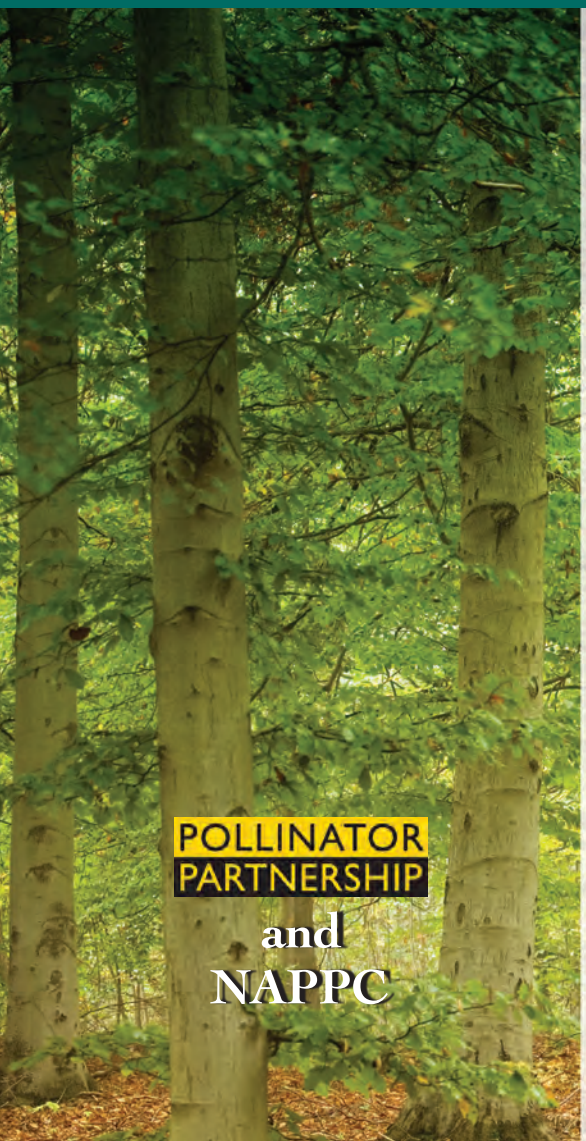
SELECTING PLANTS FOR POLLINATORS

A REGIONAL GUIDE FOR FARMERS, LAND MANAGERS, AND GARDENERS IN THE



EASTERN BROADLEAF FOREST

OCEANIC PROVINCE

INCLUDING THE STATES OF
CONNECTICUT,
NEW JERSEY,
RHODE ISLAND

AND PARTS OF:
DELAWARE, KENTUCKY, MAINE,
MARYLAND, MASSACHUSETTS,
NEW HAMPSHIRE,
NEW YORK, OHIO,
PENNSYLVANIA, TENNESSEE

POLLINATOR PARTNERSHIP
and
NAPPC

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This is one of several guides for different regions in the United States. We welcome your feedback to assist us in making the future guides useful. Please contact us at

feedback@pollinator.org

SELECTING PLANTS FOR POLLINATORS

A REGIONAL GUIDE FOR FARMERS, LAND MANAGERS, AND GARDENERS

IN THE

ECOLOGICAL REGION OF THE

EASTERN BROADLEAF FOREST OCEANIC PROVINCE

INCLUDING THE STATES OF:

CONNECTICUT, NEW JERSEY, RHODE ISLAND

AND PARTS OF:

DELAWARE, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW YORK, OHIO, PENNSYLVANIA, TENNESSEE, WEST VIRGINIA

A NAPPC AND POLLINATOR PARTNERSHIP™ PUBLICATION

BY: **ELIZABETH L. LEY, BOTANIST, EDGEWATER, MD**

This guide was funded by the National Fish and Wildlife Foundation, the C.S. Fund, the Plant Conservation Alliance, the U.S. Forest Service, and the Bureau of Land Management with oversight by the Pollinator Partnership™ (www.pollinator.org), in support of the North American Pollinator Protection Campaign (NAPPC–www.nappc.org).

WHY SUPPORT POLLINATORS?

In their 1996 book, The Forgotten Pollinators, Buchmann and Nabhan estimated that animal pollinators are needed for the reproduction of 90% of flowering plants and one third of human food crops. Each of us depends on these industrious pollinators in a practical way to provide us with the wide range of foods we eat. In addition, pollinators are part of the intricate web that supports the biological diversity in natural ecosystems that helps sustain our quality of life.

Abundant and healthy populations of pollinators can improve fruit set and quality, and increase fruit size. In farming situations this increases production per acre. In the wild, biodiversity increases and wildlife food sources increase.

Alfalfa, clover, apples, blueberries, cranberries, cherries, cucumbers, pears, pumpkins, soybeans, squash, tomatoes, and watermelons are some of the crops raised in the Eastern Broadleaf Forest that rely on honey bees and native bees for pollination. Domestic honey bees pollinate approximately $10 billion worth of crops in the U.S. each year.

Unfortunately, the numbers of both native pollinators and domesticated bee populations are declining. They are threatened by habitat loss, disease, and the excessive and inappropriate use of pesticides. The loss of commercial bees to Colony Collapse Disorder (CCD) has highlighted how severe the issues of proper hive management are to reduce stresses caused by disease, pesticide use, insufficient nutrition, and transportation practices. Currently, the pollination services that the commercial beekeeping industry provides are receiving much needed research and conservation resources. The efforts to understand the threats to commercial bees should help us understand other pollinators and their roles in the environment as well.

It is imperative that we take immediate steps to help pollinator populations thrive. The beauty of the situation is that by supporting pollinators' need for habitat, we support our own needs for food and support diversity in the natural world.

Thank you for taking time to consult this guide. By adding plants to your landscape that provide food and shelter for pollinators throughout their active seasons and by adopting pollinator friendly landscape practices, you can make a difference to both the pollinators and the people that rely on them.

