

All Hands on Deck: Conserving a Flagship Species

Jennifer Thieme
Monarch Joint Venture

Lake Wisconsin Alliance
Annual Meeting
August 25, 2018

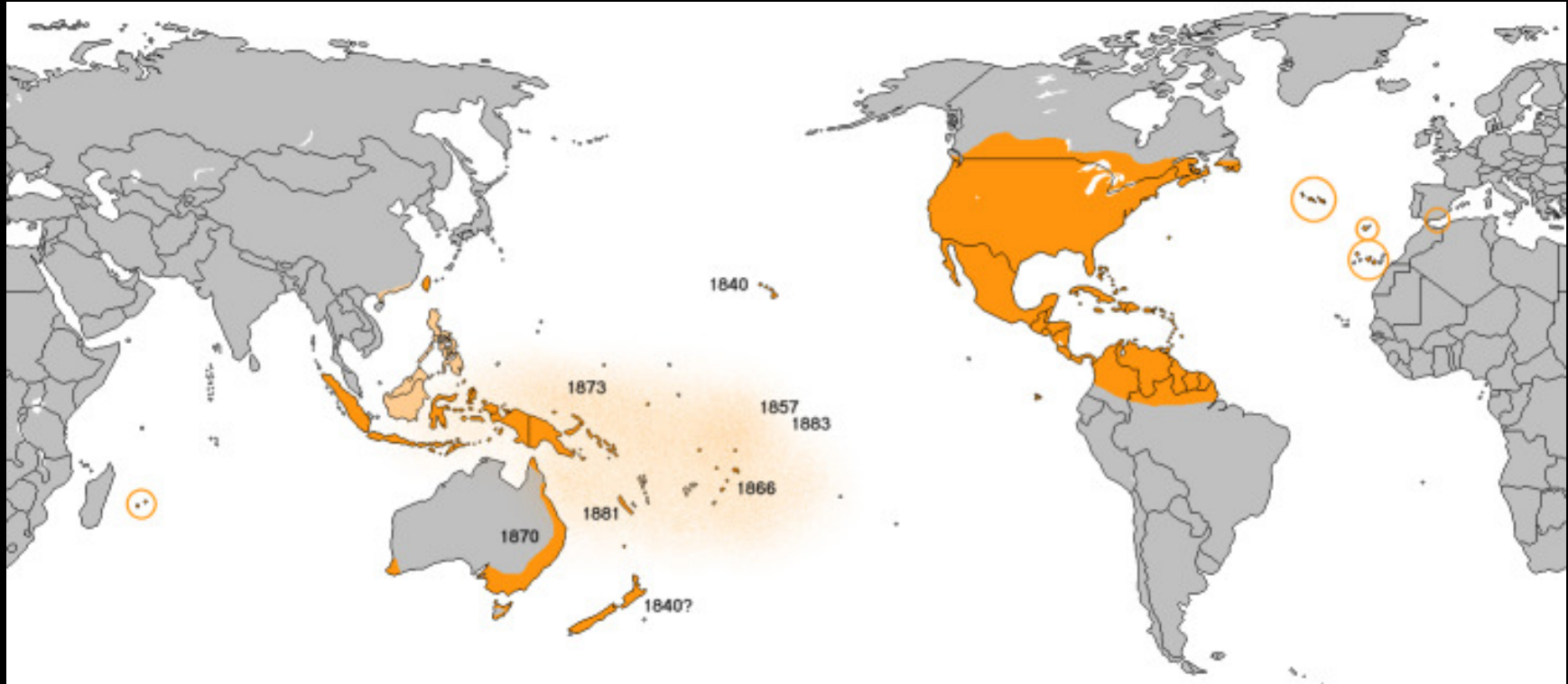


MONARCH
JOINT VENTURE

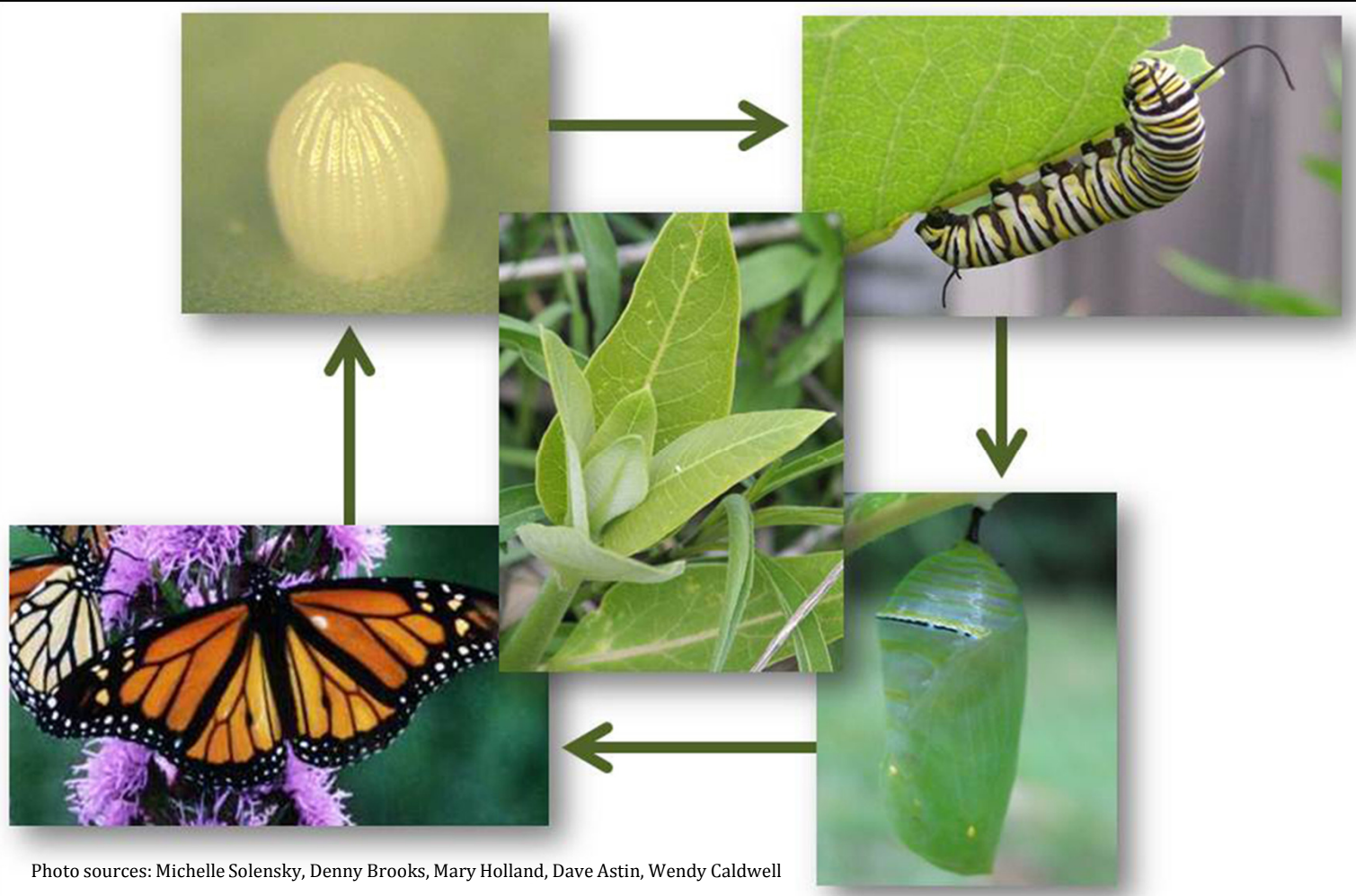
MONARCH JOINT VENTURE



