Nebraska
Statewide
Arboretum

GARDENING FOR POLLINATORS

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Major groups of pollinating insects.

- Bees and wasps
- Flies
- Butterflies and moths
- Beetles

SOURCES:

- Nebraska Insects and Bugs - Insect Identification
- Attracting Native Pollinators- Xerces Society
- Bringing Nature Home- Douglas Tallamy
- National Pollinator Week- June 20 - 26

Why do pollinators matter!

- Almost 90 percent of the world’s flowering species require insects or other animals for pollination,”

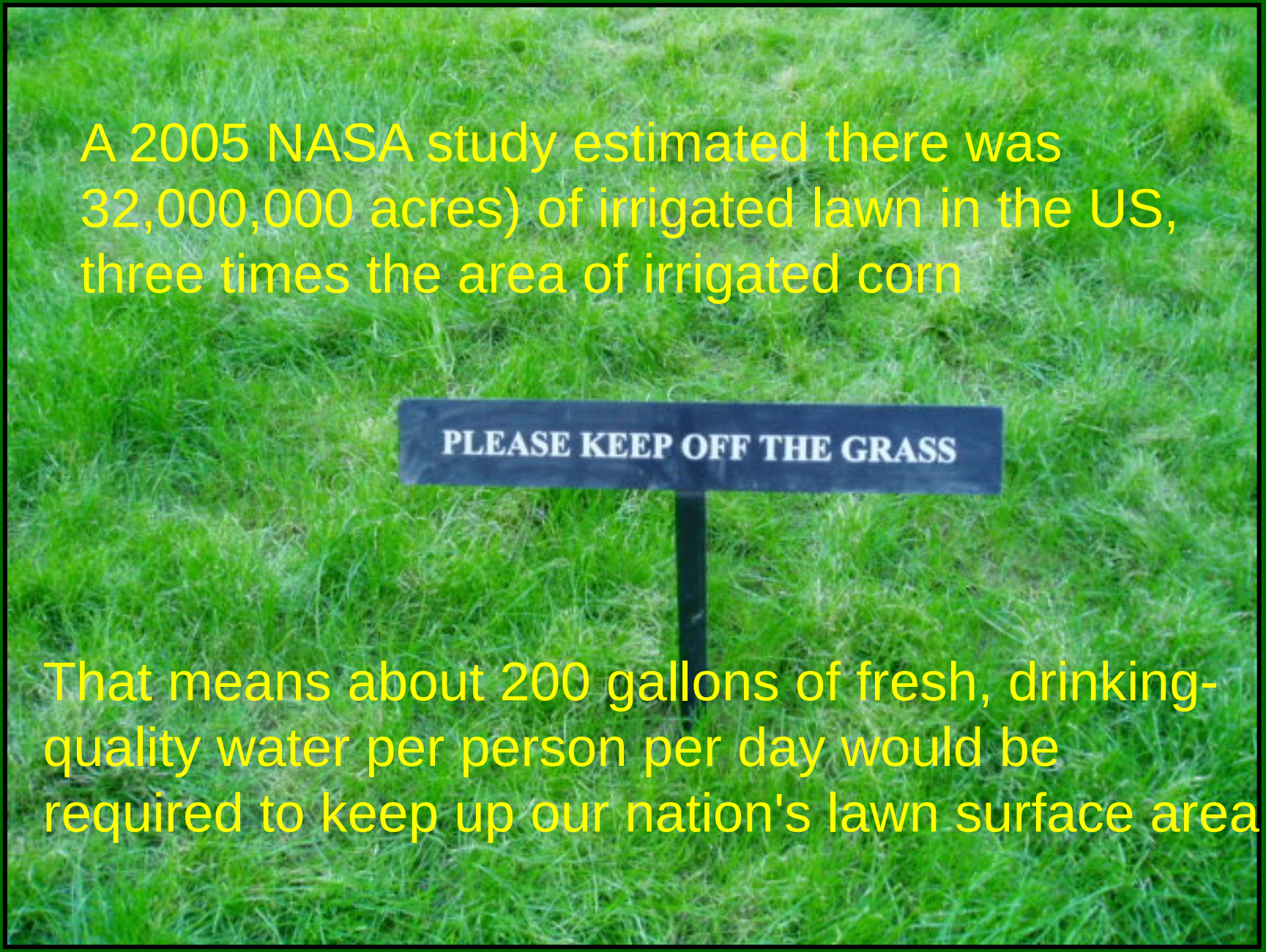
- Seventy out of the top 100 human food crops, which supply about 90 percent of the world's nutrition, are pollinated by bees.

- You have a bee to thank for every one in three bites of food you eat.

“Anywhere, U.S.A.”