Laurie Davies Adams
Executive Director
Pollinator Partnership

"FARMING FEEDS THE WORLD, AND WE MUST REMEMBER THAT POLLINATORS ARE A CRITICAL LINK IN OUR FOOD SYSTEMS."

-- PAUL GROWALD,
CO-FOUNDER,
POLLINATOR PARTNERSHIP

GETTING STARTED

THIS REGIONAL GUIDE IS just one in a series of plant selection tools designed to provide information on how individuals can influence pollinator populations through choices they make when they farm a plot of ground, manage large tracts of public land, or plant a garden. Each of us can have a positive impact by providing the essential habitat requirements for pollinators including food, water, shelter, and enough space to allow pollinators to raise their young.

Pollinators travel through the landscape without regard to property ownership or state boundaries. We've chosen to use R.G. Bailey's classification system to identify the geographic focus of this guide and to underscore the connections between climate and vegetation types that affect the diversity of pollinators in the environment.

Bailey's Ecoregions of the United States, developed by the United States Forest Service, is a system created as a management tool and is used to predict responses to land management practices throughout large areas. This guide addresses pollinator-friendly land management practices in what is known as the Eastern Broadleaf Forest, Oceanic Province.

Portions of thirteen states make up the 104,500 square miles of this province with elevations ranging from sea level to 3,000 feet. Although the area is dissected by population centers, farms, and roads, the natural vegetation shares common natural characteristics: primarily, forests that shed their leaves each fall. The seasonal cycle of sun and shade within the forests has created a changing pattern of bloom time for food plants and shelter needs for foraging, nesting, and migrating pollinators.

Farmers, land managers, and gardeners in this region have a wide palette of plants to use in the landscape. Farms and residential areas provide a diverse range of soil types in both sunny and shady areas. With this diversity of locations many different species of plants may be used to improve pollinator habitats.

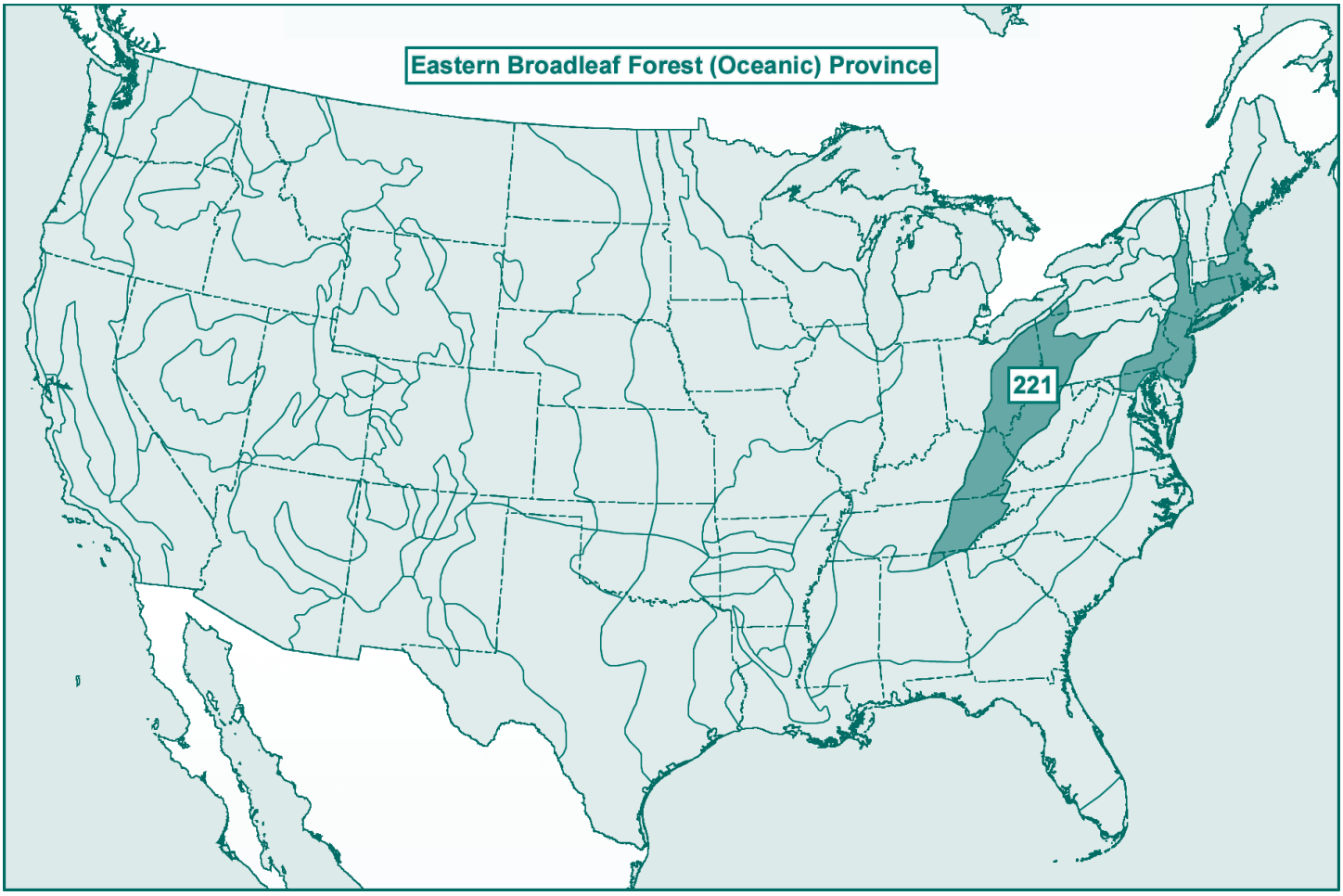
Long before there were homes and farms in this area, the original, natural vegetation provided continuous cover and adjacent feeding opportunities for wildlife, including pollinators. In choosing plants, aim to create habitat for pollinators that allow adequate food, shelter, and water sources. Most pollinators have very small home ranges. You will make a difference by understanding the vegetation patterns on the farm, forest, or neighbor's yard adjacent to your property. With this information in hand, your planting choices will better support the pollinators' need for food and shelter as they move through the landscape.

