

Butterflies & Pollinators: Master Gardeners Can Make a Difference



Jaret C. Daniels, Ph.D.



Insects and other arthropods represent the most diverse components of terrestrial ecosystems.

> 1 million species accounting for over 80% of all animal life on earth

















































Major Insect Pollinators



Pollination Services



Bees are particularly important pollinators

Join the Conversation
about
**Native
Bees**

What's the buzz?

North America has over 4,400 described species of native bees* that pollinate wildflowers and crops. From the tiny *Pedicularis minima* to the substantial carpenter bee *Drylocopa wickhami*, these local pollinators are hard at work in the floral landscapes of gardens, farms, forests, grasslands and urban and wild lands. Unfortunately, several species of native bees are showing disturbing signs of decline. Learn more about these colorful pollinators and how you can support them at www.pollinator.org



- Collect and transport pollen
- Actively forage in neighboring area around nests
- Exhibit flower constancy



Pollination Services

- Non-bees performed 25–50% of the total number of flower visits.
- Although non-bees were less effective pollinators than bees per flower visit, they made more visits; thus these two factors compensated for each other, resulting in pollination services rendered by non-bees that were similar to those provided by bees.
- These results strongly suggest that non-bee insect pollinators play a significant role in global crop production and respond differently than bees to landscape structure, probably making their crop pollination services more robust to changes in land use.
- Non-bee insects provide a valuable service and provide potential insurance against bee population declines.

Mounting evidence points to substantial losses of pollinators in many regions of the globe, with the strongest evidence coming from Europe and North America.



Florida's Native Bees

4000 Native bees in North America

Florida is home to roughly 316 species of native bees; about 29 are endemic.



Native Bees



- Most native bees are solitary
- ~70% nest in the ground
- Bumble bees best known eusocial species.

