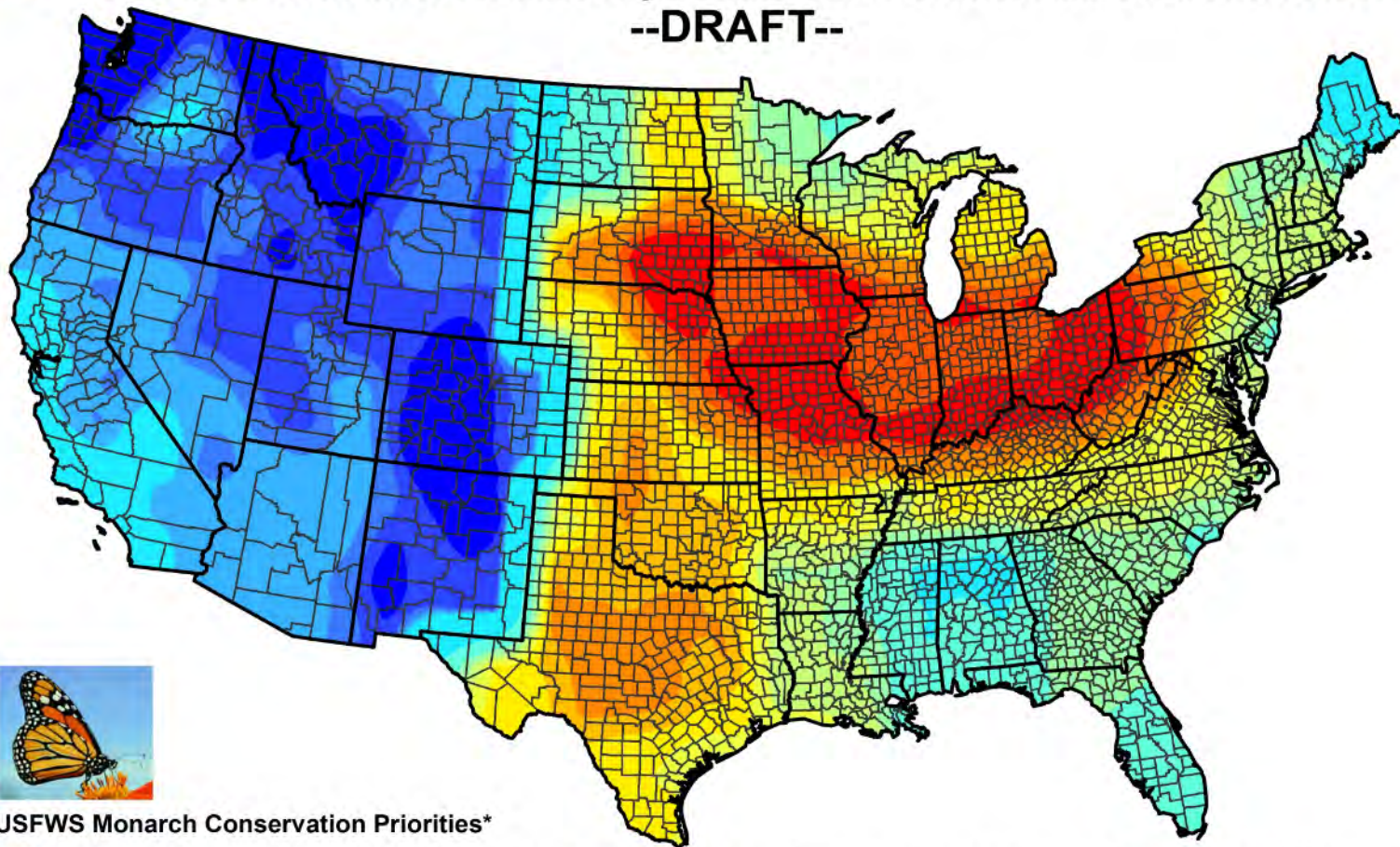




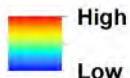
U.S. Fish and Wildlife Service

USFWS Monarch Butterfly National Conservation Priorities

--DRAFT--



USFWS Monarch Conservation Priorities*



**This map is intended to inform U.S. Fish and Wildlife Service national-scale monarch butterfly conservation work. It was created using tools developed by the USGS-led Monarch Science Partnership, in this case highlighting priorities for maximizing over-wintering population-level outcomes through a combination of focusing on geographic priorities, opportunity areas, and threats to be avoided. This is a DRAFT version and can be re-scaled or customized for different decisions and/or scales; updates will be ongoing, using the best available science.*



United States Department of Agriculture

Monarch Conservation: Mexico

World Wildlife Fund and scientists such as Lincoln Brower are working with the Mexican government to protect overwintering sites in Mexico.