UNDERSTANDING THE EASTERN BROADLEAF FOREST, OCEANIC PROVINCE

- This region is designated **number 221** in the Baileys' Ecosystem Provinces. To see a map of the provinces go to: **www.fs.fed.us/colorimagemap/ecoreg1_provinces.html**
- Not sure about which bioregion you live or work in? Go to **www.pollinator.org** and click on **Ecoregion Locator** for help.
- 104,500 square miles within 13 states.
- Diverse topography including the Appalachian Plateaus, New England lowlands, the mid-Atlantic coastal plain, and the Piedmont Plateau.
- Elevations ranging from sea level to 3,000 feet.
- Separated by the Central Appalachian Broadleaf Forest, Coniferous Forest, Meadow Province, which is a more mountainous terrain.
- Average annual temperature range from 40° - 60°F.
- Average year round precipitation between 35-60 inches.
- Primarily USDA Hardiness Zone 6, touching some of Zone 5 (1990 version).

CHARACTERISTICS

- Deciduous forests dominated by tall broadleaf trees with lower layers of small trees and shrubs.
- Herbaceous layer appears in the spring which mostly disappears as the foliage of the trees develops and shades the ground.
- Dissected by population centers, farms, and roads.



The Eastern Broadleaf Forest Oceanic Province includes:

- Connecticut
- New Jersey
- Rhode Island

and parts of:

- Delaware
- Kentucky
- Maine
- Maryland
- Massachusetts
- New Hampshire
- New York
- Ohio
- Pennsylvania
- Tennessee
- West Virginia

"ADDING NATIVE PLANTINGS IN RIPARIAN AREAS TO IMPROVE POLLINATOR HABITAT MAKES SENSE IN ADVANCING OUR FAMILY FARM'S CONSERVATION AND ECONOMIC OBJECTIVES, ENHANCING BENEFICIAL WILDLIFE AND IMPROVING POLLINATION IN OUR ORCHARD AND GARDEN."

--LEE MCDANIEL, FARMER AND PRESIDENT, NATIONAL ASSOCIATION OF CONSERVATION DISTRICTS

Photo courtesy of Tim Dunne

Ruby-throated Hummingbird, a species frequently seen in the Eastern Broadleaf Forest.

Eastern Tiger Swallowtail on Ironweed in Ohio.

Photo courtesy of Lara Roketenetz

WHO ARE THE POLLINATORS?

BEES

Bees are the best documented pollinators in the natural and agricultural landscapes of the Eastern Broadleaf Forest. A wide range of plants in the Aster and Rose Families, blueberry crops, and tomatoes are just a few plants that benefit from bee pollinators.

Most of us are familiar with the colonies of honey bees that have been the workhorses of agricultural pollination for years in the United States. They were imported from Europe almost 400 years ago.

There are nearly 4000 species of native ground and twig nesting bees in the U.S. Some form colonies while others live and work a solitary life. Native bees currently pollinate many crops and can be encouraged to do more to support agricultural endeavors if their needs for nesting habitat are met and if suitable sources of nectar, pollen, and water are provided. Bees have tongues of varying lengths that help determine which flowers they can obtain nectar and pollen from.

The bumble bee (*Bombus* spp.) forms small colonies, usually underground. They are generalists, feeding on a wide range of plant material from February to November and are important pollinators of tomatoes. The sweat bee (family *Halictidae*) nests underground. Various species are solitary while others form loose colonies.

Solitary bees include carpenter bees (*Xylocopa* spp.), which nest in wood; digger, or polyester bees (*Colletes* spp.), which nest underground; leafcutter bees (*Megachile* spp.), which prefer dead trees or branches for their nest sites; and mason bees (*Osmia* spp.), which utilize cavities that they find in stems and dead wood. Cactus bees (*Diadasia* spp.) are also solitary ground nesters.

BUTTERFLIES

Gardeners have been attracting butterflies to their gardens for some time. These insects tend to be eye-catching, as are the flowers that attract them. Position flowering plants where they have full sun and are protected from the wind. Also, you will need to provide open areas (e.g. bare earth, large stones) where butterflies may bask, and moist soil from which they may get needed minerals. By providing a safe place to eat and nest, gardeners can also support the pollination role that butterflies play in the landscape. It might mean accepting slight damage to the plants, known as host plants, that provide food for the larval stage of the butterfly.

A diverse group of butterflies are present in garden areas and woodland edges that provide bright flowers, water sources, and specific host plants. Numerous trees, shrubs, and herbaceous plants support butterfly populations.

Butterflies are in the Order *Lepidoptera*. Some of the species in

the Eastern Broadleaf Forest are Brush-footed, Gossamer-winged, Swallowtail, Parnassian, Skipper, White, Sulphur and Milkweed butterflies. They usually look for flowers that provide a good landing platform.

Wet mud areas provide butterflies with both the moisture and minerals they need to stay healthy. Butterflies eat rotten fruit and even dung, so don't clean up all the messes in your garden!

MOTHS

Moths are most easily distinguished from butterflies by their antennae. Butterfly antennae are simple with a swelling at the end. Moth antennae differ from simple to featherlike, but never have a swelling at the tip. In addition, butterflies typically are active during the day; moths at night. Butterfly bodies are not very hairy, while moth bodies are quite hairy and more stout.

Moths, generally less colorful than butterflies, also play a role in pollination. They are attracted to flowers that are strongly sweet smelling, open in late afternoon or night, and are typically white or pale colored.