Native Bees



~ 30% nest in hollow plant stems or holes in wood





Brush piles, snags, or artificial nesting materials







Requirements



- Floral resources
- Nesting resources
- Limited pesticides



Provide a mix of flower shapes



Provide a mix of flower colors



Include both larval host plants
and adult nectar sources





Provide flowers throughout the growing season



Create horizontal & vertical
diversity



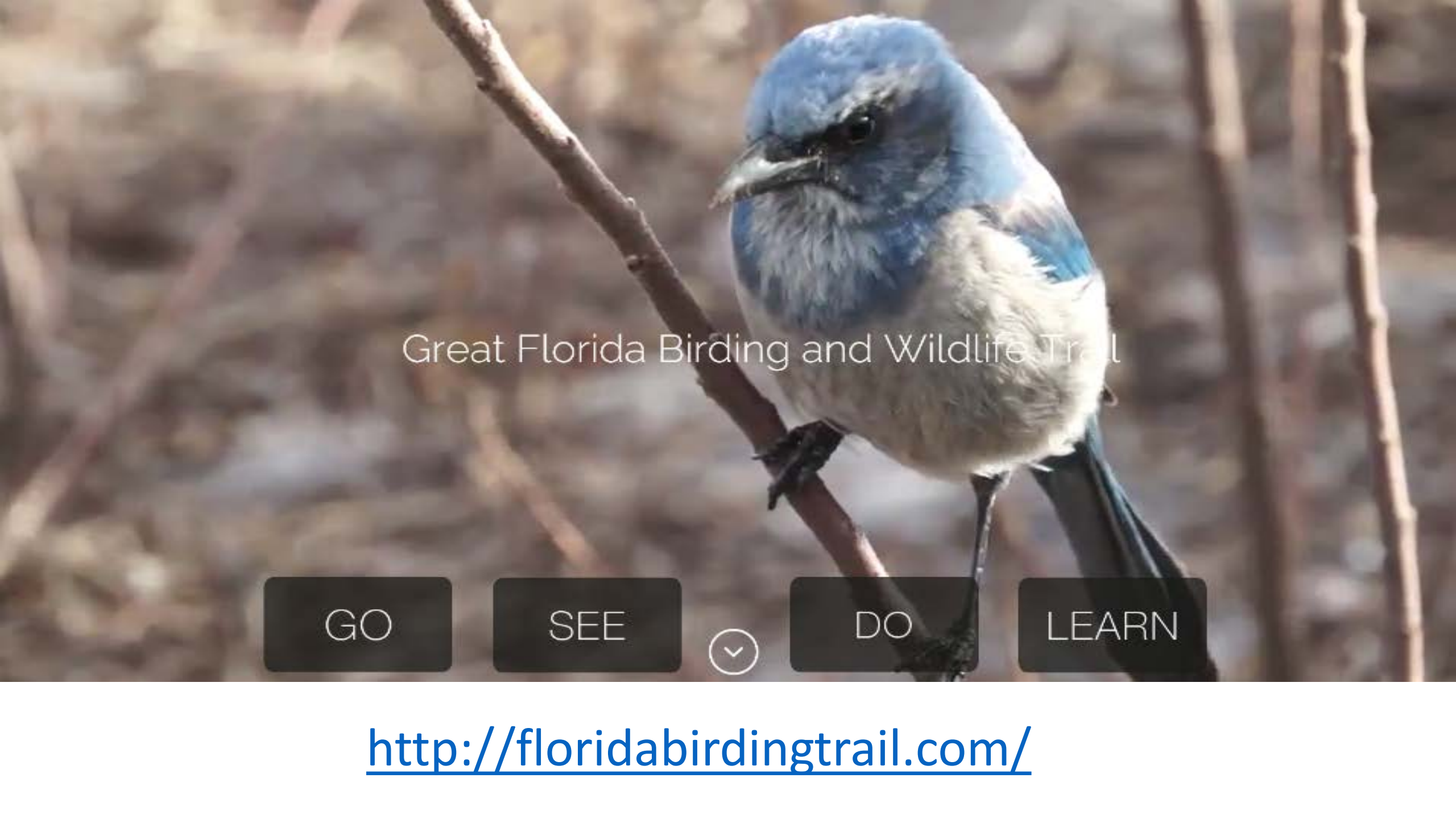
Plant in groupings



Include native plants



Chose the right plant for each location

A close-up photograph of a blue and white bird, possibly a Florida Scrub-wren, perched on a thin, brown branch. The bird has a bright blue head and back, with white underparts and a dark eye. The background is a soft-focus, natural setting with more branches and foliage.

Great Florida Birding and Wildlife Trail

GO

SEE



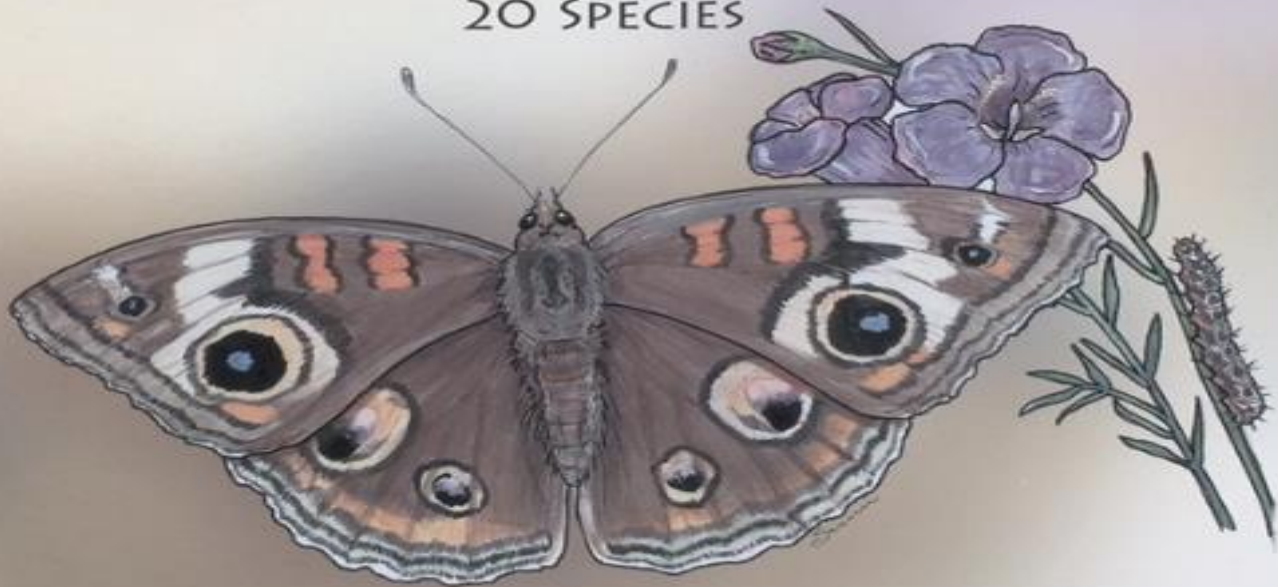
DO

LEARN

<http://floridabirdingtrail.com/>

Wings Over Florida Butterfly Viewing

20 SPECIES



COMMON BUCKEYE (*JUNONIA COENIA*)