Diverse Landscapes are Healthy Landscapes

In 1992 there were 50,000 square miles of manicured turf grass in America (Michael Pollen, Second Nature)
The space devoted to turfgrass in the United States is growing at the rate of almost six hundred square miles a year.
Avalawn



A 2005 NASA study estimated there was 32,000,000 acres) of irrigated lawn in the US, three times the area of irrigated corn

That means about 200 gallons of fresh, drinking-quality water per person per day would be required to keep up our nation's lawn surface area

A gardener's dream- a landscape with no weeds or insects!

Urban and suburban development that produces landscapes of chemically maintained, regularly mowed lawns and roadsides, and "habitat loss is generally thought to be the most important factor driving pollinator declines.

- The EPA has estimated nearly 70,000,000 pounds of active pesticide ingredients are used on suburban lawns each year in the US. It has also been estimated that more herbicides are applied per acre of lawn than are used by most farmers to grow crops.

- Sustainable gardening uses organic horticulture methods, such as organic fertilizers, biological pest control, beneficial insects, and companion planting, among other methods, to sustain an attractive lawn in a safe garden.

- Biologists have found more than 150 different chemical residues in bee pollen, a deadly "pesticide cocktail" according to University of California apiculturist Eric Mussen.

- Creating a sustainable landscape is essential to our continued well being.

- According to the Xerces Society, an invertebrate conservation group, nearly one-third of North American bumblebee species are declining.

- While important to agriculture, the honey bee is not native to North America.

A 2006 report by the National Academies of Science concluded that the populations of many other wild pollinators—especially wild bees—was trending "demonstrably downward."

The threats are much the same ones faced by managed honeybees: pesticides, lack of wild forage, parasites and disease.

The difference is that there are thousands of human beings who make it their business to care for and prop up the populations of honeybees. No one is doing the same thing for wild bees.

WILD BEES

Mason Bee

Bumble Bee

Leafcutter Bee

Sweat Bee

Michael Warriner notes that in some cases, just over 200 native bees can do the same level of pollination as a hive of honey bees containing over 10,000 workers.

Many native bee species are more effective than honey bees at pollinating flowers on a bee-for-bee basis," Honey bees operate at 72% efficiency, while native bees operate at 91% efficiency.

Also, native bees are active for more hours in the day and more days in the year than honey bees.

Honey bees are social and live in a colony. Their life is dedicated to the hive and they will do anything to protect it, which is why they sting.

In the United States, 75-90% of native bee species are solitary, not social, nesters (Shepherd, 2003). Solitary nesters are much less likely to sting, and only female native bees have stingers. Solitary bees do not live in hives, either. They live in bare ground patches and soft wood burrows.

Unfortunately, these solitary bees do not produce honey, but their value as pollinators is undeniable. If native bees are so great, why aren’t they being used for pollination efforts on a large scale already? The edge that honey bees have over native bees is that we can attach a dollar amount to honey bees’ ecosystem services for both honey and pollination.

Black Mud
Dauber
Wasp

Pollinators have a few basic habitat requirements:

- A flower rich foraging area.
- Suitable host plants or nests where they can lay their eggs.
- 70% of native bee species are ground nesters!
- An environment free of pesticides.

Plants are the Bees Knees:

- Many bee species visit a wide variety of flowers for forage.
- Many other species are specialist foragers, relying on a small number of flower species for nectar and pollen.
- Bee mouth parts prevent them from sipping nectar from deep flower tubes.

Replace turf with other landscape plants

- Groundcovers
- Perennials
- Trees and shrubs
- Mini-prairies

- Relax. Work WITH Mother Nature.

- Mass trees and other landscape plants together and separate from turf.

- Strive for biological diversity – even in the lawn (put up with a few “weeds”).

- Try to reduce or eliminate use of pesticides – and be smarter with their use.

- Taking any action, however modest, is better than taking none at all!

- Worldwide, 37% of animal species are herbivorous insects (Wiess 1988)

- A large percentage of the world's fauna depends entirely on insects to access the energy stored in plants. (Wilson 1987)

- 96% of terrestrial bird species in NA rely on insects to feed their young.

Larval insects become bird food!

Realize native plants become more than just landscape plants

- Most insect herbivores can only eat plants with which they share an evolutionary history. They cannot, or will not use exotic or alien plants for food.

- Our native insects will not be able to survive on alien plant species alone.

Insects Don’t Like Aliens!

- Leaf eating larval insects encounter leaf chemical defenses.
- Nectar from alien plants is the same as nectar from native plants.
- Flower shape and amount of nectar are most important—native bees evolved to forage in flowers with particular morphologies.

- Butterflies lay their eggs directly on or near the caterpillar’s food source.
- Caterpillars need the right food on which to feed.
- Caterpillars of some species will eat only a single species. Others will eat a very wide range of plants from numerous families.