BEETLES

Over 30,000 species of beetles are found in the United States and many of them can be found on flower heads. Gardeners have yet to intentionally draw beetles to their gardens, possibly because beetle watching isn't as inspiring as butterfly or bird watching. Yet beetles do play a role in pollination. Some have a bad reputation because they can leave a mess behind, damaging plant parts that they eat. Beetles are not as efficient as some pollinators. They wander between different species, often dropping pollen as they go.

Beetle pollinated plants tend to be large, strong scented flowers with their sexual organs exposed. They are known to pollinate Magnolia, sweetshrub (*Calycanthus*), paw paws, and yellow pond lilies.

FLIES

It may be hard to imagine why one would want to attract flies to the garden. However, like beetles, the number of fly species and the fact that flies are generalist pollinators (visit many species of plants), should encourage us all to leave those flies alone and let them do their job as pollinators.

Recent research indicates that flies primarily pollinate small flowers that bloom under shade and in seasonally moist habitats. The National Research Council's *Status of Pollinators in North America* study states that flies are economically important as pollinators for a range of annual and bulbous ornamental flowers.

Plants pollinated by the fly include the American pawpaw (*Asimina triloba*), dead horse arum (*Helicodiceros muscivorus*), skunk cabbage (*Symplocarpus foetidus*), goldenrod (*Solidago* spp.), and members of the carrot family like Queen Anne's lace (*Daucus carota*).

BIRDS

Hummingbirds are the primary birds which play a role in pollina–tion in North America. Their long beaks and tongues draw nectar from tubular flowers. Pollen is carried on both the beaks and feathers of different hummingbirds. The regions closer to the tropics, with warmer climates, boast the largest number of hummingbird species and the greatest number of native plants to support the bird's need for food. White-winged doves (*Zenaida asiatica*) are also pollinators of the saguaro cactus (*Carnegeia gigantea*) in the south central United States.

Bright colored tubular flowers attract hummingbirds to gardens throughout the United States. Hummingbirds can see the color red; bees cannot. Many tropical flowers, grown as annuals in the Eastern Broadleaf Forest, along with native woodland edge plants, attract hummingbirds.

BATS

Though bats in the Eastern Broadleaf Forest are not pollinators, bats play an important role in pollination in the southwest where they feed on agave and cactus. The long-nosed bats' head shape and long tongue allows it to delve into flower blossoms and extract both pollen and nectar.

WHICH FLOWERS DO THE POLLINATORS PREFER?

NOT ALL POLLINATORS ARE found in each North American province, and some are more important in different parts of the United States. Use this page as a resource to understand the plants and pollinators where you live.

Plants can be grouped together based on the similar characteristics of their flowers. These floral characteristics can be useful to predict the type of pollination method or animal that is most effective for that group of plants. This association between floral characteristics and pollination method is called a pollination syndrome.

The interactions of animal pollinators and plants have influenced the evolution of both groups of organisms. A mutualistic relationship between the pollinator and the plant species helps the pollinator find necessary pollen and nectar sources and helps the plant reproduce by ensuring that pollen is carried from one flower to another.

Plant Trait	Bats	Bees	Beetles
Color	Dull white, green or purple	Bright white, yellow, blue, or UV	Dull white or green
Nectar guides	Absent	Present	Absent
Odor	Strong musty; emitted at night	Fresh, mild, pleasant	None to strongly fruity or fetid
Nectar	Abundant; somewhat hidden	Usually present	Sometimes present; not hidden
Pollen	Ample	Limited; often sticky and scented	Ample
Flower Shape	Regular; bowl shaped – closed during day	Shallow; have landing platform; tubular	Large bowl-like, Magnolia

This chart and more information on pollinator syndromes can be found at:

Pollinator

Birds	Butterflies	Flies	Moths	Wind
Scarlet, orange, red or white	Bright, including red and purple	Pale and dull to dark brown or purple; flecked with translucent patches	Pale and dull red, purple, pink or white	Dull green, brown, or colorless; petals absent or reduced
Absent	Present	Absent	Absent	Absent
None	Faint but fresh	Putrid	Strong sweet; emitted at night	None
Ample; deeply hidden	Ample; deeply hidden	Usually absent	Ample; deeply hidden	None
Modest	Limited	Modest in amount	Limited	Abundant; small, smooth, and not sticky
Large funnel like; cups, strong perch support	Narrow tube with spur; wide landing pad	Shallow; funnel like or complex and trap-like	Regular; tubular without a lip	Regular; small and stigmas exerted

http://www.fs.fed.us/wildflowers/pollinators/syndromes.shtml

DEVELOPING LANDSCAPE PLANTINGS THAT PROVIDE POLLINATOR HABITAT

WHETHER YOU ARE A FARMER of many acres, land manager of a large tract of land, or a gardener with a small lot, you can increase the number of pollinators in your area by making conscious choices to include plants that provide essential habitat for bees, butterflies, moths, beetles, hummingbirds and other pollinators.

FOOD:

Flowers provide nectar (high in sugar and necessary amino acids) and pollen (high in protein) to pollinators.
Fermenting fallen fruits also provide food for bees, beetles and butterflies. Specific plants, known as host plants, are eaten by the larvae of pollinators such as butterflies.

- Plant in groups to increase pollination efficiency. If a pollinator can visit the same type of flower over and over, it doesn't have to relearn how to enter the flower and can transfer pollen to the same species, instead of squandering the pollen on unreceptive flowers.
- Plant with bloom season in mind, providing food from early spring to late fall. (see Bloom Periods pp.16-17)
- Plant a diversity of plants to support a variety of pollinators. Flowers of different color, fragrance, and season of bloom on plants of different heights will attract different pollinator species and provide pollen and nectar throughout the seasons.
- Many herbs and annuals, although not native, are very good for pollinators. Mint, oregano, garlic, chives, parsley and lavender are just a few herbs that can be planted. Old fashioned zinnias, cosmos, and single sunflowers support bees and butterflies.
- Recognize weeds that might be a good source of food. For example, dandelions provide nectar in the early spring before other flowers open. Plantain is alternate host for the Baltimore Checkerspot.
- Learn and utilize Integrated Pest Management (IPM) practices to address pest concerns. Minimize or eliminate the use of pesticides.