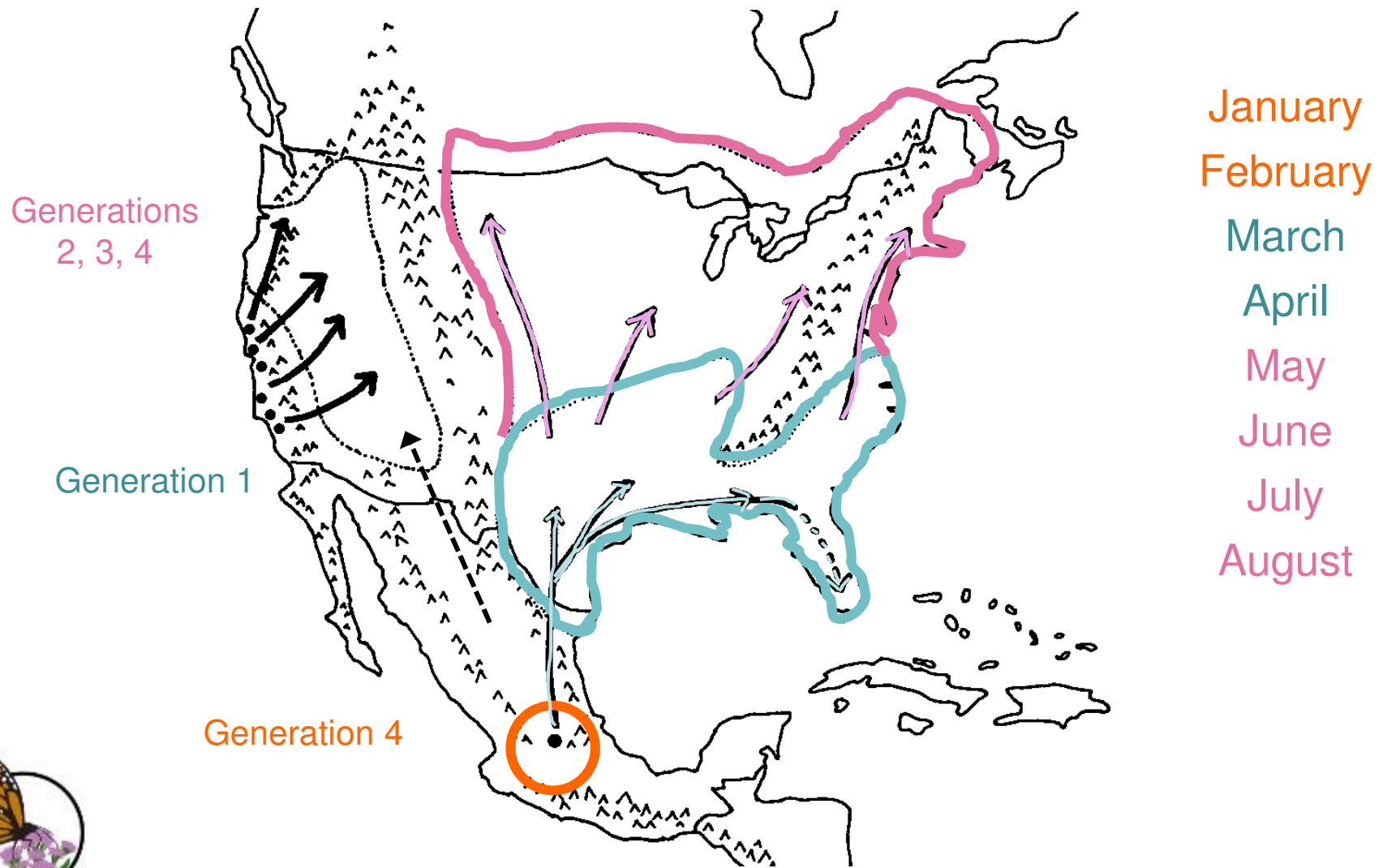
Monarch: *Danaus plexippus*



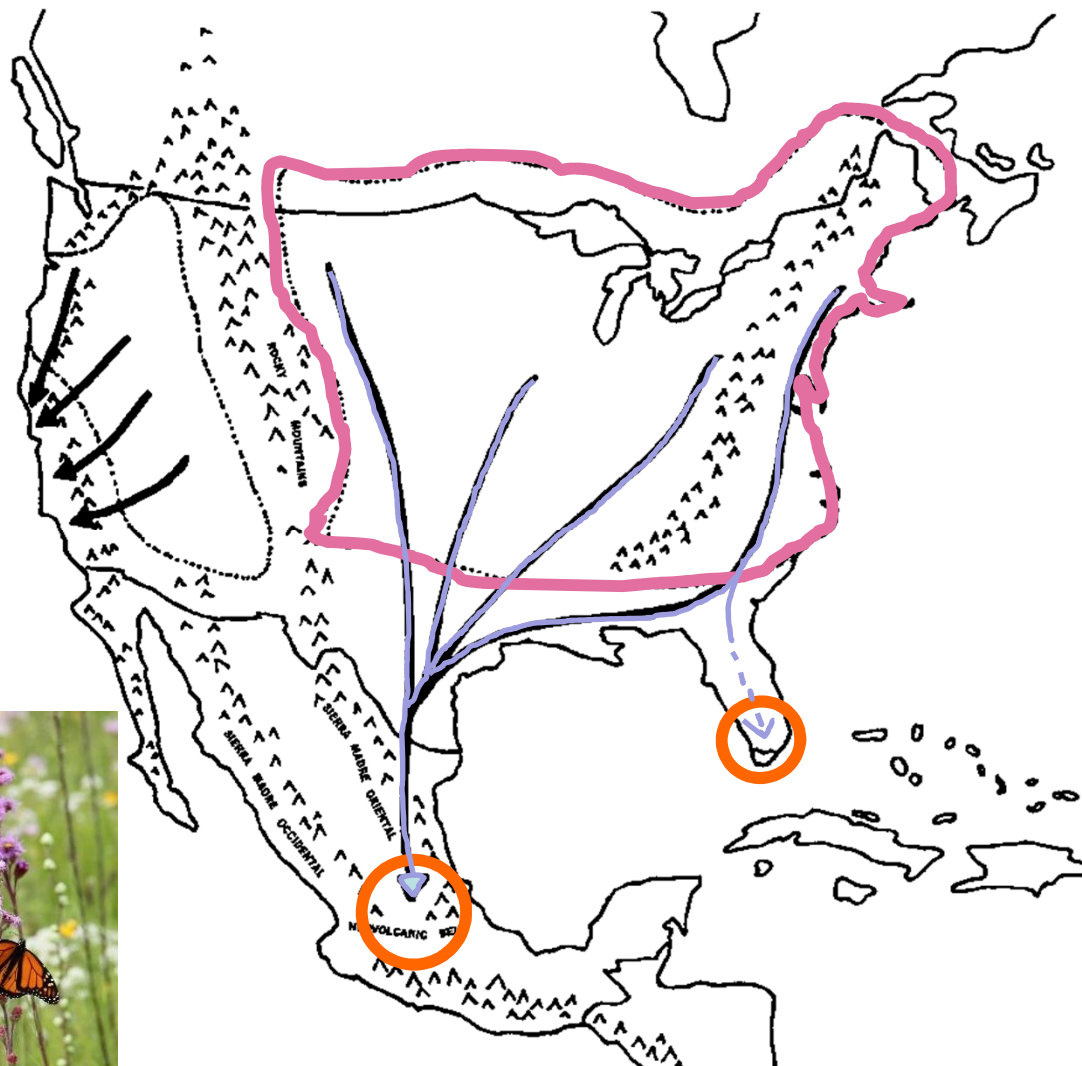
Monarch Life Cycle



Monarch Annual Cycle



Fall Migration



January
February
March
April
May
June
July
August
September
October
November
December