- Among other pollinators, iconic monarch butterfly declines are well documented: Their numbers are now at a small fraction of historical levels.

MOTHS

Sphinx or Hummingbird Moth

- Moths become an important group of pollinators for most night blooming plants.

Hawk Moth

Flies

Often important pollinators in natural ecosystems for specific plants

Hover Fly

Robber Fly

Syrphid Fly

Tachinid Fly

Forty percent of the world’s flower fly species have larvae that mainly eat crop-damaging aphids, thrips and other plant-sucking insects.

Bee Fly

Bottle Fly

The larvae of many fly species are predators of other insects!

Their diet of other insects makes flower flies valueable for pest control as well as pollination!

Syrphid fly larva eating aphids

Tachinid fly eggs on walnut
catepillar

Forage for Flies…..

- The foraging plants for butterflies and bees will be home to spiders and aphids, the preferred larval food of flies!

- Tolerate some dead wood and leave a few untidy corners.

BEETLES

Blister Beetle

Soldier Beetle

- Beetles presence can serve as an indicator that host bee populations are robust.

Beetle Habitat….

- The habitat requirement for beetles can be met as you manage for bees and butterflies!

- The larvae of many beetles hunt for prey in leaf litter or develop in decaying wood.

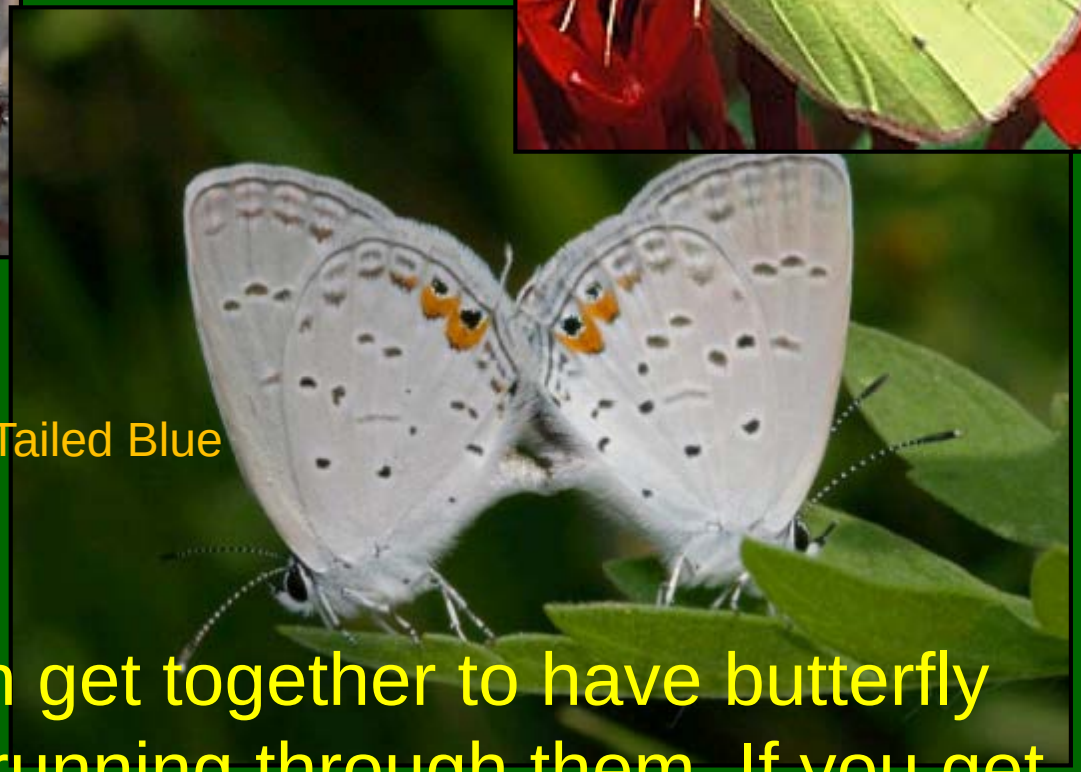
Does it Matter?

Native plants provide the food, shelter and nesting cover for songbirds, beneficial insects and critters that conventional landscapes cannot.

- Recognize the importance of suburban gardens for the preservation of wildlife!

- Our gardens can play a role in creating habitat by using a wide variety of plants

- We can no longer rely on local natural areas to supply food and shelter to the birds, mammals, reptiles and amphibians.



- Communities can get together to have butterfly garden corridors running through them. If you get five households on a city block, you've got a corridor!

What can we do about it?

- Learn a variety of plants that are native to Nebraska and the Great Plains region!
- Visit local arboretums and parks that have demonstrations that feature native plants
- Encourage more demonstration plantings in public places, corporate campuses, educational institutions and national business chains.

