Essential Aspects of Monarch Habitat in the Southeast

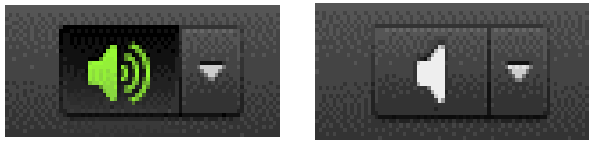
(Part 2 in a 3 Part Series)

Monarch on tall thistle
by Ray Moranz

XERCES SOCIETY
for Invertebrate Conservation

Logistics

Computer Speaker Status



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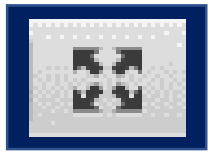
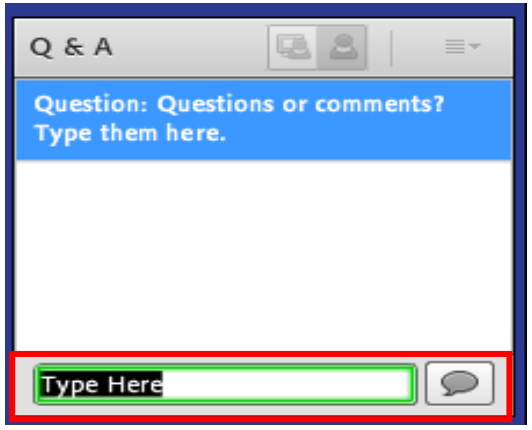
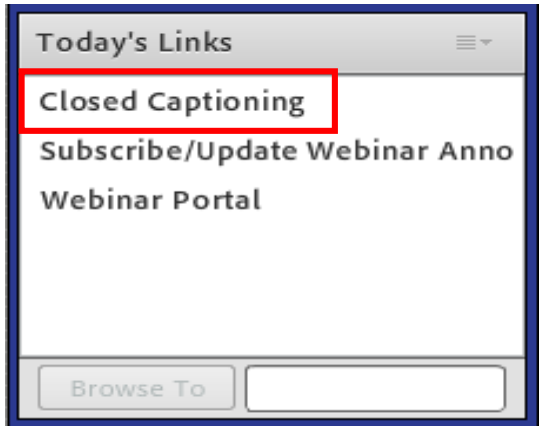


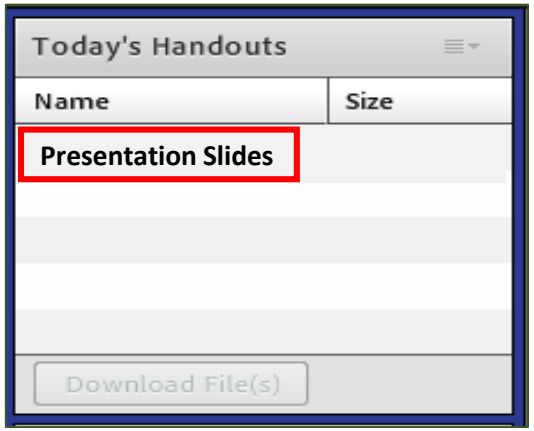
Q&A Pod



Today's Links



Today's Handouts



Essential Aspects of Monarch Habitat in the Southeast

(Part 2 in a 3 Part Series)

Ray Moranz

Grazing Lands Pollinator Ecologist, Xerces Society and USDA NRCS CNTSC Stillwater, OK

Sudie Daves Thomas

Wildlife Biologist, SC NRCS, Manning, SC

Billy McCord

McCord Ecological Services and SC Dept. of Natural Resources, Charleston, SC

Photo by Erica Connery, SC DNR

See http://conservationwebinars.net/ for replay & upcoming

PART 1:
Introduction to Monarch Biology & Conservation in the Southeast

PART 3 (Dec 2nd):
Establishment and Management of Habitat for Monarchs and its Value for Other Wildlife

Nancy Adamson

Senior Pollinator Conservation Specialist Xerces Society and USDA NRCS ENTSC Greensboro, NC

xerces.org

Brief Recap of Webinar 1

Monarch butterflies on frostweed, *Verbesina virginica*

Photo: Anthony Burns

Monarch caterpillars are host plant specialists

Monarch caterpillars only feed on milkweed

Photos: Ray Moranz

xerces.org

Adult monarchs use a variety of nectar species, but also show preferences

Of the thousands of species of flowering plants in the southeast…monarchs only visit a few frequently

Aster Family	Dogbane Family	Mint Family	Coffee Family
			

Ray Moranz

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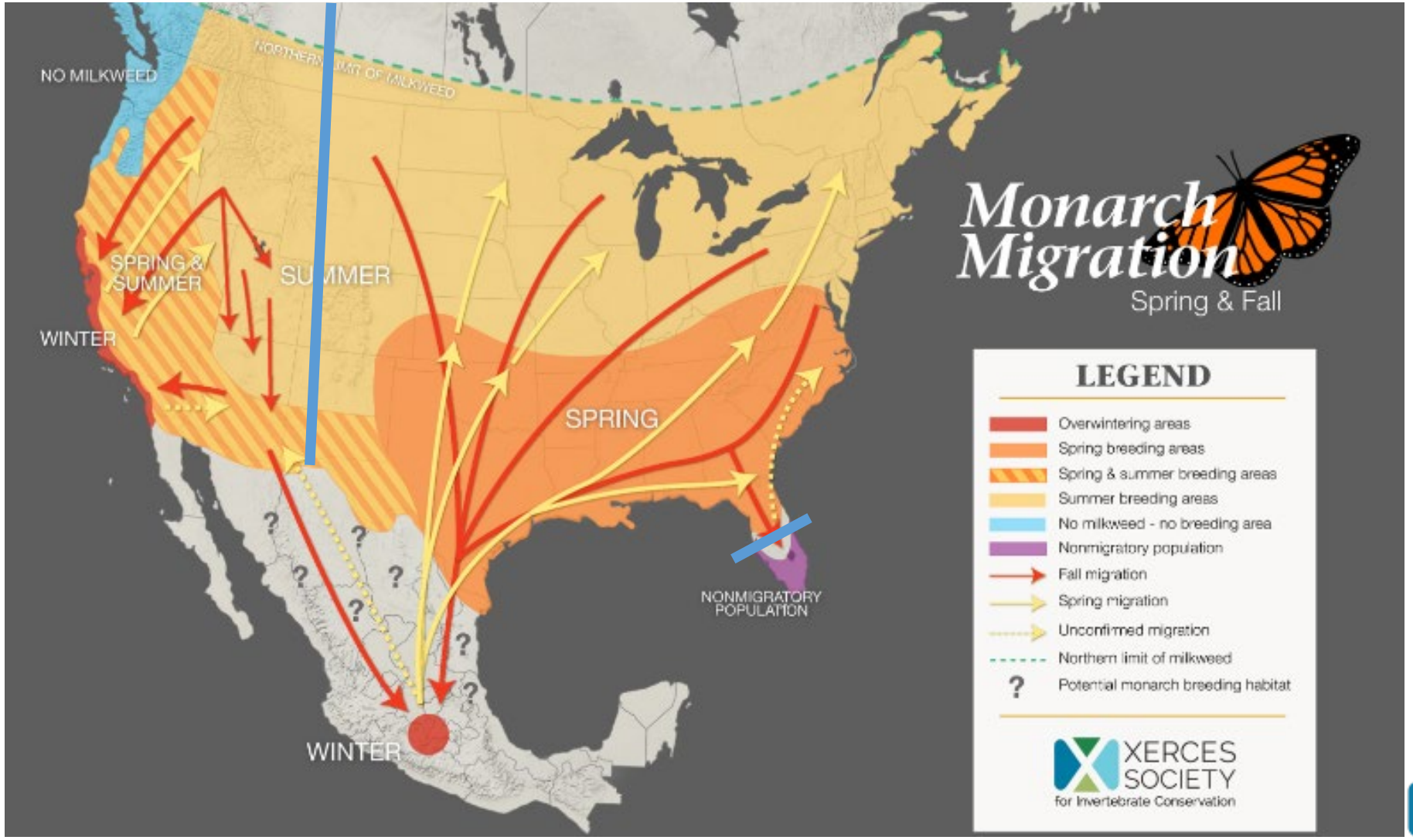
Three monarch populations in lower 48



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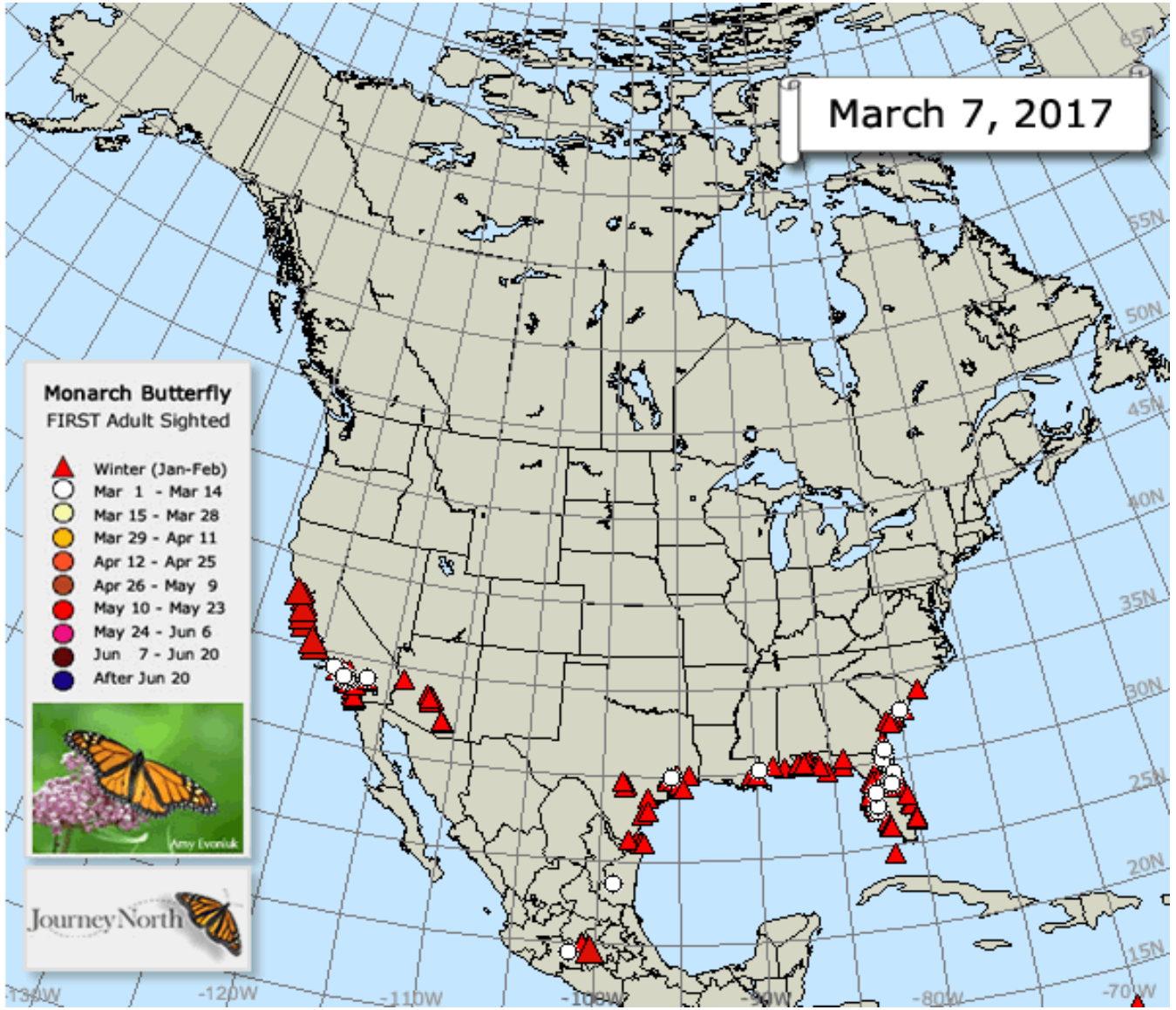
Journey North Spring Migration Map: March



Map: Journey North (www.learner.org/jnorth)

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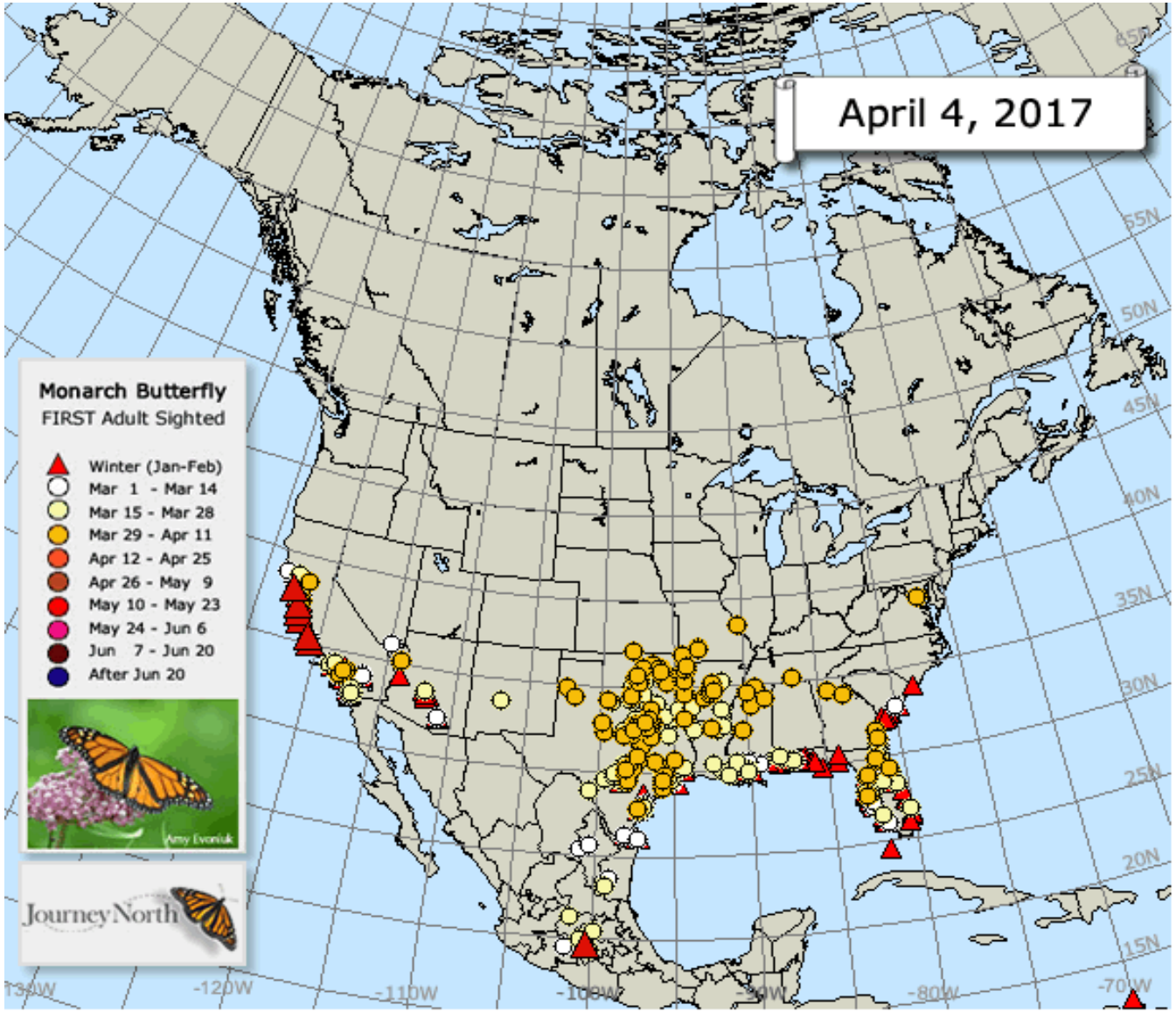
Spring Migration and Breeding: April



Map: Journey North (www.learner.org/jnorth)

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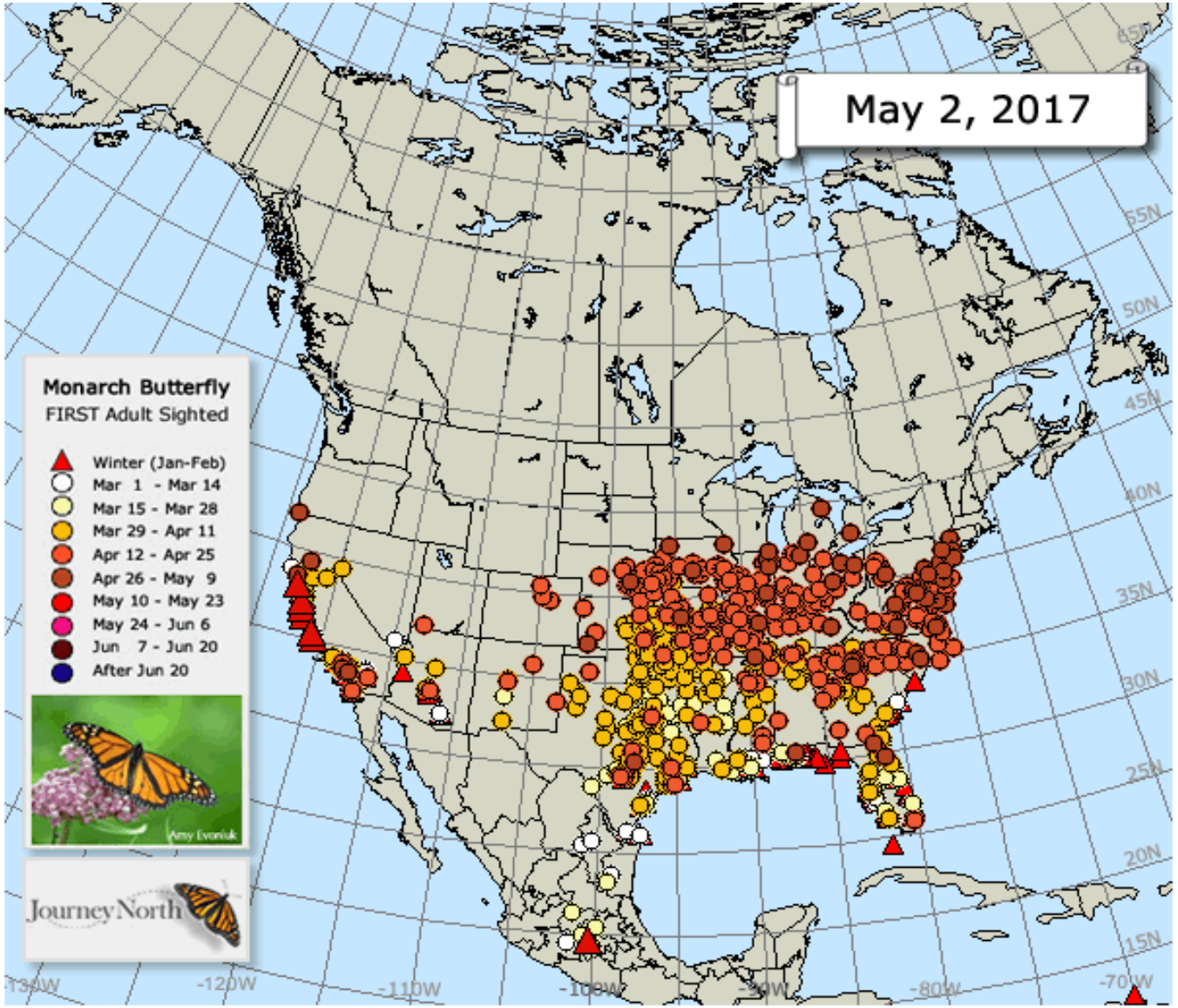
Spring Migration and Breeding: May



Map: Journey North (www.learner.org/jnorth)

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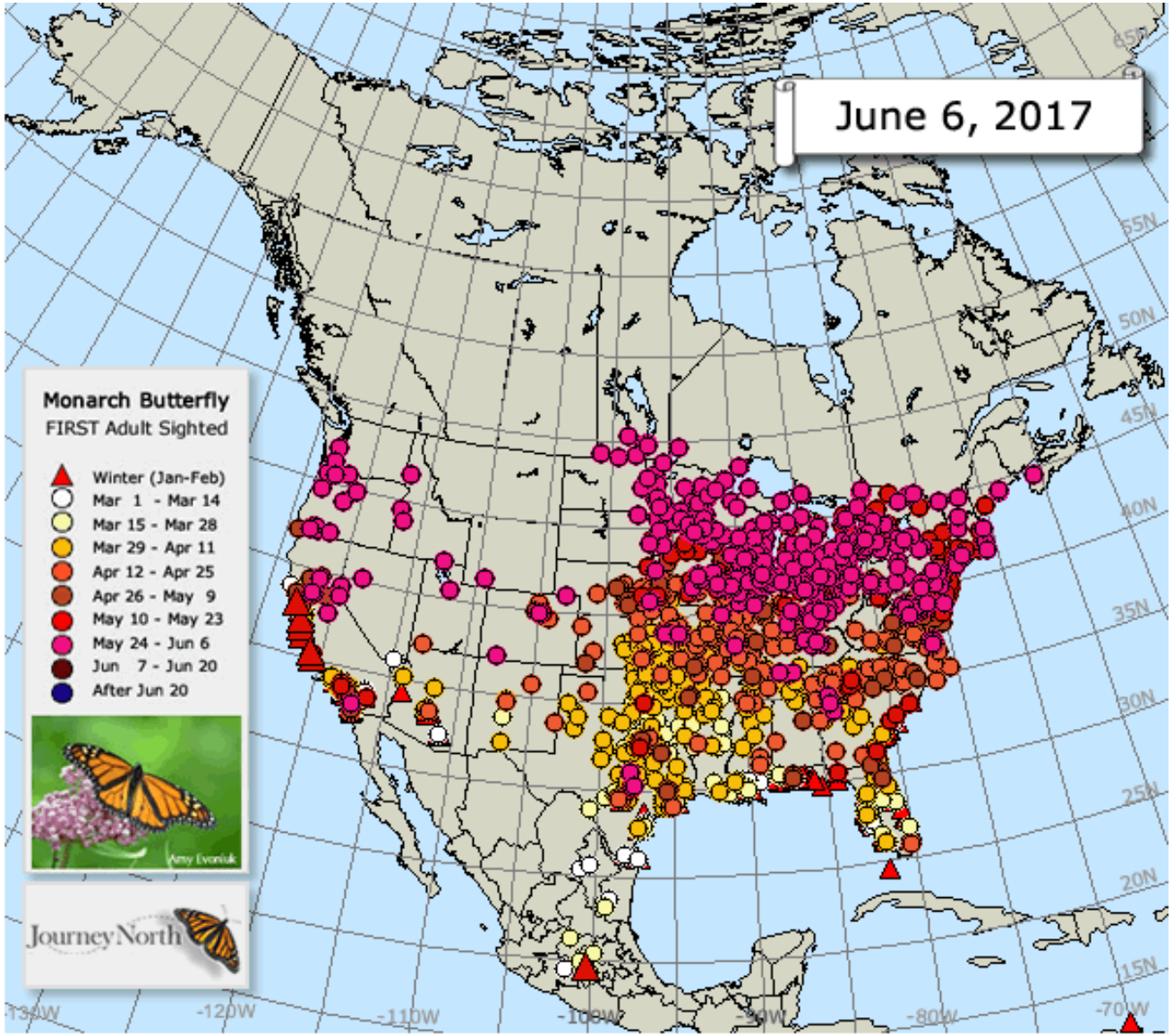
Summer Breeding: June



Map: Journey North (www.learner.org/jnorth)

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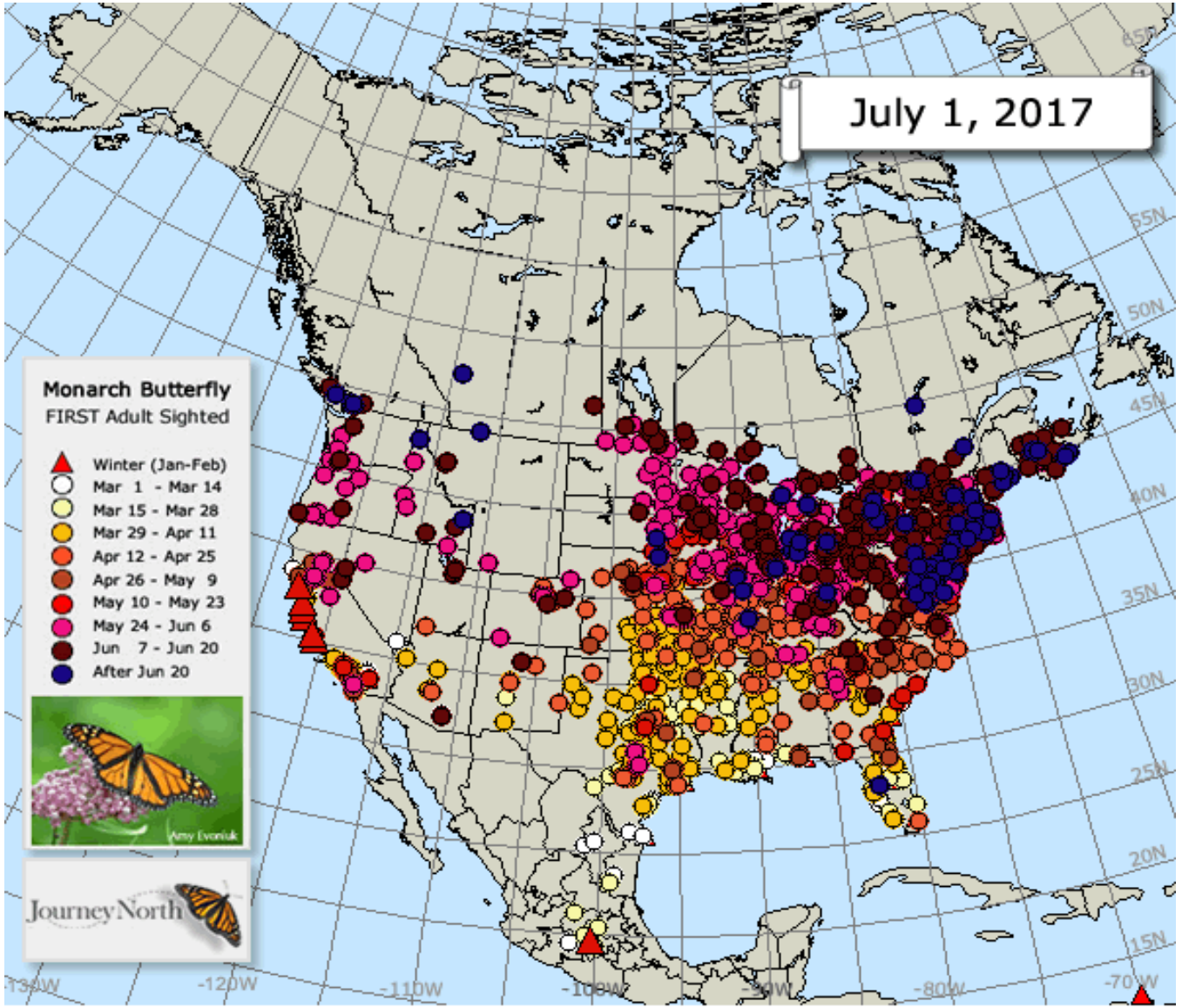
Summer Breeding: July



Map: Journey North (www.learner.org/jnorth)

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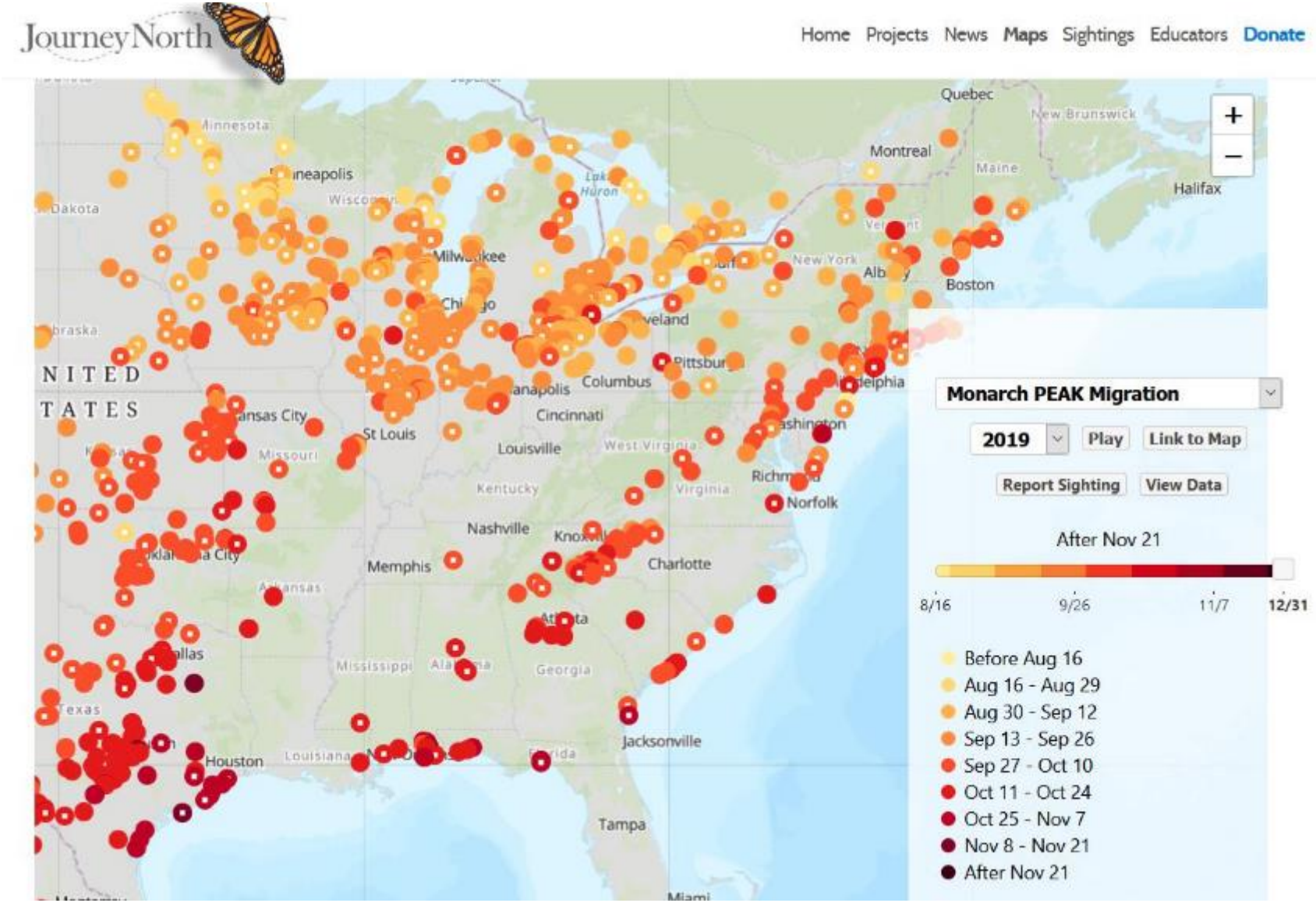
Fall migration: Sept-Nov.



Map: Journey North (www.learner.org/jnorth)

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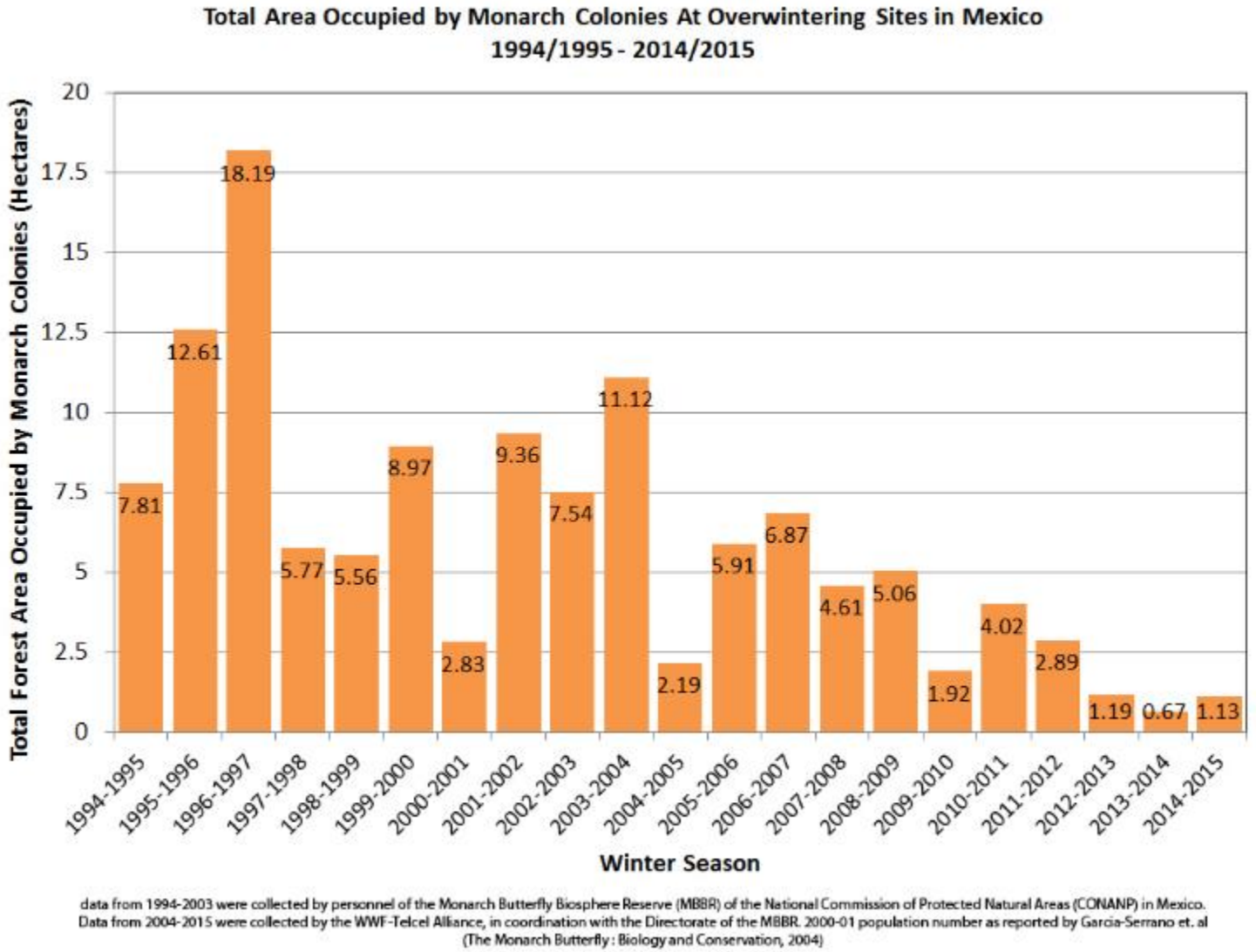
Why does the NRCS work on monarchs?