Population Decline

(Eastern population)

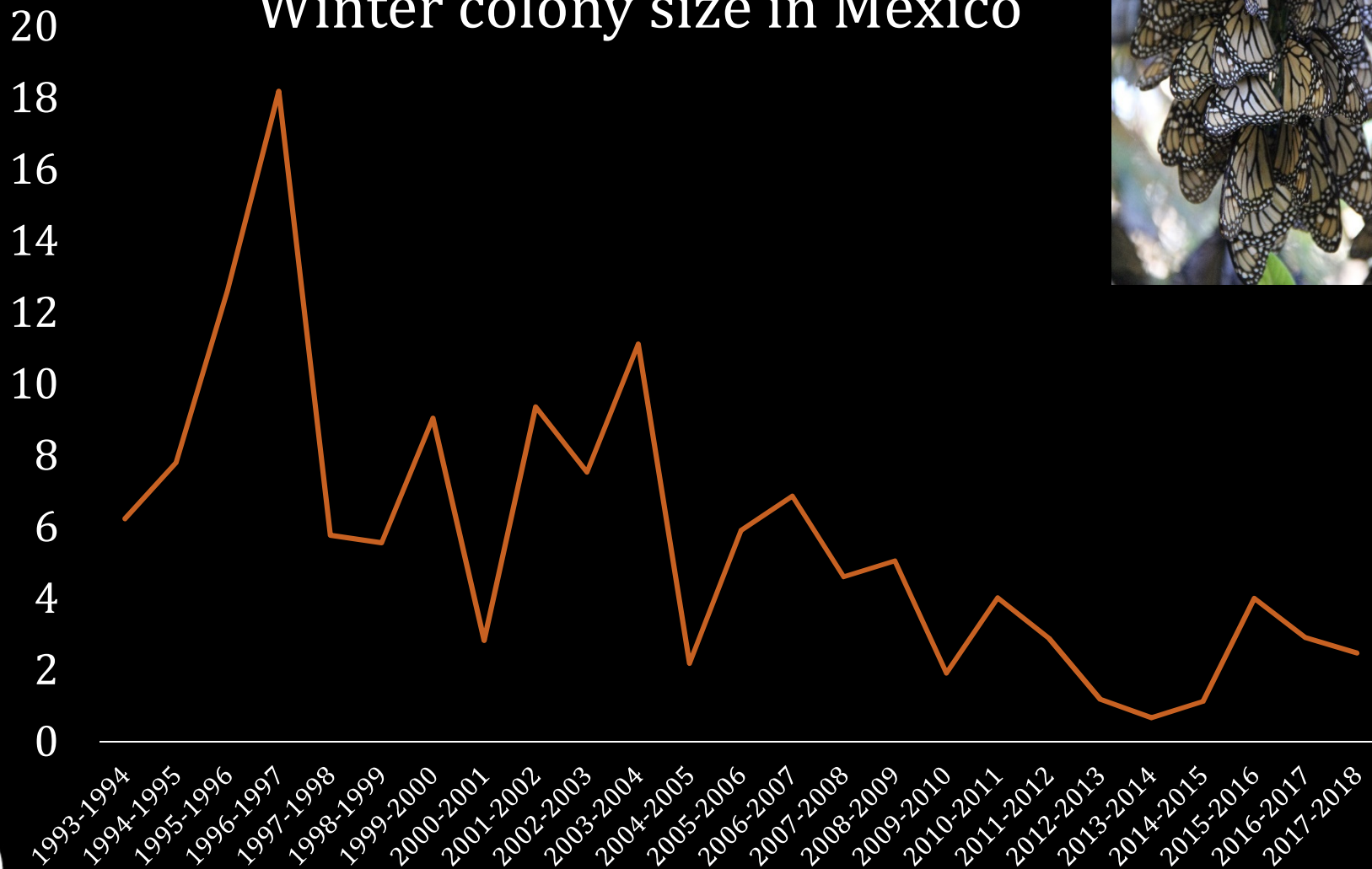
Winter colony size in Mexico



Area Occupied (Hectares)

20
18
16
14
12
10
8
6
4
2
0

1993-1994
1994-1995
1995-1996
1996-1997
1997-1998
1998-1999
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004
2004-2005
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2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2015-2016
2016-2017
2017-2018



Threats to Monarchs

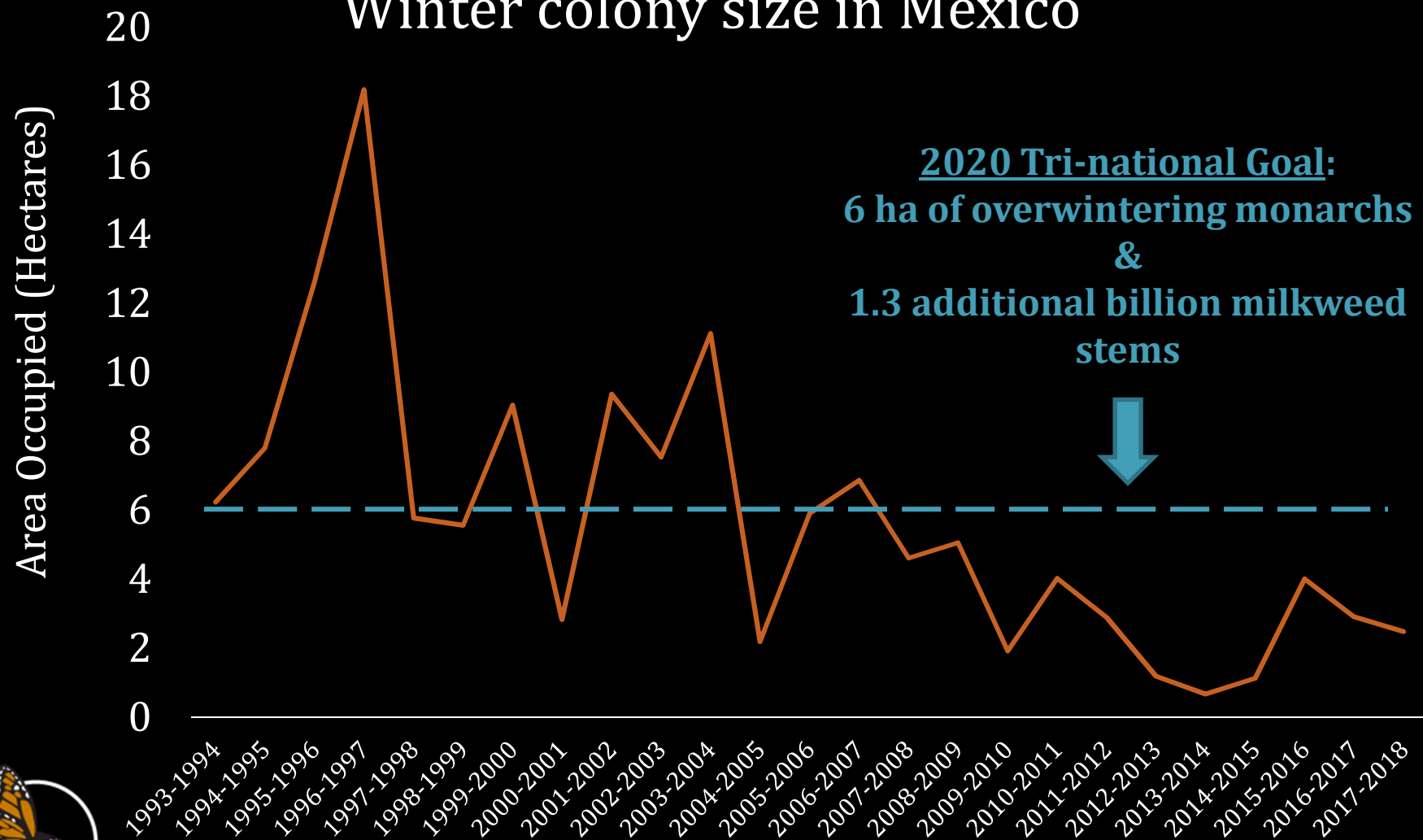
- Habitat loss
 - Overwintering grounds
 - Breeding grounds
- Insecticides
- Climate change
- Natural predators
- Vehicle Collisions
- Disease
 - Ophryocystis elektroscirrha (OE)