National Park Service Regional Headquarters

Sallows Arboretum, Sunken Gardens- Alliance, NE

Gilman Park Arboretum- Pierce

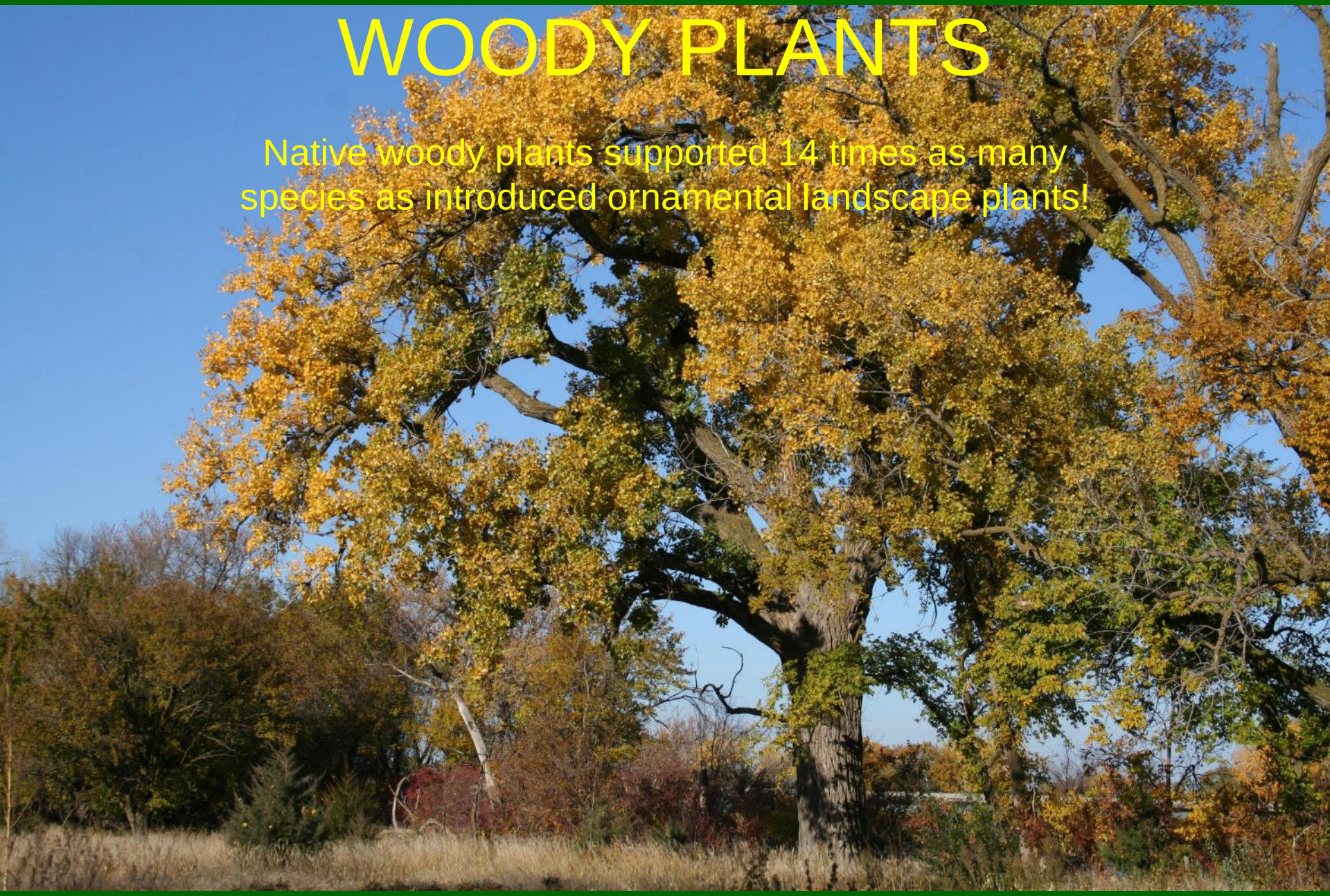
The Shulenberg Prairie—Morton Arboretum

Millennium Park

Garfield Park Conservatory

WOODY PLANTS

Native woody plants supported 14 times as many species as introduced ornamental landscape plants!