- Monarchs overwintering in Mexico are monitored in hectares of forest occupied



- Graph courtesy of the Monarch Joint Venture.

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How does the Natural Resources Conservation Service help with Monarch Conservation? The Farm Bill

Photos by Dave Kastner

USDA United States Department of Agriculture

NATURAL RESOURCES CONSERVATION SERVICE

Landscape Conservation Initiatives Regional Pollinator Effort: *Working Lands for Monarch Butterflies* factsheet

WORKING LANDS FOR MONARCH BUTTERFLIES

Good for Butterflies, Good for Your Bottom Line

NRCS helps landowners to protect the full spectrum of natural resources necessary for economically sustainable businesses, including monarch habitat. Let NRCS develop a comprehensive, resource conservation plan for your operation and the monarch.

at the right time, along their migration route. NRCS has a list of plants that are known to be used by monarch butterflies.

Assistance Available

America's farmers, ranchers and forest landowners are voluntarily combating the decline of monarchs by adding and maintaining for high-quality monarch habitat on their land. Through the Farm Bill, USDA's Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers to help make conservation improvements that benefit the monarch while also increasing the productivity and resiliency on

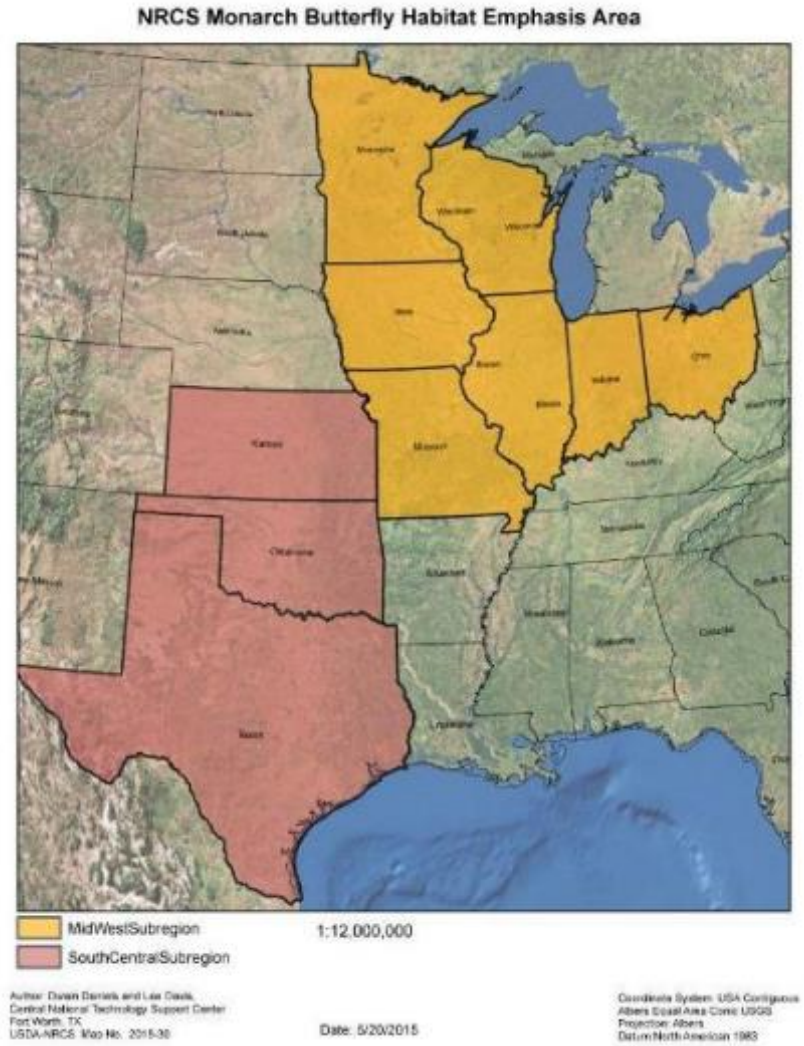
NATURAL RESOURCES CONSERVATION SERVICE

Conservation Choices

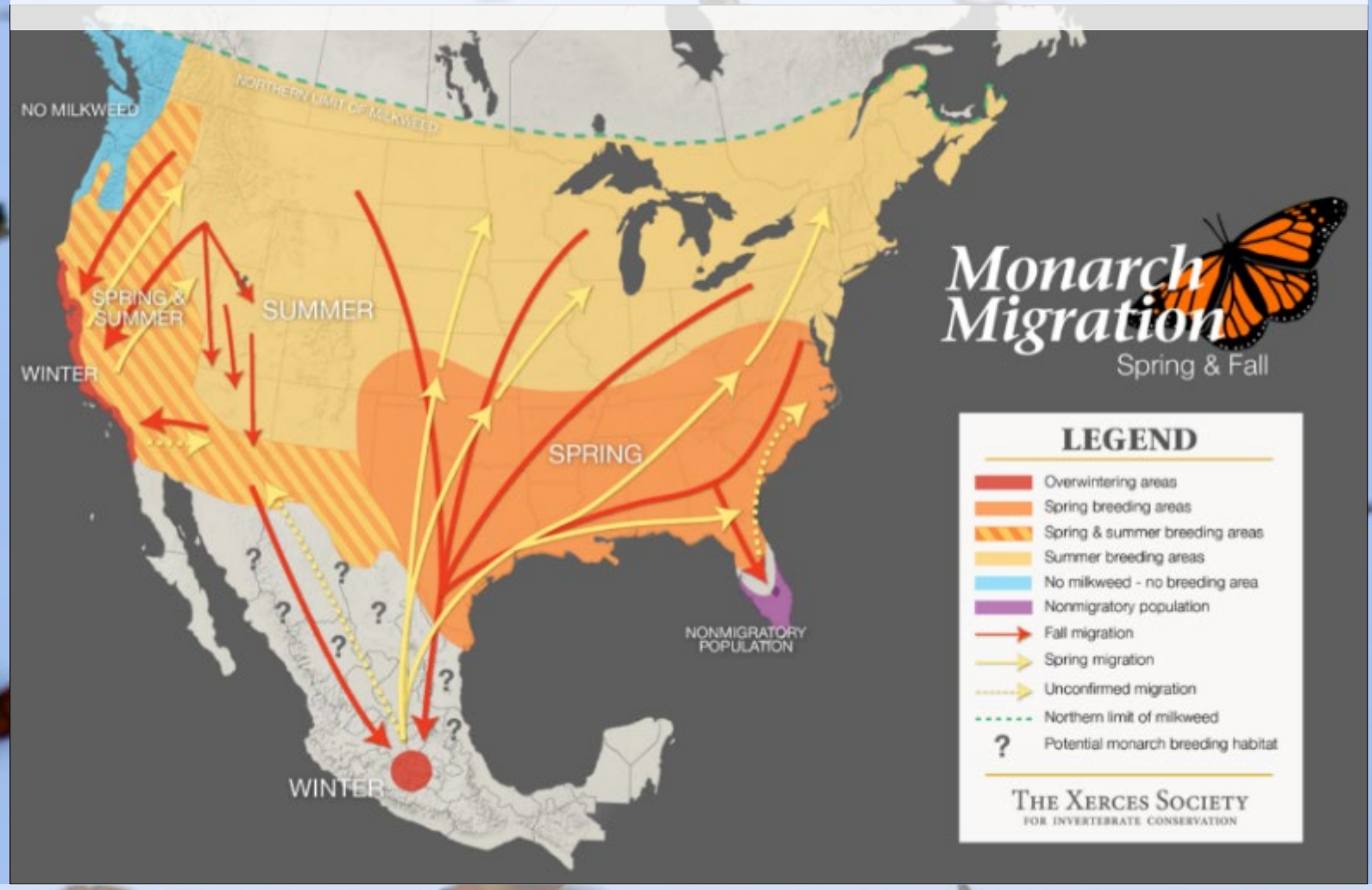
NRCS offers more than three dozen conservation practices that can benefit monarchs by providing for healthy stands of milkweed and high-value nectar plants, and protecting these stands from exposure to pesticides. While many of these practices may target improving grazing lands or reducing soil erosion, simple tweaks to the practice can yield big benefits for monarchs. Here are a few examples:

Conservation Practice	What Is It?	How Does It Help Monarchs?	What Are Other Benefits?
Brush Management	Removal of invasive woody species in grasslands.	Increases sunlight that is critical for monarch habitat to thrive. Allows wildflowers and other native vegetation to return to degraded habitats.	Increases groundwater recharge. Increases plant pollination. Reduces soil erosion. Provides wildlife habitat. Reduces risks of catastrophic wildfires.
Conservation Cover	Permanent vegetative cover of native grasses, legumes, and forbs.	Plantings can include milkweed and valuable monarch nectar plants. Plant diversity will ensure flowers are in bloom for as long as possible to provide nectar and pollen throughout the growing season.	Increases plant pollination. Improves water quality. Reduces soil erosion. Provides wildlife habitat.
Contour Buffer Strips*	Strips of vegetation that run along a contour of a farmed field.	Plantings can include milkweed and valuable monarch nectar plants.	Increases plant pollination. Improves water quality. Reduces soil erosion.
Critical Area Planting	Plants that stabilize the ground to curb soil erosion.	Plantings can include milkweed and valuable monarch nectar plants.	Increases plant pollination. Improves water quality. Reduces soil erosion.
Habitat Management	Creates open and sunny habitats on which many species depend.	Management plans can be designed to increase the abundance of	Increases plant pollination. Provides habitat for a variety of

NRCS' Working Lands for Wildlife applies in these states



NRCS conserves monarchs throughout the lower 48!!!



Photograph courtesy of Pablo Leautaud; map courtesy of The Xerces Society.

Milkweeds as Monarch Host Plants

Photos: Eric Hunt, Arkansas Native Plant Society

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Native milkweed genera used by monarch larvae

Asclepias

Funastrum

Cynanchum

Photos: Ray Moranz (Xerces Society)

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Native milkweed genera used by monarchs

Gonolobus

Pattalias

Matelea

Photos: Ray Moranz (Xerces Society)

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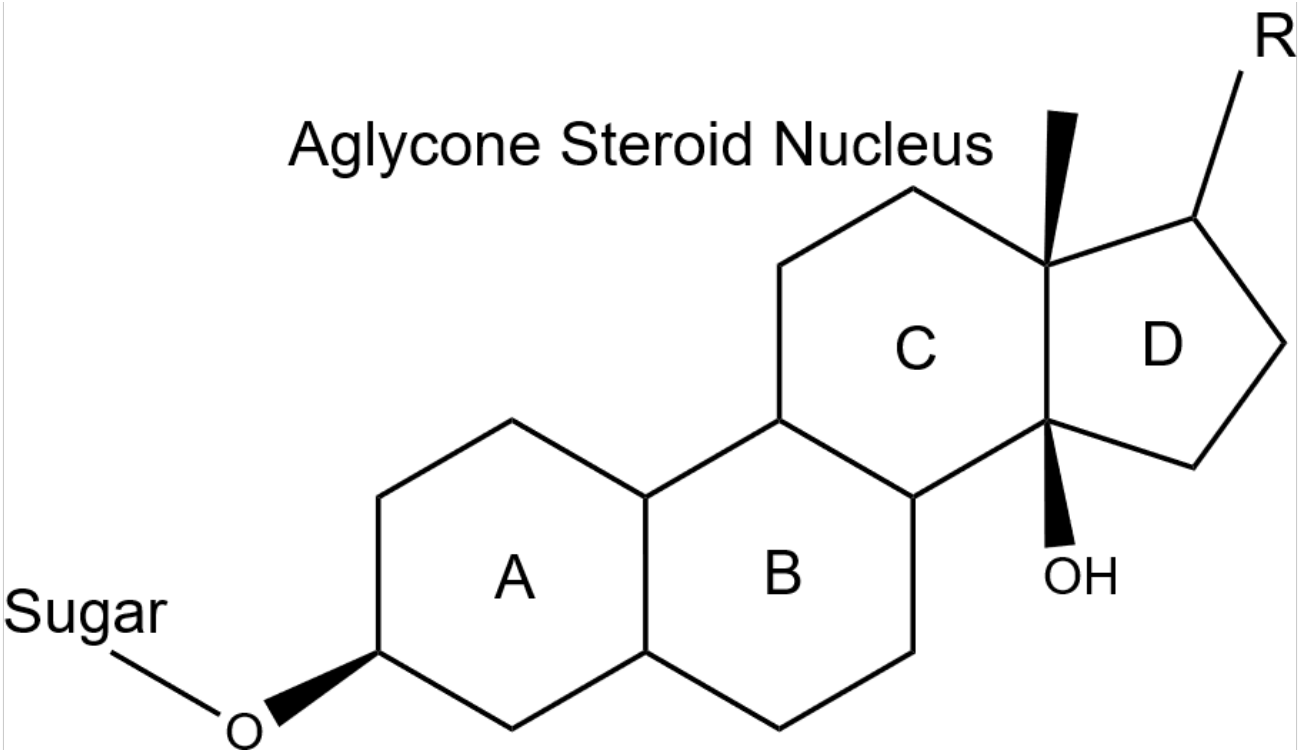
MILKWEEDS are known for chemical defenses called cardiac glycosides (cardenolides)

But not all milkweeds have them. Milkweed species differ greatly in their amounts of cardiac glycosides



Broadly distributed milkweeds

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butterfly milkweed (*Asclepias tuberosa*)

a.k.a. butterflyweed

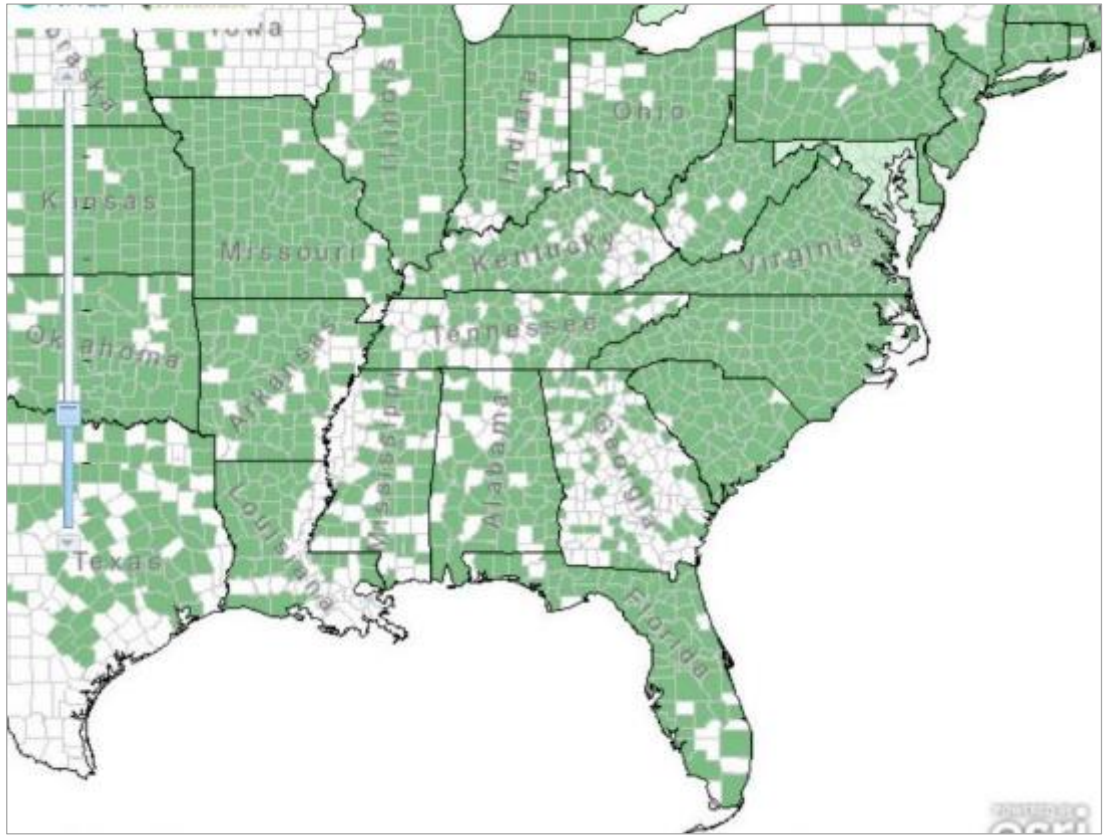

Photo: Eric Hunt, Arkansas Native Plant Society; Map: USDA PLANTS

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butterfly milkweed (*Asclepias tuberosa*)

- Often grows in dry places, and loves sandy soils
- Very low levels of cardenolides
- Tuber-like taproots can grow multiple feet long, making them very difficult to transplant once large

Photo: Ray Moranz

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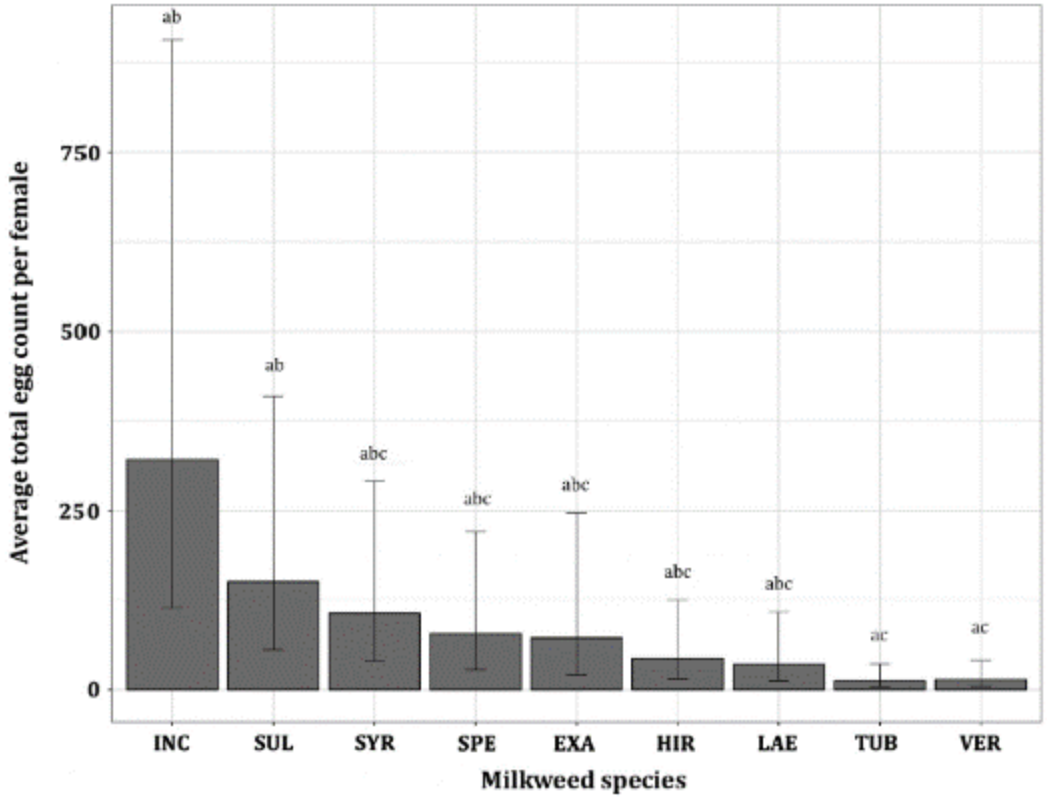
ECOSPHERE

Monarch butterflies do not place all of their eggs in one basket: oviposition on nine Midwestern milkweed species

Victoria M. Pocius,[1,†] Diane M. Debinski,[1,2] John M. Pleasants,[1] Keith G. Bidne,[3] and Richard L. Hellmich[3]

- Lead author: Dr. Tori Pocius (now at U. Alabama-Tuscaloosa)



Butterfly milkweed (*Asclepias tuberosa*)

Photos: Ray Moranz

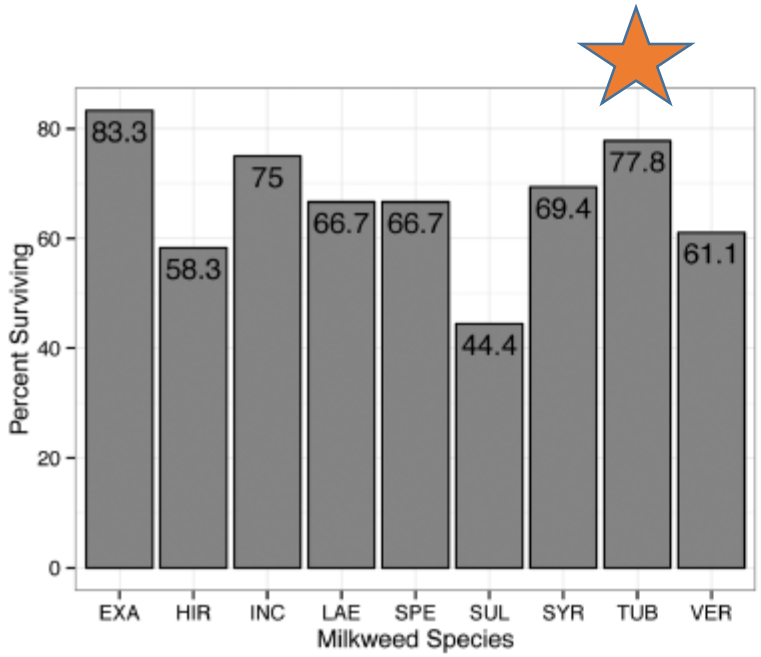
Environmental Entomology, 46(5), 2017, 1098–1105
doi: 10.1093/ee/nvx137
Advance Access Publication Date: 7 September 2017
Research

Plant–Insect Interactions

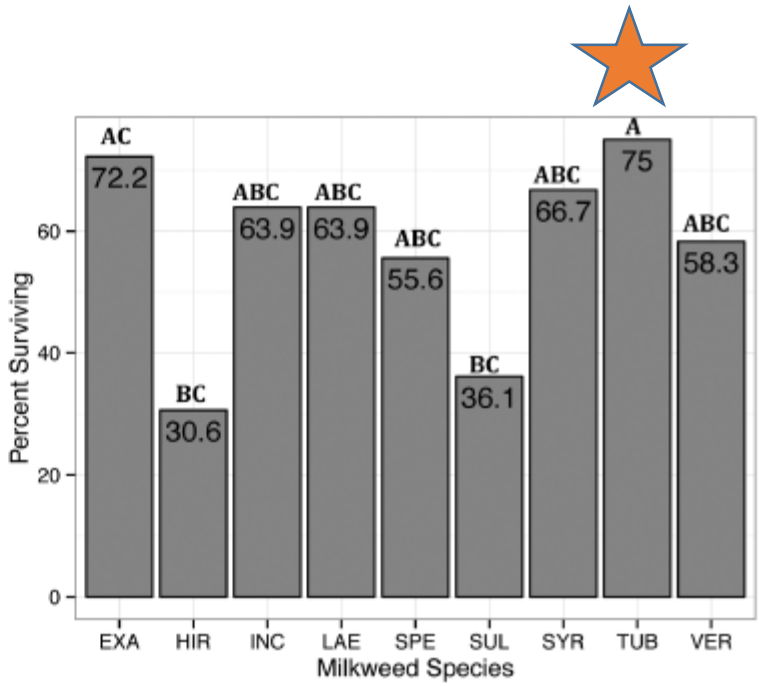
Milkweed Matters: Monarch Butterfly (Lepidoptera: Nymphalidae) Survival and Development on Nine Midwestern Milkweed Species

V. M. Pocius,[1,4] D. M. Debinski,[1,5] J. M. Pleasants,[1] K. G. Bidne,[2] R. L. Hellmich,[2] and L. P. Brower[3]

Pocius et al. 2017



- Percent surviving to early pupal stage



- Percent surviving to adulthood

clasping milkweed (*Asclepias amplexicaulis*)

a.k.a. sand milkweed, curly milkweed, blunt-leaved milkweed

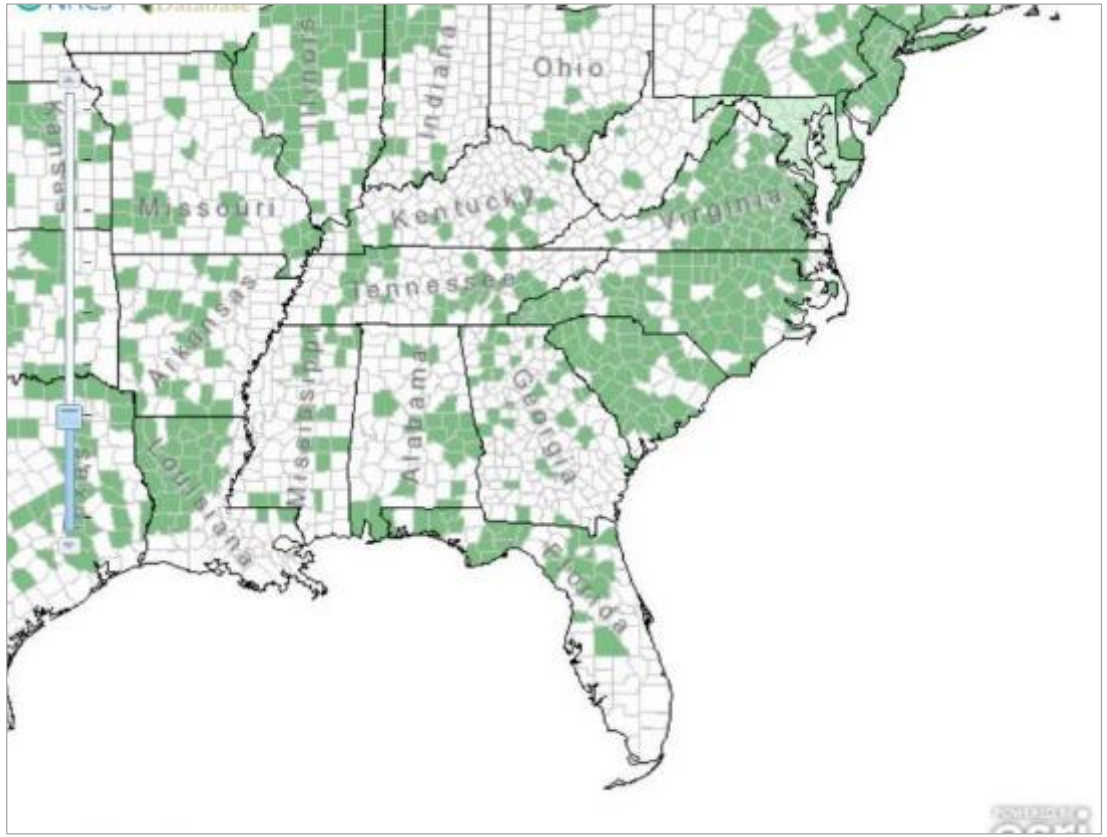


Photo: Doug McGrady; Map: USDA PLANTS

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clasping milkweed (*Asclepias amplexicaulis*)

- Often grows in dry places: well-drained woodlands and savannas, sandy soils
- Very low levels of cardenolides
- Seeds NOT commercially available in bulk
- Somewhat difficult to grow transplants

Photo: Eric Hunt, Arkansas Native Plant Society

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red ring milkweed (*Asclepias variegata*)

Wow!

Photo: Eric Hunt, Arkansas Native Plant Society

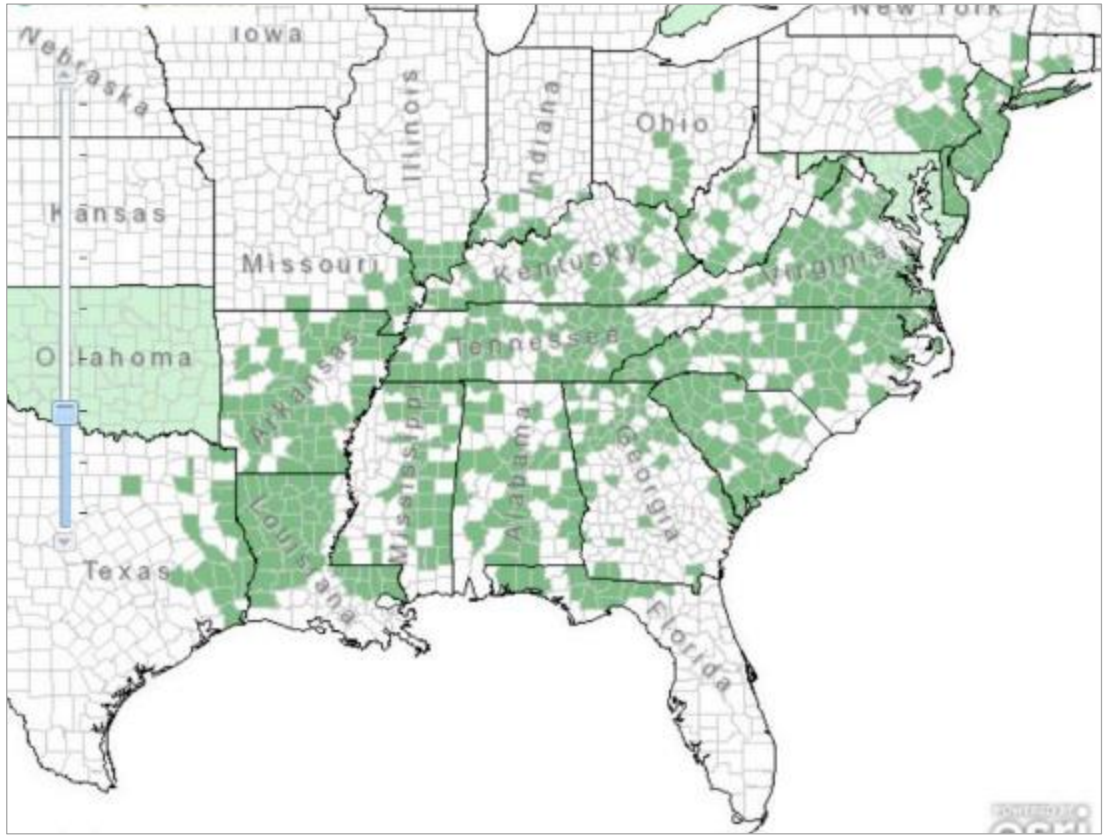

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Photo by Eric Hunt, Arkansas Native Plant Society

red ring milkweed (*Asclepias variegata*)

- Upland deciduous woodlands and forests
- Seeds not available in bulk quantities

Photo: Nancy Lee Adamson

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Swamp milkweed (*Asclepias incarnata*)

Photo by Ray Moranz

Swamp milkweed (*Asclepias incarnata*)

- freshwater marshes, pond edges, ditches, occasionally swamps
- Very low levels of cardenolides
- Seeds ARE available in bulk
- Seeds germinate and establish well

Photo: Ray Moranz

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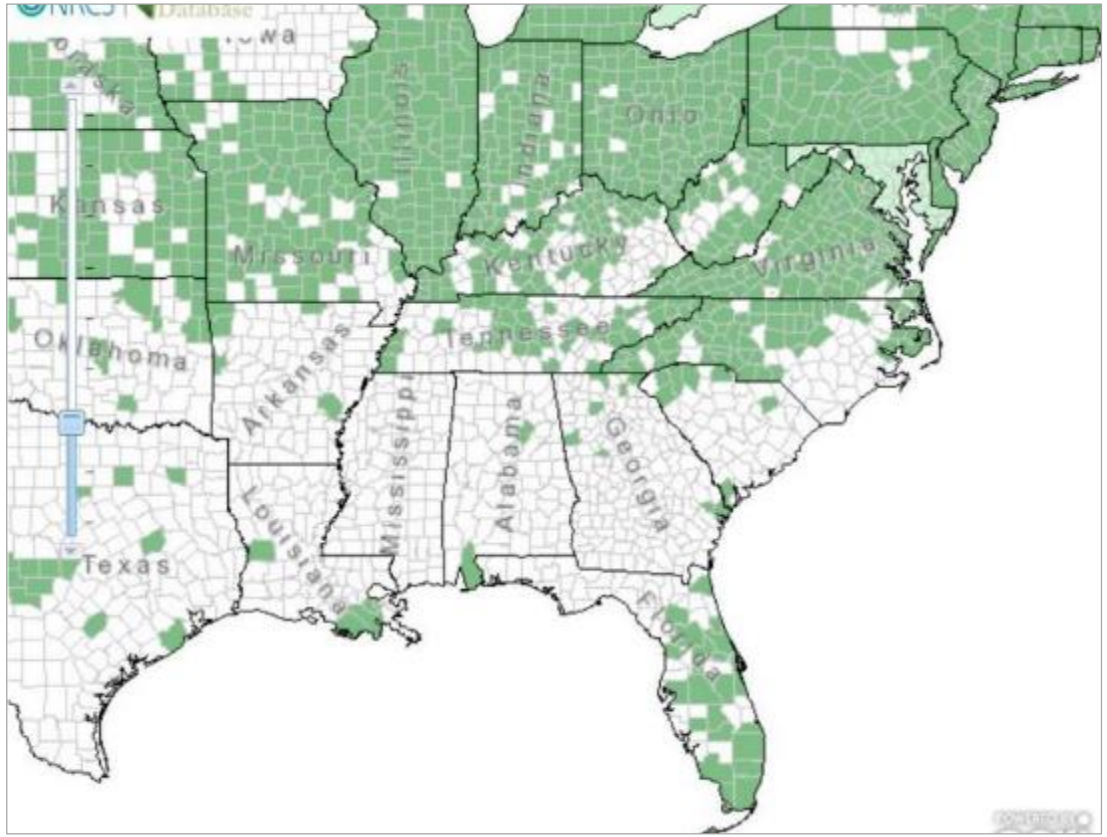
Swamp milkweed (*Asclepias incarnata*):

Absent from much of the southeast

Photo: Nancy Lee Adamson



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Common Milkweed
(*Asclepias syriaca*)
Photo: Ray Moranz

common milkweed (*Asclepias syriaca*)

The most abundant milkweed in the Northeast ¼ of U.S. Spreads via rhizomes and seed.