Population Decline

(*Eastern population*)

Winter colony size in Mexico



Where can we put those milkweeds?

- Rights of way? ✓
- Developed spaces? ✓
- Agricultural lands?
(marginal & conservation) ✓
- Protected grasslands? ✓
- Unclassified grasslands? ✓



Thogmartin et al. 2017

Benefits of Pollinator Habitat

- More pollinators!
 - *Bees to pollinate crops & gardens, butterflies to watch, host-specific or habitat-sensitive species*
- Grassland bird & game species
- Carbon sequestration
- Mental health/well-being
- Water quality protection
 - *Improve groundwater infiltration*
 - *Slow runoff flow*
 - *Improve quality of surface water*



Upland sandpiper



Filter/Prairie Strips in Ag

- HABITAT

- 5x greater density of scrub/shrub birds
- 2x bee species richness
- Wider strips →
 - More obligate grassland birds
 - More habitat-sensitive & large butterflies (incl. monarch)

- WATER QUALITY

- 10% strip →
 - 90% reduction in sediment loss
 - 89% reduction in P loss on surface
 - 84% reduction in N loss on surface



☐ ROW ☐ Developed ☒ Ag/Marginal ag ☐ Protected grassland ☐ Unclassified grassland

Riparian Buffers

- HABITAT

- >5m wide &/or fenced →
 - Greater bee and butterfly diversity
 - Higher # of bees & butterflies



- WATER QUALITY

- Highly variable: landscape context, width, veg, etc.
- 88%+ reduction in nitrates from organic soils
- 61%+ reduction in P*

*Seasonal, short term, variable



☒ ROW ☒ Developed ☒ Ag/Marginal ag ☐ Protected grassland ☐ Unclassified grassland

Rain Gardens

- HA

- WA

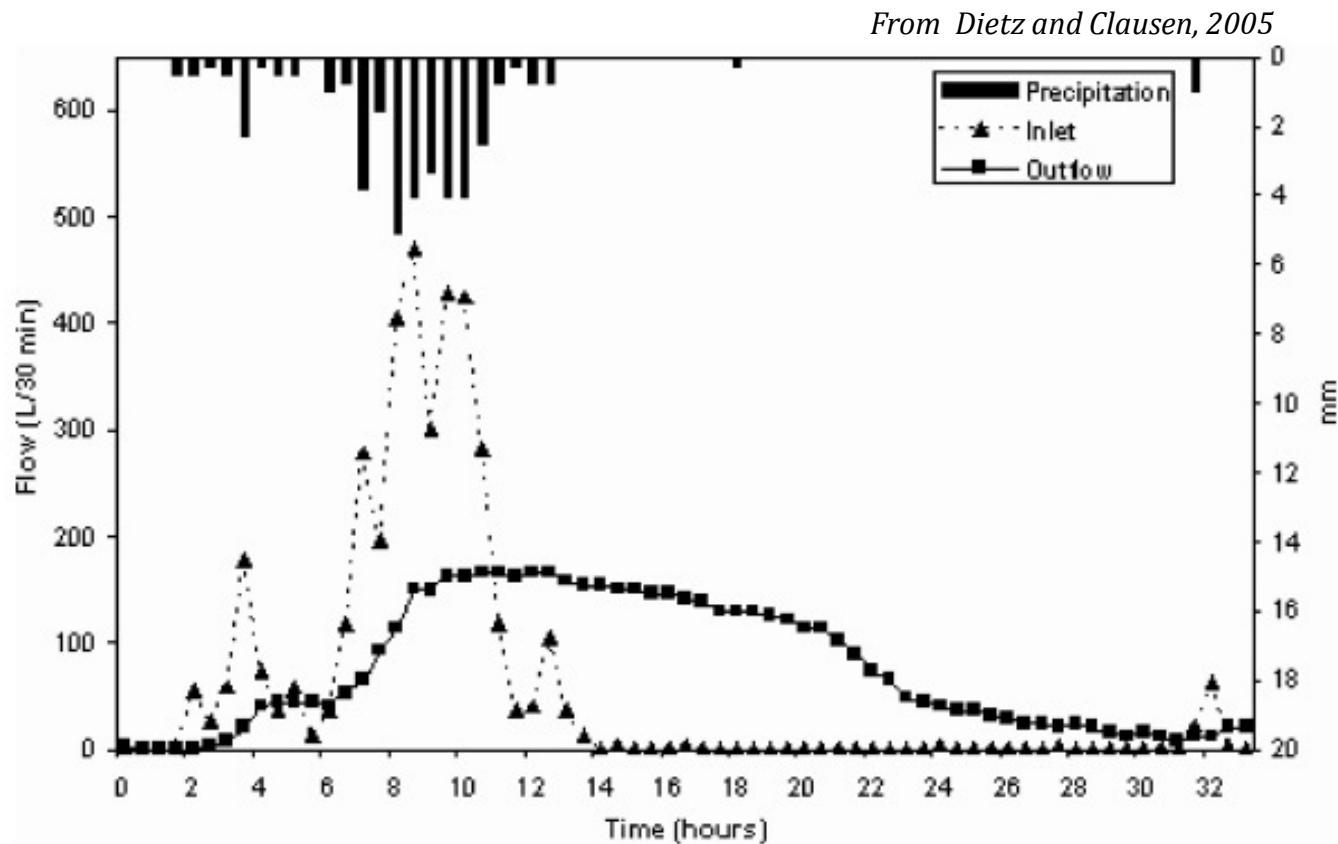


Figure 3. Precipitation, inflow, and outflow (underdrain) for one event, Haddam rain garden.

ty



☒ ROW
 ☒ Developed
 ☐ Ag/Marginal ag
 ☐ Protected grassland
 ☐ Unclassified grassland

Vegetated Swales

- HABITAT
 - “Native vegetation or turfgrass” – WI DNR
 - Similar to rain gardens
- WATER QUALITY
 - Sediment removal (*highly variable*)
 - Up to 60% removal of total N
 - 44% reduction in copper (*with native veg*)
 - 15% reduction in lead (*with native veg*)



☒ ROW ☒ Developed ☐ Ag/Marginal ag ☐ Protected grassland ☐ Unclassified grassland

Measuring Change

- Water quality ← Cit. Lake Monitoring Ntwk
- Birds ← eBird
- Bees ← WI Bumble Bee Brigade
- Frogs/Toads ← WI Frog/Toad Survey
- Dragonflies ← WI Odonata Survey
- Rare plants ← WI Rare Plant Monitoring
- Pollinator Habitat/
Monarchs ← Integrated Monarch
Monitoring Program