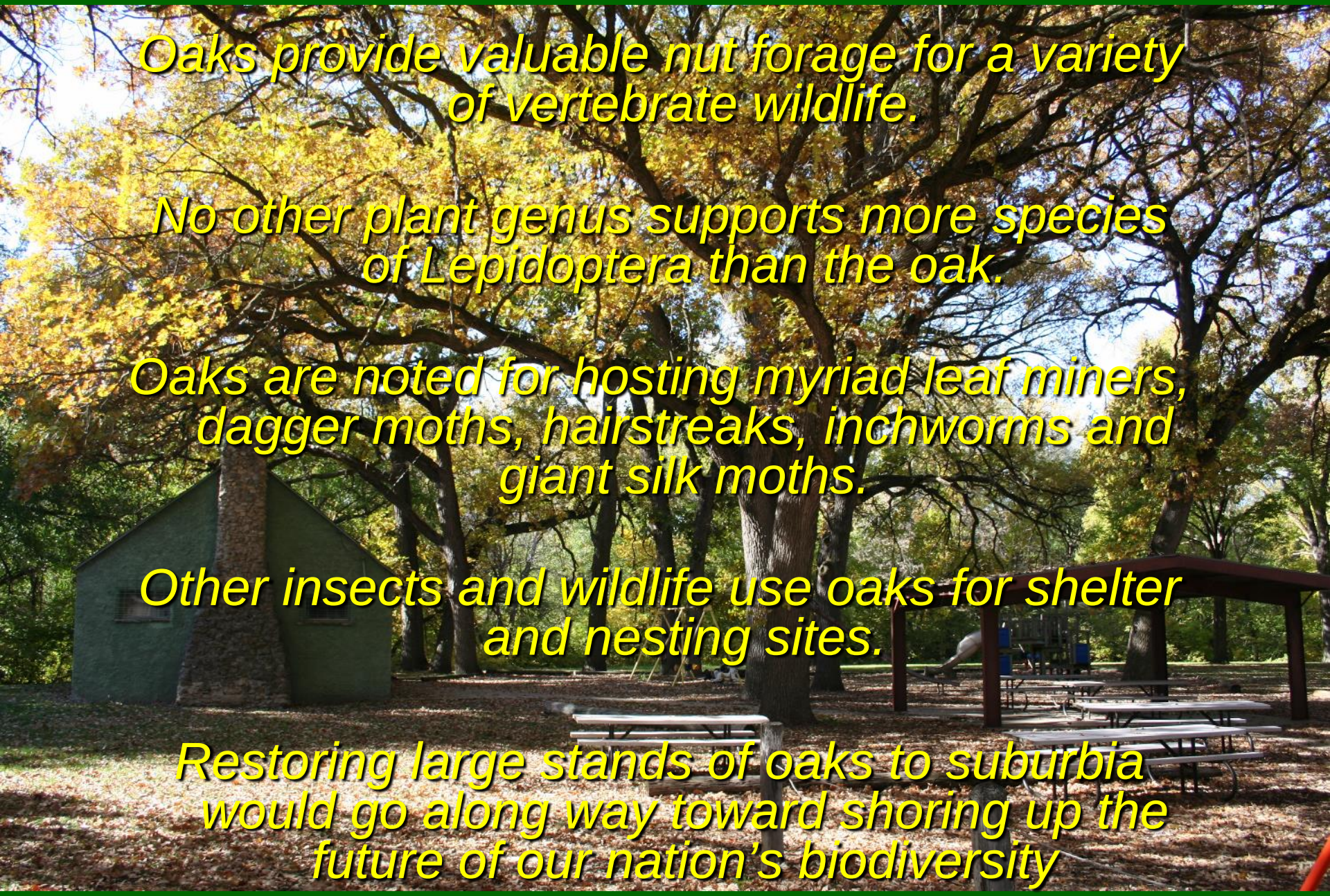
Top Ten Trees: Larval Food Sources

- Oak
- Willow
- Cherry, Plum
- Poplar, Cottonwood
- Crabapple
- Maple, Boxelder
- Elm
- Hickory
- Linden
- Walnut

OAKS—The quintessential wildlife plant

Bur Oak

Quercus macrocarpa



Oaks provide valuable nut forage for a variety of vertebrate wildlife.

No other plant genus supports more species of Lepidoptera than the oak.

Oaks are noted for hosting myriad leaf miners, dagger moths, hairstreaks, inchworms and giant silk moths.

Other insects and wildlife use oaks for shelter and nesting sites.

Restoring large stands of oaks to suburbia would go along way toward shoring up the future of our nation's biodiversity

HERBACEOUS PLANTS

Native forbs and grasses supported 3 times as many species as introduced herbaceous plants!