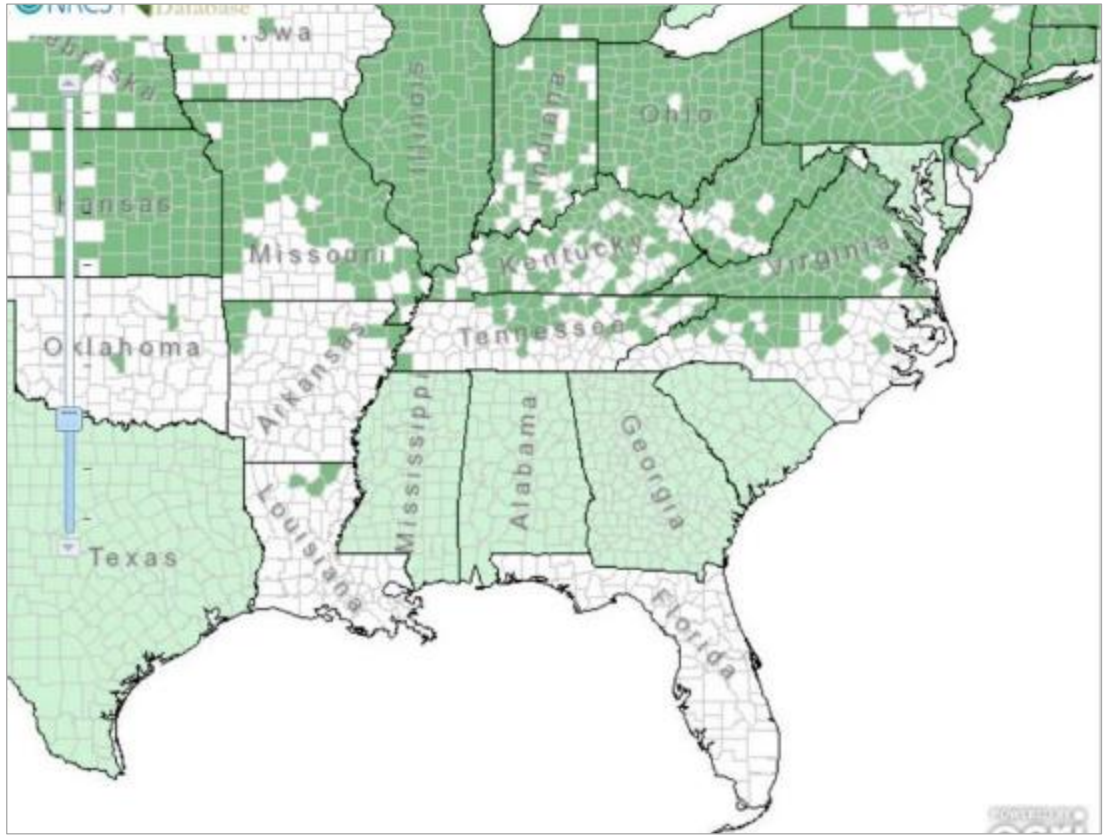

Photo: Ray Moranz; Map: USDA PLANTS

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whorled milkweed (A. *verticillata*) and green comet milkweed (*A. viridiflora*)

Photos: Eric Hunt, Arkansas Native Plant Society, and Ray Moranz, Xerces Society

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Milkweeds in western part of region

Photo: Eric Hunt, Arkansas Native Plant Society

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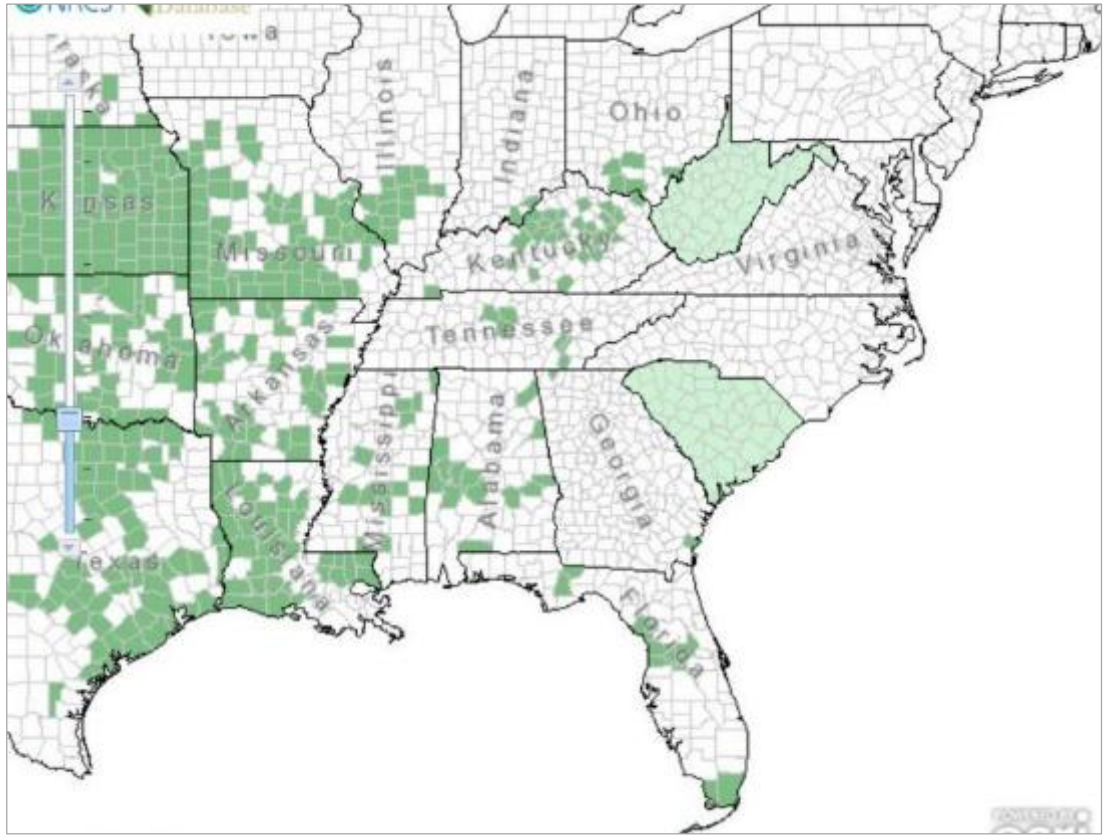
green antelopehorn (*Asclepias viridis*)

Photo: Ray Moranz Xerces Society



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green antelopehorn (*Asclepias viridis*)

- High levels of cardenolides (very toxic)
- Cows very rarely eat it, so it thrives in pastures and rangeland

Photo:: Ray Noranz

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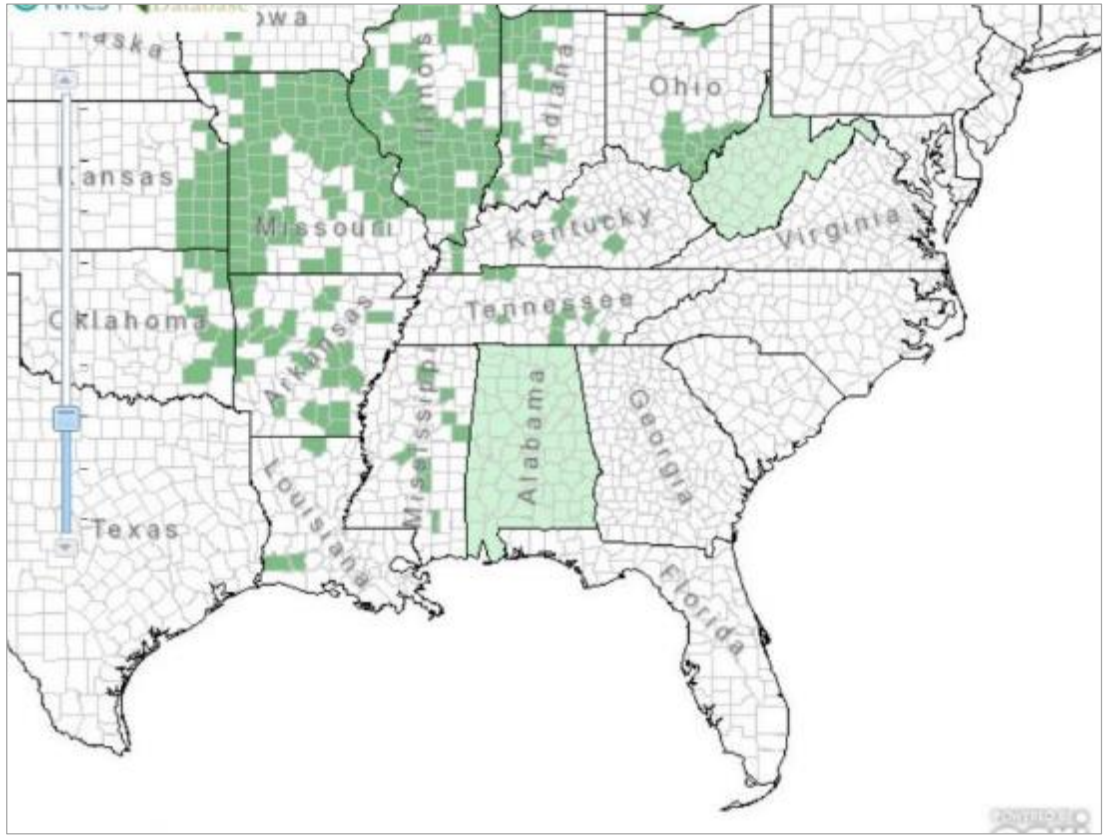
green milkweed (*Asclepias hirtella*)

Photo: Ray Moranz



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Milkweeds of the Appalachians

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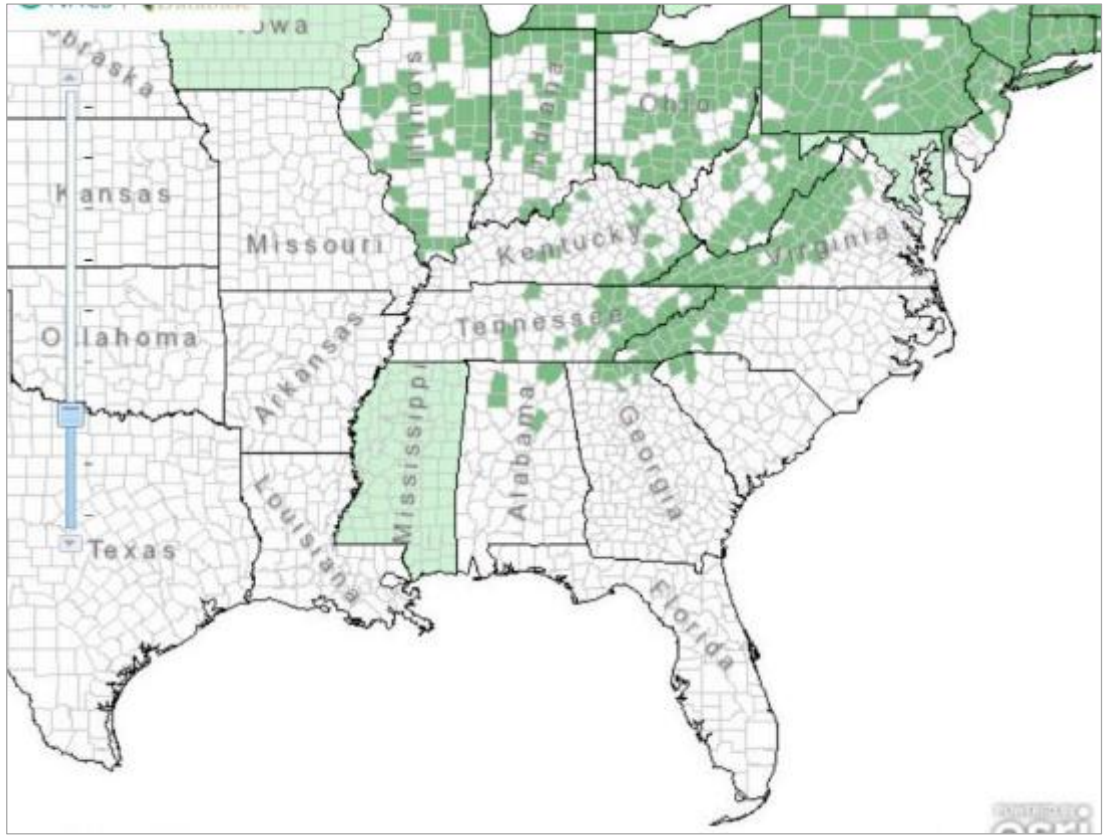
poke milkweed (*Asclepias exaltata*)

Foliage resembles that of pokeweed

Photo: Rob Routledge_Sault College_Bugwood-CC 1



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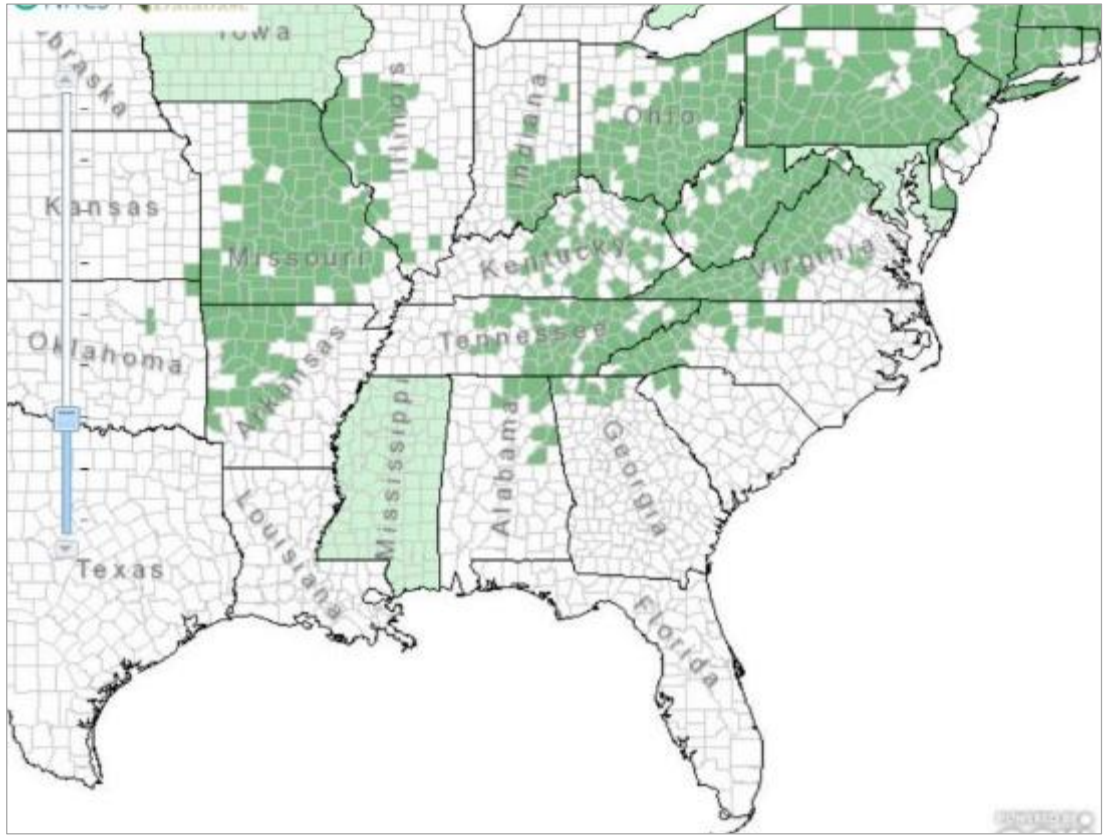
fourleaf milkweed (*Asclepias quadrivalvis*)

Four leaves radiating out from some of the nodes

Photo: Eric Hunt, Arkansas Native Plant Society



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Milkweeds of the Coastal Plain

- Photo: JaxStrong Flickr.com

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pinewoods milkweed (*Asclepias humistrata*)

Better known as sandhill milkweed

Photo: Nancy Adamson; Map: USDA PLANTS

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pinewoods milkweed (*Asclepias humistrata*)

- Sandhills, xeric woodlands, xeric pastures, dunes, scrub
- Very HIGH levels of cardenolides, therefore…
- ….does great in livestock pastures
- Seeds NOT commercially available in bulk
- VERY difficult to grow transplants

Photo:: Sudie Thomas, NRCS

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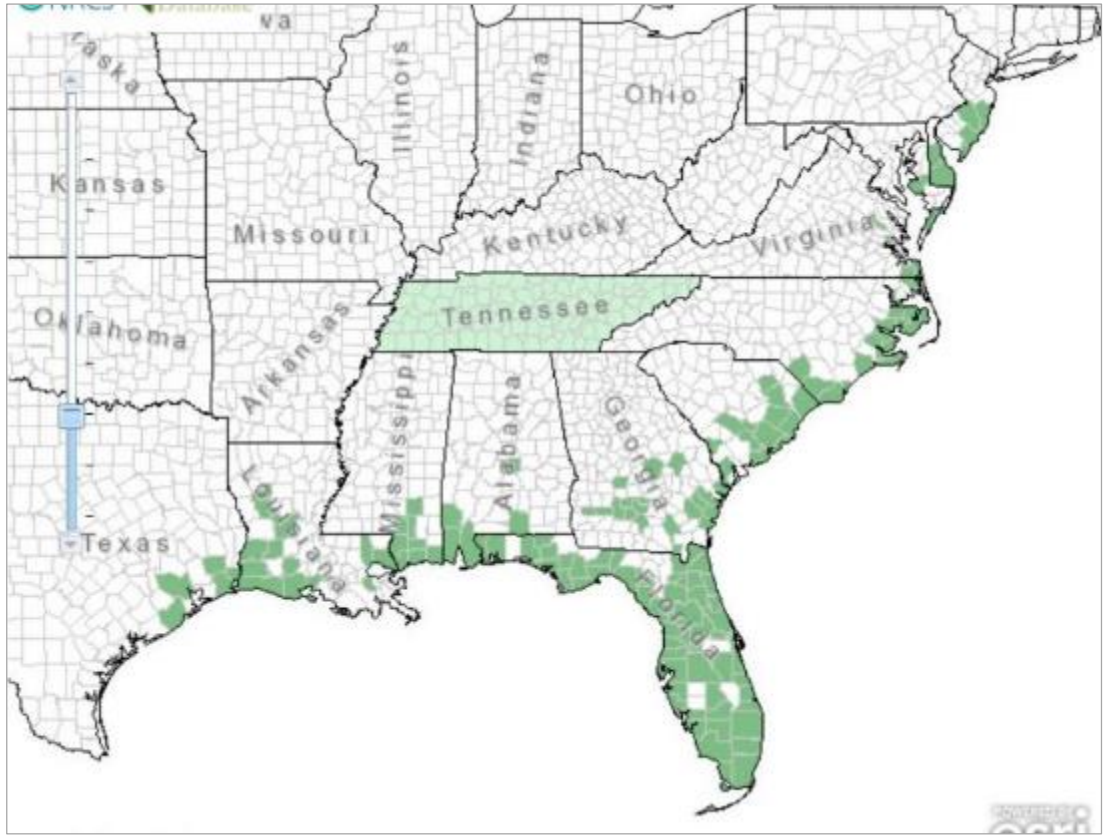
fewflower milkweed (*Asclepias lanceolata*)

Likes wet areas. Usually just one or two plants here or there.

Photo: Nancy Adamson



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Aquatic milkweed (*Asclepias perennis*)

Photos: Eric Hunt, Arkansas Native Plant Society: Ray Moranz

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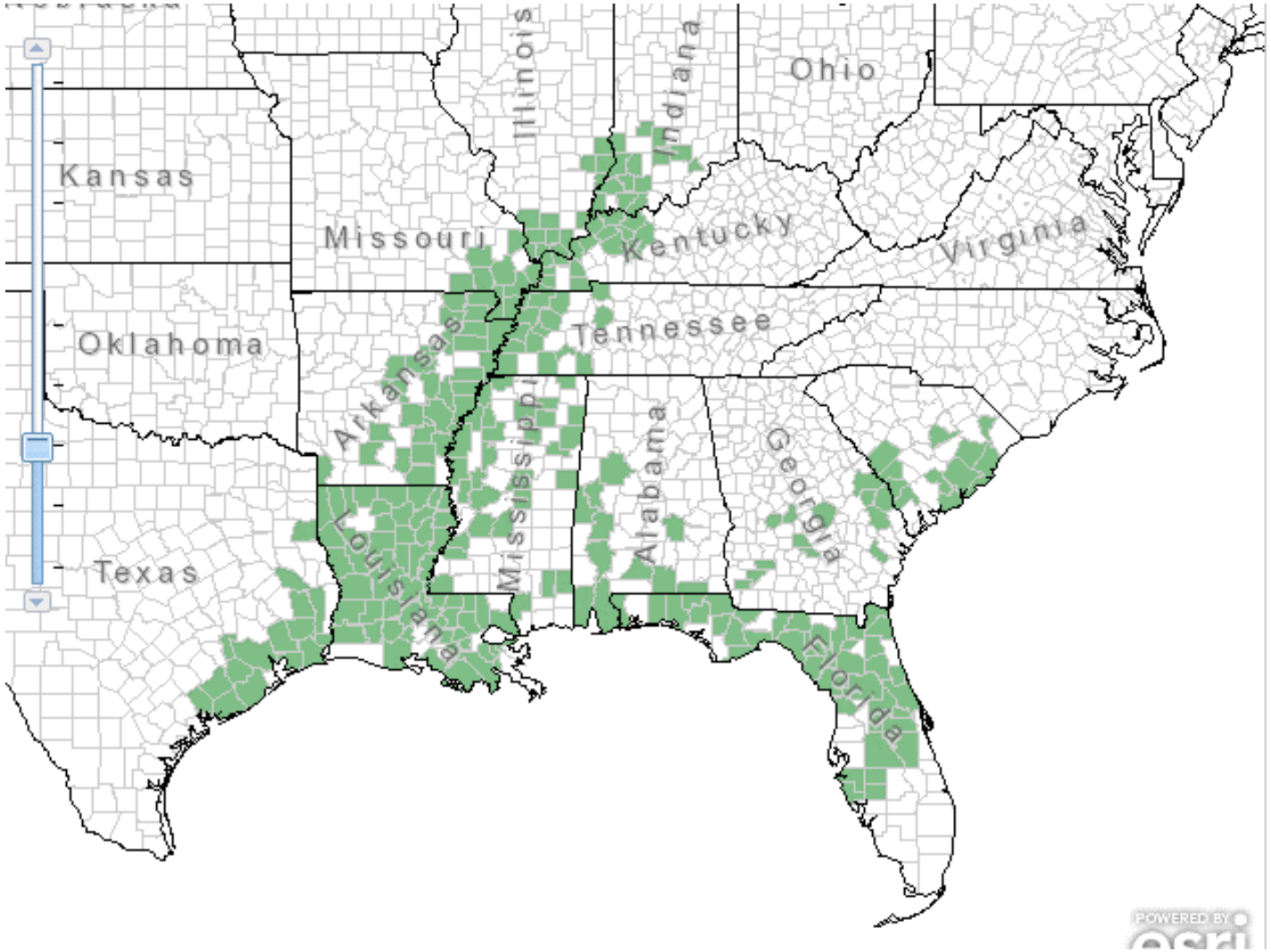
Aquatic milkweed (*Asclepias perennis*)



USDA Plants

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Aquatic milkweed (*Asclepias perennis*)

Photos: Ray Moranz

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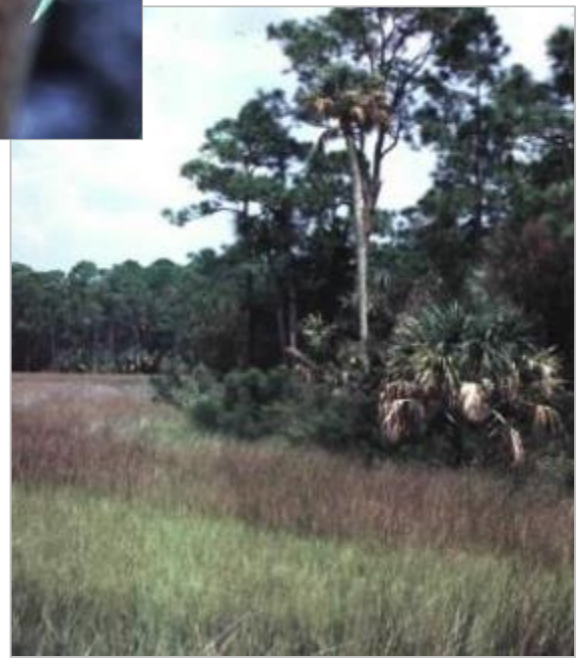
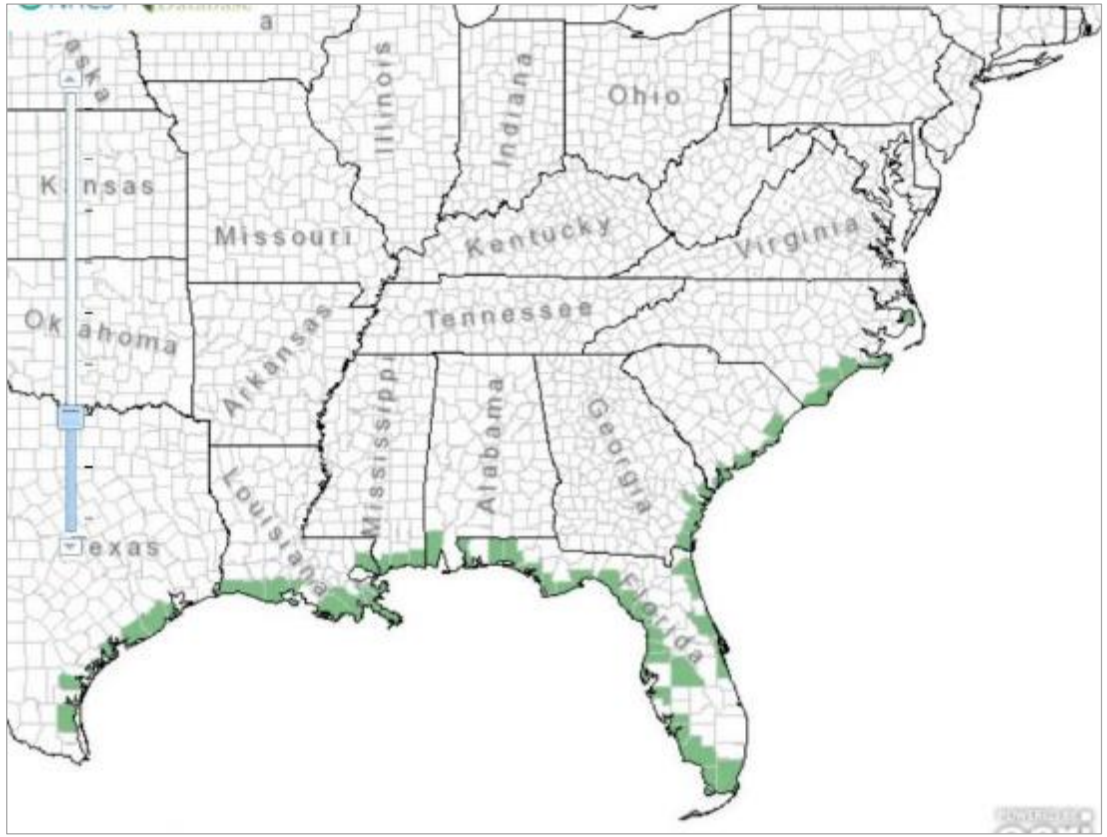
Gulf coast swallow-wort(*Pattalias palustre*)

Formerly known as *Seutera angustifolia*, *Cynanchum angustifolium*, *C. palustre*, and *Funastrum angustifolium*





Photos: Ray Moranz

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Some odds and ends

- Photo: Ray Moranz

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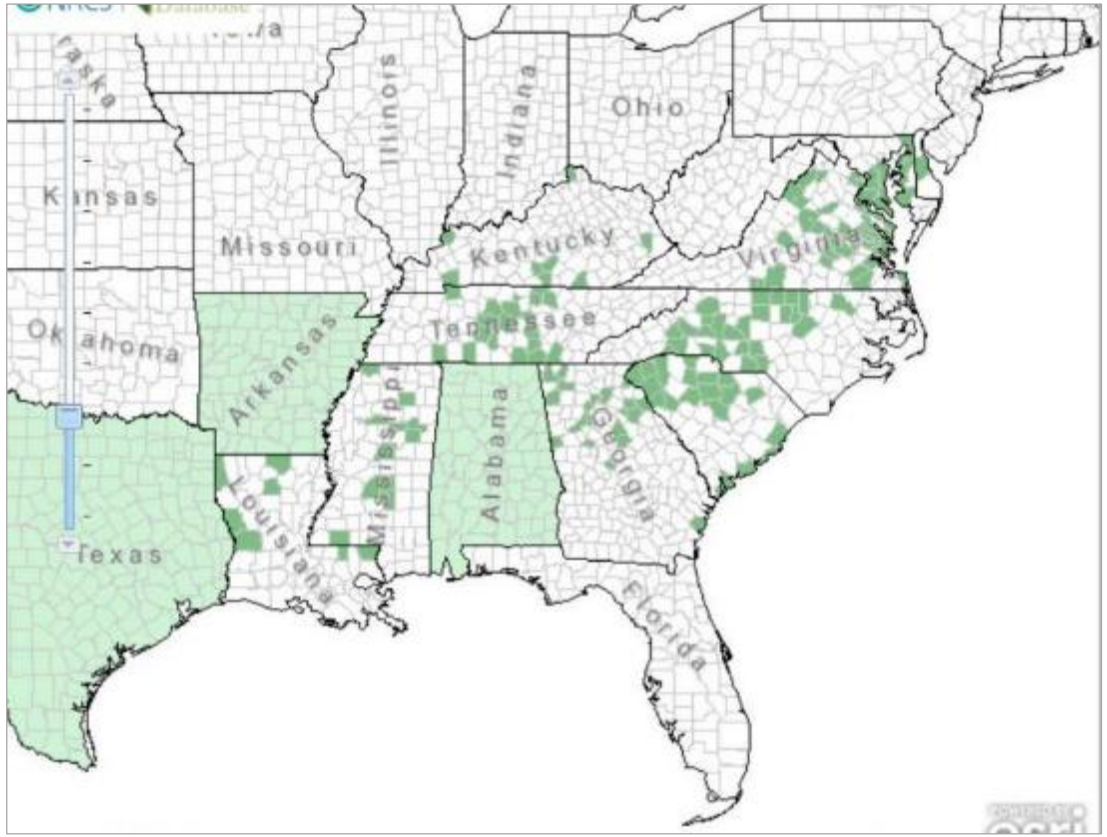
maroon Carolina milkvine (*Matelea carolinensis*)

Multiple reports online of monarchs using this one

Photo: Sudie Thomas



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White twinevine (*Funastrum clausum*)

Photo: Bob Peterson commons.wikimedia.org

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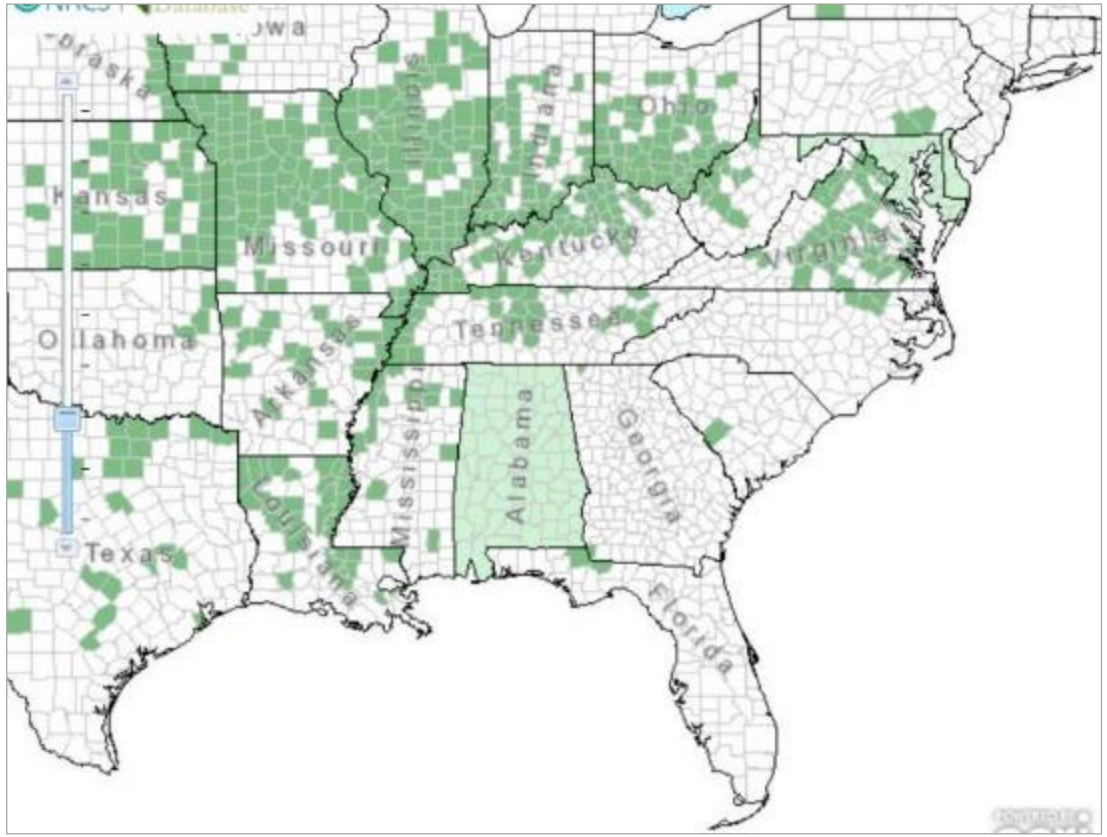
honeyvine (*Cynanchum laeve*)

This one is more important to monarchs than many *Asclepias* species

Photo: Nancy Lee Adamson



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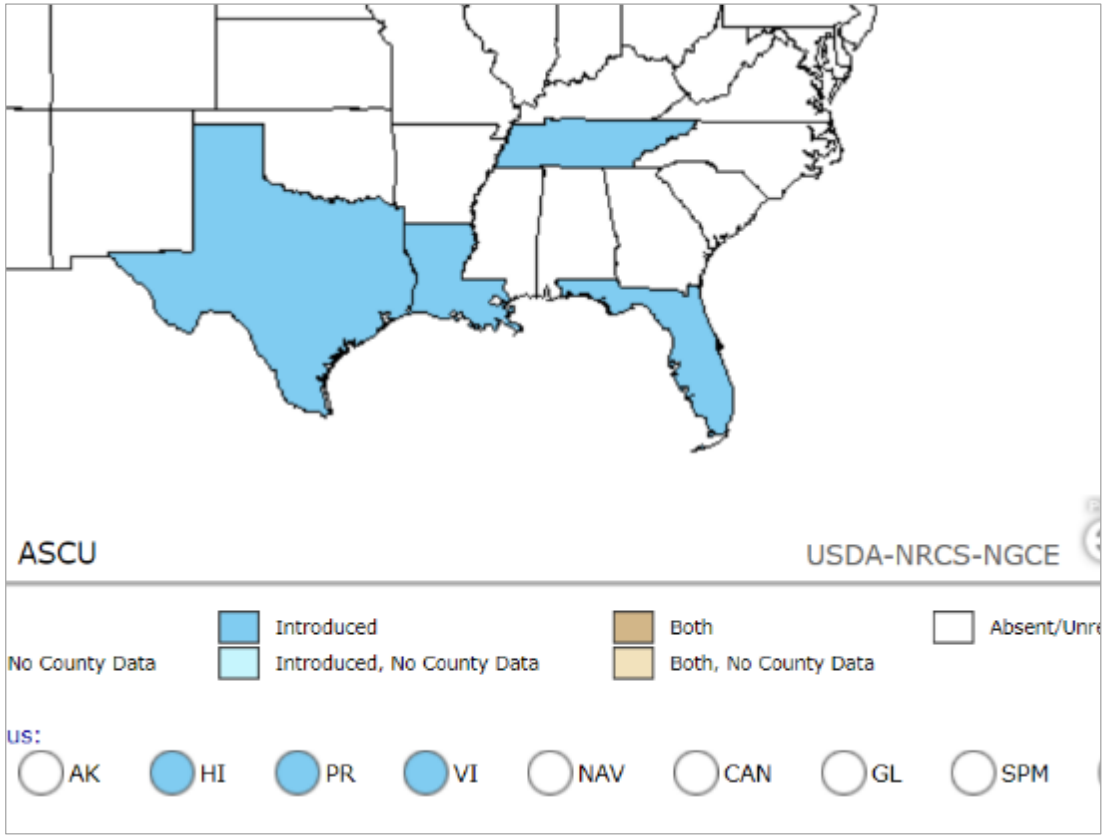
tropical milkweed (*Asclepias curassavica*)

An introduced species that can be invasive. NRCS doesn't recommend this one.