Photograph courtesy of Pablo Leautaud.

If we hope to maintain populations of monarchs, we must:

- 1) Protect natal habitat that remains.
- 2) Promote large scale habitat projects that include milkweed and a diversity of other flowering native plants.



It is vital that we work to restore large areas of milkweed habitat.

- Native milkweed is not available for sale in many parts of the monarch range.
- Where it is available, it is expensive.

To address this seed shortage, the Xerces Society launched *Project Milkweed*.





United States Department of Agriculture

The Xerces Society: Project Milkweed

Resources & Publications:

Milkweed Seed Finder:

A national directory of milkweed seed vendors to help you find sources of seed.

www.xerces.org/milkweed-seed-finder

Milkweed Seed — FINDER —

Resources & Publications:

A series of regional guides to the native milkweeds of North America—including the Central United States—developed in cooperation with the USDA–NRCS.



Pollinator Plants of the Central United States
Native Milkweeds
(*Asclepias* spp.)



June 2013

The Xerces Society for
Invertebrate Conservation
www.xerces.org



THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION



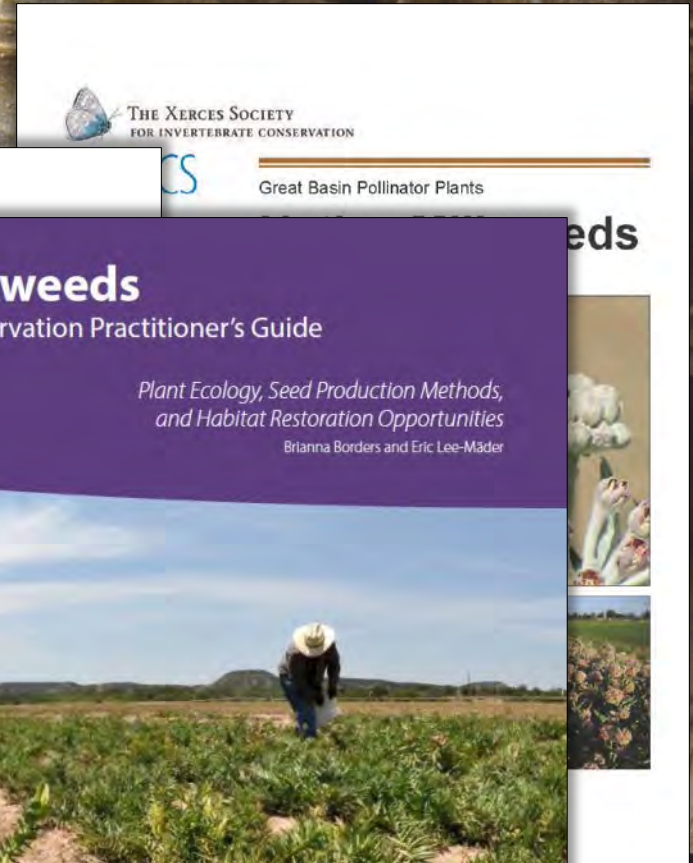
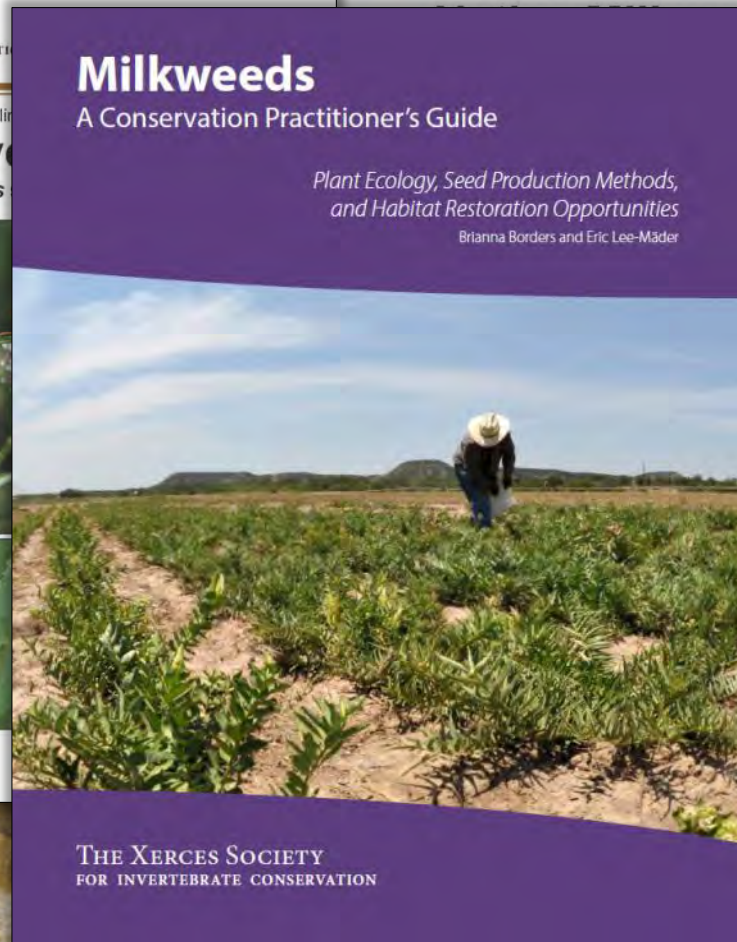
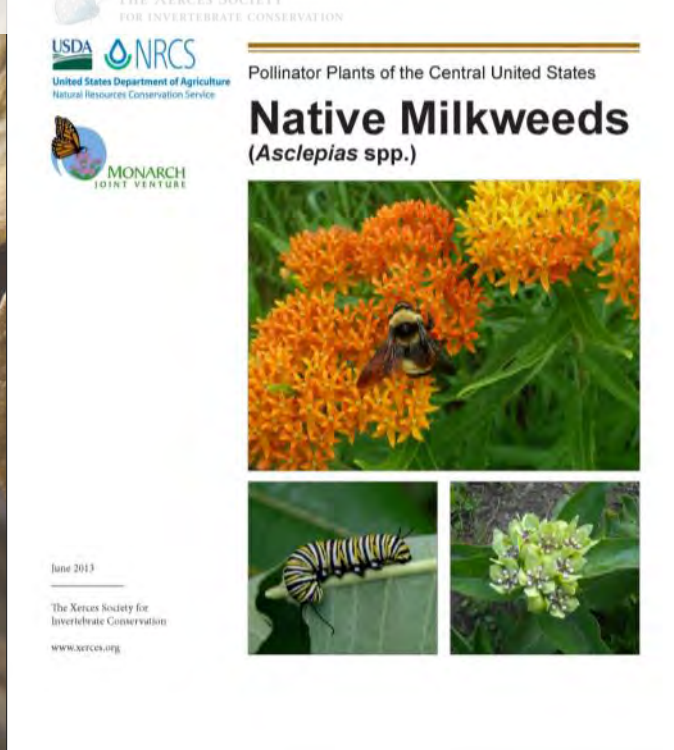
Great Basin Pollinator Plants