SHELTER:

Pollinators need protection from severe weather and from predators as well as sites for nesting and roosting.

- Incorporate different canopy layers in the landscape by planting trees, shrubs, and different-sized perennial plants.
- Leave dead snags for nesting sites of bees, and other dead plants and leaf litter for shelter.
- Build bee boxes to encourage solitary, non-aggressive bees to nest on your property.
- Leave some areas of soil uncovered to provide ground nesting insects easy access to underground tunnels.
- Group plantings so that pollinators can move safely through the landscape protected from predators.
- Include plants that are needed by butterflies during their larval development.

WATER:

A clean, reliable source of water is essential to pollinators.

- Natural and human-made water features such as running water, pools, ponds, and small containers of water provide drinking and bathing opportunities for pollinators.
- Ensure the water sources have a shallow or sloping side so the pollinators can easily approach the water without drowning.

Your current landscape probably includes many of these elements. Observe wildlife activity in your farm fields, woodlands, and gardens to determine what actions you can take to encourage other pollinators to feed and nest. Evaluate the placement of individual plants and water sources and use your knowledge of specific pollinator needs to guide your choice and placement of additional plants and other habitat elements. Minor changes by many individuals can positively impact the pollinator populations in your area. Watch for - and enjoy - the changes in your landscape!

- CAUTION: Remember that pesticides are largely toxic to pollinators. Extreme caution is warranted if you choose to use any pesticide. Strategically apply pesticides only for problematic target species.

FARMS

Soybean, alfalfa, blueberry, clover, cranberry, strawberry, stone fruits, and tomatoes are a few of the food crops in the Eastern Broadleaf Forest that will benefit from strong native bee populations that boost pollination efficiency. Incorporate different plants throughout the farm that provide food for native populations when targeted crops are not in flower.

Farmers have many opportunities to incorporate pollinator-friendly land management practices on their land which will benefit the farmer in achieving his or her production goals:

- Manage the use of pesticides to reduce the impact on native pollinators. Spray when bees aren't active (just after dawn) and choose targeted ingredients.
- Carefully consider the use of herbicides. Perhaps the targeted weeds can provide needed food for pollinators.
- Minimize tillage to protect ground nesting pollinators.
- Ensure water sources are scattered throughout the landscape.
- Choose a variety of native plants to act as windbreaks, riparian buffers, and field borders throughout the farm.
- Plant unused areas of the farm with temporary cover crops that can provide food or with a variety of trees, shrubs, and flowers that provide both food and shelter for pollinators.
- Check with your local Natural Resources Conservation Service (NRCS) office to see what technical and financial support might be available to assist you in your effort to provide nectar, pollen, and larval food sources for pollinators on your farm.

Illustrations by Carolyn Vibbert

"FOOD SUPPLIES FOR BEES ARE CRITICAL TO MAINTAINING STRONG HIVES FOR ALMOND POLLINATION THE FOLLOWING WINTER."

-- DAN CUMMINGS, CHICO, CALIFORNIA ALMOND GROWER.

PUBLIC LANDS

"FROM HUMMINGBIRDS TO BEETLES, TO BUTTERFLIES, NATURE'S POLLINATORS HELP KEEP MIDEWIN'S TALLGRASS PRAIRIE RESTORATIONS FULL OF DIVERSE FLOWERING PLANTS. INSECT MONITORING PROVIDES A KEY MEASURE OF OUR SUCCESS."

-- LOGAN LEE
PRAIRIE SUPERVISOR, MIDEWIN NATIONAL TALLGRASS PRAIRIE

Public lands are maintained for specific reasons ranging from high impact recreation to conservation. In the Eastern Broadleaf Forest, forests have been cut to allow for roads, buildings, open lawn areas, boat ramps, and vistas. Less disturbed natural areas can be augmented with plantings of native plant species. Existing plantings around buildings and parking areas should be evaluated to determine if pollinator-friendly plants can be substituted or added to attract and support pollinators. Public land managers have a unique opportunity to use their plantings as an education tool to help others understand the importance of pollinators in the environment through signs, brochures, and public programs.

In an effort to increase populations of pollinators the land manager can:

- Inventory and become knowledgeable of local pollinators.
- Provide connectivity between vegetation areas by creating corridors of perennials, shrubs, and trees that provide pollinators shelter and food as they move through the landscape.
- Maintain a minimum of lawn areas that support recreational needs.
- Restrict the use of pesticides and herbicides.
- Provide water sources in large open areas.
- Maintain natural meadows and openings that provide habitats for sun-loving wildflowers and grasses.
- Remove invasive species and encroaching shrubs and trees.

HOME LANDSCAPES

"A GARDEN IS ONLY AS RICH AND BEAUTIFUL AS THE INTEGRAL HEALTH OF THE SYSTEM; POLLINATORS ARE ESSENTIAL TO THE SYSTEM - MAKE YOUR HOME THEIR HOME."

-- DERRY MACBRIDE
NATIONAL AFFAIRS AND LEGISLATION CHAIRWOMAN, GARDEN CLUB OF AMERICA

Gardeners have a wide array of plants to use in their gardens. Native plants, plants introduced from years of plant exploration from around the world, and plants developed by professional and amateur breeders can be found in garden centers, in catalogs, and on web-sites. Use your knowledge of pollinator needs to guide your choices.

- Choose a variety of plants that will provide nectar and pollen throughout the growing season.
- Resist the urge to have a totally manicured lawn and garden. Leave bare ground for ground nesting bees. Leave areas of dead wood and leaf litter for other insects.
- Strive to eliminate the use of all pesticides.
- Find local resources to help you in your efforts. Contact your local county extension agent or native plant society. Visit your regional botanic gardens and arboreta.