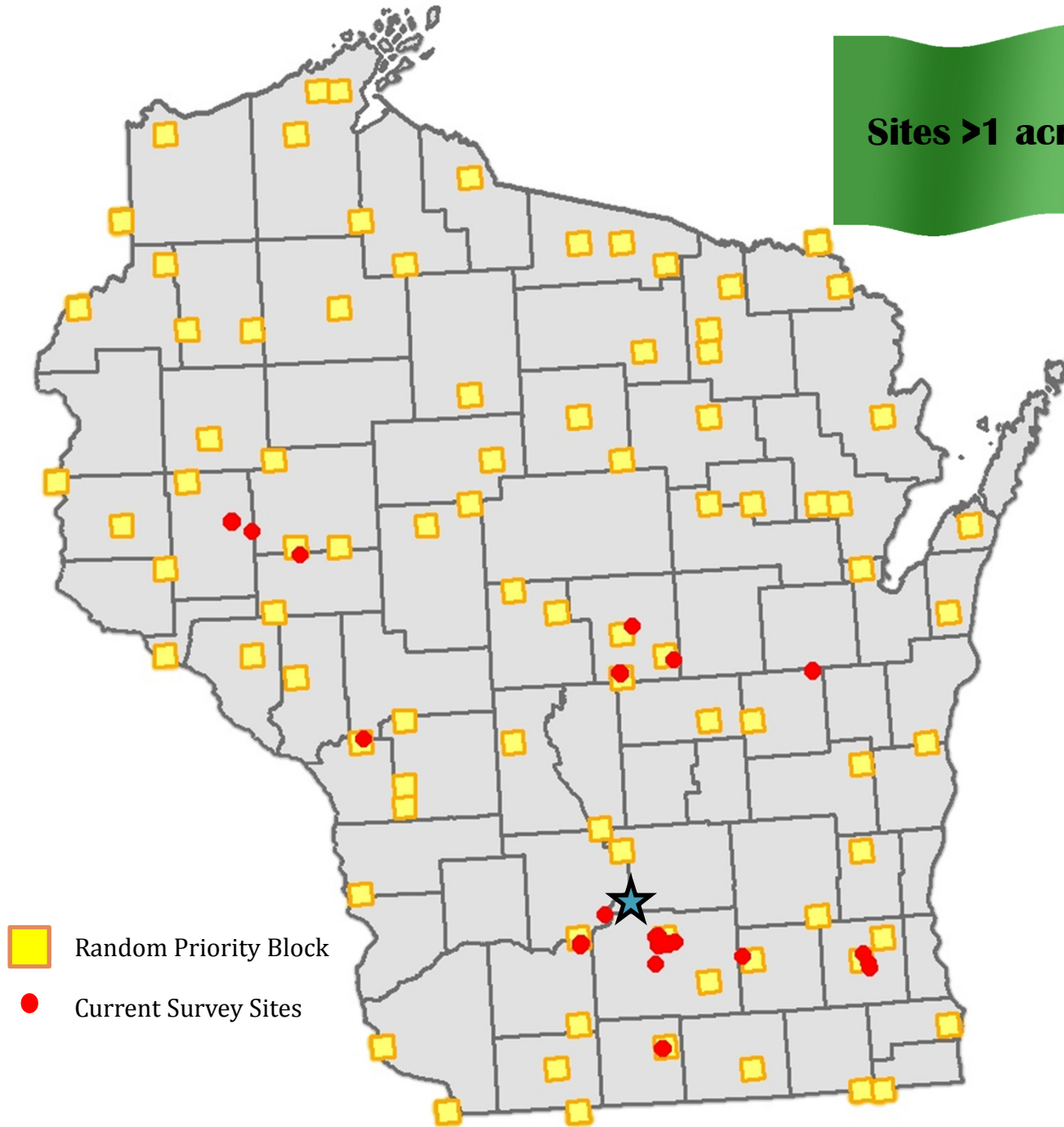
Integrated Monarch Monitoring Program (IMMP) Objectives

1. Track the **distribution and abundance** of monarchs and their habitats
2. Provide **geographically and ecologically representative** info to update population and habitat models
3. Share info about how **habitat conservation actions** affect monarchs and their habitat



Ra

Sites >1 acre are best



IMMP Activities

Activity	Required?	Frequency	Time
Site description	Required	Yearly	30 min



SITE DESCRIPTION

1. Land use
2. General vegetation cover
3. Disturbance (e.g., mowing, grazing)
4. Wetland presence
5. Site-specific characteristics (e.g., width of ROW, type of developed area)



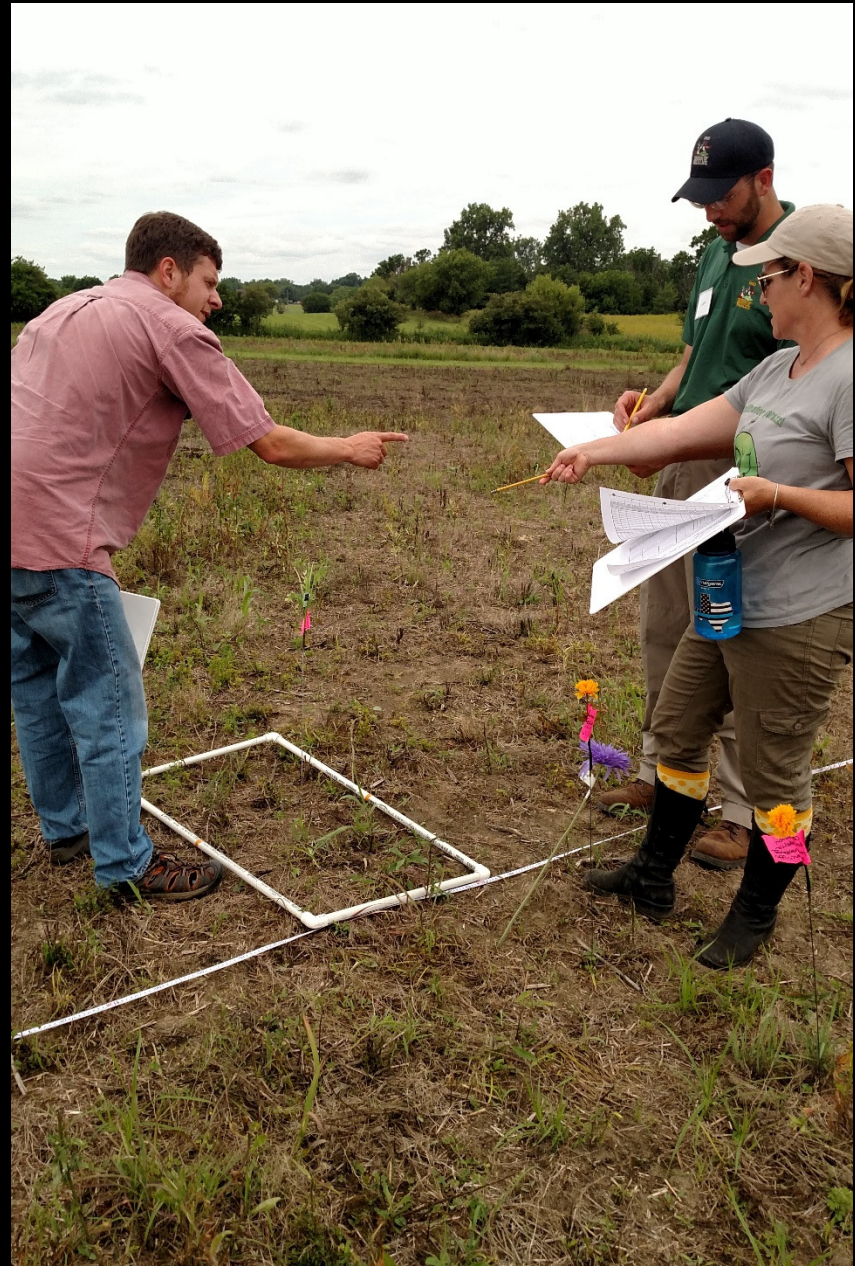
IMMP Activities

Activity	Required?	Frequency	Time
Site description	Required	Yearly	30 min
Activity 1: Milkweed and Blooming Plant Survey	Optional	Monthly	2-4 hr