Douglas S. Jones
Douglas S. Jones, Director
Florida Museum of Natural History

Nick Wiley
Nick Wiley, Executive Director
Florida Fish and Wildlife Conservation Commission



Florida Fish and Wildlife
Conservation Commission
MyFWC.com

Wings Over Florida Butterfly Viewing

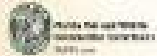
10 SPECIES - JUNIOR CERTIFICATE



ZEBRA SWALLOWTAIL (*PAISANUS STRIPEDORUS*)

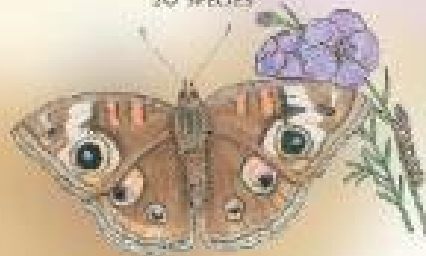
Douglas S. Jones
Curator, Florida Museum
of Natural History

Nick Witte
2024 Florida Butterfly
Viewing Competition Co-Chair



Wings Over Florida Butterfly Viewing

20 SPECIES



COMMON BUCKEYE (*SPHECIOPERUS ORITHYIA*)

Douglas S. Jones
Curator, Florida Museum
of Natural History

Nick Witte
2024 Florida Butterfly
Viewing Competition Co-Chair



Wings Over Florida Butterfly Viewing

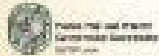
40 SPECIES



PALM BEACH BUTTERFLY (*ORINOMEDES PALMACHORUS*)

Douglas S. Jones
Curator, Florida Museum
of Natural History

Nick Witte
2024 Florida Butterfly
Viewing Competition Co-Chair



Wings Over Florida Butterfly Viewing

80 SPECIES



CLETISPA WARB (*TRITONIA INTERMEDIATA*)

Douglas S. Jones
Curator, Florida Museum
of Natural History

Nick Witte
2024 Florida Butterfly
Viewing Competition Co-Chair



Wings Over Florida Butterfly Viewing

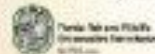
120 SPECIES



GULF FRITILL (*ORINOMEDES ELEGANS*)

Douglas S. Jones
Curator, Florida Museum
of Natural History

Nick Witte
2024 Florida Butterfly
Viewing Competition Co-Chair



Wings Over Florida Butterfly Viewing

150 SPECIES



GULF FRITILL (*ORINOMEDES ELEGANS*)

Douglas S. Jones
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of Natural History

Nick Witte
2024 Florida Butterfly
Viewing Competition Co-Chair



WINGS OVER FLORIDA – BUTTERFLIES



Keep up with the Trail. [Sign up](#)  and select "Wildlife Viewing".

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Florida Checklist of Butterflies



Wings Over Florida
www.floridabirdingtrail.com/wof/

FLORIDA MUSEUM
FLORIDA DEPARTMENT OF AGRICULTURE
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION





Schaus' Swallowtail

Heraclides aristodemus ponceanus

Bring this image to life!
see reverse side for details



Inspiring people to care
about life on earth.

The critically endangered **Schaus' Swallowtail** (*Heraclides aristodemus ponceanus*) is a large, iconic butterfly found in South Florida. Historically, the butterfly inhabited dense upland forests called tropical hardwood hammocks from the greater Miami area south through the Florida Keys. Habitat loss and fragmentation over the past century have led to severe population declines and range reductions.

Today, Schaus' Swallowtail is restricted to only a few remaining sites in the northern Florida Keys, making it one of the rarest butterflies in the U.S. and our only federally listed swallowtail. Although small numbers occur on Key Largo, the main population resides on islands in Biscayne National Park. Because recent surveys indicate extremely small numbers of butterflies throughout its range, the risk of extinction is thought to be very high. Collaborative conservation and recovery efforts are underway for the Schaus' Swallowtail. They include regular population monitoring, captive breeding, organism reintroduction, and habitat restoration.