The scale of your plantings will vary but it is important to remember that you are trying to provide connectivity to the landscape adjacent to your property. Don't just look within your property boundaries. If your neighbor's property provides an essential element, such as water, which can be utilized by pollinators visiting your land, you may be able to devote more space to habitat elements that are missing nearby. It is best to use native plants which have evolved to support the needs of specific native pollinators. Some pollinators, however, are generalists and visit many different plants, both native and non-native. Be sure that any non-native plants you choose to use are not invasive. Remember that specialized cultivars sometimes aren't used by pollinators. Flowers that have been drastically altered, such as those that are double or a completely different color than the wild species, often prevent pollinators from finding and feeding on the flowers. In addition, some altered plants don't contain the same nectar and pollen resources that attract pollinators to the wild types.

- CAUTION: Take time to evaluate the source of your plant material. You want to ensure you get plants that are healthy and correctly identified. Your local native plant society can help you make informed decisions when searching for plants.

BLOOM PERIODS
FOR THE EASTERN BROADLEAF FOREST, OCEANIC PROVINCE

The following chart lists plants and the time they are in bloom throughout the growing seasons. Choose a variety of flower colors and make sure something is blooming at all times! Note for all charts: When more than one species of the same genus is useful, the genus name is followed by "spp."

Botanical Name	Common Name	March	April	May	June	July	Aug	Sep	Oct
Trees and Shrubs									
Acer spp.	maple	red, greenish yellow	red, greenish yellow						
Amelanchier spp.	serviceberry	white	white						
Salix spp.	willow	yellow green	yellow green	yellow green	yellow green				
Sassafras albidum	sassafras		yellow green	yellow green					
Cercis canadensis	eastern redbud		pink to lav	pink to lav					
Arctostaphylos uva-ursi	bearberry		white tinged with pink	white tinged with pink					
Celtis occidentalis	common hackberry		yellow green	yellow green					
Vaccinium spp.	blueberry		white to pink	white to pink	white to pink	white to pink			
Sambucus spp.	elderberry			creamy white	creamy white	creamy white			
Rosa spp.	rose (wild types)			pale pink	pale pink	pale pink	pale pink		
Ceanothus americanus	New Jersey tea			white	white	white	white	white	
Oxydendrum arboreum	sourwood				white	white			
Cephalanthus occidentalis	buttonbush					creamy white	creamy white		
Rhus copallinum	dwarf sumac					yellow green	yellow green	yellow green	
Perennial Flowers									
Salvia spp.	sage		violet	violet	violet				
Viola spp.	volets		white, yellow, blue, deep purple	white, yellow, blue, deep purple	white, yellow, blue, deep purple				

Botanical Name	Common Name	March	April	May	June	July	Aug	Sep	Oct
Perennial Flowers continued									
Lupinus perennis	lupine, sundial lupine		blue-purple	blue-purple	blue-purple	blue-purple			
Geranium spp.	cranesbills		lav or pink	lav or pink	lav or pink				
Phlox spp.	phlox, wild sweet William		rose, pink, purple, blue, violet, white	rose, pink, purple, blue, violet, white	rose, pink, purple, blue, violet, white	rose, pink, purple, blue, violet, white	rose, pink, purple, blue, violet, white	rose, pink, purple, blue, violet, white	rose, pink, purple, blue, violet, white
Aquilegia canadensis	wild columbine		red & yellow	red & yellow	red & yellow				
Baptisia australis	false blue indigo			blue-purple	blue-purple				
Asclepias syriaca	common milkweed			pale purple	pale purple	pale purple	pale purple		
Asclepias tuberosa	milkweed, butterfly weed			yellow to orange	yellow to orange	yellow to orange	yellow to orange		
Rubus spp.	blackberry, raspberry			white or rose purple	white or rose purple	white or rose purple			
Echinacea purpurea	purple coneflower				rose pink	rose pink	rose pink		
Asclepias incarnata	swamp milkweed				pink to reddish	pink to reddish	pink to reddish	pink to reddish	
Actaea racemosa var. *racemosa*	black cohosh, fairy candles				white	white	white		
Aster spp.	sunflower, black-eyed susan, goldenrod, sneezeweed				yellow	yellow	yellow	yellow	yellow
Symphyotrichum spp.	aster					white, blue, violet	white, blue, violet	white, blue, violet	white, blue, violet
Chelone glabra	white turtlehead					white	white	white	white
Monarda spp.	bee-balm, wild bergamot, horsemint				red, pink, purple	red, pink, purple	red, pink, purple	red, pink, purple	red, pink, purple
Eupatorium spp.	Joe-Pye weed, boneset, thoroughwort					pink, purple, white	pink, purple, white	pink, purple, white	pink, purple, white
Liatris spp.	blazing star					lav to rose purple	lav to rose purple	lav to rose purple	lav to rose purple
Lobelia spp.	cardinal flower					red or blue violet	red or blue violet	red or blue violet	red or blue violet
Vines									
Campsis radicans	trumpet vine or creeper				orange-red	orange-red	orange-red	orange-red	

PLANTS THAT ATTRACT POLLINATORS IN THE EASTERN BROADLEAF FOREST, OCEANIC PROVINCE

The following chart lists plants that attract pollinators. It is not exhaustive, but provides guidance on where to start. Annuals, herbs, weeds, and cover crops provide food and shelter for pollinators, too.