ACTIVITY 1: MILKWEED AND BLOOMING PLANT SURVEY

1. Set up transect
2. Every 5m, count milkweed stems & record blooming plants



IMMP Activities

Activity	Required?	Frequency	Time
Site description	Required	Yearly	30 min
Activity 1: Milkweed and Blooming Plant Survey	Optional	Monthly	2-4 hr
Activity 2: Monarch Egg and Larva Survey	Optional	Weekly	1-2 hr



ACTIVITY 2: MONARCH EGG & LARVA SURVEY

1. Search for monarch eggs & larva on random milkweeds
2. Record the stage (i.e., age) of each monarch found



IMMP Activities

Activity	Required?	Frequency	Time
Site description	Required	Yearly	30 min
Activity 1: Milkweed and Blooming Plant Survey	Optional	Monthly	2-4 hr
Activity 2: Monarch Egg and Larva Survey	Optional	Weekly	1-2 hr
Activity 3: Adult Monarch Survey	Optional	Bi-weekly	30 min



SITE DESCRIPTION:

1. Set up transect
2. Look for adult monarchs within 5m from you
3. Record their distance and behavior



IMMP Activities

Activity	Required?	Frequency	Time
Site description	Required	Yearly	30 min
Activity 1: Milkweed and Blooming Plant Survey	Optional	Monthly	2-4 hr
Activity 2: Monarch Egg and Larva Survey	Optional	Weekly	1-2 hr
Activity 3: Adult Monarch Survey	Optional	Bi-weekly	30 min
Activity 4: Monarch Survival and Parasitism	Optional	Daily (care)	30 min



SITE DESCRIPTION:

1. Collect a 4th or 5th instar
2. Rear it indoors
3. Record the outcome (e.g., survival, death, parasitism)
4. Sample for disease
5. Submit disease samples and parasites for analysis



IMMP Activities

Activity	Required?	Frequency	Time
Site description	Required	Yearly	30 min
Activity 1: Milkweed and Butterfly Survey	Required	Monthly	2-4 hr
Activity 2: Monarch Larval Search	Required	Weekly	1-2 hr
Activity 3: Adult Monarch Observations	Required	Bi-weekly	30 min
Activity 4: Monarch Rearing	Optional	Daily (care)	30 min
Activity 5: Red Impatiens (south only)	Optional	Yearly	

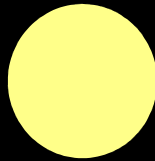
Choose your own adventure!



Opportunities!!

- WATER QUALITY BMPs
 - Reduce sediments in surface flow
 - Increased infiltration
 - Delayed peak flow → reduced flood potential
 - Nutrient & heavy metal uptake
- POLLINATOR HABITAT & MONITORING
 - What **nectar resources** are available to pollinators?
 - Where is **milkweed** growing **and not** growing?
 - Which **land types** are monarchs using?
 - How are monarchs **responding** to BMPs/restoration?











Latitude of Monarch Generations

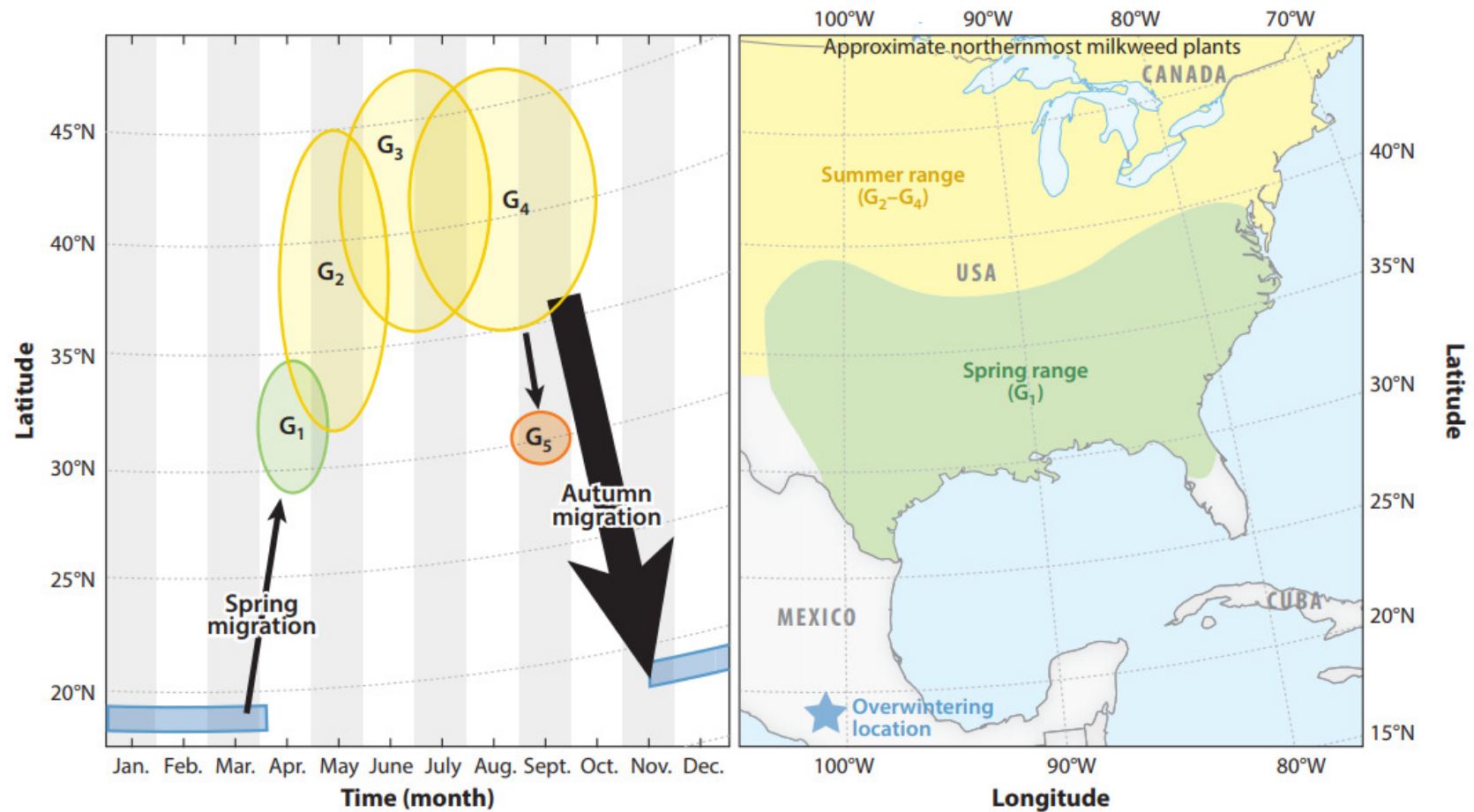


Figure 2

Distribution of monarch butterfly (*Danaus plexippus*) overwintering (starred location on the map) and five annual generations (G_1 – G_5) in eastern North America against latitude (°N) and time (month). Spring (G_1) and summer generation ranges (G_2 – G_4) are determined from patterns of monarch voltinism (97), cardenolide fingerprinting (99), and wing isotope ratios (58–60, 170), with recent evidence for G_5 in late summer in the southern United States (10, 138).