Native Milkweeds
(*Asclepias* spp.)



Resources & Publications:

...and *Milkweeds: A Conservation Practitioner's Guide*, the first-of-its-kind manual on large-scale milkweed seed production, nursery propagation, and habitat restoration.

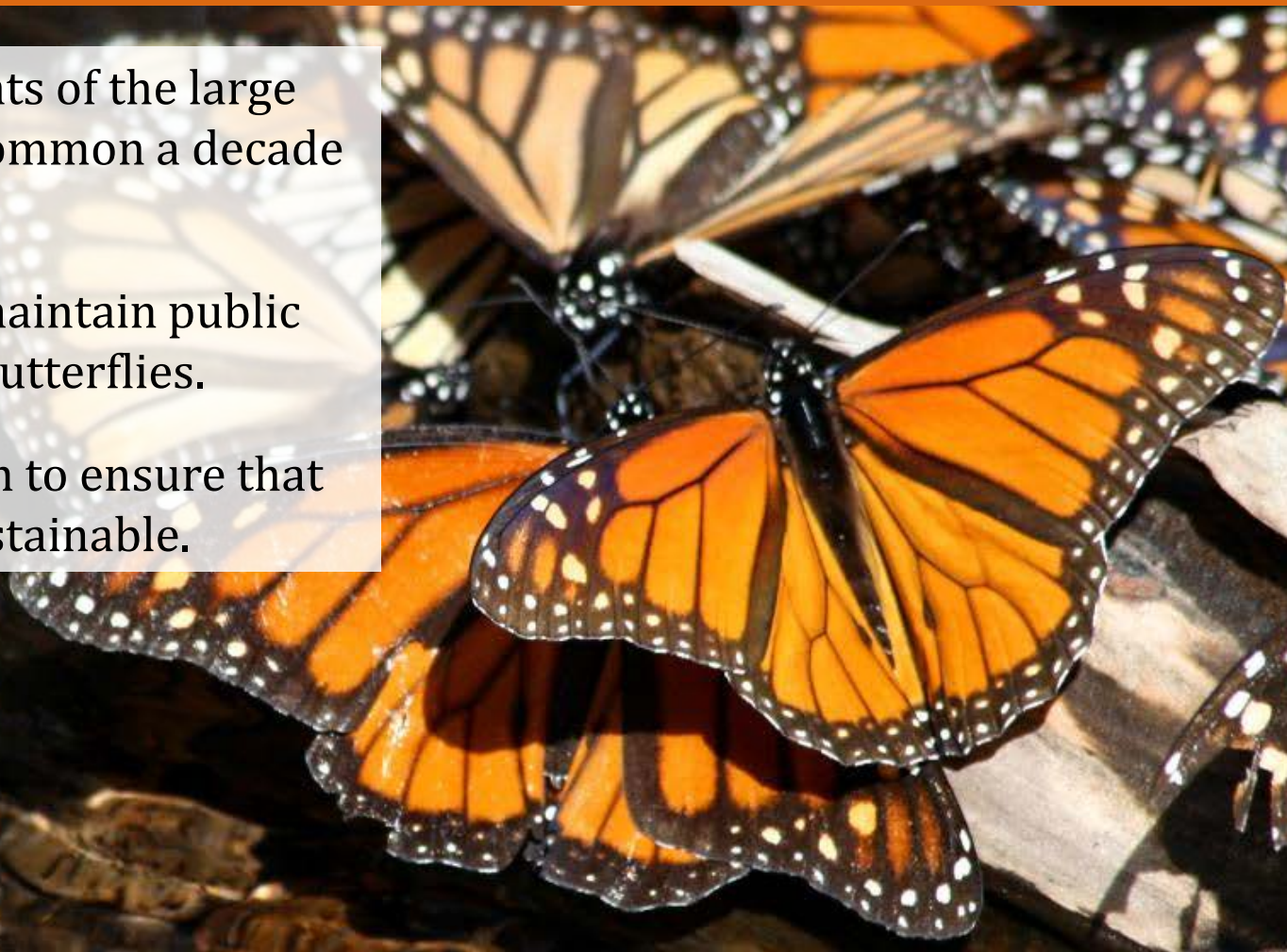




We may not see repeats of the large numbers that were common a decade ago.

We need to work to maintain public interest in monarch butterflies.

We must do all we can to ensure that the new normal is sustainable.





Authors

This presentation created by Anne Stine and Mace Vaughan of The Xerces Society for Invertebrate Conservation, and Wendy Caldwell of the Monarch Joint Venture for the use of USDA–NRCS personnel.

Layout

Sara Morris, The Xerces Society.

Photographs

We thank the photographers who generously allowed use of their images: Brianna Borders, The Xerces Society; Lincoln Brower, Sweet Briar University; CameliaTWU*; Richard Crook (crookrw)*; Joel Dinda (joeldinda)*; Marion Doss*; Stephen Harper (PM Stephen Harper)*; Eric Heupel (eclectic echoes)*; Stephen Katovich, USDA Forest Service, Bugwood.org; Pablo Leautaud (Pablo Leautaud.)*; Eric Lee-Mäder, The Xerces Society; Henry T. McLin*; Justin Meissen (jmeissen)*; Douglas Mills (dmills727)*; Karen Oberhauser, University of Minnesota; Karan Rawlins, University of Georgia, Bugwood.org; Samuel (_sjg_)*; Andrea Schieber (AnSchieber)*; ScottN*; Ken Slade (TexasEagle)*; Tina Shaw, USFWS Midwest (USFWSmidwest)*; The White House*; U.S. Department of Agriculture (USDAgov)*; Carol Von Canon (Big Grey Mare)*; Rebekah D. Wallace, University of Georgia, Bugwood.org; Brett Whaley*. Copyright of all photographs remains with the photographers.

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Any questions?