Botanical Name	Common Name	Color	Height	Flower Season	Sun	Soil	Visitation by Pollinators	Also a host plant. See pgs 20-21
Trees and Shrubs								
Acer spp.	maple	red, orange, greenish yellow	40-70′	Mar-Apr	sun to part shade	moist, well drained	bees	
Aesculus pavia	red buckeye	red, yellow	10-15′	Mar-May	part shade	moist	hummingbird	
Amelanchier spp.	serviceberry	white	6-25′	Mar-Apr	sun to part shade		bees	
Arctostaphylos uva-ursi	bearberry	white tinged with pink	6-12″	Apr-May	full	poor, acidic, well drained	bees	X
Ceanothus americanus	New Jersey tea	white	3-4′	varies May-Sep	sun to part shade	dry well drained	bees	X
Tilia americana	basswood	yellow white	75-130′	Apr-May	shade	moist	bees, flies, moths	X
Cephalanthus occidentalis	buttonbush	creamy white	6-12′	Jul-Aug	sun to part shade	wet	bees, butterflies	
Cercis canadensis	eastern redbud	pink-lav	20-30′	Apr-May	sun to part shade	moist well drained	bees	X
Oxydendrum arboreum	sourwood	white	25-30′	Jun-Jul	sun to part shade	moist, acidic well drained	bees	
Rhus copallinum	dwarf sumac	yellow green	3-6′	Jul-Sep	sun to part shade	dry to med wet, average	butterflies, bees	X
Rosa spp.	rose (wild types)	pale pink	1-8′	May-Aug	sun to part shade	med wet to wet, well drained	bees	
Rubus spp.	blackberry, raspberry	white or rose purple	3-9′	Jun-Sep	sun to part shade	moist	butterflies, bees	
Salix nigra, S. sericea	black willow, silky willow	yellow green	12-50′	Mar-Jul	sun to shade	moist	flies, bees	X
Sambucus spp.	elderberry	creamy white	5-12′	May-Jun	sun to shade	wet	flies, bees, beetles	
Sassafras albidum	sassafras	yellow green	35-50′	April	sun to part shade	light, acidic, sandy	flies, bees	X
Vaccinium spp.	blueberry	white to pink	6″-12′	Apr-Jul	sun to shade	acid, moist, rich, well drained	bees	X
Perennial Flowers								
Actaea racemosa	black cohosh, fairy candles	white	3-6′	Jun-Sep	part shade to shade	moist, acid, rich loan	bees, butterflies	X
Aquilegia canadensis	wild columbine	red & yellow	12-15″	May-Jun	part shade, shade	sandy, well drained	butterflies, bees, moths, hummingbirds	X
Asclepias incarnata	swamp milkweed	pink to reddish	4-5′	Jun-Oct	sun to part shade	moist	flies, butterflies, hummingbirds	X
Asclepias syriaca	common milkweed	pale purple	2-3′	May-Aug	full sun	moist	flies, butterflies, bees	X
Asclepias tuberosa	milkweed, butterfly weed	yellow to orange	1-3′	May-Aug	sun to part shade	dry to moist	bees, butterflies, flies hummingbirds	

Botanical Name	Common Name	Color	Height	Flower Season	Sun	Soil	Visitation by Pollinators	Also a host plant. See pgs 20-21
Perennial Flowers continued								
Baptisia australis	false blue indigo	blue- purple	3-6′	May-Jun	sun to part shade	dry to moist	bees	X
Chelone glabra	white turtlehead	white	3-10′	Jul-Oct	sun to part shade	light, rich, wet to moist	bees	X
Echinacea purpurea	purple coneflower	rose-purple	2-4′	Jun-Aug	full sun to part shade	med wet, well drained	bees, butterflies	X
Eupatorium spp.	Joe-Pye weed, boneset, thoroughwort	pink, purple, white	1-10′	Jul-Oct	sun to part shade	average medium wet to wet	butterflies, bees	
Geranium spp.	cranesbills	lav or pink	1-2′	Apr-Jul	full sun to part shade	med wet, well drained	flies, bees, beetles	
Helianthus spp.	sunflower	yellow	1-6′	Jul-Oct	full sun to part shade	dry to med wet, well drained	bees, beetles	X
Liatris spp.	blazing star	lav to rose-purple	1-6′	Jul-Oct	full sun to part shade	med wet, well drained	bees, butterlies, hummingbirds	
Lilium spp.	native lilies	yellow, red, orange	3-6′	Jun-aug	sun	moist to wet	hummingbird	
Lobelia spp.	cardinal flower	red or blue violet	1-5′	Jul-Oct	full sun to part shade	moist	butterflies, bees, hummingbirds	
Lupinus perennis	lupine, sundial lupine	blue- purple	1-3′	Apr-Jul	sun to part shade	dry sandy	bees, beetles	X
Monarda spp.	bee-balm, wild bergamot, horsemint	red	1-3′	Jul-Oct	sun to part shade	acidic, rich moist	butterflies, bees, hummingbirds	X
Phlox spp.	phlox, wild sweet william	rose, pink, purple, blue, violet, white	1/2-6′	Apr-Oct	sun to part shade	med wet, well drained	butterflies, moths	X
Rudbeckia spp.	black-eyed susan, coneflower	yellow	1-10′	Jul-Oct	full sun to part shade	dry to med wet, well drained	bees, beetles, butterflies	X
Salvia spp	sage	violet	1-2′	Apr-Jun	full sun to part shade	moist, well drained	bees, butterflies, hummingbirds	
Solidago spp.	goldenrod	yellow	1-6′	Jun-Oct	full sun to part shade	dry to med wet, well drained	migrating butterflies, bees, beetles, flies	X
Spigelia marilandica	woodland pinkroot	red	1-3′	May-Jul	part shade	moist	hummingbird	
Symphyotrichum spp.	aster	white, blue, violet	1-6′	Jul-Oct	full sun to part shade	medium wet, well drained	butterflies - room to land and perch, bees, beetles	X
Viola spp.	violets	white, yellow, blue, deep purple	3-8″	Apr-Jun	full sun or filtered shade		butterflies, bees	X
Vines								
Bignonia capreolata	crossvine	orange-red	to 20′	Jul-Aug	sun	moist, well drained	hummingbird	
Campsis radicans	trumpet vine or creeper	orange-red	to 35′	Jul-Sep	sun to part shade	moist, well drained	bees, hummingbird	
Lonicera sempervirens	trumpet honeysuckle	red	to 15′	Jul-Sep	part shade	moist	hummingbird	

HOST PLANTS
FOR THE EASTERN BROADLEAF FOREST, OCEANIC PROVINCE

The larval stage of butterflies relies on plants for food and shelter. These plants are usually different than the ones that provide food and shelter to adult butterflies. The following chart lists plants that support specific butterfly species.