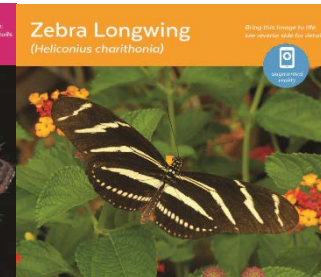
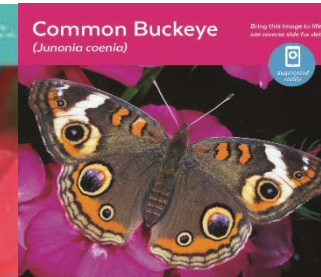
- Download the *Libraries of Life* app from the iTunes or Android store and install on your device.
- Launch the app.
- Hold your mobile device camera about 6 inches away from card image.
- View specimen and click buttons to view content.



Florida Museum 3-D Butterfly Cards



The Florida Museum of Natural History is a leading authority in biodiversity and cultural heritage, using its expertise to advance knowledge and solve real world problems. The Florida Museum inspires people to value the biological richness and cultural heritage of our diverse world and make a positive difference in its future.





Larva



FLORIDA MUSEUM

EXIT

DISCOVER BUTTERFLIES & MOTHS

Butterfly Brochures

Monarch Butterflies Eastern United States

During spring and summer, monarchs breed throughout the U.S. and southern Canada. In the fall, adults of an eastern population migrate to Mexico, flying up to 3,000 miles. In the western U.S., monarchs migrate to scattered groves along the coast of California. The following spring, these butterflies leave their overwintering sites and fly northward in search of host plants on which to lay their eggs. Female monarchs lay eggs on milkweeds and a few other plants in the dogbane family. As monarchs spread across North America, several generations of butterflies are produced. In Florida, some non-migratory individuals remain and breed year-round.

Sadly, population monitoring at overwintering sites in Mexico and California has documented a steady decline. Monarchs are threatened by loss and degradation of habitat, natural disease and predation, adverse weather and the ongoing decline of native milkweeds. Because of the monarch's migratory lifecycle, effective conservation strategies need to protect and restore habitat across their entire range.



Monarch Butterflies

are one of our most beloved animals — an insect that makes an amazing annual migration.

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Monarch Butterflies Northern Great Plains

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Flowering Plants & Butterflies: Southeast

The southeastern United States is home to a spectacular array of native flowering plants. These plants support a healthy environment and add beauty to our wildlands, gardens, and green spaces. Invite butterflies into your yard by including nectar plants for adult butterflies and host plants for their larvae. While gardens cannot replace natural habitat, a diverse landscape full of native flowering plants offers a bounty of resources to help support butterflies, hummingbirds, bees and other pollinators.

Butterflies have four life stages: egg, larva (caterpillar), pupa (chrysalis), and adult. While adult butterflies tend to be generalists, sipping nectar from a range of colorful blossoms, their larvae are specialists, feeding only on specific host plants to complete development. The illustration below shows the life cycle of the Zebra Swallowtail (*Eurytelus zoroaster*) on its host plant, Deep-pew (*Asimina triloba*).



Southwest Region (LA, MS, GA, SC, NC, TN, VA, FL, AL)