Photo: Ray Moranz



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Good news: milkweed transplants are often available

Native nurseries often carry them or will contract grow them

Green milkweed (*A.viridiflora),* poke milkweed (*A.exalta),* fourleaf milkweed (*A.quadrifolia) (top),),* swamp milkweed (*A. incarnata*) (bottom*), lance-leaved milkweed (Asclepias lanceolata*) (top), purple milkweed*),* (*A.purpurascens*) (bottom) by Nancy Adamson

xerces.org

Bad news: few species available as bulk seed

Asclepias syriaca

Asclepias incarnata

Asclepias tuberosa

Photos: Nancy Lee Adamson (1,2) Ray Moranz (3)

xerces.org

Milkweeds as nectar sources

Photos: Nancy Lee Adamson (1,2,5), Ray Moranz (3,4)

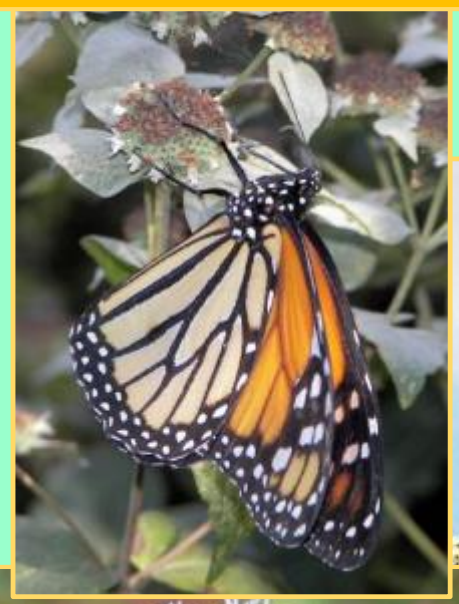
xerces.org

Roadside Milkweed Fact Sheets

For every region of the lower 48

xerces.org

Important Nectar Plant Species for Monarchs



Photos: Dave Kastner

Important Nectar Plant Species for Monarchs

It is thought that Monarchs find nectar plants via chemoreceptors and visual cues

Adult monarchs depend on diverse nectar sources for food during all stages of the year, from spring and summer breeding to fall migration and overwintering

https://xerces.org/monarchs/monarch-nectar-plant-guides

Adult butterflies sense most smells through their antennae, which are densely covered with chemoreceptors, especially on the clubs. In monarchs, chemoreceptors on the antennae sense the honey odor associated with nectar and feeding.

https://www.monarchwatch.org/biology/sense1.htm

More than beautiful, **monarch butterflies contribute to the health of our planet**. While feeding on nectar, **they pollinate many types of wildflowers.** The flowers they chose are varieties that are brightly colored, grow in clusters, stay open during the day, and have flat surfaces that serve as landing pads for their tiny guests. **Monarch butterflies are also an important food source for birds, small animals, and other insects.**

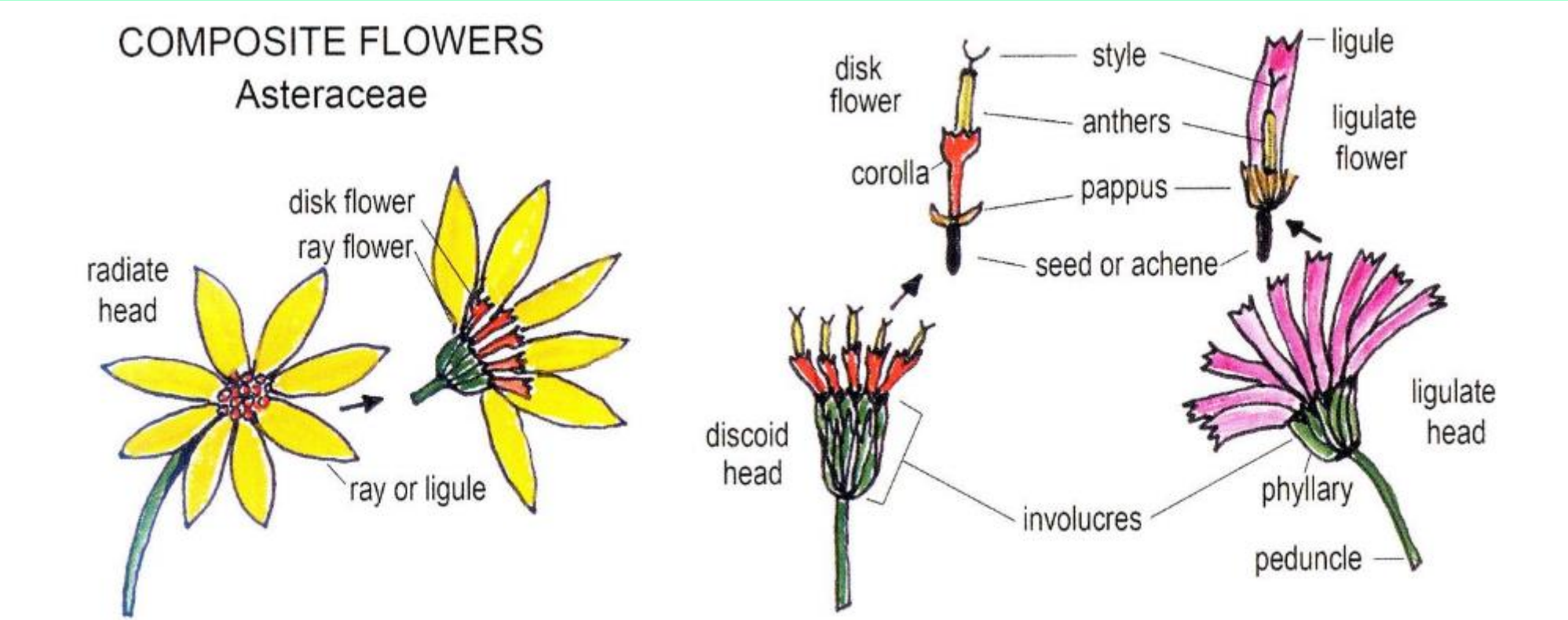
https://www.nps.gov/articles/monarch-butterfly.htm

Important Nectar Plant Species for Monarchs

Herbaceous **Species most often documented being used by Monarchs**

Family:
Asteraceae (asters)

Common attributes: clusters of multiple flowers, many are fragrant, many bloom during late summer and fall



Thanks to James Lightner for allowing the use of this image; you can find this and other botanical terms illustrated in the book, *San Diego County Native Plants* by James Lighter (2011) https://thenaturecollective.org/wp-content/uploads/2019/05/Composite_flower.jpeg

Bidens beggarsticks

Steve Hurst CC0 1.0

Bidens aristosa tickseed sunflower / bearded beggarticks

Dennis Burnette

Asteraceae (asters)

Ray Moranz

Bidens alba Spanish needles

Jerry Bright

Sudie Thomas

Hosts 15 Lepidopterans

Sudie Thomas

Bidens laevis tickseed Showy Bur-marigold, Smooth Beggarticks

Bloom Time: Jul , Aug
Water Use: High
Light Requirement: full sun or Part Shade

Commercially available: Yes

Carphephorus
Chaffhead

Asteraceae (asters)

Before flowering

Carphephorus paniculatus, hairy chaffhead

Bloom Time: Jan , Aug , Sep , Oct , Nov , Dec

Photos: Sudie Thomas

Carphephorus
Chaffhead

Asteraceae (asters)

Carphephorus odoratissimus, vanilla leaf, vanilla plant, deer's tongue

John Ruter Bugwood.org

Nancy Adamson

Sudie Thomas

Bloom Time: Aug , Sep , Oct , Nov

Commercially available: Yes, in mixes

Carphephorus
Chaffhead

Carphephorus bellidifolius, Sandhill Chaffhead, Sandywoods Chaffhead

Asteraceae (asters)

Bloom Time: Aug , Sep , Oct

Carphephorus tomentosus, Sticky Chaffhead, Woolly Chaffhead

Photos: Sudie Thomas

CIRSIUM spp. (Native THISTLES)

Asteraceae (asters)

- **Sandhills thistle (*Cirsium repandum*)**

Sudie Thomas

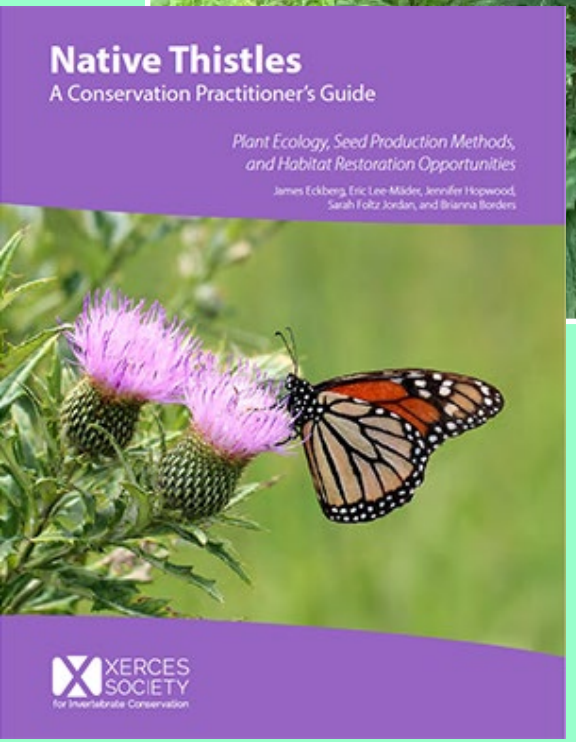
- Judy Gallagher CC BY 2.0

- Nancy Adamson

- **Yellow thistle (*Cirsium horridulum*)**
- Scott Zona CC BY-NC 2.0

CIRSIUM spp. (Native THISTLES)

Asteraceae (asters)



- Tall thistle (*Cirsium altissimum*):

Ray Moranz

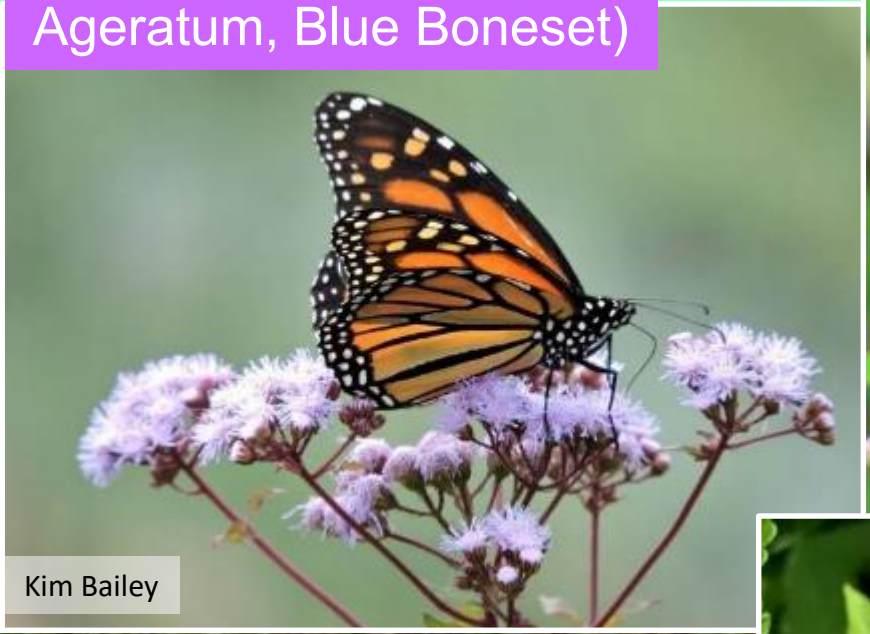
"xerces thistle guide"
https://xerces.org/sites/default/files/2018-05/16-029_01_XercesSoc_Native-Thistles-Conservation-Guide_web.pdf

Non-native Thistles that we DON'T promote:

- Native to Eurasia and Northern Africa
- Listed as noxious weeds in many states
- Aggressively infest disturbed areas and degrade habitats by reducing plant biodiversity

Conoclinum colestineum, **Mistflower** (Blue Mistflower, Wild Ageratum, Blue Boneset)

Asteraceae (asters)


Kim Bailey


Sudie Thomas


Ray Moranz


Dave Kastner

Bloom Time: Jul , Aug , Sep , Oct , Nov

Water Use: Medium

Light Requirement: Sun , Part Shade

Soil Moisture: Moist

Commercially available: Yes

Coreopsis lanceolata
(Lanceleaf Coreopsis, Coreopsis, Lanceleaf Tickseed, Sand Coreopsis)

Asteraceae (asters)

Stephanie Brundage, Ladybird Johnson Wildflower Center

Sudie Thomas

Bloom Time: Apr , May , Jun

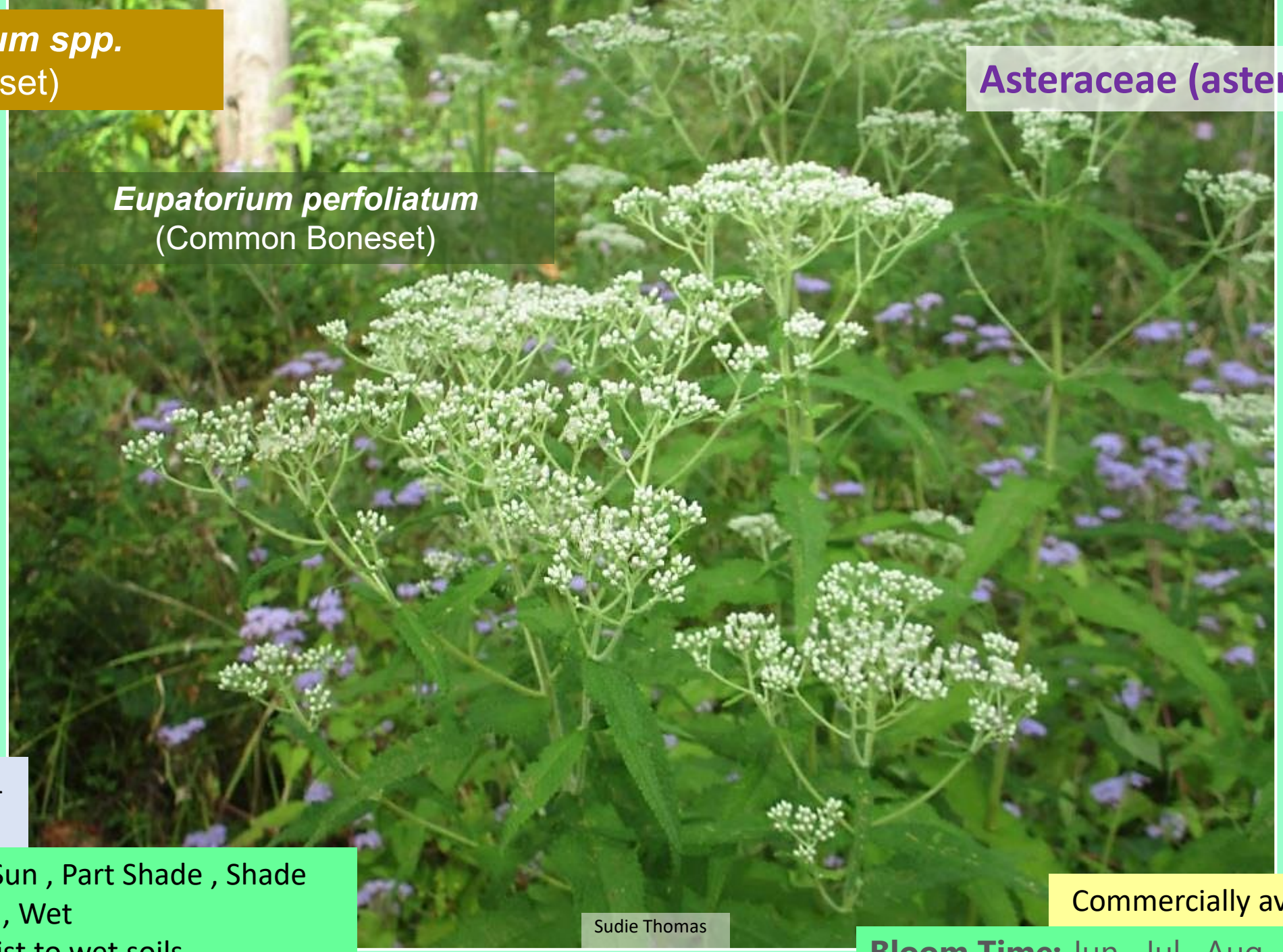
Commercially available: Yes

Water Use: Medium
Light Requirement: Sun , Part Shade , Shade
Soil Moisture: Dry

Eupatorium spp.
(Boneset)

Asteraceae (asters)

Eupatorium perfoliatum
(Common Boneset)



Sudie Thomas

Eupatorium hosts 41 Lepidopterans!

Light Requirement: Sun , Part Shade , Shade
Soil Moisture: Moist , Wet
Soil Description: Moist to wet soils

Commercially available: Yes

Bloom Time: Jun , Jul , Aug , Sep , Oct

Eupatorium spp.
(Boneset)

~ 20 species in SC

Bloom Time: Jul, Aug, Sep

Eupatorium glaucescens
(Wedgeleaf Thoroughwort, Broadleaf Bushy Eupatorium, Wedgeleaf Eupatorium)

Asteraceae (asters)

Photos: Sudie Thomas

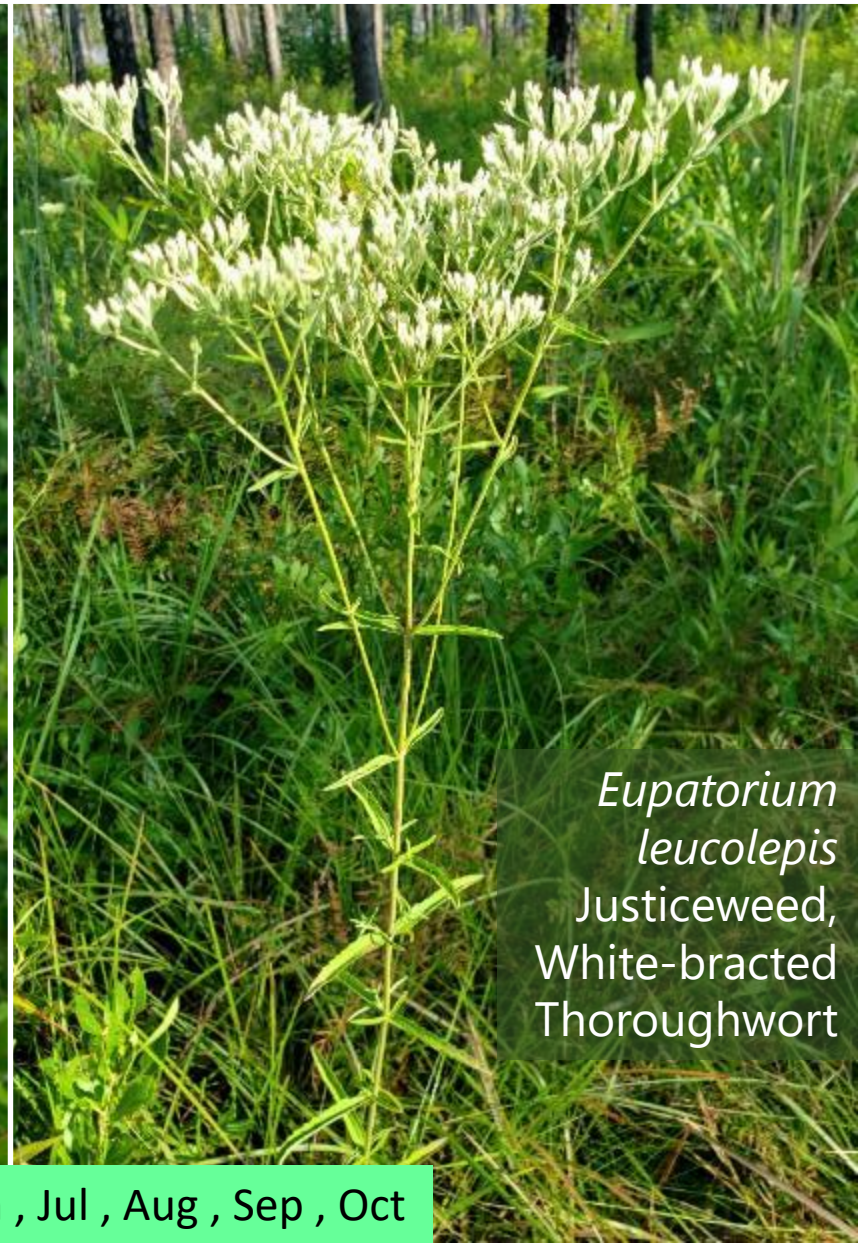
Eupatorium spp.
(Boneset)

Light Requirement: Sun
Soil Moisture: Moist
Soil Description: Sandy

Asteraceae (asters)

Eupatorium hyssopifolium
Hyssopleaf Thoroughwort,
Hyssop-leaf Boneset

Eupatorium rotundifolium
Roundleaf Thoroughwort



Eupatorium leucolepis
Justiceweed,
White-bracted
Thoroughwort

Photos: Sudie Thomas

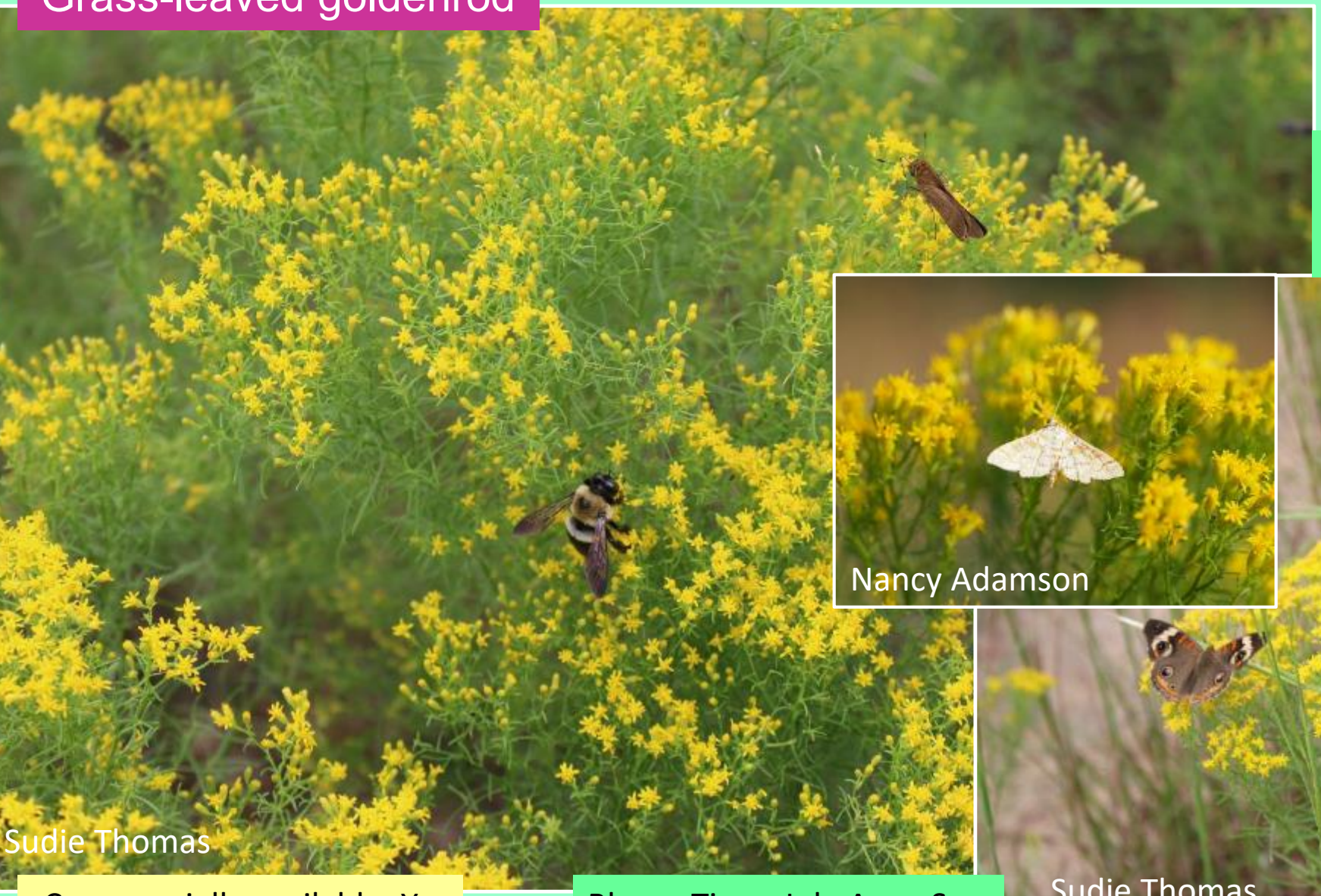
Commercially available: Yes

Bloom Time: Jun , Jul , Aug , Sep , Oct

Euthamia graminifolia
Flat-topped goldenrod,
Grass-leaved goldenrod

Asteraceae (asters)

Light Requirement: Sun
Soil Moisture: Moist
Soil Description: Moist, average soils.



Sudie Thomas

Nancy Adamson

Sudie Thomas

Commercially available: Yes

Bloom Time: Jul , Aug , Sep

Eutrochium spp.
(Joe Pye Weed)


Sudie Thomas

Asteraceae (asters)

Commercially available: Yes


Sudie Thomas

Eutrochium fistulosum
(Hollow stem joe pye weed)

Bloom Time: Jul , Aug , Sep


William Avery Hudson / Flickr CC

Eutrochium dubium
(Coastal joe pye weed)

Bloom Time: Jul , Aug , Sep , Oct

Gaillardia pulchella
(beach blanket flower, firewheel)

Asteraceae (asters)

Commercially available: Yes

Photos: Sudie Thomas

Bloom Time: May , Jun , Jul , Aug

Helianthus spp. (sunflowers)

Asteraceae (asters)

Bloom Time: Oct

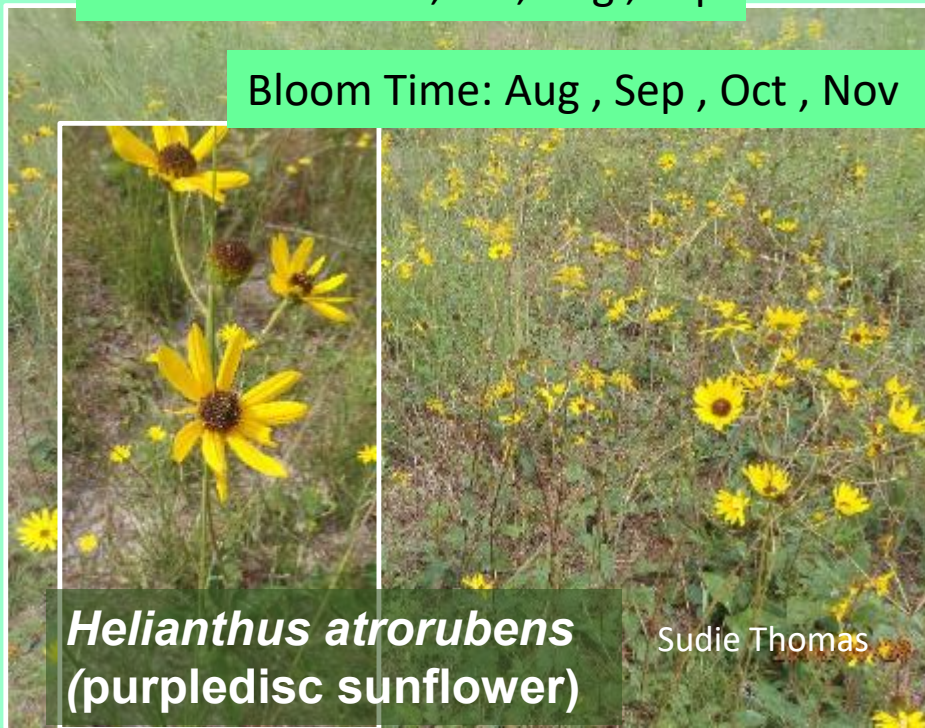
***Helianthus divaricatus* (woodland sunflower)**

Bloom Time: Jun , Jul , Aug , Sep

***Helianthus angustifolius* (swamp or narrow-leaved sunflower)**

Commercially available: Yes

Bloom Time: Aug , Sep , Oct , Nov



***Helianthus atrorubens* (purpledisc sunflower)**

Helianthus angustifolius (swamp or narrow-leaved sunflower)

Asteraceae (asters)

Ray Moranz

Liatris spp. (Blazing star)

Asteraceae (asters)

Liatris pilosa

Sudie Thomas

Nancy Adamson

Liatris spicata

Dale Buchner

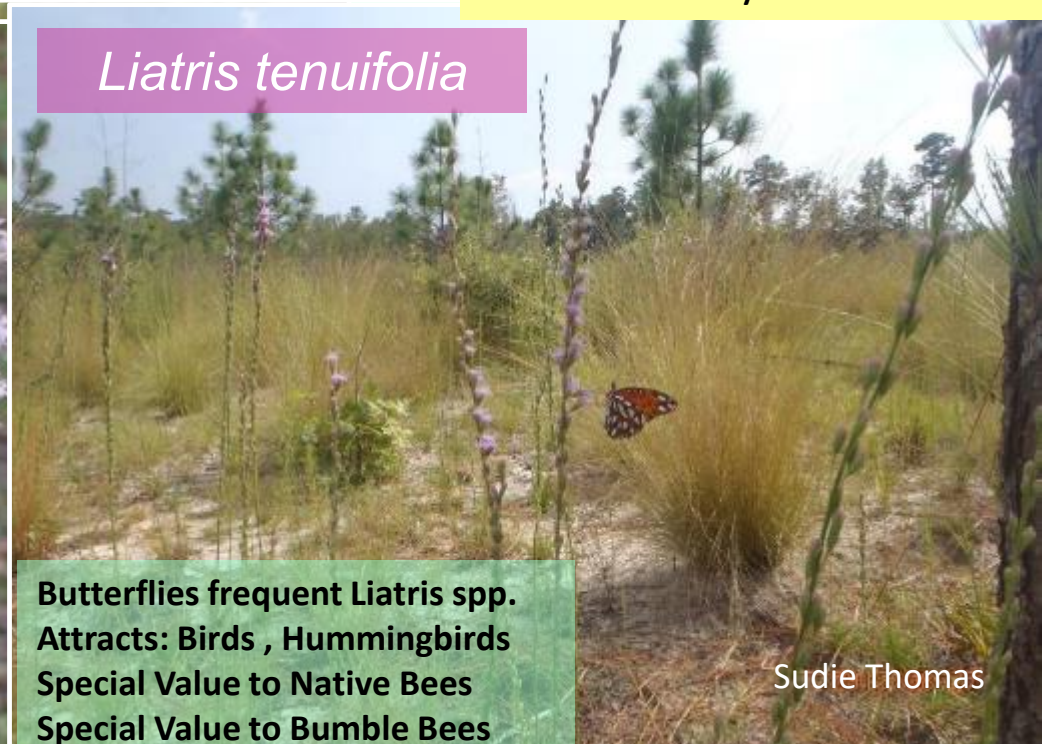
Commercially available: Yes

Nancy Adamson

Sudie Thomas

Liatris elegans

Liatris tenuifolia



Butterflies frequent Liatris spp.
Attracts: Birds , Hummingbirds
Special Value to Native Bees
Special Value to Bumble Bees

Sudie Thomas

Bloom Time: Jul , Aug , Sep

Mikania scandens (climbing hempvine)

Water Use: Medium
Light Requirement: Sun to Shade
Soil Moisture: Wet
Soil Description: Clay, Loam
Larval host for Little Metalmark Butterfly

Sudie Thomas

Monarch on climbing hemp vine by Dennis Burnette, Carolina Butterfly Society

Bloom Time: Jun , Jul , Aug

Asteraceae (asters)

Packera spp.
(ragwort, groundsel, butterweed)

Packera glabella

JK Marlow

Bloom Time: Mar , Apr , May

JK Marlow

Packera anonyma

Sudie Thomas

Bloom Time: Mar, Apr, May, Jun, Jul, Aug

Rudbeckia spp. (coneflower)

Asteraceae (asters)

Rudbeckia fulgida

Bloom Time: Jul , Aug , Sep , Oct

JK Marlow

Rudbeckia hirta

Sudie Thomas

Rudbeckia triloba

Sudie Thomas

Sudie Thomas

Bloom Time: Jun , Jul , Aug , Sep , Oct

Sudie Thomas

Commercially available: Yes

Silphium spp.
(cup plant, rosinweed)

Asteraceae (asters)

Bloom Time: Jun , Jul , Aug , Sep

Silphium asteriscus
Starry rosinweed

Photos: JK Marlow

Commercially available: Yes

Solidago spp. (goldenrod)