Top Native Pollinator Plants

- Aster
- Baptisia
- Coneflower
- Culver’s Root
- Gayfeather
- Golden Alexander’s
- Goldenrod
- Helen’s Flower
- Joe-Pye Weed
- Milkvetch, Canada
- Milkweeds
- Mountain Mint
- Rattlesnake master
- Penstemon
- Phlox
- Spiderwort
- Prairie Clover
- Vervain, Hoary
- Wild Beebalm
- Wild Quinine
- Wild Senna

Aromatic Aster, *Aster oblongifolius*

Smooth Aster, *Aster laevis*

New England Aster, *Aster novae-angliae*

Calico Aster, *Aster lateriflorum*

Heath Aster, *Aster ericoides*

Sky Blue Aster, *Aster azureus*

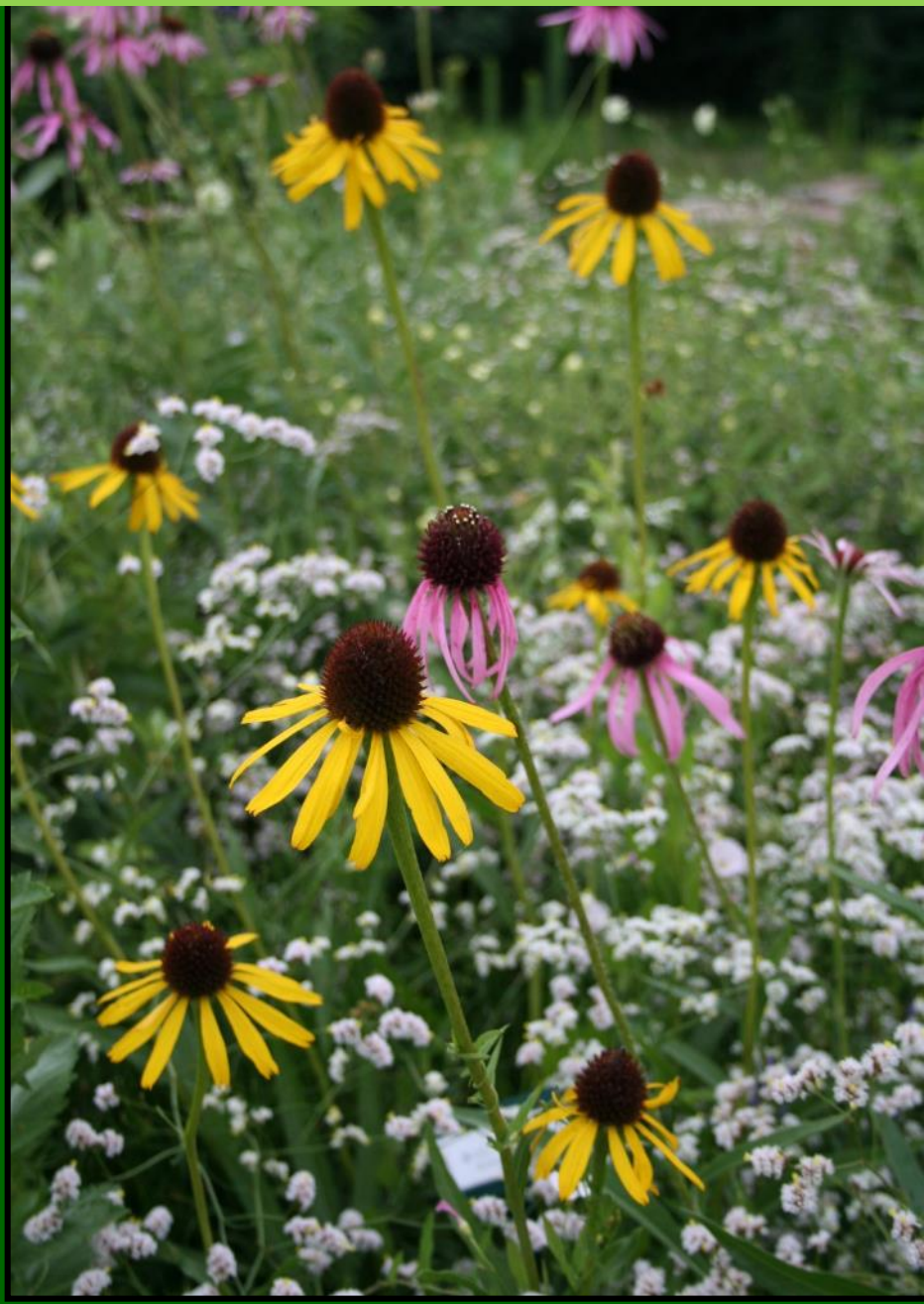
Late Boneset, *Eupatorium serotinum*

Dwarf Blue Indigo, Baptisia minor

White Wild Indigo, *Baptisia lactea*

Pale Purple Coneflower, *Echinacea pallida*

Ozark Coneflower, *Echinacea paradoxa*



Culver's Root, *Veronicastrum virginicum*