Tiger Swallowtail (<i>Papilio glaucus</i>) (Male)	Checked White (<i>Phaetor protenor</i>)	Henry's Elfin (<i>Colias hyas</i>) (Female)	Little Metalmark (<i>Colias virginica</i>)	Red Admiral (<i>Vanessa atalanta</i>)	Little Wood Satyr (<i>Neotoma cymela</i>)
Zebra Swallowtail (<i>Eurytelus zoroaster</i>) (Male)	Fekete Orange tip (<i>Aethochroa mikiel</i>) (Male)	White M Hairstreak (<i>Pararge aegeria</i>) (Male)	Zebra Longwing (<i>Nymphalis xanthocentrus</i>)	American Lady (<i>Vanessa virginica</i>)	Common Wood Nymph (<i>Carpenter peneus</i>)
Pieris Swallowtail (<i>Battus philenor</i>)	Orange Sulphur (<i>Cotax erythraea</i>)	Grey Hairstreak (<i>Strymon melinus</i>)	Gulf Fritillary (<i>Gnnyphes vindex</i>)	Common Buckeye (<i>Anaxia coarctata</i>)	Monarch (<i>Danaus plexippus</i>)
Spicebush Swallowtail (<i>Papilio troilus</i>)	Southern Dogface (<i>Zerene cesonia</i>)	American Snout (<i>Glyptoneura carolina</i>)	Geat Spangled Fritillary (<i>Speyeria cybele</i>)	Red-spotted Purple (<i>Limenitis lorana</i>)	Long-tailed Skipper (<i>Urbanus proteus</i>)
Giant Swallowtail (<i>Hemodes crepholus</i>)	Slender Orange (<i>Abaeis nicippe</i>)	Red-banded Hairstreak (<i>Calycopis cecrops</i>)	Pearl Crescent (<i>Phycodes strophus</i>)	Viceroy (<i>Linnaea archippe</i>)	Silver-spotted Skipper (<i>Speyeria claus</i>)
Black Swallowtail (<i>Papilio polydamus</i>)	Little Yellow (<i>Pyrausta nlo</i>)	Eastern Tailed-Blue (<i>Gyanis cybele</i>)	Phion Crescent (<i>Phycodes phion</i>)	Hickberry Emperor (<i>Anterope compels</i>)	Horse's Duskywing (<i>Erynnis horatius</i>)
Palamedes Swallowtail (<i>Papilio palamedes</i>)	Great Purple Hairstreak (<i>Altilia felixus</i>)	Summer Azure (<i>Coliasa neglecta</i>)	Question Mark (<i>Polignona interrogatoria</i>)	Southern Pearly-eye (<i>Enodia puerile</i>)	Yucca Giant Skipper (<i>Hegemonia yuccae</i>)
Cloudless Sulphur (<i>Xanthopan creata</i>)	Banded Hairstreak (<i>Satonia catana</i>)	Cerulean Blue (<i>Phemargus ceruleus</i>)	Mourning Cloak (<i>Nymphalis antiopa</i>)	Carolina Satyr (<i>Nemotrypa scytalis</i>)	Common/White Checkered Skipper (<i>Pyrus comata</i>) & (black)

A great variety of native plants are excellent for landscaping. They can be planted in small containers or over several acres.
Southwest Region Flowering Plants (LA, MS, GA, SC, NC, TN, VA, FL, AL)

Native plants:

- Require less irrigation once established
- Are adapted to the region's soil types and climate
- Provide food and shelter for butterflies, birds, and other wildlife
- Require limited maintenance and pest control

Designing Your Garden

- Garden in full sun and partial shade
- Check the sunlight, water, and soil needs of each plant to determine the best location
- Choose plants in a variety of colors, shapes, and sizes
- Choose plants with different heights and growth habits
- Select a variety of plants that bloom at different times
- Group plants of the same species
- Plant both butterfly host plants and nectar sources

¹ See indicates the species also comes as host plants for butterfly larvae. The native flowering plants pictured provide nectar and/or pollen resources for adult butterflies, bees and other pollinators.

Illustrations by Dale S. Johnson and Photographs by Janet Daniels and Russ Fawcett



Forked Bluecurls (<i>Trichostema filiforme</i>)	Coastal Plain Willow (<i>Salix caroliniana</i>)	Scarlet Indian Paintbrush (<i>Castilleja coccinea</i>)	Common Blue Yarrow (<i>Achillea millefolium</i>)	Woman's Tobacco (<i>Asplenium platyneuron</i>)	Common Blue Violet (<i>Viola sororia</i>)
Spurred Butterfly Pea (<i>Cassipourea virginiana</i>)	Trumpetweed (<i>Linum catharticum</i>)	Dense Blazing Star (<i>Liatris spicata</i>)	Cardinal-flower (<i>Loelia cardinalis</i>)	Yellow Fringed Orchid (<i>Platanthera citrina</i>)	Golden Zizia (<i>Zizia aurea</i>)
Swamp Milkweed (<i>Asclepias tuberosa</i>)	Flowering Dogwood (<i>Cornus florida</i>)	Black Cherry (<i>Prunus serotina</i>)	Maryland Seneca (<i>Senecio nemoralis</i>)	Purple Coneflower (<i>Echinacea purpurea</i>)	

Native Insect Pollinators Of the Southeastern United States



Beyond the Honey Bee

When people think about pollination, the honey bee immediately comes to mind. But honey bees are not native to the Americas. There are many other native insects that also provide the valuable service of plant pollination. Just about any insect that moves from flower to flower is capable of serving as a pollinator. Actually, it is really incredible how many insect species do pollinate. More than 4,000 species of bees, 750 species of butterflies, and thousands of species of wasps, flies and beetles act as pollinators for 75 percent of U.S. flowering plant species.