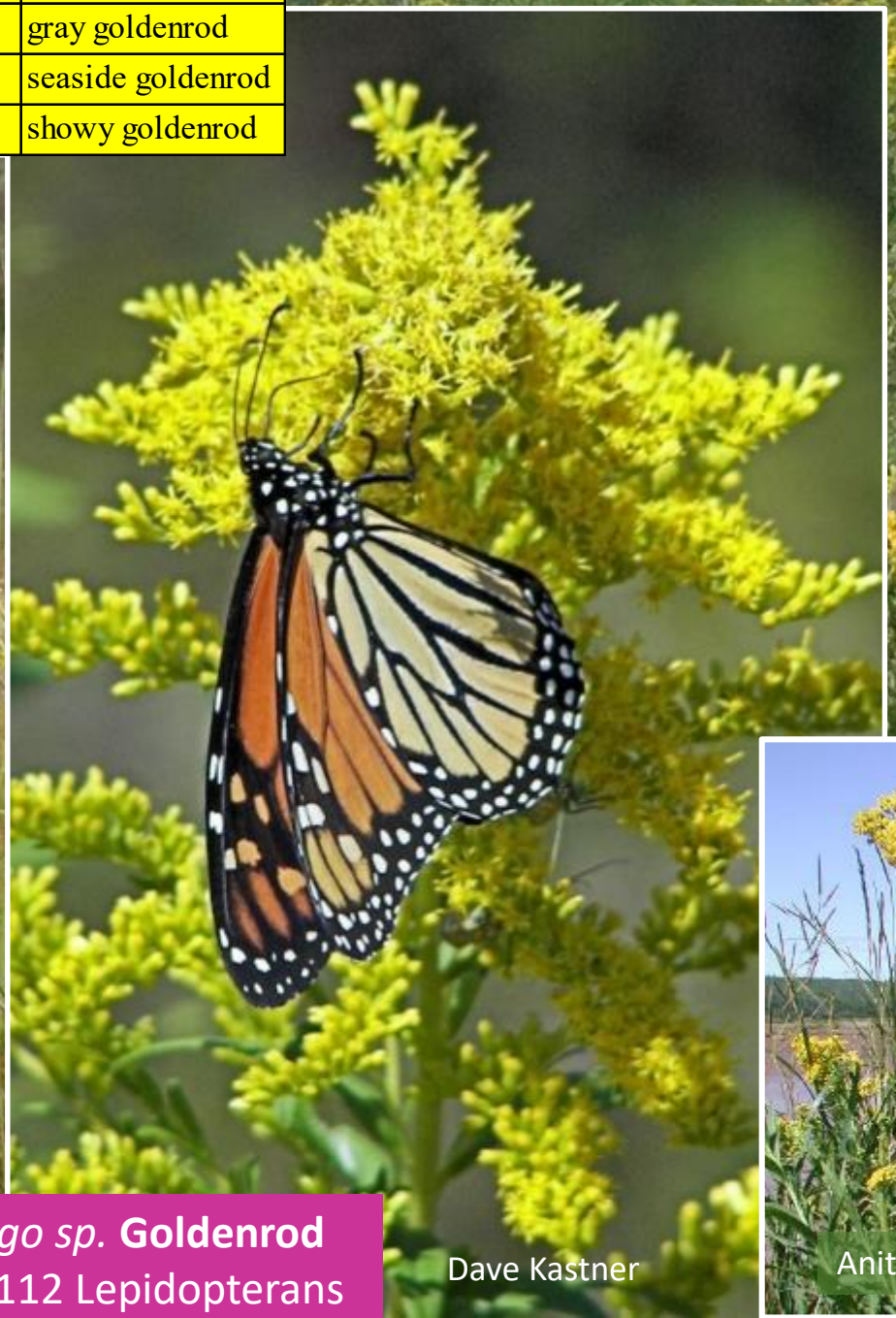
Solidago altissima	tall goldenrod
Solidago nemoralis	gray goldenrod
Solidago sempervirens	seaside goldenrod
Solidago speciosa	showy goldenrod

Asteraceae (asters)

Bloom Times vary: some species bloom in spring and summer but most bloom late summer and fall
(39 species in SC)

Commercially available: Yes

Sudie Thomas



Solidago sp. **Goldenrod** hosts 112 Lepidopterans

Dave Kastner

Symphyotrichum spp. (aster)

Asteraceae (asters)

Bloom Time: Aug , Sep , Oct

Symphyotrichum laterifolium
Calico aster

Sudie Thomas

Dennis Burnette

Symphyotrichum pilosum
Hairy white old field

Sudie Thomas

Commercially available: Yes

Symphyotrichum lateriflorum	calico aster
Symphyotrichum novae-angliae	New England aster
Symphyotrichum novae-belgii	New York aster
Symphyotrichum pilosum	hairy white oldfield
Symphyotrichum puniceum	purplestem aster

Symphyotrichum spp.
(aster)

Asteraceae (asters)

Commercially available: Yes

Symphyotrichum puniceum
Purple stem aster

Bloom Time: Jul , Aug

Symphyotrichum novae-angliae
New England aster

Bloom Time: Aug , Sep , Oct

Bloom Time: Jul , Aug , Sep , Oct

Symphyotrichum novi-belgii
New York aster

Asteraceae (asters)

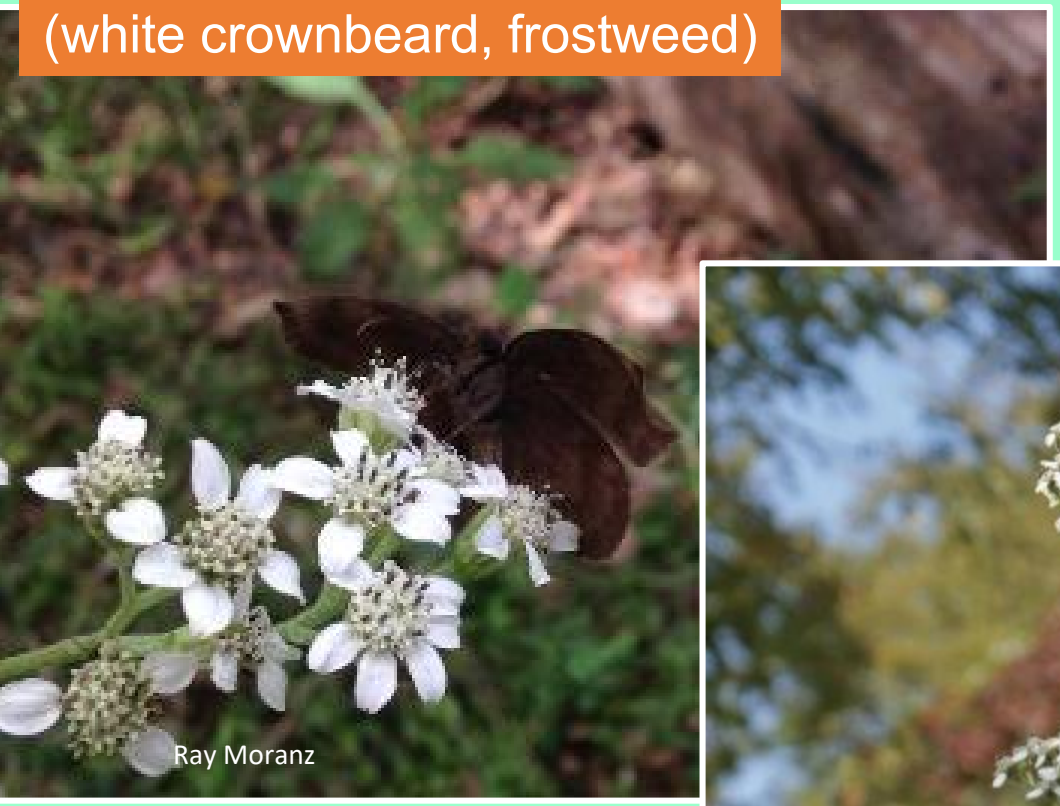
Verbesina alternifolia
(common or yellow wingstem)

Bloom Time: Aug , Sep , Oct

Commercially available: Yes

Verbesina virginica
(white crownbeard, frostweed)

Asteraceae (asters)



Commercially available: Yes

Bloom Time: Aug , Sep , Oct , Nov

Vernonia spp. (ironweed)

Asteraceae (asters)

Commercially available: Yes

Vernonia gigantea
Giant Ironweed

Vernonia acaulis,
stemless Ironweed

Vernonia angustifolia,
Tall Ironweed

Bloom Time: Jun , Jul , Aug

Special Value to Native Bees

Bloom Time: Aug , Sep , Oct

Photos: Sudie Thomas

Important Nectar Plant Species for Monarchs

Herbaceous **Species most often documented being used by Monarchs**

Family:
Lamiaceae (mints)

Common attributes: clusters of multiple flowers, many are fragrant, many bloom mid to late summer

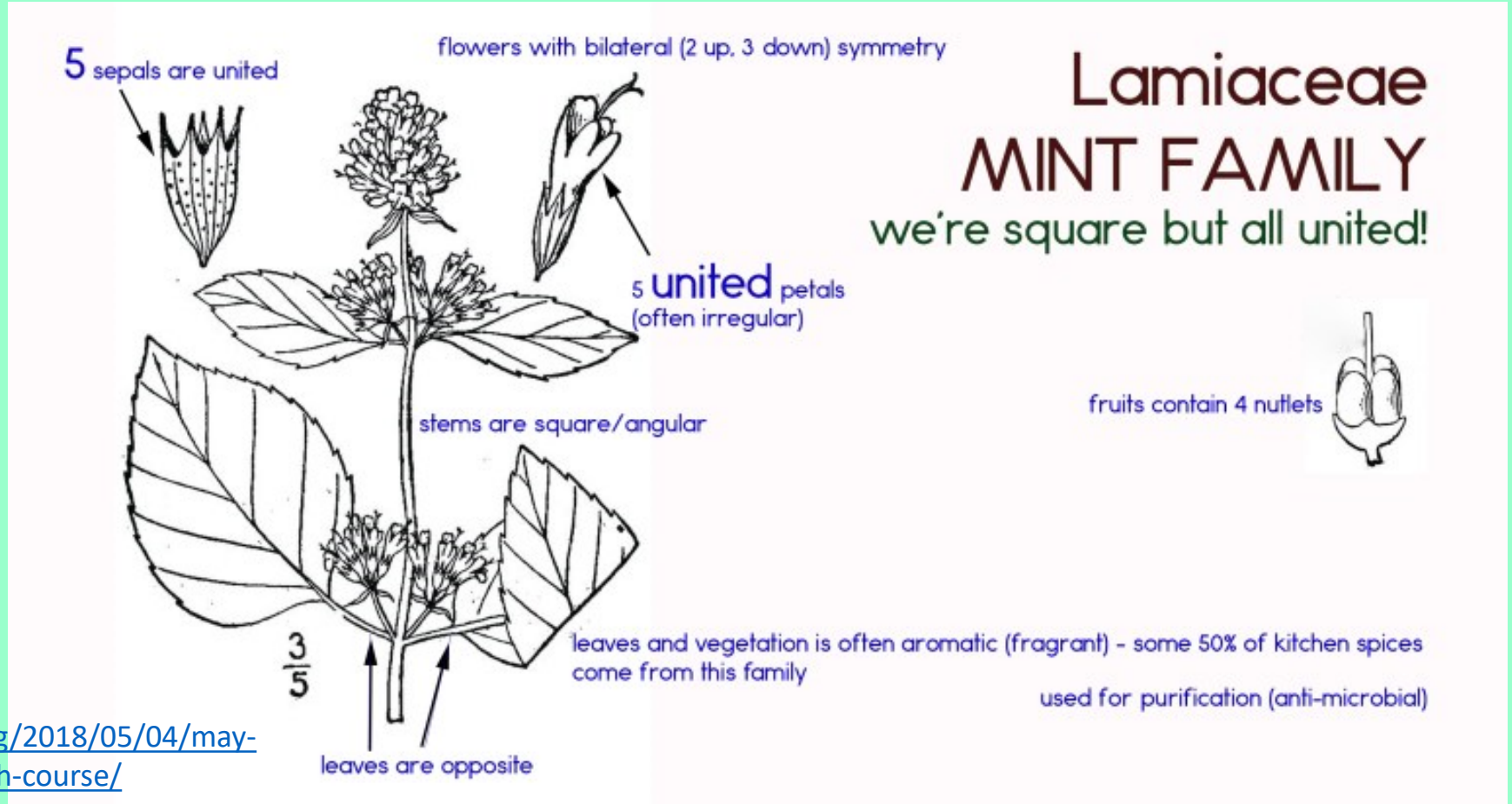


Image from:
https://www.goldenhour.org/2018/05/04/may-taxonomy-and-plant-id-crash-course/

Hyptis alata
(clustered bushmint)

Lamiaceae (mints)

Water Use: Medium , High
Light Requirement: Sun , Part Shade
Soil Moisture: Moist , Wet

Propagation Material:
Root Division , Seeds ,
Softwood Cuttings

Bloom Time: May , Jun , Jul , Aug , Sep , Oct , Nov

Lamiaceae (mints)

Monarda punctata (horse mint)

Monarda spp., wild bergamot, bee balm, dotted mint (horsemint)


Annette Meredith


Sudie Thomas


Sudie Thomas

Bloom Notes: While the flowers of this plant are usually yellow with maroon markings on the upper petals, they may also be white or green. However, the bracts are showier and may be purple, pink, white or yellow.

Special Value to Native Bees
Special Value to Bumble Bees
Special Value to Honey Bees
Supports Conservation Biological Control

Nancy Adamson

Monarda fistulosa
(wild bergamot, beebalm)

Lamiaceae (mints)

Bloom Time: May , Jun , Jul , Aug , Sep

Commercially available: Yes

Attracts: Birds , Butterflies , Hummingbirds
Deer Resistant: High

Special Value to Native Bees
Special Value to Bumble Bees

Water Use: Mec
Light Requirement: Sun , Part Sh
Soil Moisture: Dry , M

Lamiaceae (mints)

Pycnanthemum spp., slender mountain mint, hoary mountain mint, clustered mountain mint, etc. 8 species in SC

Photo: Mark Fiely, Ernst Conservation Seed

Sudie Thomas

Preferred nectar
Special Value to Native Bees
Special Value to Bumble Bees
Special Value to Honey Bees
Supports Conservation Biological Control
Host to 2 Leps

Lamiaceae (mints)

Pycnanthemum spp., slender mountain mint, hoary mountain mint, clustered mountain mint, etc. 8 species in SC

Special Value to Native Bees
Special Value to Bumble Bees
Special Value to Honey Bees
Supports Conservation Biological Control

Woody shrubs and small trees are important for nectar

Groundsel tree
Baccharis halimifolia.

Sudie Thomas


Dave Kastner


Sudie Thomas

Billy McCord

fresh & brackish marshes, marsh borders, hammocks, moist abused land, roadsides, ditches, old fields, & a wide variety of disturbed areas

Important fall nectar for migrating butterflies and many other insects

Use Wildlife: Cover, Nectar-bees, Nectar-butterflies, Nectar-moths, Nectar-insects, Seeds-granivorous birds, hosts 20 native leps

Woody shrubs and small trees are important for nectar

- Large shrub found at wetland, stream, and river edges in the wild
- Loves having wet feet
- Can do great in garden with average moisture
- Attracts MANY pollinator species
- Tough; easy to grow

Cephalanthus occidentalis, **buttonbush**


Photo: Ray Moranz


Photo: Nancy Adamson


Photo: Sudie Thomas

Buttonbush hosts 19 native leps

Woody shrubs and small trees are important for nectar

Fothergilla gardenii,
Dwarf witch alder

Water Use: High
Light Requirement: Sun, Part Shade
Soil pH: Acidic (pH<6.8)
Commercially available

Bloom Time: Apr , May


Sudie Thomas


Sudie Thomas


JK Marlow ©JK Marlow

Woody shrubs and small trees are important for nectar

Prunus americana, **American plum**

- Bloom Time: Apr , May
- Commercially available
- Fruit great for wildlife
- Good cover for wildlife
- Water Use: Medium
- Light Requirement: Sun , Part Shade , Shade
- Soil Moisture: Moist

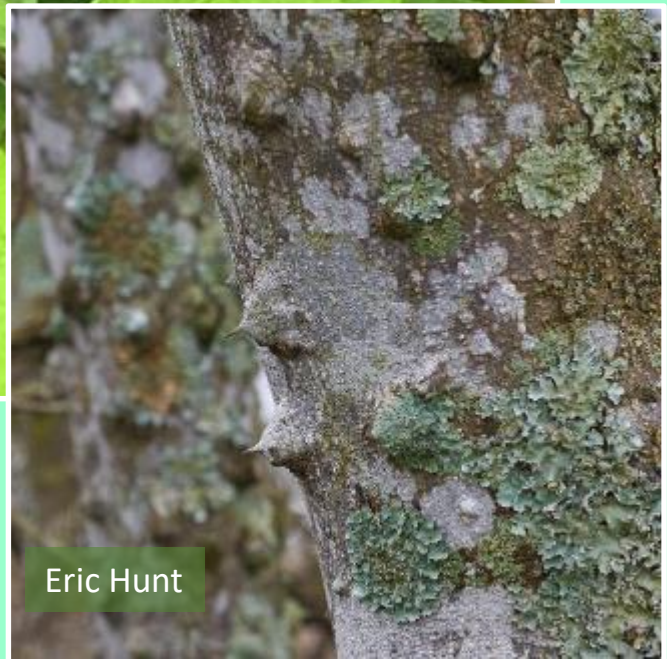
Photos: Ray Moranz

Nancy Adamson

Woody shrubs and small trees are important for nectar

Zanthoxylum clava-herculis,
Hercules' club

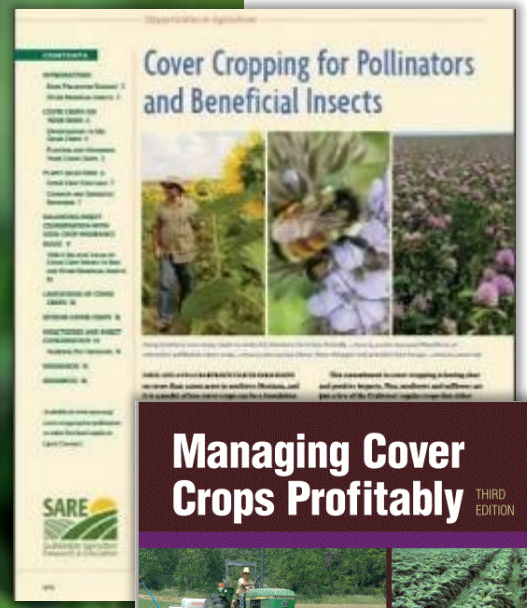
Water Use: Medium
Light Requirement: Sun
Soil Moisture: Dry



Bloom Time: Mar , Apr

Use Ornamental: Aromatic, Showy
Use Wildlife: Seeds-granivorous birds.
Larval Host: Giant swallowtail butterfly.

Interrelated benefits of cover crops



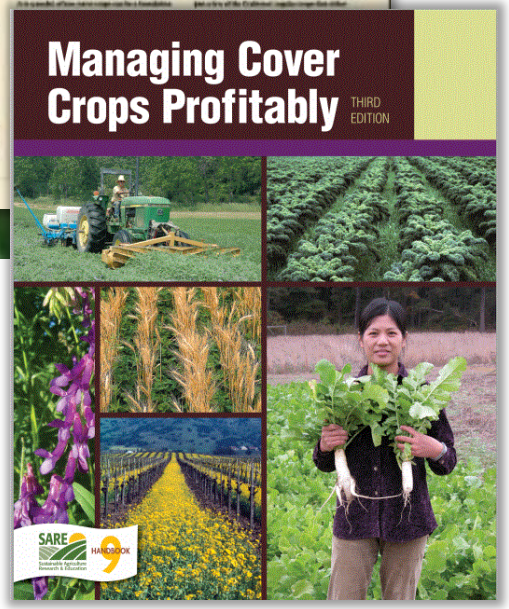


Photo: Monarch on red clover, Trifolium pretense, by Dennis Burnette, Carolina Butterfly Society

◄ This includes a full section on cover crops

1. Support pest predators & parasitoids
2. Support pollinators
3. Support soil life
4. Weed suppression
   a. Smother crops
   b. Support weed seed consumers
5. Prevent soil erosion
6. Increase water filtration
7. Improve soil health
8. Increase farm biodiversity
9. Supports IPM; reduces inputs of chemical fertilizers & pesticides

xerces.org

Cover Crops (340)

Some cover crop options that support monarch butterflies, other pollinators, & natural enemies of crop pests

Buckwheat	Legumes	Cut flowers	Insectary plants
Fagopyrum esculentum	*Trifolium* and other spp.	*Zinnia elegans*	*Tithonia diversifolia*




Photos: Alina Harris (buckwheat); Dennis Burnette (red clover); Nancy Adamson (zinnia, Mexican sunflower)

xerces.org

efotg.sc.egov.usda.gov/#/details

FIELD OFFICE TECHNICAL GUIDE

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Welcome to NRCS Field Office Technical Guide (FOTG)

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Keyword Search: monarch

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SEARCH

Documents (4)

Document Title	Type	Pub Date	Subject	Keywords	Abstract	Size (kB)	Actions
327 SC IR Conservation Cover-Monarch Habitat 2015		2015-1-5	--	--	--	1150	
Preferred_Nector_Source_Monarchs		2015-1-27	--	--	--	232	
SC327_Conservation_Cover_JS_Monarch_Habitat_October_2015		2015-10-27	--	--	--	1150	
SC327ConservationCoverTechGuideApril2015		2020-3-20	--	Conservation, Cover, Monarch, Pollinator, Native, Grasses, Forbes	--	803	

Species lists for host plants and preferred nectar plants can be found on the NRCS FOTG https://efotg.sc.egov.usda.gov/#/

USDA United States Department of Agriculture

Preferred_Nectar_....pdf Preferred_Nectar_....pdf PA080055 P7243810 pipevin....JPG Show all

Native Wildflower (seeds available commercially) species of the southeast preferred as nectar sources by Monarch butterflies*

Common Name	*Scientific name*	bloom	bloom	bloom	region	moisture needs	sunlight needs	flower color
Annual Phlox*	*Phlox drummondii*	sprg	sum		P, CP	low	sun to part shade	pink, red
Aster, Calico*	*Aster lateriflolius/ Symphyotrichum lateriflorum*		sum	fall	All	moderate	full sun	purple, white
Aster, Common Blue Wood (heartleaf aster)*	*Aster cordifolius / Symphyotrichum cordifolium*		sum		P	low	full sun	white, lavender
Aster, Eastern Showy (NC ecotype)*	*Aster spectabilis / Eurybia spectabilis (NC)*		sum	fall	P	low	full sun	purple
Aster, False / White Doll's Daisy*	*Boltonia asteroides*		sum	fall	P, CP	moderate	full sun	white
Aster, Health / Hairy White Oldfield*	*Aster pilosus / Symphyotrichum pilosum*		sum	fall	All	moderate	sun to part shade	white
Aster, New England *	*Aster novae-angliae / Symphyotrichum novae-angliae*		sum	fall	M	moderate	part shade	purple
Aster, New York *	*Aster novi-belgii / Symphyotrichum novi-belgii*			fall	P, CP	moderate	sun to part shade	blue
Aster, Purple Stemmed*	*Aster puniceus / Symphyotrichum puniceum*			fall	M, P	high	full sun	purple
Aster, Smooth Blue*	*Aster laevis / Symphyotrichum laeve*		sum	fall	All	moderate	part sun	blue
Beard Tongue, Appalachian* (SC ecotype)	*Penstemon laevigatus (SC)*	sprg	sum		All	high	full sun	purple
Beard Tongue, Eustis Lake/Slender * (NC ecotype)	*Penstemon australis*	sprg	sum		ALL	low	part shade	lavender
Beggarsticks, Bearded/Showy Tickseed* (NC, SC ecotypes)	*Bidens aristosa (SC, NC)*		sum	fall	All	moderate to high	full sun or partial shade	yellow
Beggarsticks, Devil's/Tickseed Sunflower*	*Bidens frondosa*		sum	fall	ALL	high	sun to part shade	yellow
Blazing Star, Elegant* (GA ecotype)	*Liatris elegans (GA)*			fall	P, CP	low	full sun	pink
Blazing Star, Grass-leaf*	*Liatris graminifolia / L. pilosa*		sum		All	low	full sun	purple
Blazing Star, Marsh or Spiked*(FL ecotype)	*Liatris spicata (FL)*		sum	fall	M, P	moderate	part shade to sun	pink, purple
Blazing Star, Rough or Tall*	*Liatris aspera*		sum	fall	P, CP	low to moderate	full sun	purple
Blazing Star, Scaly* (VA ecotype)	*Liatris squarossa (VA)*		sum		All	low	full sun	purple
Blazing Star, Slender*	*Liatris gracilis*		sum	fall	CP	dry to moist	full sun	purple
Blue Mistflower* (VA ecotype)	*Eupatorium coelestinum / Conoclinium coelestinum*		sum	fall	All	moderate	sun to part shade	blue, purple
Blue Vervain*	*Verbena hastata*		sum	fall	ALL	moist to wet	sun to shade	purple, blue
Blue-eyed Grass, Narrowleaved*	*Sisyrinchium angustifolium*	sprg			All	moderate	sun to part shade	blue
Boneset* (FL ecotype)	*Eupatorium perfoliatum (FL ecotype)*			fall	All	moderate to high	full sun or partial shade	white
Columbine, Red *	*Aquilegia canadensis*	sprg	sum		All	dry to moist	part shade	red, orange
Coneflower, Purple *	*Echinacea purpurea*		sum		All	moderate	full sun	purple
Coreopsis, Greater* (AL ecotype)	*Coreopsis major (AL)*	sprg	sum		All	low to moderate	full sun	yellow
Coreopsis-Goldenmane Tickseed* (FL ecotype)	*Coreopsis basalis (FL)*		sum		P, CP	low	full sun	yellow/red
Coreopsis-Lance Leaved* (NC ecotype)	*Coreopsis lanceolata (NC)*	sprg	sum		All	low	part shade	yellow

Nectar plant list – 6 pages, update in progress….

Conservation Cover (Monarch Habitat)

S. C. Practice Job Sheet 327

Prepared for: _____

Prepared by: _____

Farm: _____ Tract: _____ Date: _____

DEFINITION

Monarchs cannot survive without habitat that includes milkweed (*Asclepias* species, but also milkvine and swallow-wort) on which to lay eggs. Their caterpillars (larval stage of monarch life cycle) primarily eat plants in the Asclepiadaceae family. With shifting land management practices, essential habitat has been lost from the landscape and monarch populations have drastically declined. Stands of other beneficial native wildflowers and grasses provide nectar, pollen, and structure. Native bunch grasses can assist herbaceous wildflowers in staying upright, while providing cover and sites for pupation/metamorphosis. Native woody plants (trees, shrubs, vines) are also important nectar sources for monarchs, especially during spring when they migrate north.

PURPOSE

- Provide nectar and pollen for monarch butterflies throughout the growing seaso
- Provide host sites (milkweed, milkvine, or swallow-wort) for monarch larvae
- Provide cover (protection from weather and predators) and structure (pupation l

WHERE USED

- Odd or converted areas within farmland margins, field borders, old fields with l decks, or areas where exotic plants have been removed (including pasture grass
- Locations with at least six hours of sunlight.
- Areas where exotic invasive plant infestations will be removed or have previou
- Where habitat can be protected from pesticides (they can harm caterpillars and

Practice tech guide with host plant list for Monarchs

OPERATIONS

Pre-planting: Scout the areas at least one year prior to the planned seeding date. Identify all of the vegetation that will compete with desired planted native species. It is critical to the success of the seeding that the competition from other plants (especially bahia, bermuda, fescue, sericea, Johnson grass, Texas Panicum, and crabgrass) be removed prior to seeding. If areas with beneficial natives or intact natural communities exist, protect those areas and establish new plants in other disturbed areas needing improvement.

Control competition: If chemical treatment is needed for problematic exotic and/or invasive plants, follow the recommendation of the Clemson Weed Guide or Clemson Extension for the correct herbicide treatment (guidance can also be found in the publication: A Management Guide for Invasive Plants in Southern Forests by James H. Miller, Steven T. Manning, and Stephen F. Enloe: http://www.srs.fs.usda.gov/pubs/36915). It is often necessary to apply a chemical treatment in fall before seeding in spring, and/or to apply multiple treatments in the spring and summer before seeding in fall or the following spring. Tillage, if planned, should occur prior to chemical treatment, not after. Delay seeding for the recommended time necessary for selected herbicide.

Native Milkweeds (Monarch larval host plant) in South Carolina		
Common name of Milkweed	**Genus, species**	**Region**
Clasping	*Asclepias amplexicaulis*	statewide
Carolina	*Asclepias cinerea*	south coastal plain
Large-flower	*Asclepias connivens*	south coastal plain
Poke	*Asclepias exaltata*	piedmont, mountains
Pinewoods	*Asclepias humistrata*	coastal plain
Swamp	*Asclepias incarnata*	statewide
Few-flower	*Asclepias lanceolata*	coastal plain
Long-leaf	*Asclepias longifolia*	coastal plain
Michaux's	*Asclepias michauxii*	coastal plain
Pinelands	*Asclepias obovata*	south coastal plain
Savanna	*Asclepias pedicellata*	outer coastal plain
Aquatic	*Asclepias perennis*	coastal plain
Four-leaf	*Asclepias quadrifolia*	piedmont, mountains
Red	*Asclepias rubra*	coastal plain
Common	*Asclepias syriaca*	statewide
Tuba	*Asclepias tomentosa*	inner coastal plain, lower piedmont
Butterfly	*Asclepias tuberosa*	statewide
Red-ring	*Asclepias variegata*	statewide
Whorled	*Asclepias verticillata*	statewide
Green comet	*Asclepias viridiflora*	statewide

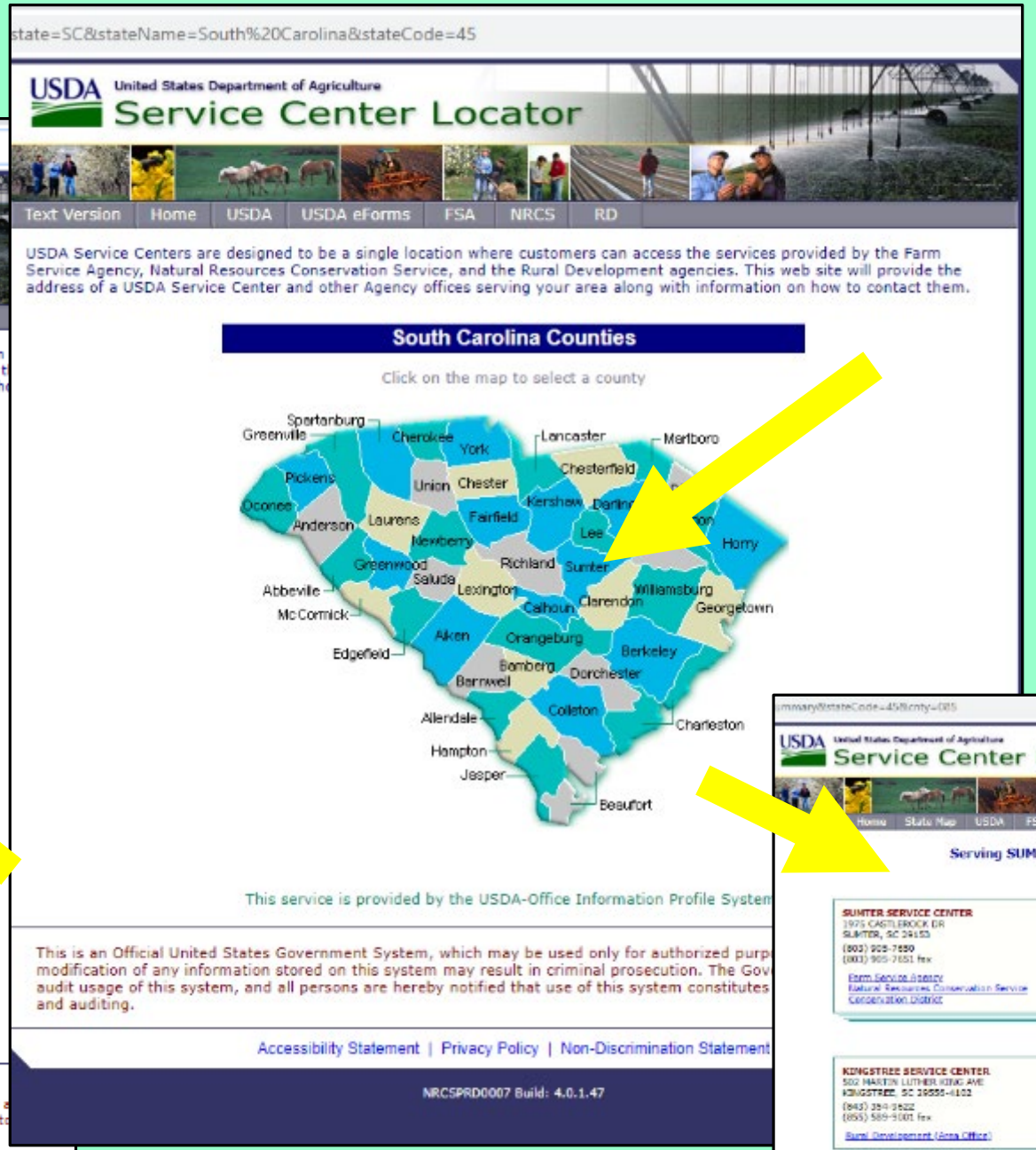
Other Native Wildflowers and Vines (Monarch larval host plants) in South Carolina		
Common name	***Genus, species***	**Region**
Honeyvine, Sandvine, Bluevine milkweed, or Smooth Swallow-wort	*Cynanchum laeve*	statewide
Gulf Coast Swallow-wort, Gulf Coast Milkvine	*Cynanchum angustifolium, Cynanchum palustre, Seutera angustifolium*	outer coastal plain
Leafless Swallow-wort	*Cynanchum scoparium*	outer south coastal plain
Maroon Carolina moonvine	*Matelea carolinensis*	statewide
Oldfield milkvine	*Matelea decipiens*	statewide
Angularfruit milkvine	*Matelea gonocarpos, Matelea suberosa*	piedmont, coastal plain
Yellow Carolina milkvine	*Matelea flavidula*	coastal plain