Malcolm, 2018, Annual Review of Entomology

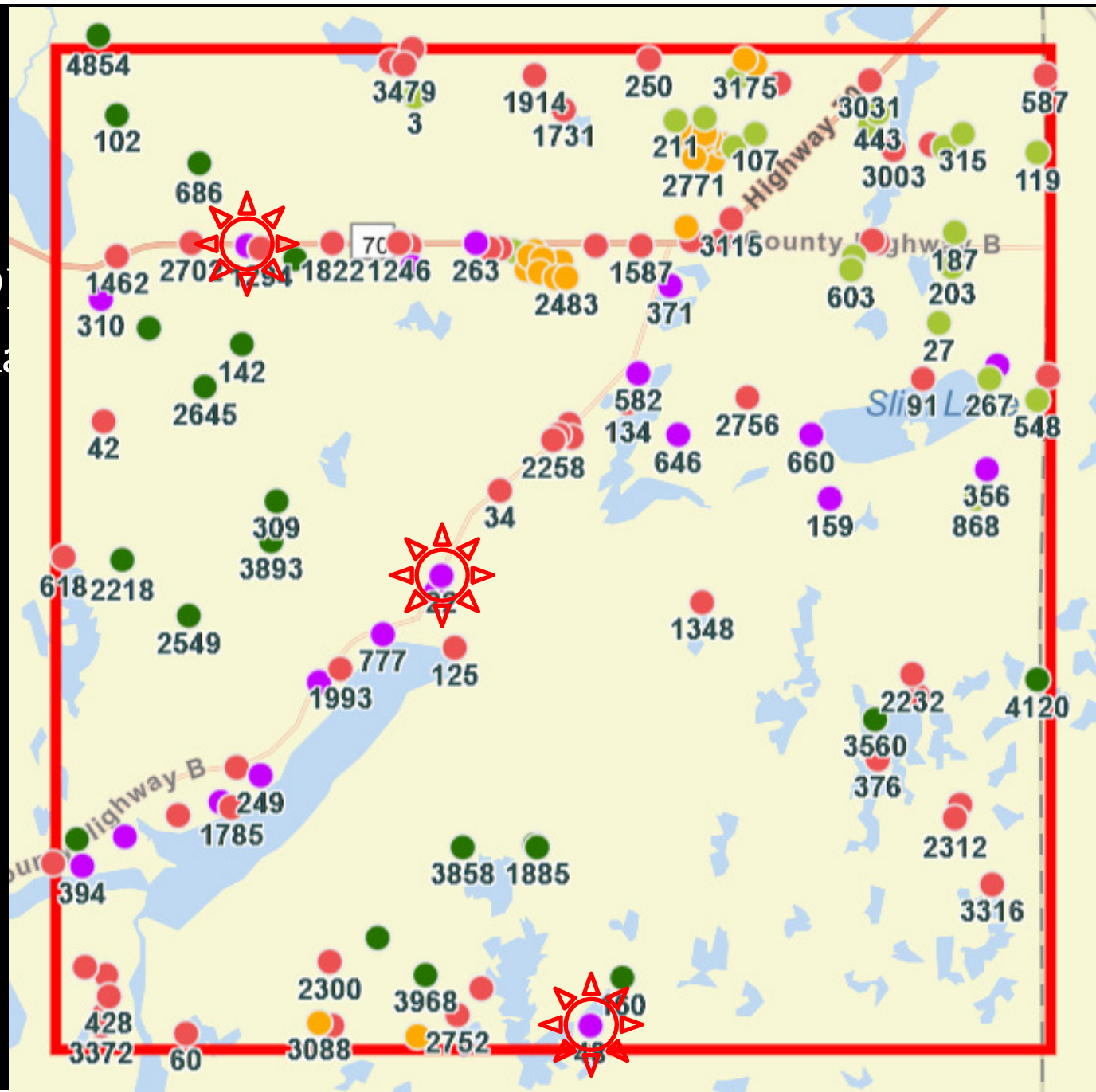
<u>Site Type</u>	<u>Subtypes</u>
Protected grassland	None
Unclassified grassland	None
Agriculture	Crop fields, edge habitat
Rights-of-way	Roadsides, railways, power corridors, transmission lines
Developed	High density, medium density, low density, open space
Agricultural Conservation Land ¹	None