Native pollinators are extremely important because they maintain productive, diverse plant communities and help pollinate many of our agricultural crops. Unfortunately, native pollinator populations have declined in many parts of the United States. Land development, agricultural practices, habitat loss, pesticides, pathogens, and climate change are some of the factors blamed to cause native pollinator declines. Consequently, the growing network of yards, community green spaces, rights-of-way, and agricultural systems in conjunction with wild lands is becoming an ever more important resource for pollinators.

How can we help native pollinators?



PARTRIDGE PEA
Cassipouira fasciculata

1 Plant native wildflowers

Wildflowers bloom at different times of the year, so plant a variety to provide food throughout the spring, summer and fall. Many species of wildflowers are easy to grow. Their variety of shapes and colors attract a multitude of different pollinators.



2 Provide nesting habitats

Set out hollow bamboo sticks and drilled wooden nest blocks as habitat for many beneficial native bees and wasps.

Leave bare ground and do not till the soil. This allows ground-nesting bees and other pollinators to maintain and establish new nesting sites.

Leave some organic debris on the ground. Many pollinating flies and beetles use dead vegetation or wood for habitat.

3 Spray wisely and minimize mowing

Limit pesticide use in the landscape. When pesticides are used, application should occur during early morning, late afternoon, or at night, when pollinator activity is low. Always follow label directions.

Many so-called "weeds" also provide forage for multiple bees and other flower-visiting insects. Therefore, minimizing mowed areas is a great way to enhance pollination activity.

Select Native Wildflowers

- Swamp Sunflower (*Helianthus angustifolius*)
- Giant Ironweed (*Veronica gigantea*)
- Mountainmint (*Physantherum* spp.)
- Trumpetweed (*Rauwolfia fistulosa*)
- Spiderwort (*Phlox pilularis*)
- Goldenrod (*Solidago* spp.)
- Aster (*Symphoricarpos* spp.)
- Blazing Star (*Liatris* spp.)



OBEYDIENT PLANT
Rhynchospora virginica

INDIAN BLANKET
Gaillardia aristata

BUTTERFLY MILKWEED
Asclepias tuberosa

SPOTTED KORBALM
Thymus occidentalis

BLACK-EYED SUSAN
Rudbeckia hirta

Butterflies need host plants

Butterflies have four life stages: 1) egg, 2) caterpillar, or larva, 3) pupa, and 4) adult. During the larval stage, the caterpillar feeds on certain plants in order to grow and eventually pupate.



MONARCH CATERPILLAR

Underground bee nest showing the life cycle of a ground-nesting bee



Sweet wasp

Cuckoo wasp

Potter wasp

Leaf-cutting bee

Good providers

They feed their young pollen and nectar, while wasps feed their young spider and/or insects. Wasps are good natural enemies of caterpillars and agricultural pests.

No hive required

Unlike honey bees, most native bees and wasps are solitary and build their nests in the ground in comb-shaped cells.

Sand wasp

NATIVE BEES and WASPS



Bee fly

Green bottle fly

Hover fly

Look-alikes and others

Many flower-visiting flies strongly resemble bees and wasps. This misleads the true bees and wasps, but also makes identification challenging.

Flesh fly

Feather-legged fly

FLIES

Know Your Pollinators

Learn to identify the many native pollinators you may encounter in the great outdoors.

Longhorned beetle

Soldier beetle

Metallic wood-boring beetle

Feared beetle

Tumbling flower beetle

Meal time

Flower-visiting beetles, flies and bees get their pollen and nectar, while suckling, moths and most wasps take only nectar.

BEEETLES

Photo credits: Mary Gibbs, Loretta Seltzer, Gil Beards, Lesley Wilson, Bob DeKorser, Mary DeWitt, Bill Booth, Amy Stewart, Stephen Greenwell, Angier Proctor, Jane Baskin, Douglas Newman

Hawkmoth

Skipper

A natural "straw"

Butterflies and moths have long, flexible mouthparts. They use to dig and sip nectar that many other insects cannot reach.

Swallowtail

Sulphur

Mulberry

BUTTERFLIES and MOTHS

THANKS!