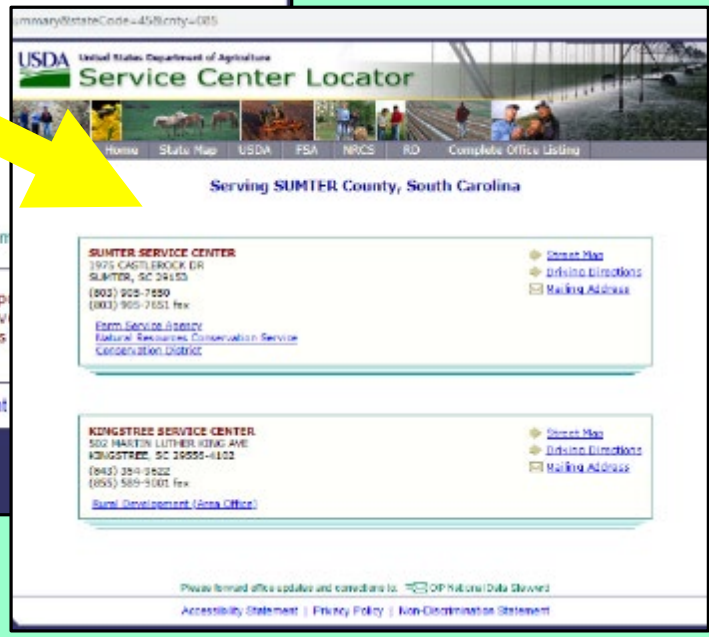
Exotic plants that attract monarch egg laying but that DO NOT SUPPORT larvae or may be harmful to monarch populations (DO NOT encourage these, eradicate/replace with natives if possible)		
Common name	***Genus species***	**Region**
Black Swallow-wort, Louise's Swallow-wort	*Cynanchum louiseae or Vincetoxicum nigrum*	Northeast, upper midwest, west; not documented in SC
Pale Swallow-wort, European Swallow-wort	*Cynanchum rossicum or Vincetoxicum rossicum*	Northeast, not documented in SC
Tropical or Mexican milkweed	*Asclepias curassavica*	Widely planted in garden settings

References and Resources:

Contact USDA/NRCS service centers

https://offices.sc.egov.usda.gov/locator/app





The Incredible Monarch

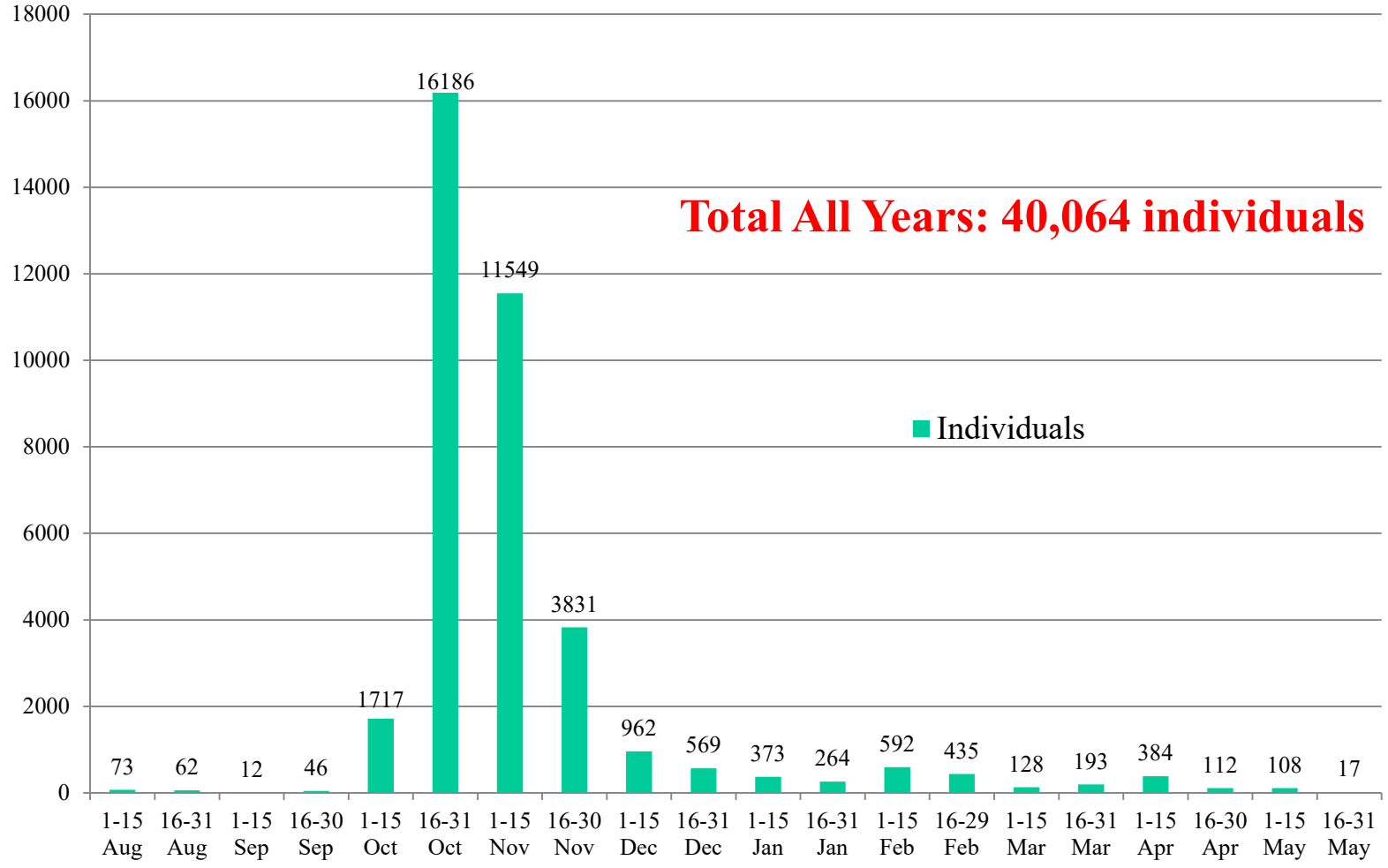
John W. (Billy) McCord

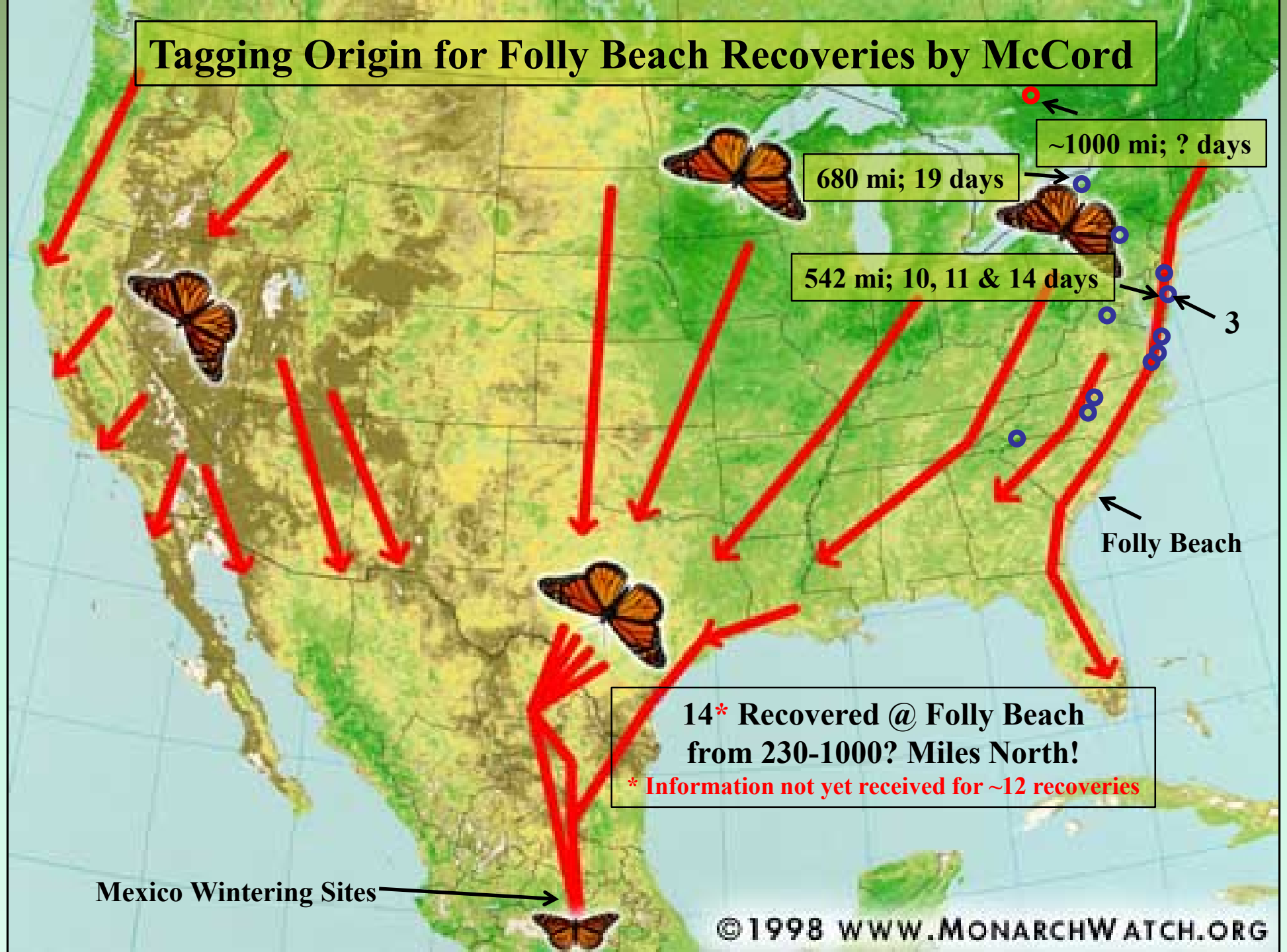
Monarch Tagging

- Tagging initiated in 1937 by Fred & Norah Urquhart of Toronto, Canada
- Urquhart's documented Mexico wintering in 1975
- Monarch Watch (University of Kansas) started tagging program in 1992
- Monarch Watch program has reached over 1 million monarchs tagged, with over 13,500 tagged monarchs recovered in Mexico in winter!

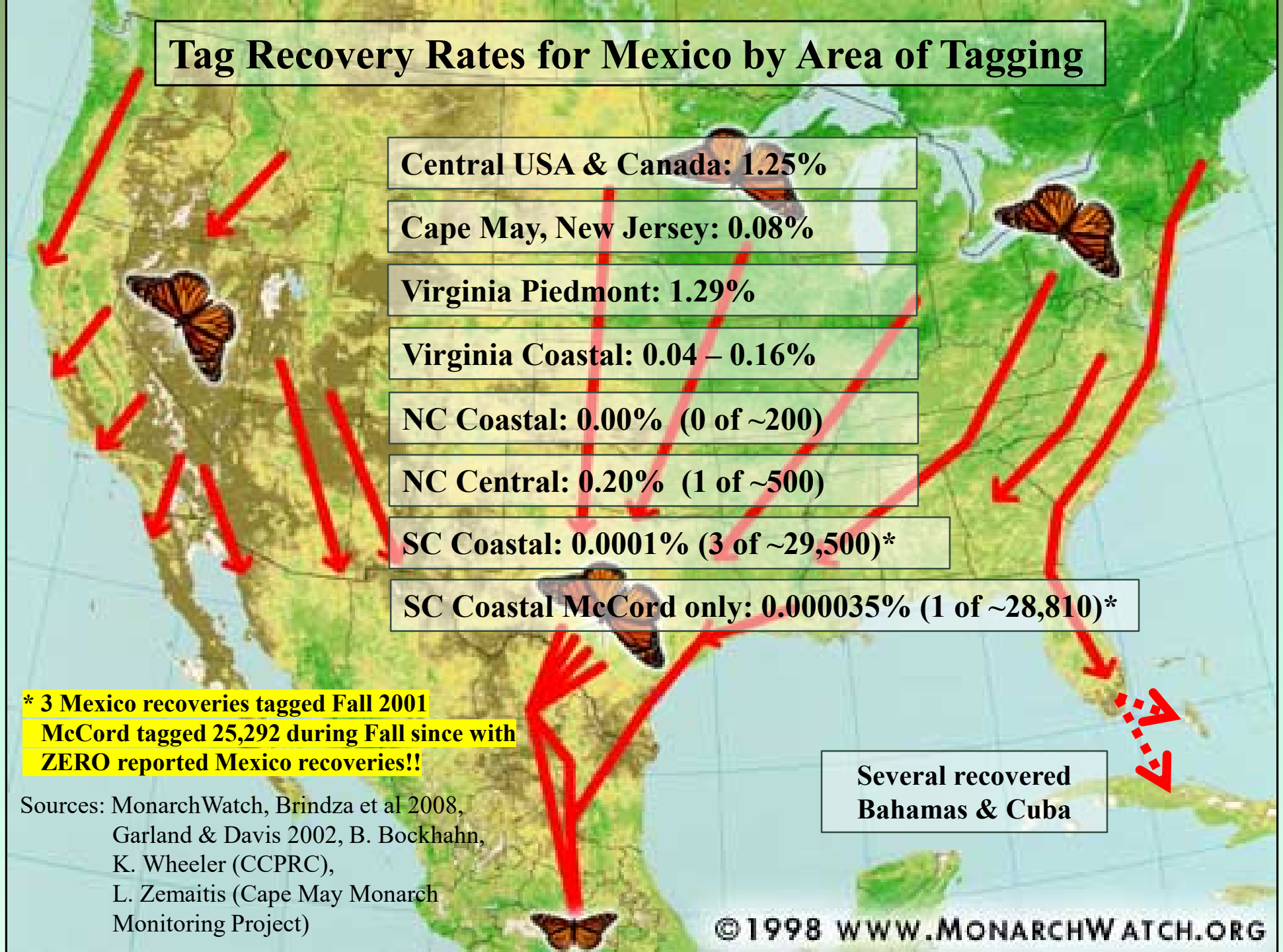

North American Migratory Monarchs
Western Population
Eastern Population
Wintering
Note this path!
Mexico
Wintering Area
©1998 WWW.MONARCHWATCH.ORG

Individuals Captured by Period @ Folly Beach
All Years (1996-2019)




Tagging Origin for Folly Beach Recoveries by McCord
~1000 mi; ? days
680 mi; 19 days
542 mi; 10, 11 & 14 days
3
Folly Beach
14* Recovered @ Folly Beach
from 230-1000? Miles North!
* Information not yet received for ~12 recoveries
Mexico Wintering Sites
©1998 WWW.MONARCHWATCH.ORG

Tag Recovery Rates for Mexico by Area of Tagging



Central USA & Canada: 1.25%

Cape May, New Jersey: 0.08%

Virginia Piedmont: 1.29%

Virginia Coastal: 0.04 – 0.16%

NC Coastal: 0.00% (0 of ~200)

NC Central: 0.20% (1 of ~500)

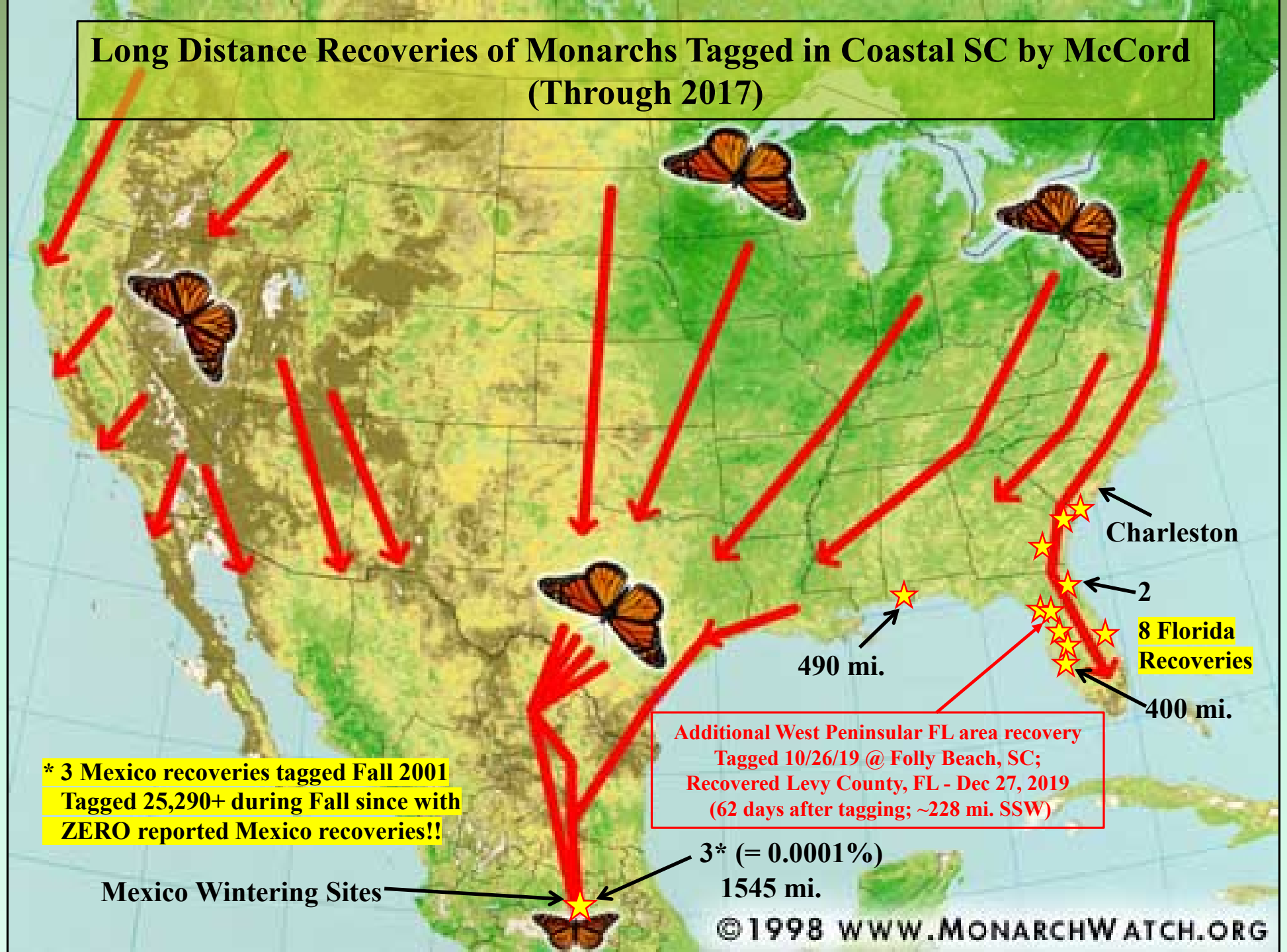
SC Coastal: 0.0001% (3 of ~29,500)*

SC Coastal McCord only: 0.000035% (1 of ~28,810)*

* 3 Mexico recoveries tagged Fall 2001
McCord tagged 25,292 during Fall since with ZERO reported Mexico recoveries!!

Several recovered Bahamas & Cuba

Sources: MonarchWatch, Brindza et al 2008, Garland & Davis 2002, B. Bockhahn, K. Wheeler (CCPRC), L. Zemaitis (Cape May Monarch Monitoring Project)


Long Distance Recoveries of Monarchs Tagged in Coastal SC by McCord
(Through 2017)
Charleston
2
8 Florida
Recoveries
400 mi.
490 mi.
Additional West Peninsular FL area recovery
Tagged 10/26/19 @ Folly Beach, SC;
Recovered Levy County, FL - Dec 27, 2019
(62 days after tagging; ~228 mi. SSW)
* 3 Mexico recoveries tagged Fall 2001
Tagged 25,290+ during Fall since with
ZERO reported Mexico recoveries!!
3* (= 0.0001%)
1545 mi.
Mexico Wintering Sites
©1998 WWW.MONARCHWATCH.ORG

Fall Migratory Monarchs in Midwest & Heading to Mexico in Reproductive Diapause

Fall Migratory Monarchs in Coastal SC Generally not Heading to Mexico and NOT in Reproductive Diapause; Monarchs Captured from 407 Mating Pairs at Folly Beach during Fall Migratory Period (16 Sep. – 15 Nov.)

Note: Tropical Milkweed not documented at Folly Beach until 29 Nov. 2006 Captured Monarchs from 74 Mating Pairs during Fall Migratory Period 1996-2005

Wintering in Coastal SC (McCord; 24 years; 1996-2019)

- **5,053 individuals netted Dec – Mar!**
  - 10 of these first captured Oct 16 – 31
  - 90 of these first captured Nov 1 – 15
  - **243 (5%) of these first captured Nov 16 - 30**

★ 1105 individuals netted 1 Dec 2011 – 30 Mar 2012!

★ 717 captured 24 Dec 2011 – 19 Mar 2012 at Patriot's Point, Mt. Pleasant alone! 347 (**48.4%**) of these recovered alive at least once; total of 829 recapture incidents (2.4 recovery incidents/recaptured monarch)!

Valuable Coastal “Wild” Nectar Plants – Winter & Early Spring

Dandelion

Henbit

Sow-thistle

Valuable Coastal “Landscaping” Nectar Plants – Fall & Winter

Loquat (Nov. & Dec.)

Bottlebrush (Oct. & early Nov.)

Lantana (Fall & early Winter)

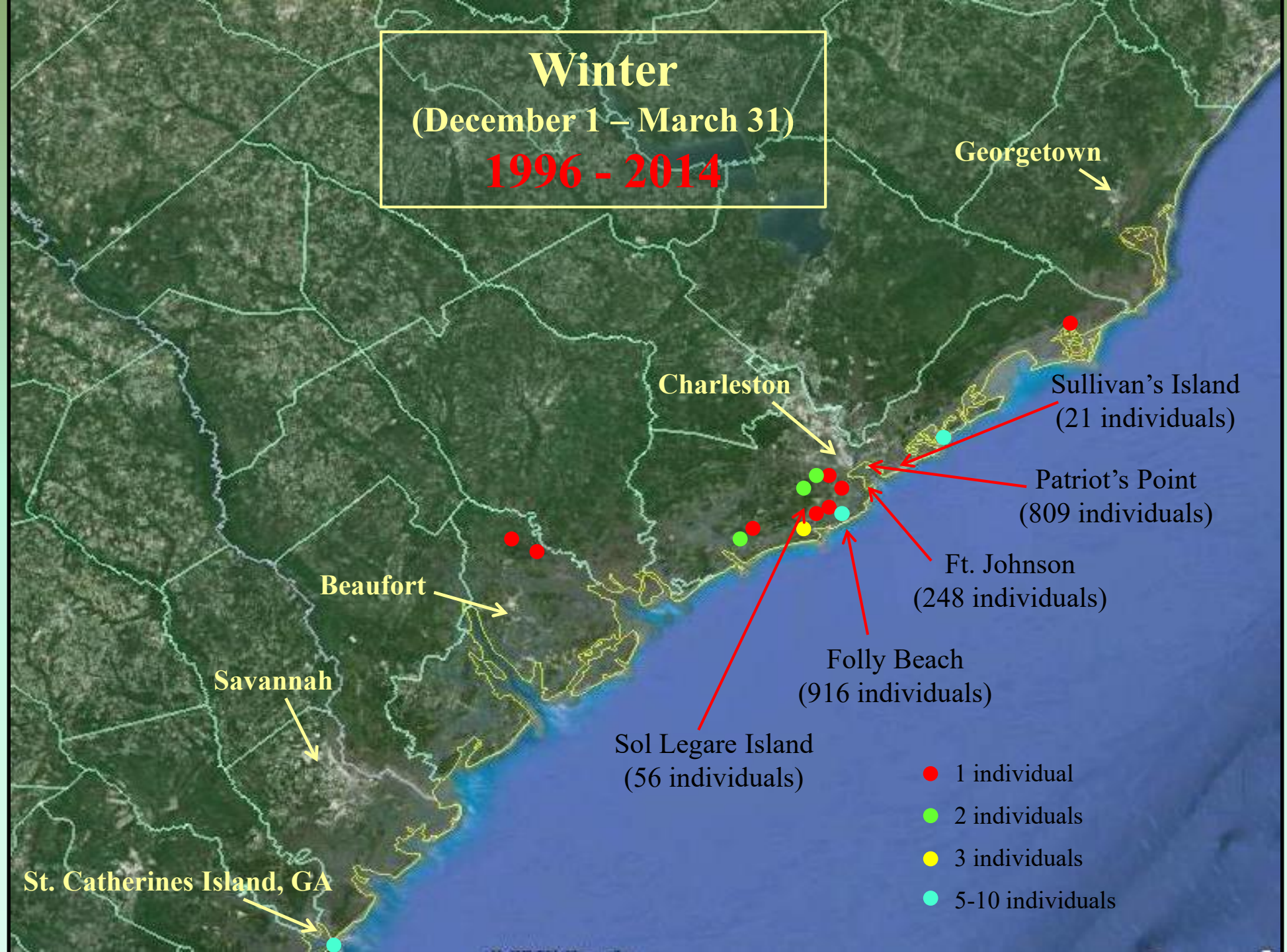
***Viburnum suspensum* (Feb.)**

Monarch Winter Kill Event

Winter Storm Grayson Jan 3-7, 2018:

- freezing rain, sleet & snow
- Ice on ground Jan 3-7
- Very high mortality

Photographer said there were ~200 dead Monarchs at this Edisto Beach site


Winter
(December 1 – March 31)
1996 - 2014
Georgetown
Charleston
Sullivan's Island
(21 individuals)
Patriot's Point
(809 individuals)
Ft. Johnson
(248 individuals)
Folly Beach
(916 individuals)
Sol Legare Island
(56 individuals)
Beaufort
Savannah
St. Catherines Island, GA
1 individual
2 individuals
3 individuals
5-10 individuals

SC Coastal Winter Monarch Study

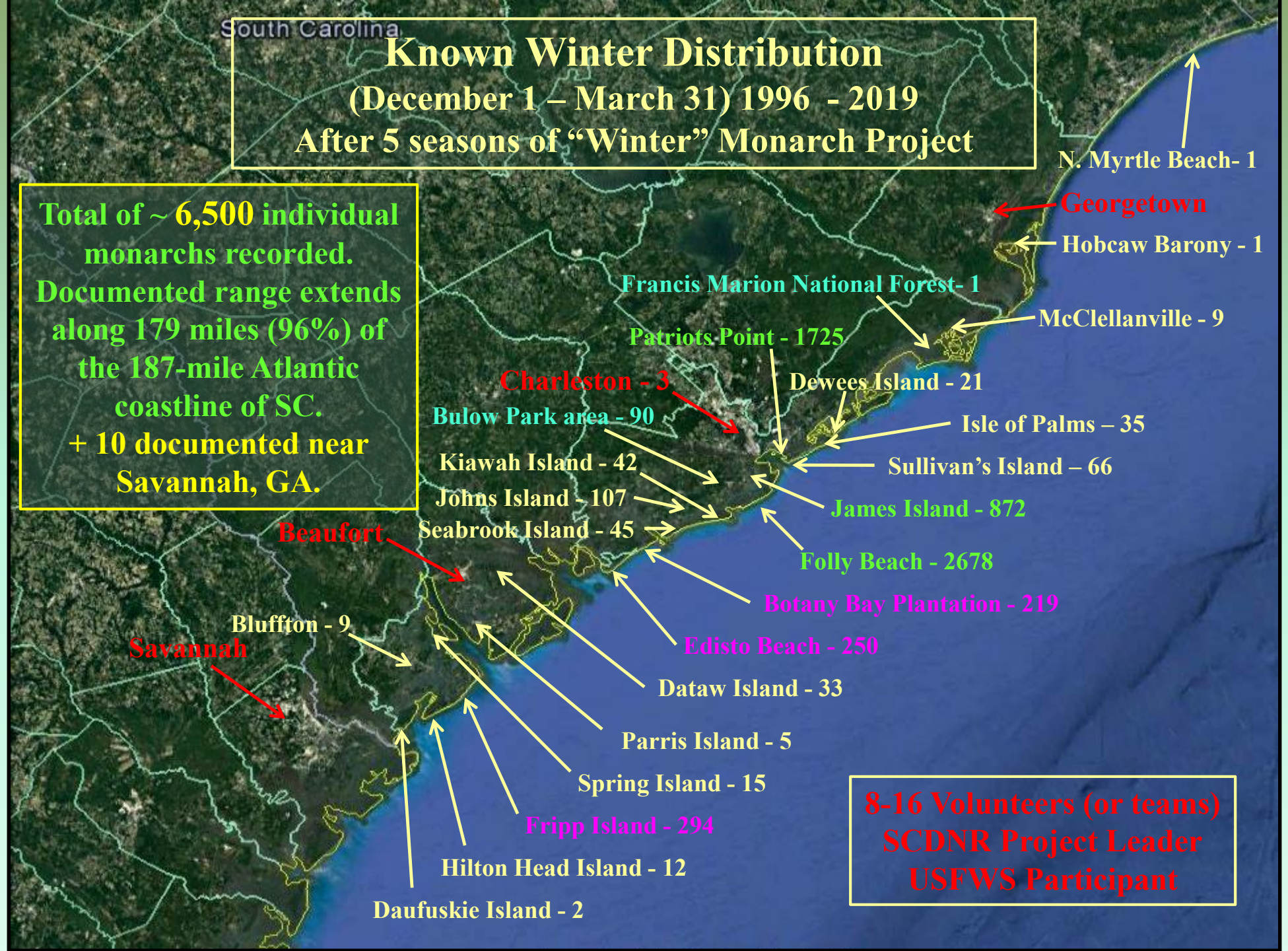
A Citizen Science Research Project (SCDNR & USFWS)

(Nov 16 – Apr 15, 2015 – 2016, 2016 – 2017, 2017 – 2018, 2018 - 2019 & 2019 - 2020)

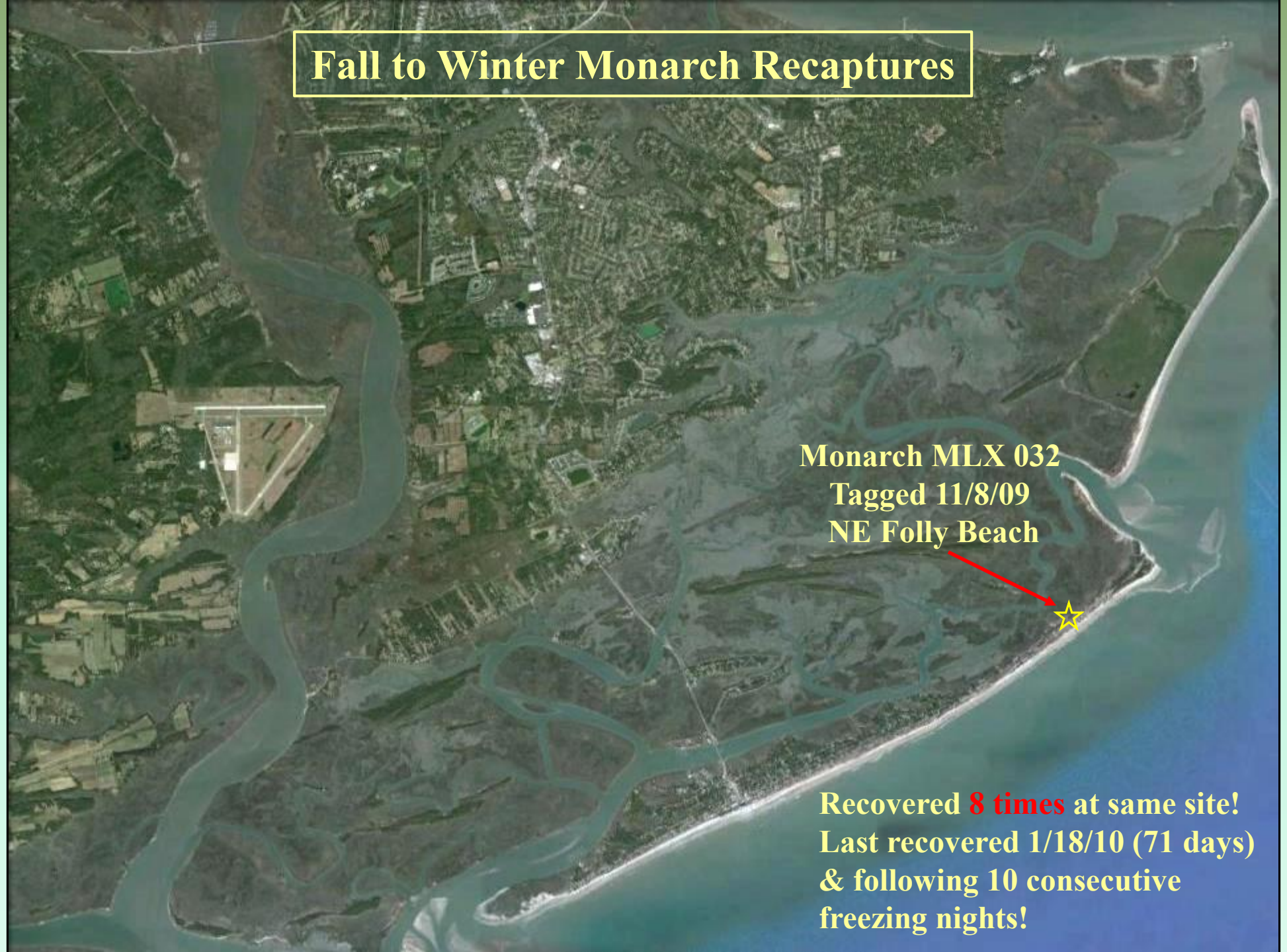
- Better determine range of wintering on Atlantic coast (likely SC & northeast GA)

- Determine breeding range of winter survivors from SC & GA(?) coast – value of these monarchs to the next fall migratory population

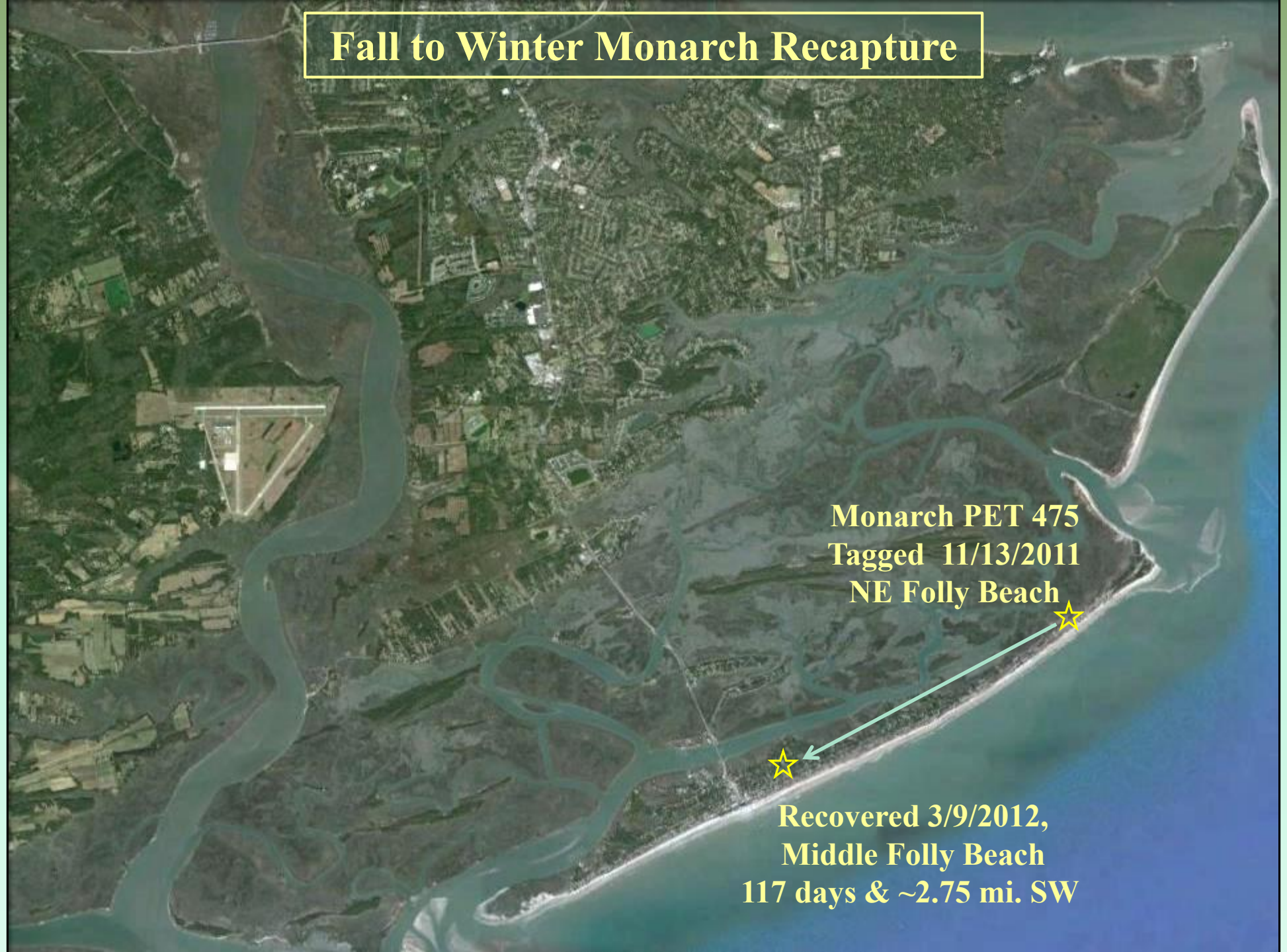
**Despite highly variable volunteer effort and tagging success,
5 "Winter" seasons of tagging added valuable insight into the
Winter distribution of Monarchs along the SC coast**