Scaly Blazing Star, *Liatris squarrosa*

Spike Gayfeather, *Liatris spicata*

Meadow Gayfeather, *Liatris ligulistylus*

Eugene Reimer 2005

Thickspike Gayfeather, *Liatris pycnostachya*

Dotted Gayfeather, *Liatris punctata*

Copyright Chris Helzer/The Nature Conservancy

Golden Alexanders, *Zizia aurea*

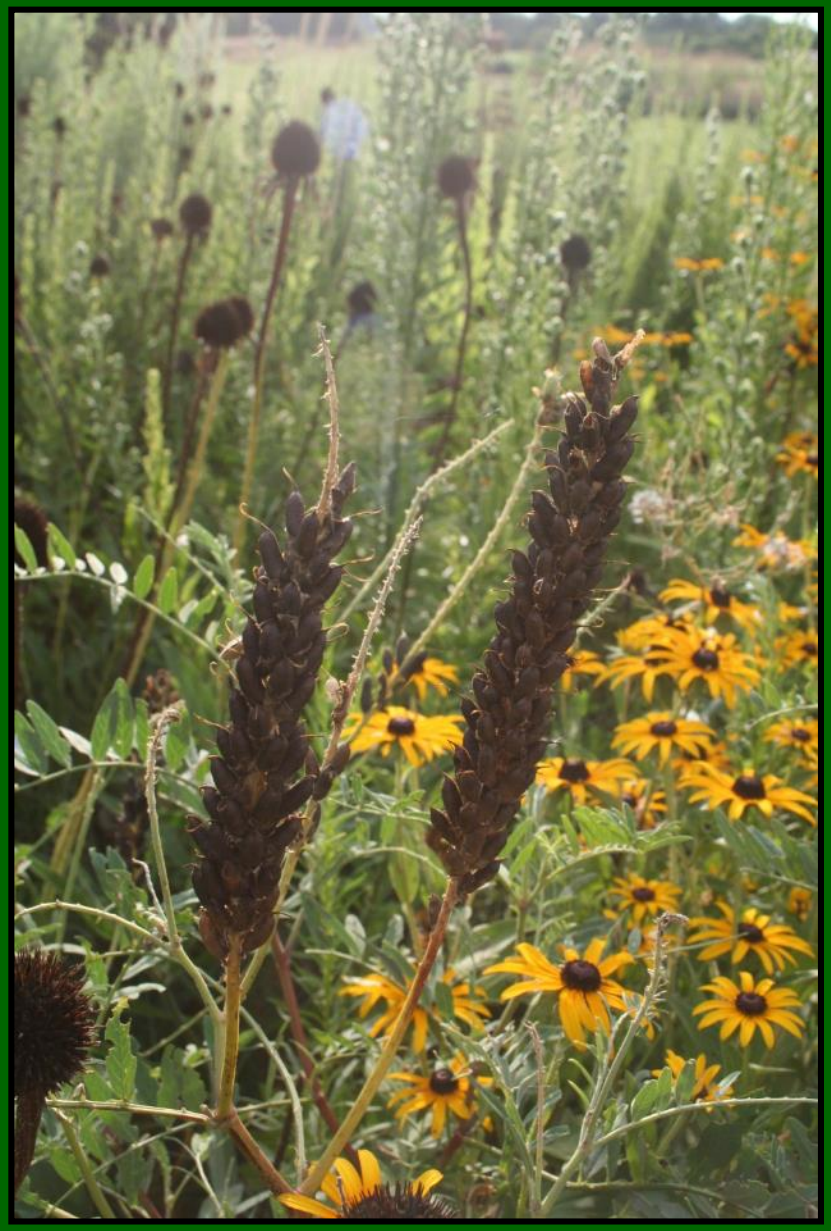
‘Wichita Mountains’ Goldenrod

‘Fireworks’ Goldenrod

Sneezeweed, *Helenium autumnale*

Joe-Pye Plant, *Eupatorium purpureum*

Canada Milkvetch, *Astragalus canadensis*



Butterfly Milkweed, *Asclepias tuberosa*

Swamp Milkweed, *Asclepias incarnata*

Smooth Milkweed, *Asclepias sullivantii*

Whorled Milkweed, *Asclepias verticillata*

- Mountain Mint,
  Pycnanthemum virginianum

Shell-leaf Penstemon,

Penstemon grandiflorus

- *Penstemon*
- ‘Prairie Splendor’

Hairy Penstemon

Penstemon ‘Pikes Peak Purple’