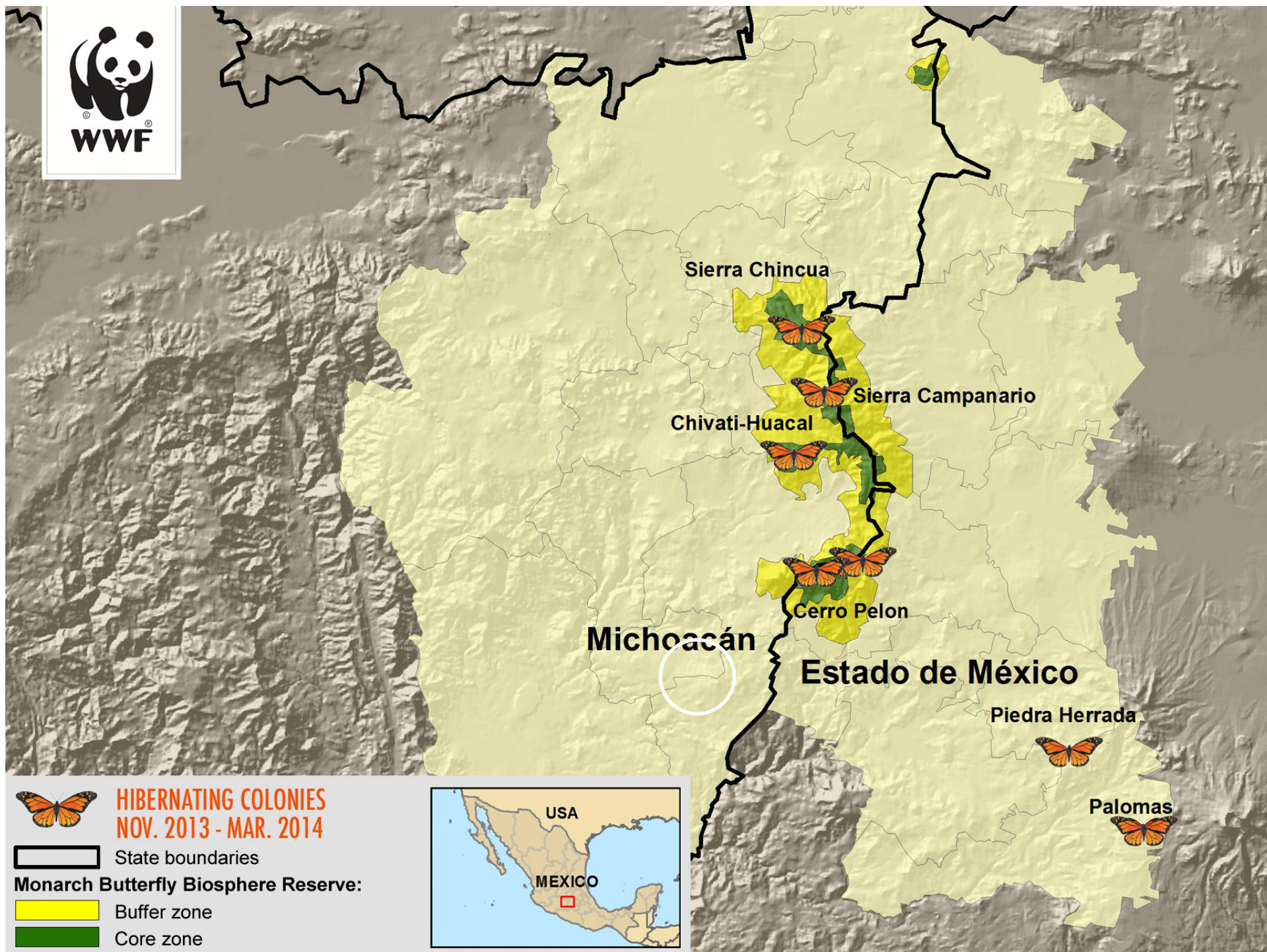


NOTE: Your monitoring coordinator will give you the site type and subtype information for your monitoring plot.

1. Ado
- R

ator





Fall 2017

Monarch Butterfly
Peak Migration

- Before Aug. 30
- Aug. 30 - Sep. 5
- Sep. 6 - Sep. 12
- Sep. 13 - Sep. 19
- Sep. 20 - Sep. 26
- Sep. 27 - Oct. 3
- Oct. 4 - Oct. 10
- Oct. 11 - Oct. 17
- Oct. 18 - Oct. 24
- After Oct. 24



JOURNEY NORTH



Winter Sightings

Monarch Butterfly FIRST Adult Sighted

- ▲ Winter (Jan-Feb)
- Mar 1 - Mar 14
- Mar 15 - Mar 28
- Mar 29 - Apr 11
- Apr 12 - Apr 25
- Apr 26 - May 9
- May 10 - May 23
- May 24 - Jun 6
- Jun 7 - Jun 20
- After Jun 20

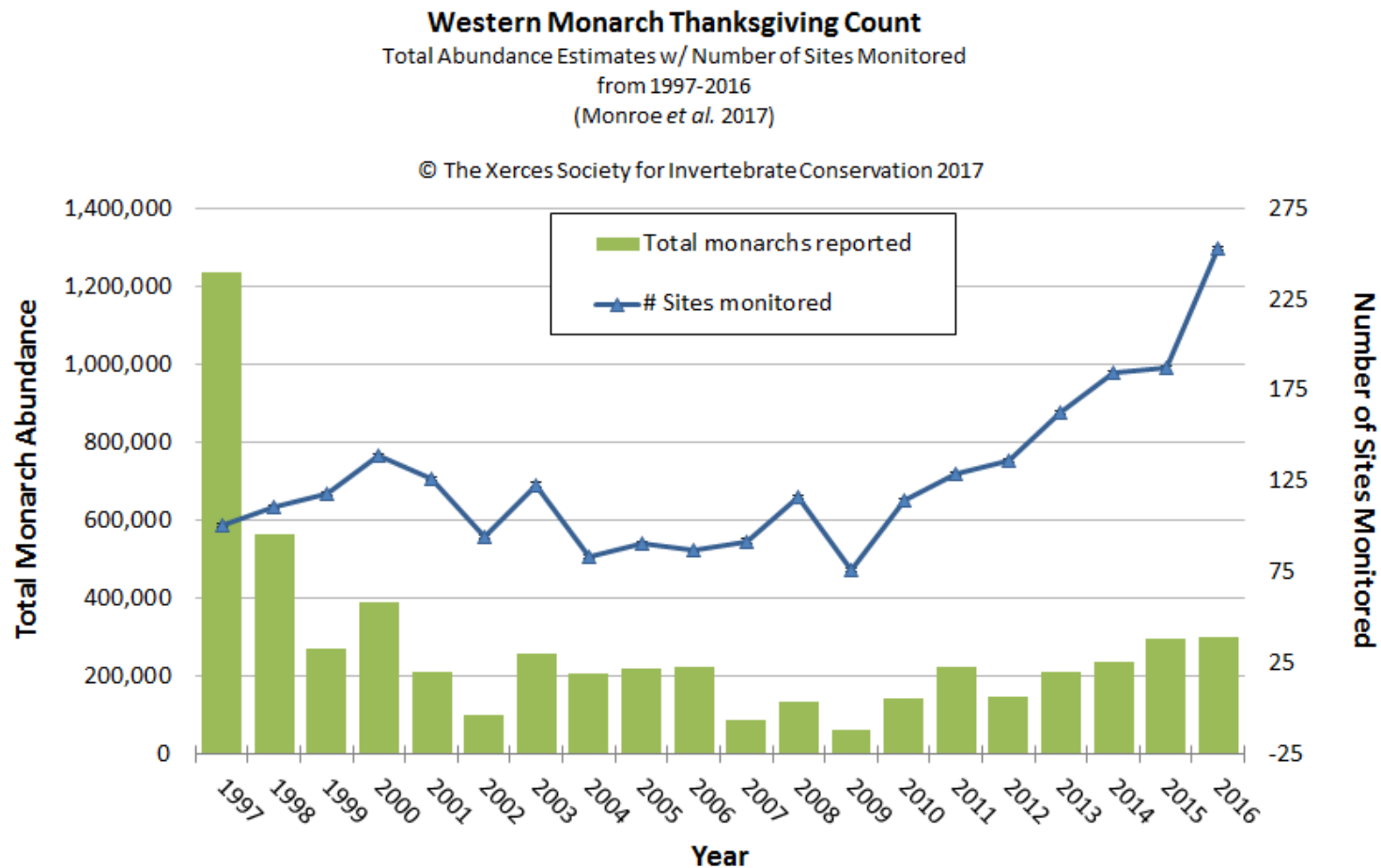


JourneyNorth



Population Decline

Wintering population in western US



Species Goals and Status

- Tri-national goal: 6 hectares of overwintering monarchs in Mexico
 - What action do we need to achieve this?
- Petitioned for protection under the Endangered Species Act (ESA) in 2014
 - Decision June 2019
 - More data needed
 - Fine-tune population models
 - Threats/stressors
 - Conservation efforts



U.S. Fish & Wildlife Service
Conserving the Nature of America

Search

Assessing the status of the monarch butterfly


In 2014, we were petitioned to protect the monarch butterfly under the Endangered Species Act. Based on information in the petition, we determined that federally protecting the monarch may be warranted and we published a 90-day substantial finding in the Federal Register on December 31, 2014. Publication of the 90-day finding also announced that we would conduct a thorough assessment to determine if the monarch butterfly needs Endangered Species Act protection. We are now conducting the assessment using the Species Status Assessment framework.

Learn more

- [Petition to protect the monarch butterfly under the Endangered Species Act \(4.8 MB PDF\)](#)
- [Monarch species status assessment fact sheet \(PDF\)](#)
- [Monarch Conservation Database](#)
- [Species status assessment fact sheet \(PDF\)](#)
- [Species status assessment update presentation - August 2017 \(4 MB PDF\)](#)
- [Watch the species status assessment update webinar - August 2017 \(24 minutes\)](#)
- [Scientists can connect through the Monarch Conservation Science Partnership](#)

90-Day warranted finding on petition; Service initiates status review

- [News Bulletin](#)
- [Federal Register](#)



Tagged monarch butterfly in Minnesota.
Photo by Katie Steger-Wheeler for USFWS