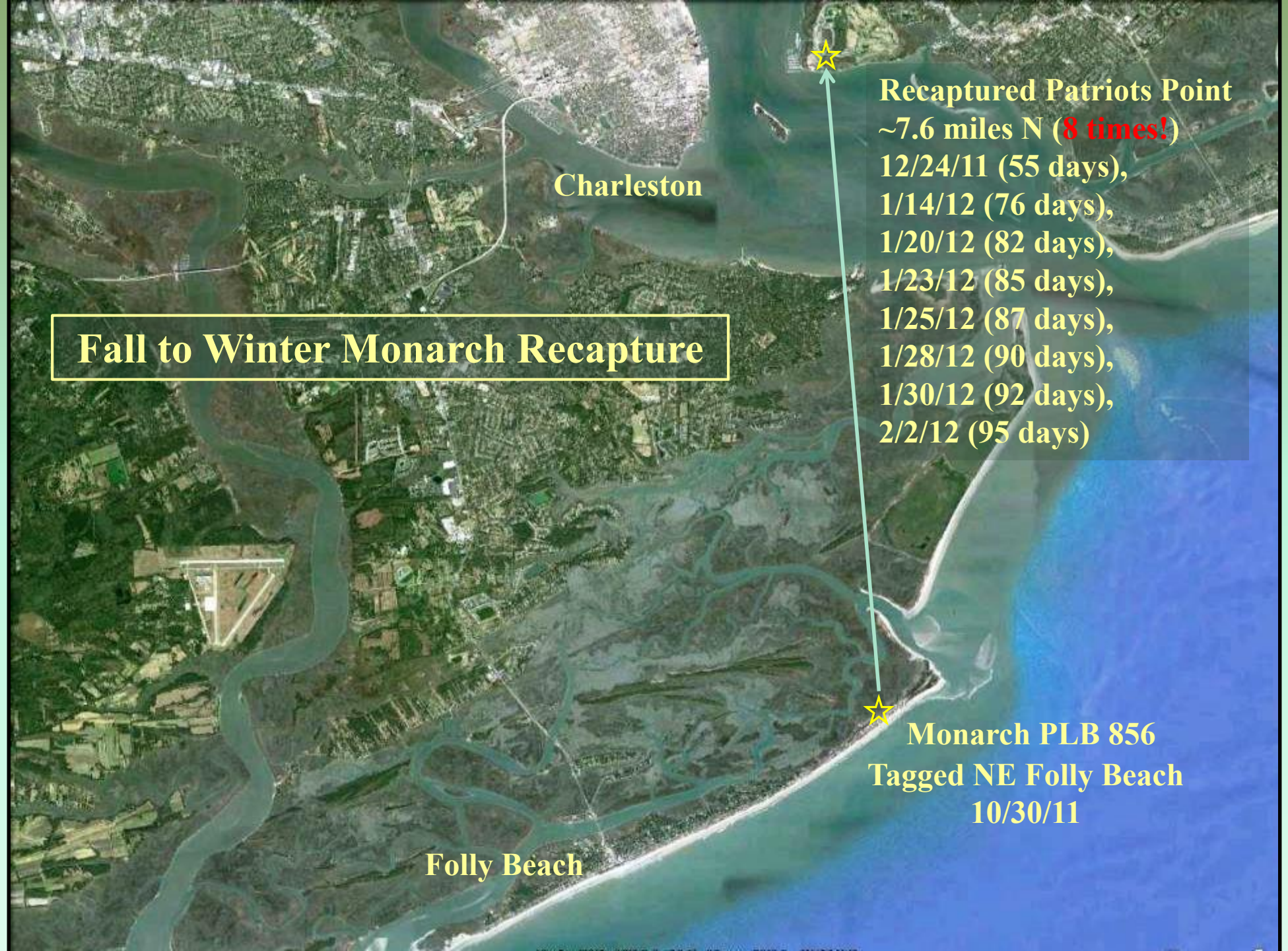

South Carolina
Known Winter Distribution
(December 1 – March 31) 1996 - 2019
After 5 seasons of "Winter" Monarch Project
Total of ~ 6,500 individual monarchs recorded.
Documented range extends along 179 miles (96%) of the 187-mile Atlantic coastline of SC.
+ 10 documented near Savannah, GA.
N. Myrtle Beach- 1
Georgetown
Hobcaw Barony - 1
Francis Marion National Forest- 1
McClellanville - 9
Patriots Point - 1725
Charleston - 3
Dewees Island - 21
Bulow Park area - 90
Isle of Palms – 35
Kiawah Island - 42
Sullivan's Island – 66
Johns Island - 107
James Island - 872
Seabrook Island - 45
Beaufort
Folly Beach - 2678
Botany Bay Plantation - 219
Bluffton - 9
Savannah
Edisto Beach - 250
Dataw Island - 33
Parris Island - 5
Spring Island - 15
Fripp Island - 294
Hilton Head Island - 12
Daufuskie Island - 2
8-16 Volunteers (or teams)
SCDNR Project Leader
USFWS Participant

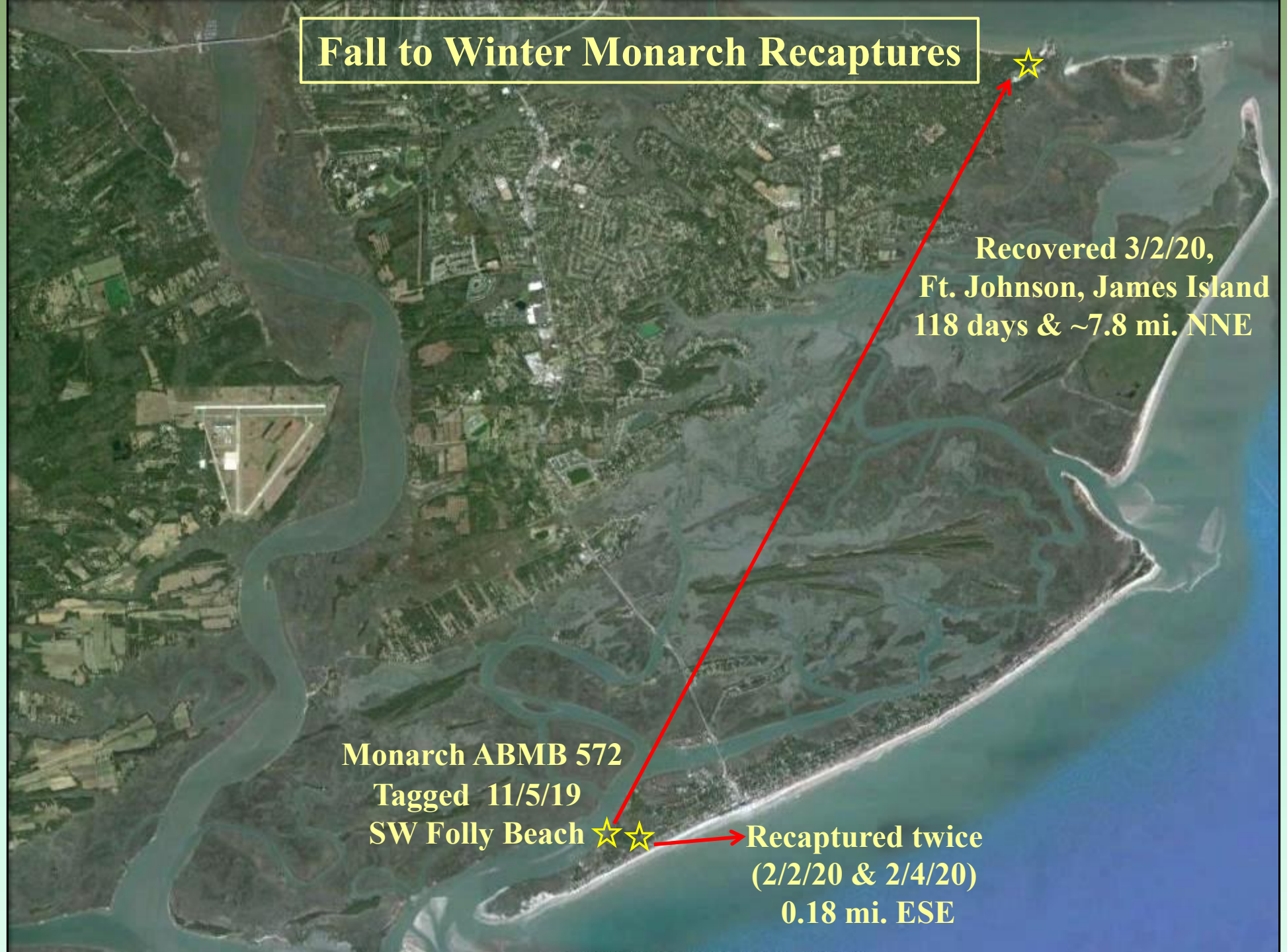
Fall to Winter Monarch Recaptures

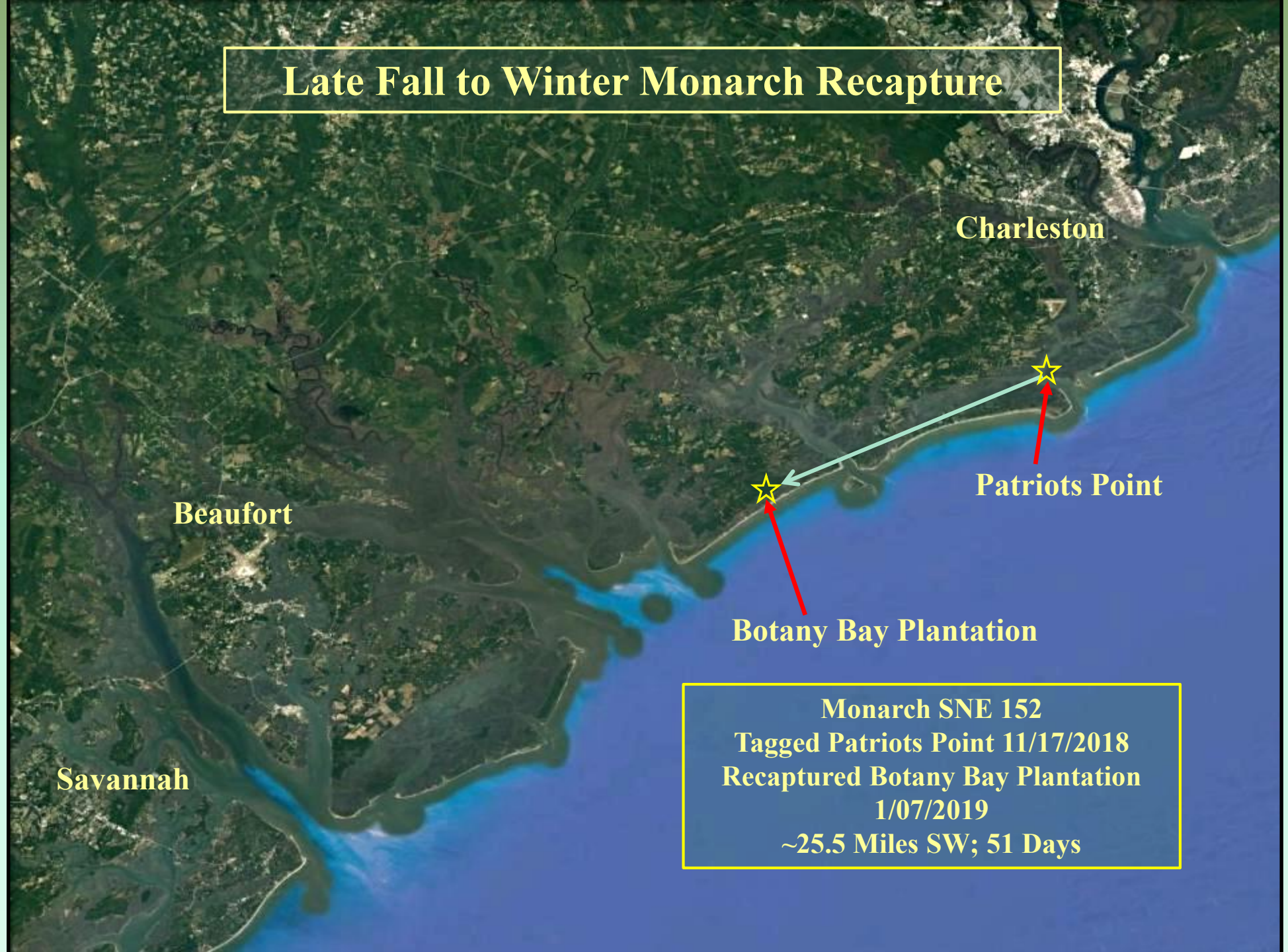


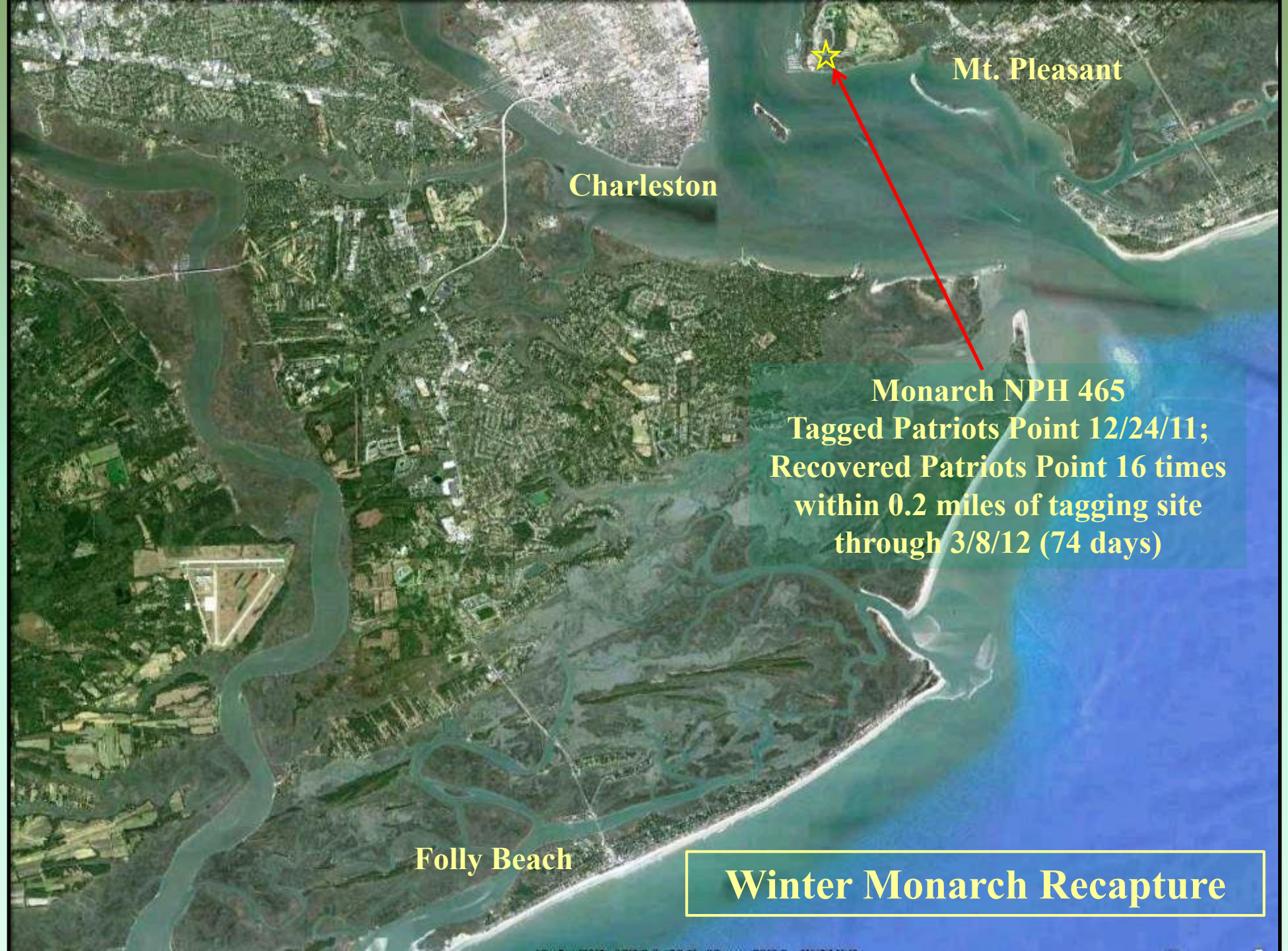
Fall to Winter Monarch Recapture




Fall to Winter Monarch Recapture
Charleston
Recaptured Patriots Point
~7.6 miles N (8 times!)
12/24/11 (55 days),
1/14/12 (76 days),
1/20/12 (82 days),
1/23/12 (85 days),
1/25/12 (87 days),
1/28/12 (90 days),
1/30/12 (92 days),
2/2/12 (95 days)
Monarch PLB 856
Tagged NE Folly Beach
10/30/11
Folly Beach


Fall to Winter Monarch Recaptures
Recovered 3/2/20,
Ft. Johnson, James Island
118 days & ~7.8 mi. NNE
Monarch ABMB 572
Tagged 11/5/19
SW Folly Beach
Recaptured twice
(2/2/20 & 2/4/20)
0.18 mi. ESE


Late Fall to Winter Monarch Recapture
Charleston
Patriots Point
Beaufort
Botany Bay Plantation
Savannah
Monarch SNE 152
Tagged Patriots Point 11/17/2018
Recaptured Botany Bay Plantation
1/07/2019
~25.5 Miles SW; 51 Days

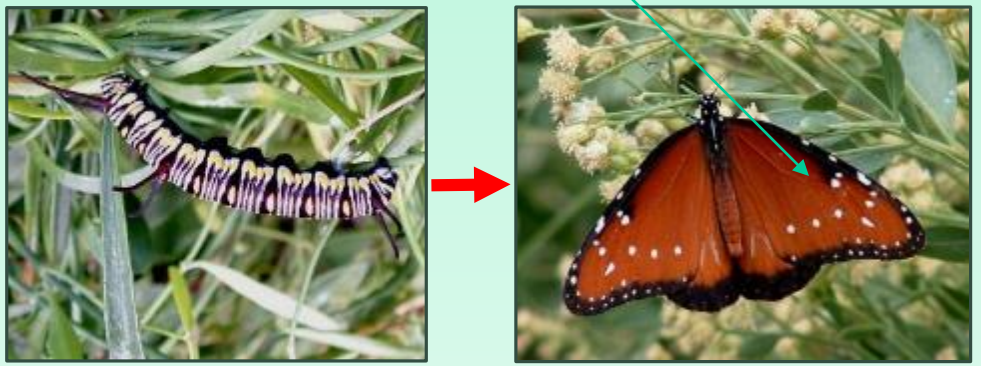

Mt. Pleasant
Charleston
Monarch NPH 465
Tagged Patriots Point 12/24/11;
Recovered Patriots Point 16 times
within 0.2 miles of tagging site
through 3/8/12 (74 days)
Folly Beach
Winter Monarch Recapture

Gulf Coast Swallow-wort (*Pattalias palustre*)

Valuable Coastal Nectar Source
(August & September)
Monarch and other pollinators

Valuable Coastal Caterpillar Host-plant
(Primarily 1st Spring Brood)

* Also used extensively as host-plant by Queen!



McCord recently successfully reared monarch on Atlantic Anglepod (*Gonolobus suberosus*), a milkweed relative

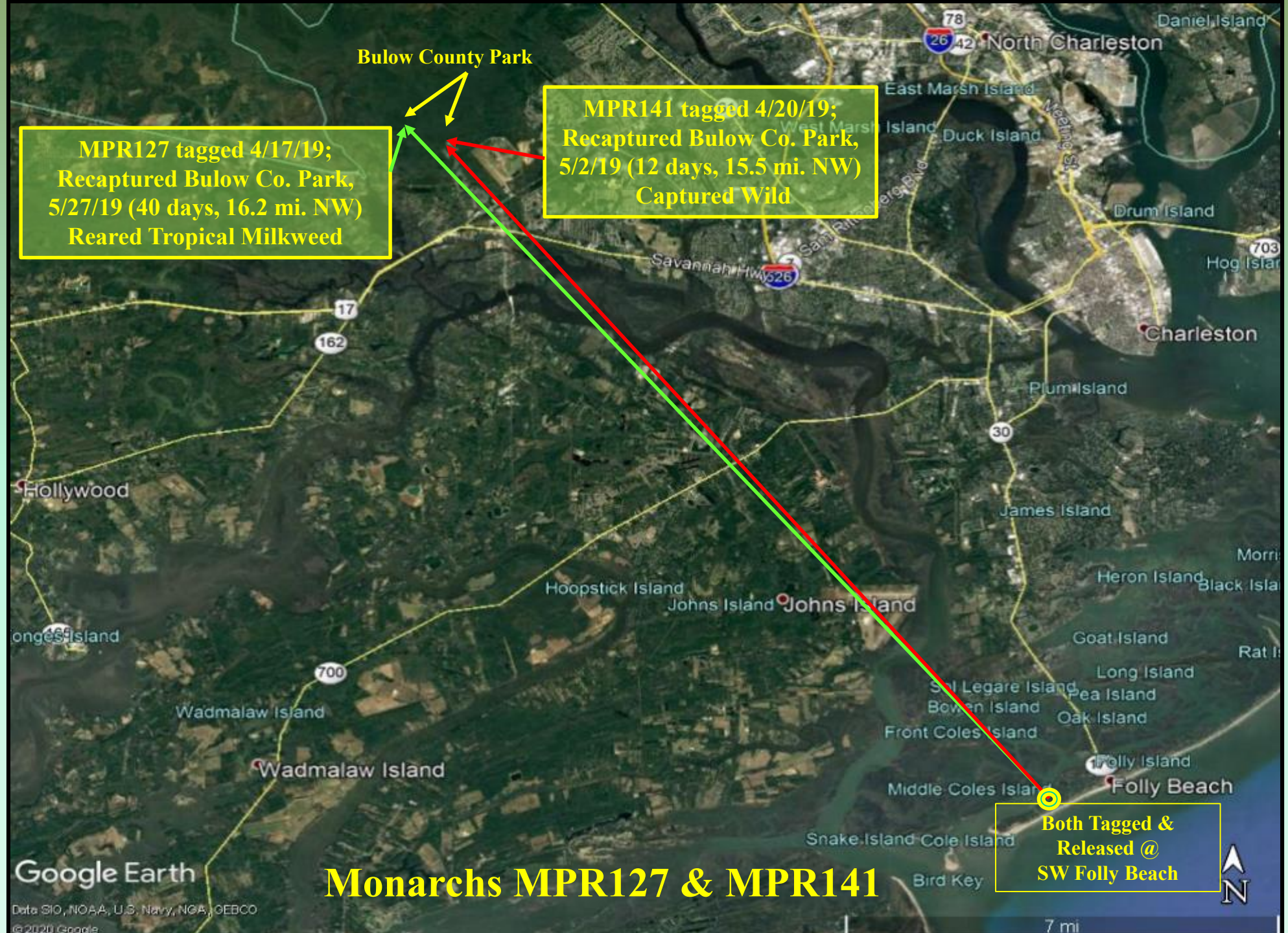

Folly Beach (Island) sites with known
Populations of Gulf Coast Swallow-wort
(*Pattalius palustre*) & with Monarch breeding


"Estuarine Meadow"
North Portion of Folly Beach
98* Monarchs tagged,
Spring 2019 & Spring 2020
Perhaps 2 Spring Broods
(early May – early June)
* 29 tagged monarchs reared from larvae or ova found on Gulf Coast Swallow-wort (*Pattalias palustre*)
0.10 mile


4 Monarchs tagged here
5 &6 May 2018; reared from larvae
found on *Pattalias palustre*
0.10 mile
1 Monarch tagged here
9 May 2020; reared from larva
found on *Pattalias palustre*
"Estuarine Meadow"
Middle Portion of Folly Beach
Perhaps 2 Spring Broods
(early May – early June)


Yard here has substantial population of Tropical Milkweed, yet Monarch oviposited on native Gulf Coast Swallow-wort!
1 Monarch tagged here 9 May 2020; reared from larva found on *Pattalias palustre*
Entrance to Folly Beach County Park
0.10 mile
SW Folly Beach


Spring Dispersal?
Patriots Point
Charleston
Isle of Palms
Monarch SPA 491
Tagged NE Folly Beach 4/10/17
Recovered Ft. Johnson 4/11/17
~5.3 Miles N; 1 Day
Folly Beach
Kiawah Island


Bulow County Park
MPR127 tagged 4/17/19;
Recaptured Bulow Co. Park,
5/27/19 (40 days, 16.2 mi. NW)
Reared Tropical Milkweed
MPR141 tagged 4/20/19;
Recaptured Bulow Co. Park,
5/2/19 (12 days, 15.5 mi. NW)
Captured Wild
Both Tagged &
Released @
SW Folly Beach
Monarchs MPR127 & MPR141
North Charleston
Daniel Island
East Marsh Island
West Marsh Island
Duck Island
Drum Island
Hog Island
Charleston
Plum Island
James Island
Hollywood
Hoopstick Island
Johns Island
Wadmalaw Island
Goat Island
Long Island
Oak Island
Folly Beach
Middle Coles Island
Front Coles Island
Snake Island
Cole Island
Bird Key
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
7 mi
N

Milkweed Site Records for Francis Marion National Forest

(Summer 2018 – Fall 2020)

Species	Sites	Sites with Monarch Larvae
Clasping Milkweed (*Asclepias amplexicaulis*)	79	2
Pinewoods Milkweed (*Asclepias humistrata*)	98	1
Fewflower Milkweed (*Asclepias lanceolata*)	161	0
Longleaf Milkweed (*Asclepias longifolia*)	38	15
Aquatic Milkweed (*Asclepias perennis*)	3393	>500
Red Milkweed (*Asclepias rubra*)	5	0
Butterfly Milkweed (*Asclepias tuberosa*)	64	1
Redring Milkweed (*Asclepias variegata*)	2	0
Whorled Milkweed (*Asclepias verticillata*)	11	0

NOTE: Individual sites are at least 10 meters from any other individual site.

Coastal Native Monarch Larval Host-plants*

Aquatic Milkweed
(*Asclepias perennis*)

Butterfly Milkweed
(*Asclepias tuberosa*)

Fewflower Milkweed
(*Asclepias lanceolata*)

Pinewoods Milkweed
(*Asclepias humistrata*)

Longleaf Milkweed
(*Asclepias longifolia*)

Clasping Milkweed
(*Asclepias amplexicaulis*)

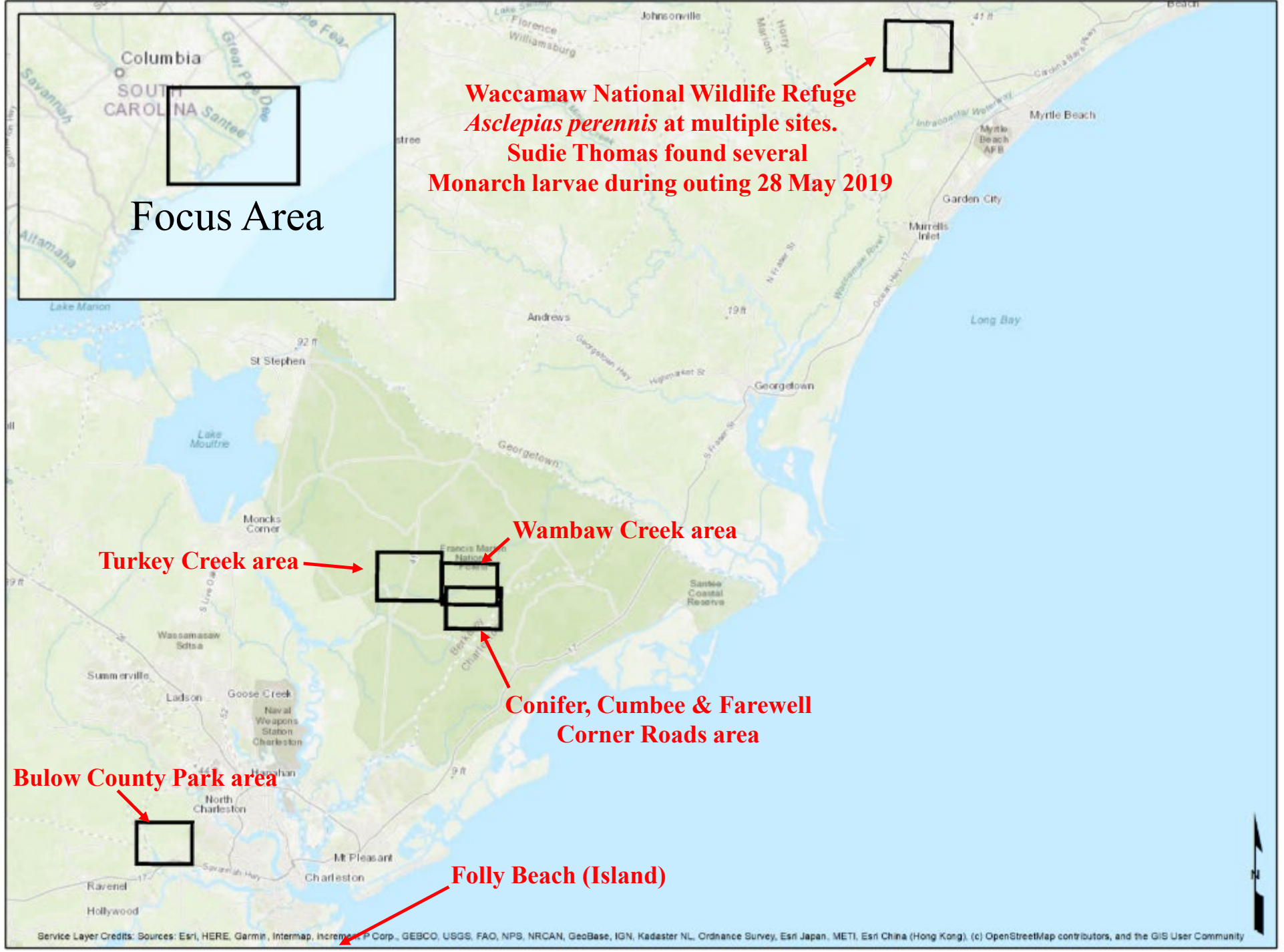
* McCord has found wild Monarch larvae on all of these species in Francis Marion National Forest, though not recently for *Asclepias lanceolata*. McCord has successfully reared larvae to adults on all of these species in recent years. He also has successfully reared larvae to adults on Atlantic Anglepod (*Gonolobus suberosus*)!