Rocky Mountain Penstemon

Prairie Phlox, *Phlox pilosa*

Woodland Phlox, Phlox divaricata

Purple Prairie Clover, *Dalea purpurea*

Copyright Chris Helzer/The Nature Conservancy

White Prairie Clover, *Dalea candida*

Rattlesnake Master, *Eryngium yuccafolium*

Dwarf Spiderwort, *Tradescantia tharpii*

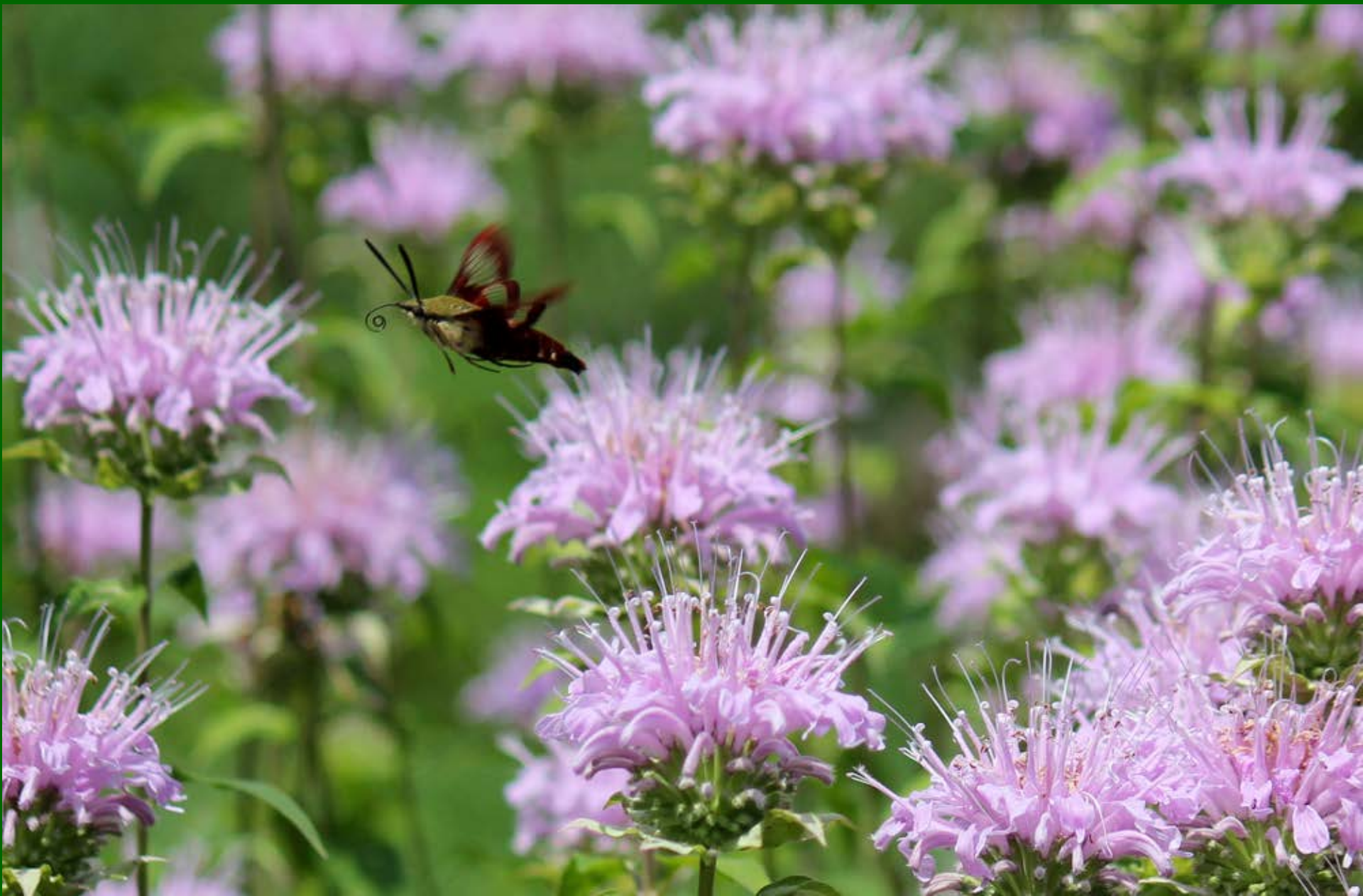
Prairie Spiderwort, Tradescantia ohioensis

Vervain, Hoary, Verbena stricta

Hoary Vervain, *Verbena stricta*

Blue Vervain, *Verbena hastata*

Wild Beebalm, Monarda fistulosa



Wild Quinine, Parthenium integrifolium

Wild Senna, *Senna hebecarpa*

Native Plant Sources

- Ion Exchange--Harpers Ferry, IA
- Missouri Wildflowers Nursery--Jefferson City, MO
- Prairie Moon Nursery --, Winona, MN
- Prairie Nursery-- Westfield, WI
- Stock Seed Farms--Murdock, NE
- Nebraska Statewide Arboretum, Inc

NEBRASKA STATEWIDE Arboretum

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IANR

…enriching lives through the beauty and wonder of plants.

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