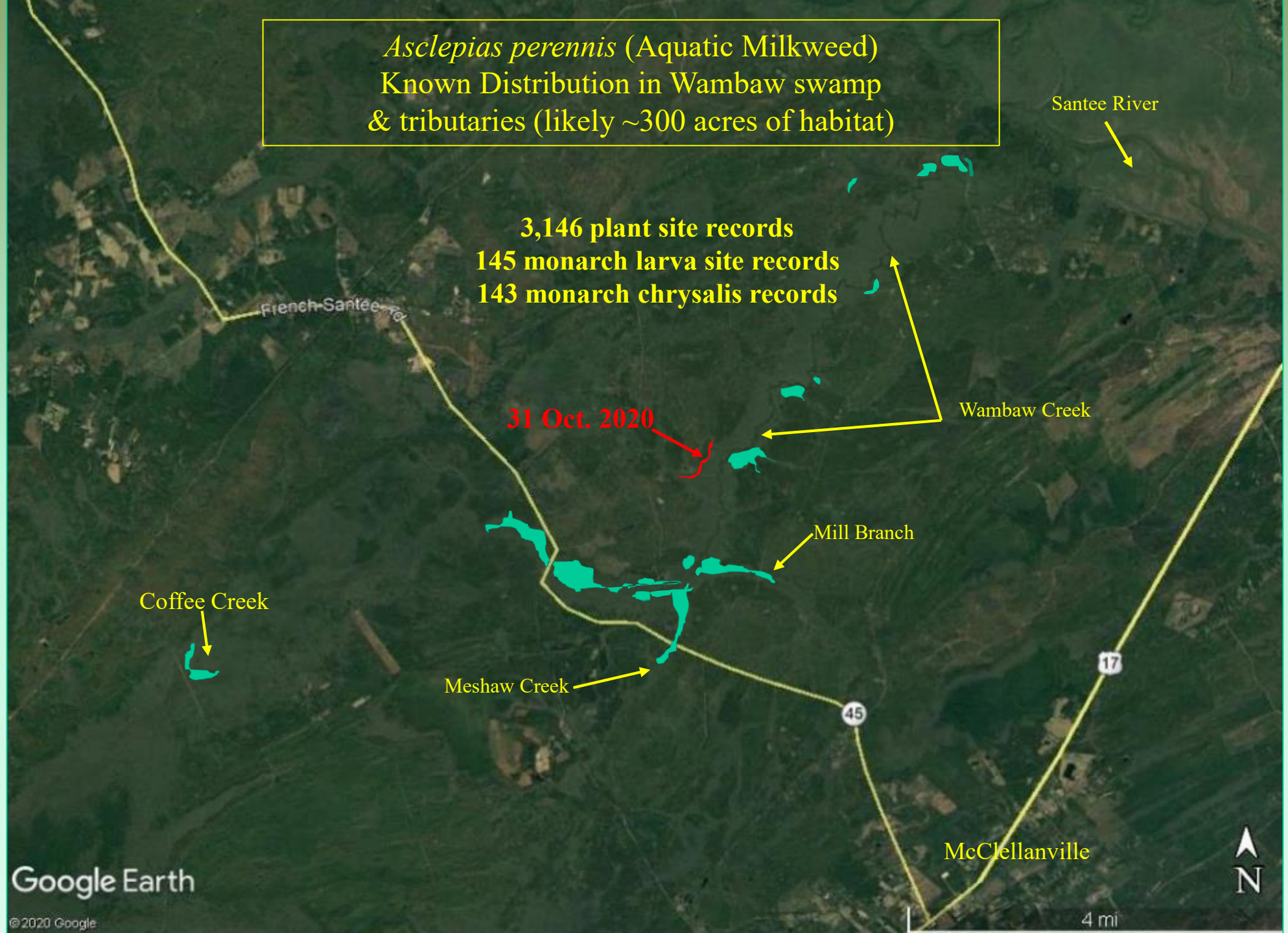
Bald Cyress Swamp Forest with Aquatic Milkweed (*Asclepias perennis*)

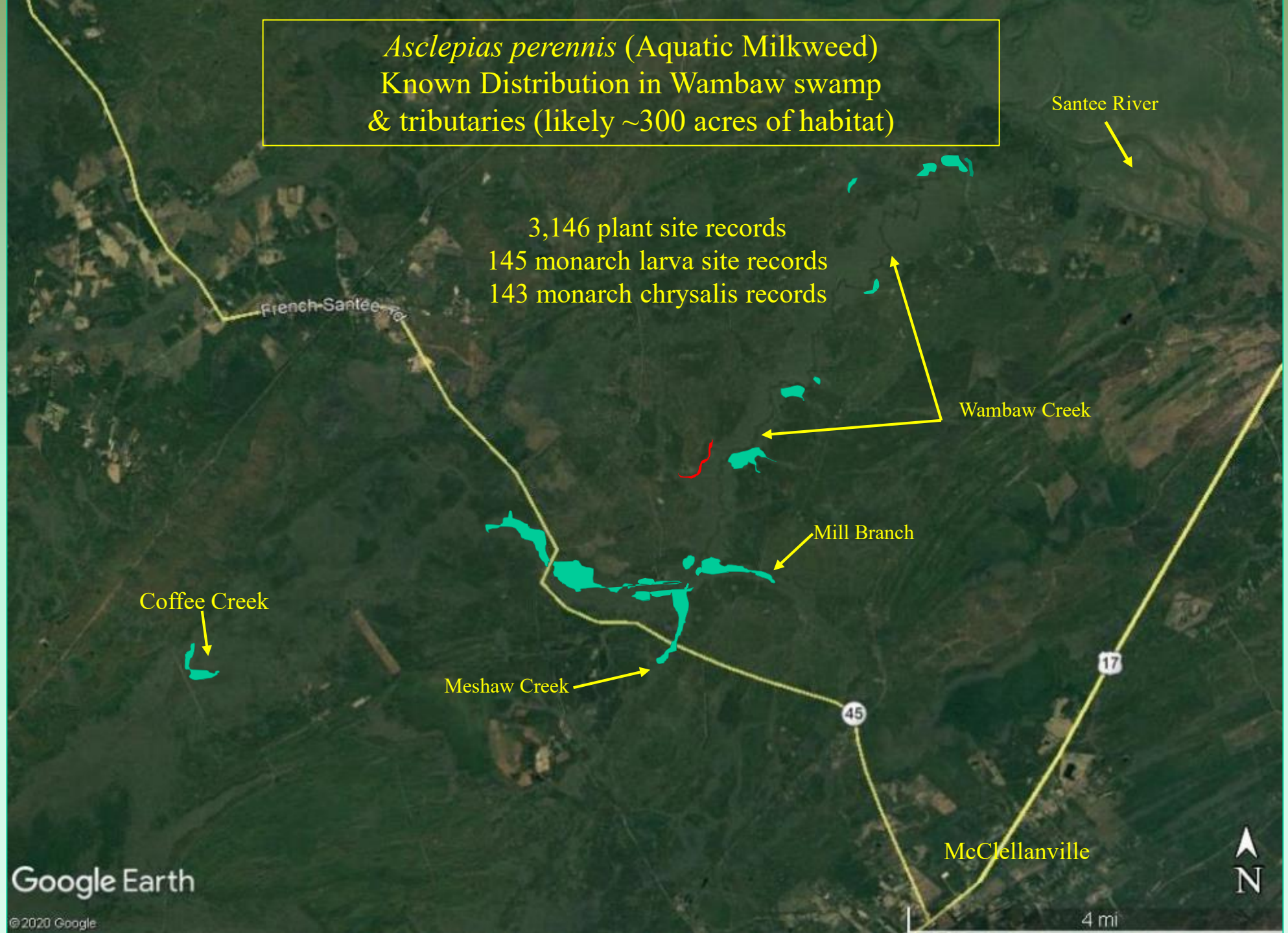
Aquatic Milkweed
(*Asclepias perennis*)

Bald Cyress Swamp Forest with Aquatic Milkweed (*Asclepias perennis*)

Aquatic Milkweed
(*Asclepias perennis*)


Columbia
SOUTH CAROLINA
Focus Area
Waccamaw National Wildlife Refuge
Asclepias perennis at multiple sites.
Sudie Thomas found several
Monarch larvae during outing 28 May 2019
Wambaw Creek area
Turkey Creek area
Conifer, Cumbee & Farewell
Corner Roads area
Bulow County Park area
Folly Beach (Island)
Myrtle Beach
Garden City
Murrells Inlet
Long Bay
Andrews
Georgetown
St Stephen
Moncks Corner
Lake Moultrie
Lake Marion
Summerville
Ladson
Goose Creek
North Charleston
Mt Pleasant
Charleston
Ravenel
Hollywood
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community


Asclepias perennis (Aquatic Milkweed)
Known Distribution in Wambaw swamp
& tributaries (likely ~300 acres of habitat)
Santee River
3,146 plant site records
145 monarch larva site records
143 monarch chrysalis records
French Santee Rd
31 Oct. 2020
Wambaw Creek
Mill Branch
Coffee Creek
Meshaw Creek
45
17
McClellanville
Google Earth
©2020 Google
4 mi
N


Asclepias perennis (Aquatic Milkweed)
Known Distribution in Wambaw swamp
& tributaries (likely ~300 acres of habitat)
Santee River
3,146 plant site records
145 monarch larva site records
143 monarch chrysalis records
French Santee Rd
Wambaw Creek
Mill Branch
Coffee Creek
Meshaw Creek
45
17
McClellanville
N
4 mi
Google Earth
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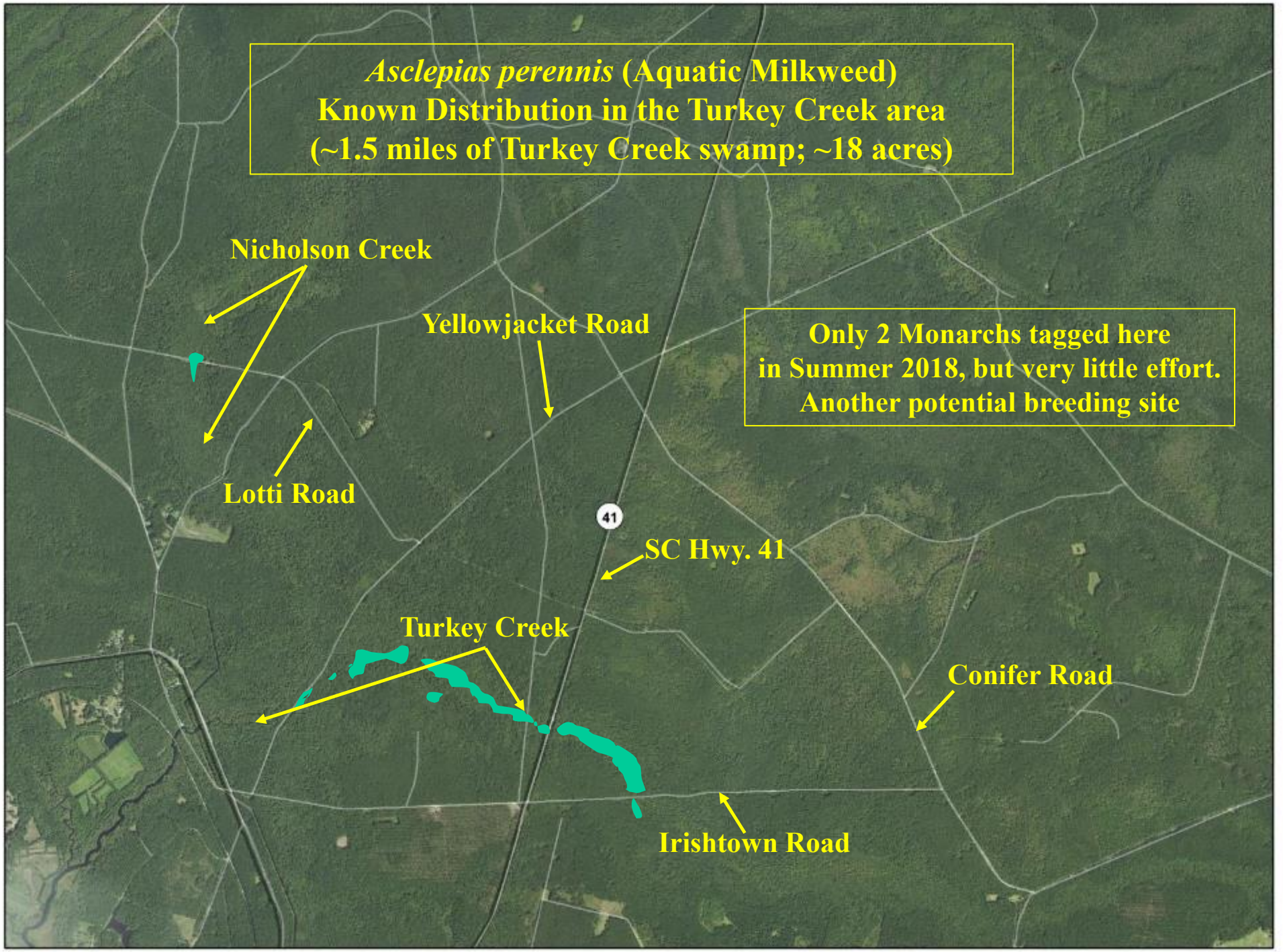
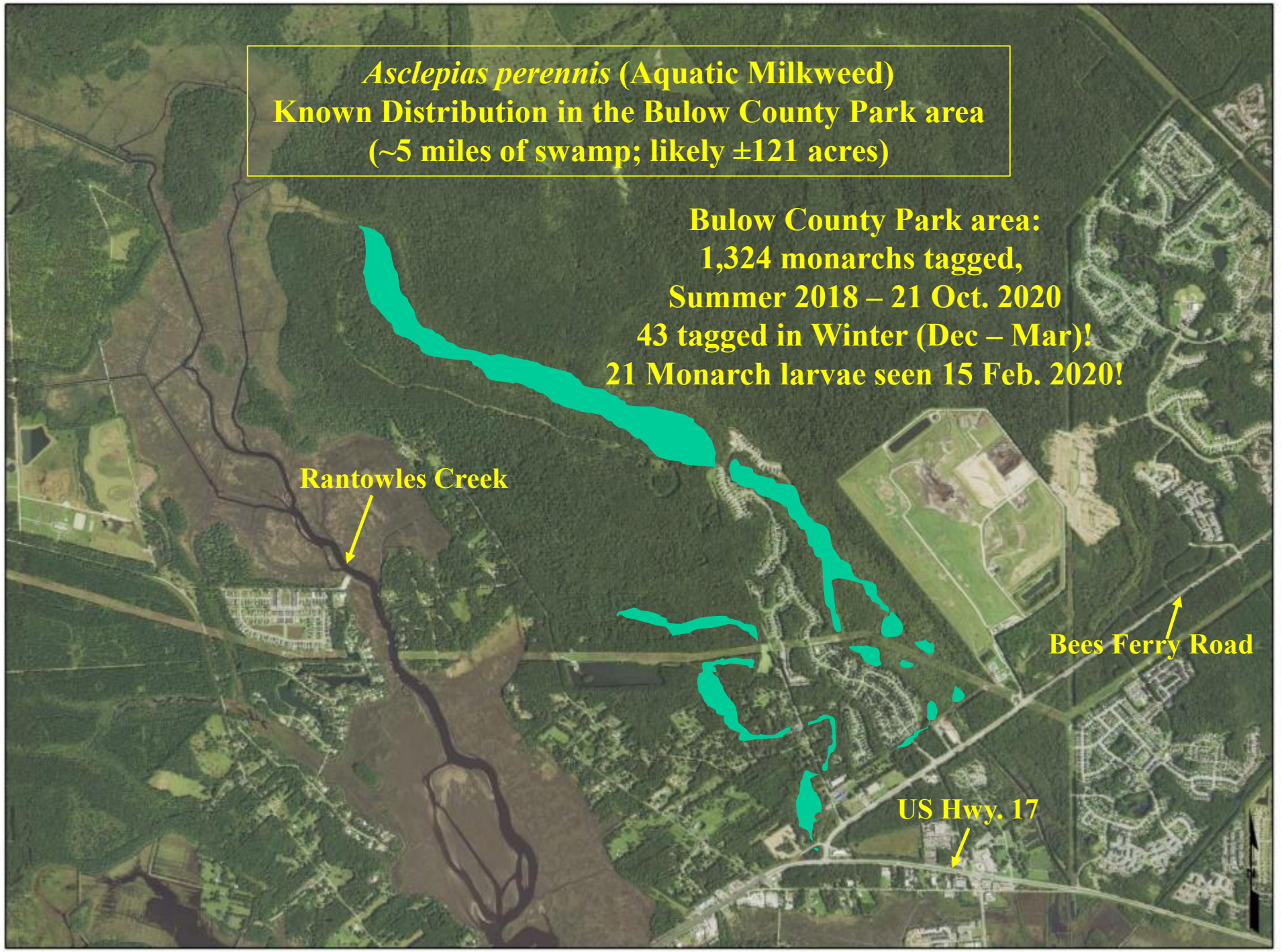
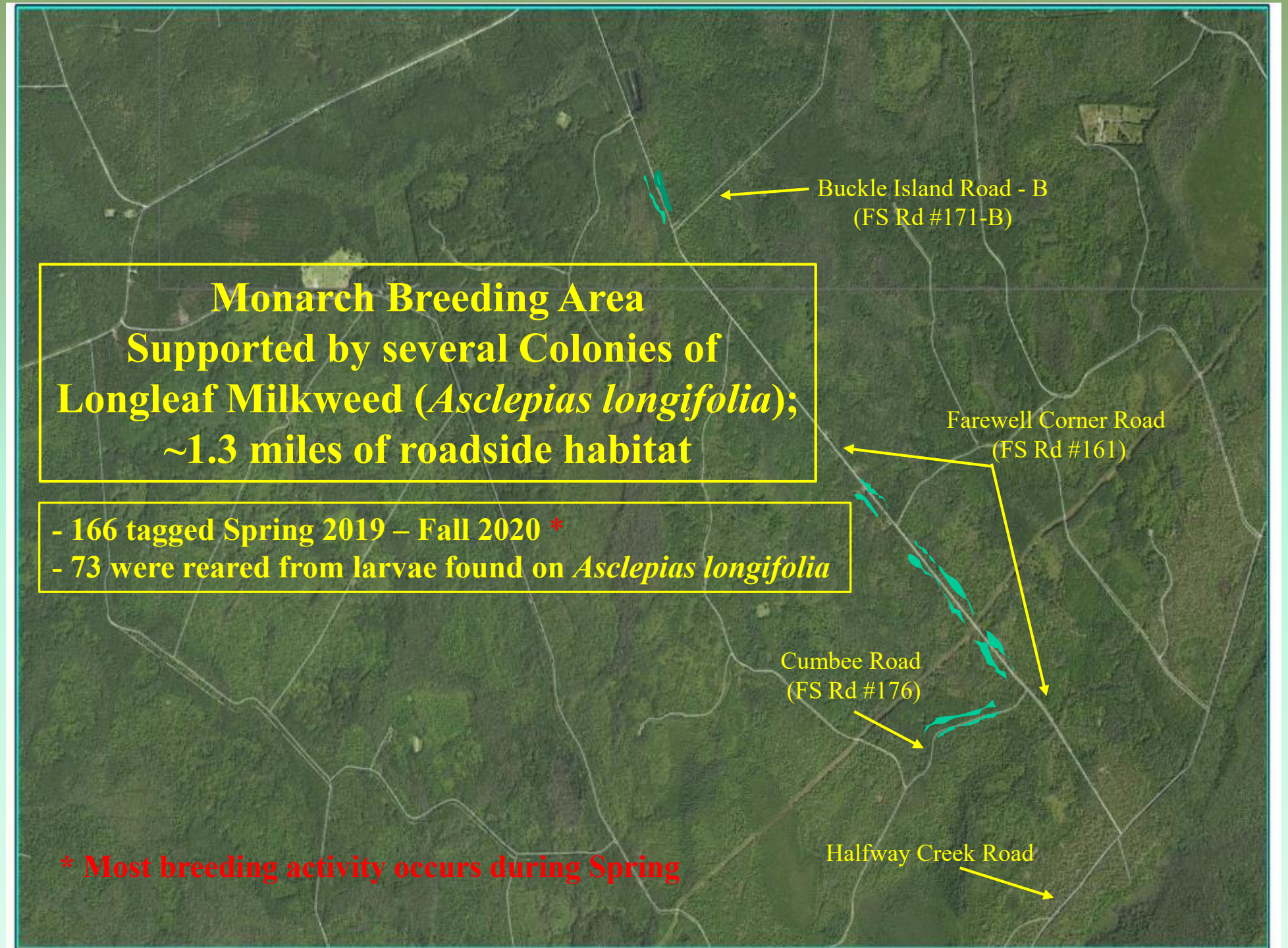
Wambaw Creek drainage area:
2,535 monarchs tagged,
Spring 2018 – 31 Oct. 2020;
Most captured @ nectar plants
along USFS roads
Asclepias humistrata
Asclepias amplexicaulis
Santee River
Asclepias amplexicaulis
French-Santee Rd
Wambaw Creek swamp
Vast *Asclepias perennis*
Breeding area – likely
~11.5 miles of Swamp
(~300 acres of breeding habitat)
Mill Branch
Asclepias tuberosa
Meshaw Creek
45
17
Coffee Creek
Sites of Recorded Monarch Breeding
McClellanville
Google Earth
©2020 Google
4 mi
N


Asclepias perennis (Aquatic Milkweed)
Known Distribution in the Turkey Creek area
(~1.5 miles of Turkey Creek swamp; ~18 acres)
Nicholson Creek
Yellowjacket Road
Only 2 Monarchs tagged here
in Summer 2018, but very little effort.
Another potential breeding site
Lotti Road
41
SC Hwy. 41
Turkey Creek
Conifer Road
Irishtown Road


Asclepias perennis (Aquatic Milkweed)
Known Distribution in the Bulow County Park area
(~5 miles of swamp; likely ±121 acres)
Bulow County Park area:
1,324 monarchs tagged,
Summer 2018 – 21 Oct. 2020
43 tagged in Winter (Dec – Mar)!
21 Monarch larvae seen 15 Feb. 2020!
Rantowles Creek
Bees Ferry Road
US Hwy. 17


Buckle Island Road - B
(FS Rd #171-B)
Monarch Breeding Area
Supported by several Colonies of
Longleaf Milkweed (*Asclepias longifolia*);
~1.3 miles of roadside habitat
- 166 tagged Spring 2019 – Fall 2020 *
- 73 were reared from larvae found on *Asclepias longifolia*
Farewell Corner Road
(FS Rd #161)
Cumbee Road
(FS Rd #176)
Halfway Creek Road
* Most breeding activity occurs during Spring

Unusual Monarchs

Bilateral “Hermaphrodite”

“White” Monarch (Nivosus)

Partially “White” Monarch

Questions?

Milkweeds as nectar sources

Photos: Nancy Lee Adamson, Ray Moranz

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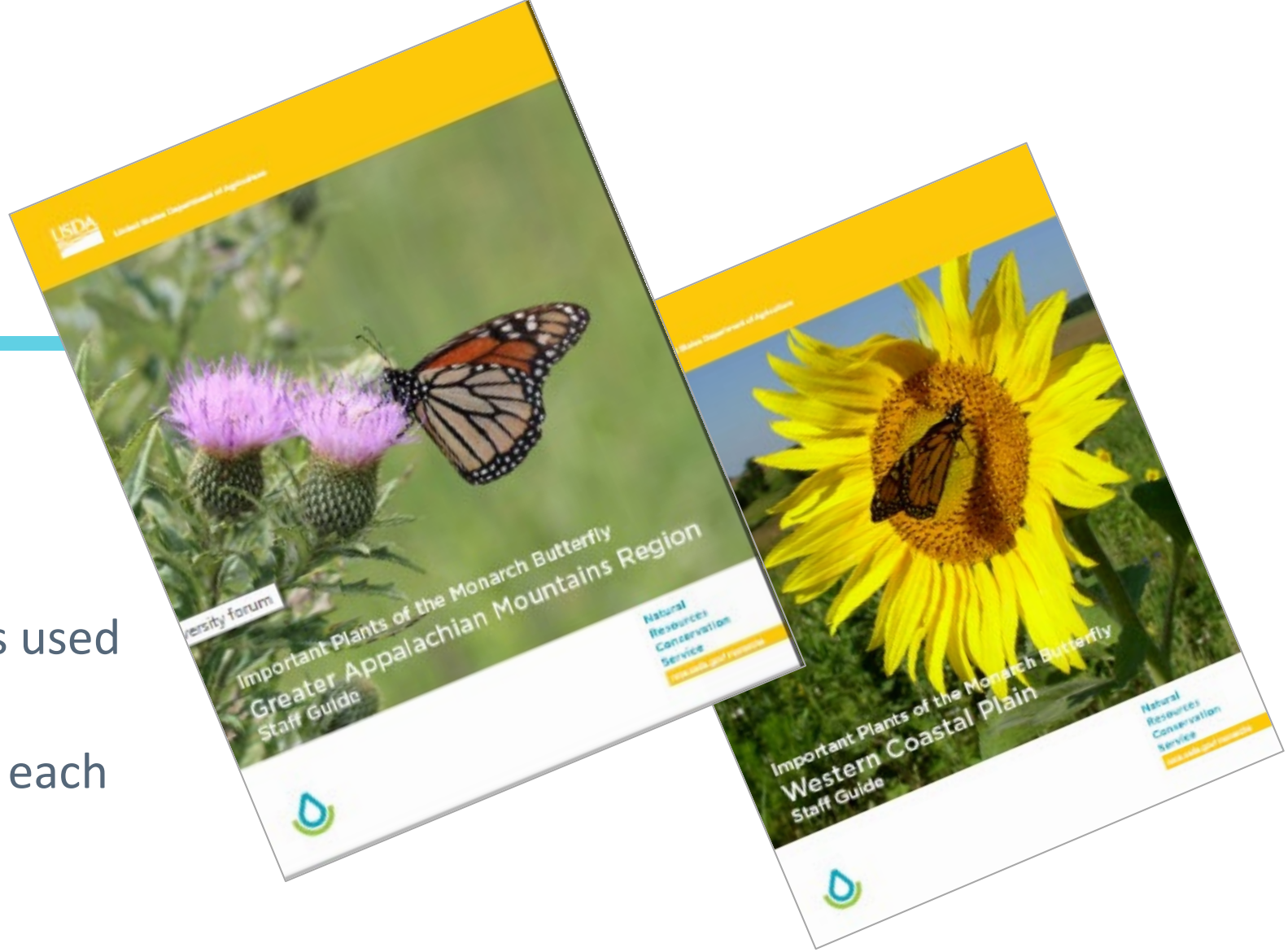
NRCS Monarch Plant Guides



- **Search “NRCS Monarchs”**
- List dozens of plant species used by monarchs in each area
- photos and description for each species

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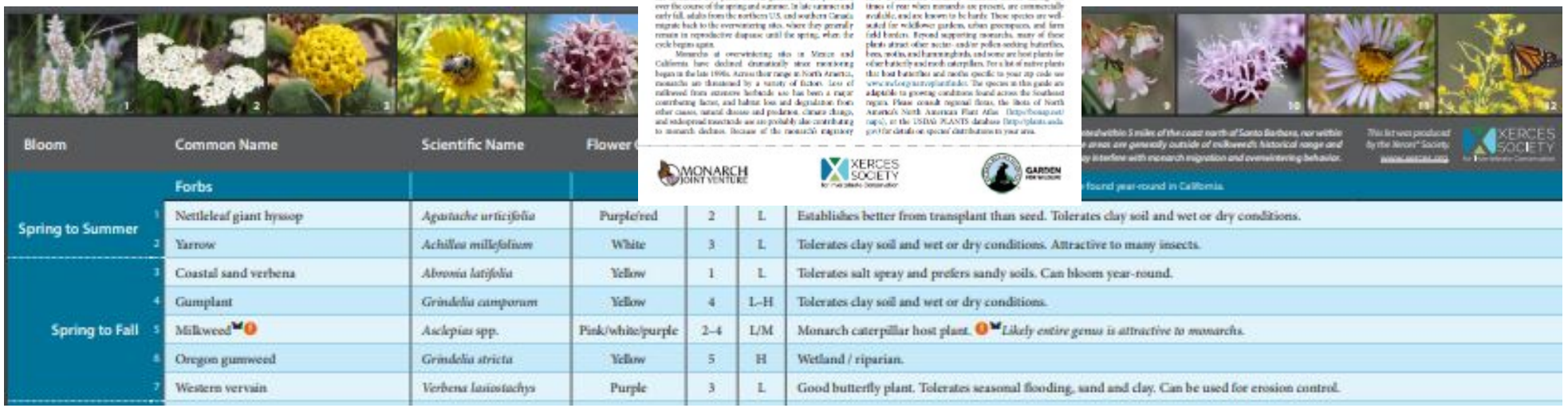
Regional Monarch Nectar Plant Guides

Nectar guides include information on species which are

- Native & attractive to monarchs (documented visitation)
- Commercially available
- Search web for “Xerces Monarch Plant Lists” and “Xerces Pollinator Plant Lists”



	Bloom	Common Name	Scientific Name	Flower			
		Forbs					
1	Spring to Summer	Nettleleaf giant hyssop	*Agastache urticifolia*	Purple/red	2	L	Establishes better from transplant than seed. Tolerates clay soil and wet or dry conditions.
2		Yarrow	*Achillea millefolium*	White	3	L	Tolerates clay soil and wet or dry conditions. Attractive to many insects.
3	Spring to Fall	Coastal sand verbena	*Abronia latifolia*	Yellow	1	L	Tolerates salt spray and prefers sandy soils. Can bloom year-round.
4		Gumplant	*Grindelia camporum*	Yellow	4	L–H	Tolerates clay soil and wet or dry conditions.
5		Milkweed	*Asclepias* spp.	Pink/white/purple	2–4	L/M	Monarch caterpillar host plant. *Likely entire genus is attractive to monarchs.*
6		Oregon gumweed	*Grindelia stricta*	Yellow	5	H	Wetland / riparian.
7		Western vervain	*Verbena lasiostachys*	Purple	3	L	Good butterfly plant. Tolerates seasonal flooding, sand and clay. Can be used for erosion control.

Images: www.xerces.org

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Please report your observations regarding nectar plant use!!

652	Gaillardia aristata	Blanketflower		Gardens and shortgrass prairie	CO	July-Sept
316	Gaillardia pulchella	Indian blanket		Mid-Atlantic coast (dune areas)	NC, VA, NJ,	Aug - Sept
533	Gaillardia pulchella var. pulche	Beach blanket-flower		Folly Beach, SC	SC	Fall migration
1619	Gaillardia sp.	Blanketflower	# #	east end Carol St., Ashland OR	OR	10/23/2017
1204	Gaillardia sp.	Blanketflower		Chincoteague NWR on Assateag	VA	Summer breeding perioc
812	Geranium richardsonii	Richardson's geranium		Mid to high elevations, AZ	AZ	Late summer through fa
187	Glandularia bipinnatifida	Dakota mock vervain		Collin Co, TX	TX	4/19/2014
1428	Glandularia bipinnatifida	Dakota mock vervain		North central Texas	TX	Unknown
1061	Glandularia bipinnatifida	Dakota mock vervain			TX	Spring
1077	Glandularia gooddingii	Southwestern mock verv		Lower and middle elevations of	AZ	Spring through summer
511	Grindelia papposa	Spanish gold		Stillwater, OK	OK	Fall 212, 2013, 2014
1363	Grindelia sp.	Gumweed		California	CA	Unknown
1190	Grindelia squarrosa	Curlycup gumweed		Nevada	NV	Summer
417	Gutierrezia sarothrae	Broom snakeweed	# #		OK	August, September, Octc

If you have seen monarchs nectaring on native plants in the Southeast, please email

ray.moranz@xerces.org

- Graph courtesy of the Monarch Joint Venture.

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TAKEAWAY MESSAGES

- Monarchs use a wide diversity of milkweeds as host plants
- Monarchs have strong preferences for some nectar plants
- Only some of these plants are commercially available
- Contact your local NRCS field office to seek technical and financial assistance

Photo: Ray Moranz

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Acknowledgements

- Thanks to:
- Tonya Van Hook (TN) monarch researcher
- Eric Hunt (AR) photographer
- Glynda Clardy (MS) biologist

- Thanks to:
- Linda Chafin (GA) botanist
- Susan Meyers (GA) and Kim Bailey (NC): monarchists
- Scott Davis (FL) milkweedologist
- Eleanor (FL), photographer
- Jaret Daniels (FL), butterfly ecologist

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Xerces Society support also provided by:

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The White Pine Fund
Whole Systems Foundation

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for Invertebrate Conservation

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Monarch butterfly on frostweed, *Verbesina virginica*
Photo: Anthony Burns

Webinar 3: Wednesday, December 2 at 2pm Eastern

monarch on Jerusalem artichoke, *Helianthus tuberosus*

Photo: Nancy Adamson

Webinar 3 will focus on habitat creation and management using Farm Bill Programs, including a deeper look at resources for NRCS planners c/o http://nrcs.usda.gov/monarchs, and the Monarch Wildlife Habitat Evaluation Guides.

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Thank you!

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We'd love to hear from you!

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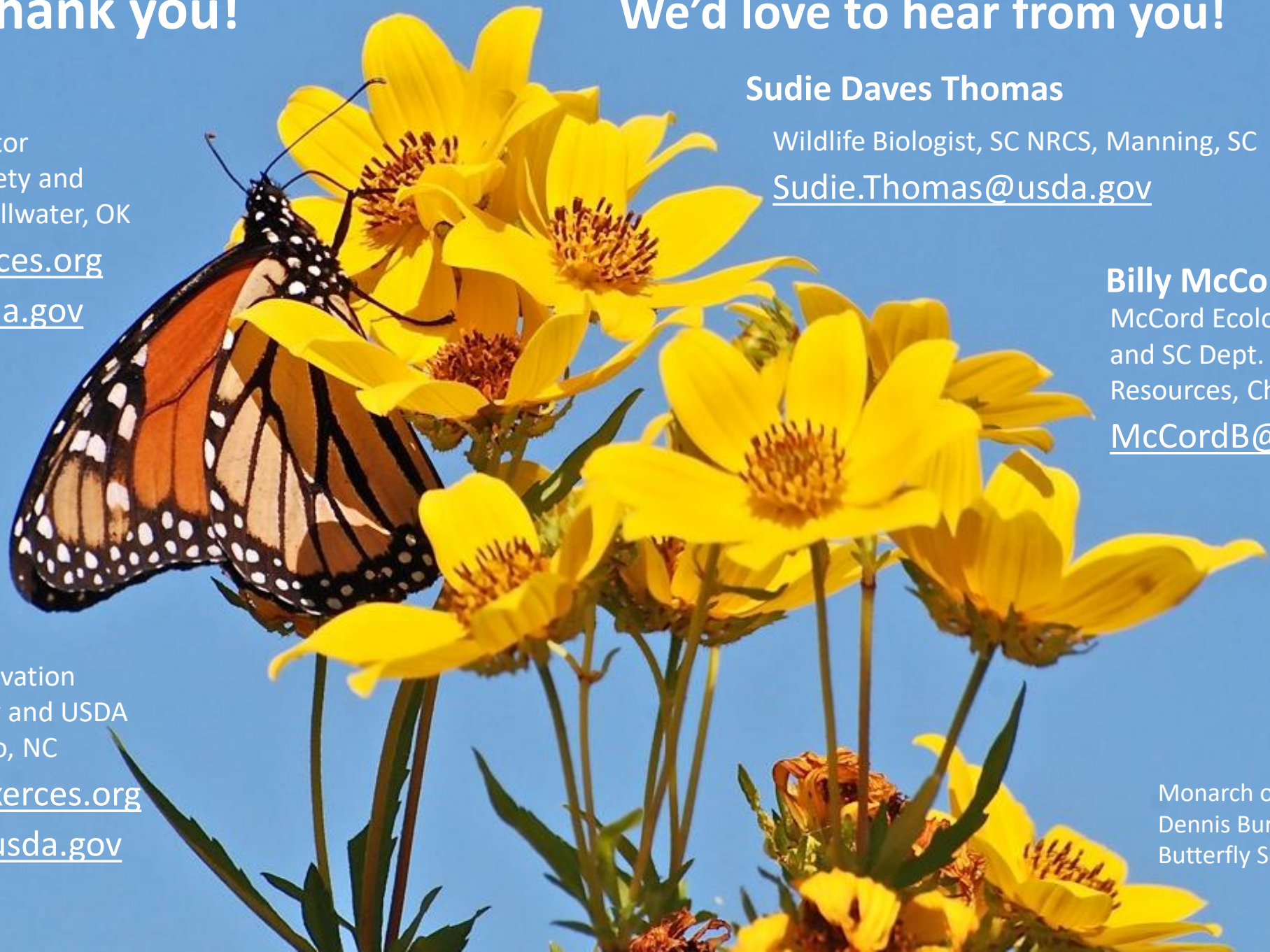

Monarch on tickseed by Dennis Burnette, Carolina Butterfly Society