Family	Subfamily	Butterfly Common Name	Butterfly Scientific Name	Larval Food Plants
Gossamer-wing Butterflies (*Lycaenidae*)	Blues (*Polyommatinae*)	Spring Azure	*Celastrina ladon*	Dogwood (*Cornus florida*), New Jersey tea (*Ceanothus americana*), black cohosh (*Actaea racemosa*), viburnum, blueberry (*Vaccinium*)
	Coppers (*Lycaeninae*)	Bog Copper	*Lycaena epixanthe*	Shrubby cranberries (*Vaccinium* spp)
	Hairstreaks (*Theclinae*)	Brown Elfin	*Callophrys augustinus*	Heath family (*Ericaceae*), bearberry (*Arctostaphylos uva-ursi*), Blue-Ridge blueberry (*Vaccinium pallidum*)
		Hoary Elfin	*Callophrys polios*	Bearberry (*Arctostaphylos uva-ursi*)
		Henry's Elfin	*Callophrys henrici*	Huckleberries and blueberries (*Vaccinium* spp.), redbud (*Cercis canadensis*)
		Frosted Elfin	*Callophrys irus*	Members of the pea family (*Fabaceae*): indigo (*Baptisia tinctoria*) and lupine (*Lupinus perennis*); occasionally blue false indigo (*Baptisia australis*)
		Red-banded Hairstreak	*Calycopis cecrops*	Fallen leaves of wax myrtle (*Morella cerifera*), dwarf sumac (*Rhus copallinum*), staghorn sumac (*R. typhina*), and several oaks (*Quercus* spp.)
Brush-footed butterflies (*Nymphalidae*)	Emporers (*Apaturinae*)	Hackberry Emporer	*Asterocampa celtis*	Common hackberry (*Celtis occidentalis*)
		Tawny Emperor	*Asterocampa clyton*	Common hackberry (*Celtis occidentalis*), dwarf hackberry (*C. tenuifolia*)
	Longwings (*Heliconiinae*)	Regal Fritillary	*Speyeria idalia*	Violets (*Viola* spp.)
		Meadow Fritillary	*Boloria bellona*	Violets (*Viola* spp.)
		Aphrodite Fritillary	*Speyeria aphrodite*	Violets (*Viola* spp.)
		Atlantis Fritillary	*Speyeria atlantis*	Violets (*Viola* spp.)
	Milkweed Butterflies (*Daninae*)	Monarch	*Danaus plexippus*	Swamp milkweed (*Asclepias incarnata*), common milkweed (*A. syriaca*), orange milkweed (*A. tuberosa*)
	Snouts (*Libytheinae*)	American Snout	*Libytheana carinenta*	Hackberry (*Celtis* spp.)
	True Brushfoots (*Nymphailinae*)	Baltimore	*Euphydryas phaeton*	White turtlehead (*Chelone glabra*), hairy beardtongue (*Penstemon hirsutus*)
		Painted Lady	*Vanessa cardui*	Many plants including thistles (*Asteraceae*), hollyhock and mallow (*Malvaceae*), and legumes (*Fabaceae*)
		Silvery Cherckerspot	*Chlosyne nycteis*	Many composites including black-eyed susan (*Rudbeckia hirta*), sunflowers (*Helianthus* spp.)
		Pearl Crescent	*Phyciodes tharos*	Several species of asters including hairy white oldfield aster (*Symphyotrichum pilosum*) and smooth blue aster (*Symphyotrichum laeve*)
		Morning Cloak	*Nymphalis antiopa*	Willows including black willow (*Salix nigra*) and silky willow (*S. sericea*); also American elm (*Ulmus americana*), cottonwood (*Populus deltoides*), aspen (*P. tremuloides*), paper birch (*Betula papyrifera*), and common hackberry (*Celtis occidentalis*)
	Admirals & Relatives (*Limenitidinae*)	Viceroy	*Limenitis archippus*	Trees in the willow family (*Salicaceae*) including willows (*Salix* spp.), and poplars and cottonwoods (*Populus* spp.)

Family	Subfamily	Butterfly Common Name	Butterfly Scientific Name	Larval Food Plants
Skippers (*Hesperi-idae*)	Spread-wing Skippers (*Pyrginae*)	Columbine Dustywing	*Erynnis lucilius*	Wild columbine (*Aquilegia canadensis*)
		Hoary Edge	*Achalarus lyciades*	False blue indigo (*Baptisia australis*), begger's ticks (*Desmodium* spp.), bush clover (*Lespedeza* spp.)
		Mottled Dustywing	*Erynnis martialis*	New Jersey tea (*Ceanothus americanus*)
Parnassians & Swallowtails (*Papilion-idae*)	Swallowtails (*Paplioninae*)	Spicebush Swallowtail	*Papilio troilus*	Spicebush (*Lindera benzoin*), sassafras trees (*Sassafras albidum*); perhaps prickly ash (*Zanthoxylum americanum*), tulip tree (*Liriodendron tulipifera*), sweetbay (*Magnolia virginiana*), and redbay (*Persea borbonia*)
		Eastern Tiger Swallowtail	*Papilio glaucus*	Wild cherry (*Prunus* spp.), sweetbay (*Magnolia virginiana*), basswood (*Tilia americana*), tulip tree (*Liriodendron tulipifera*), birch (*Betula* spp.), ash (*Fraxinus* spp.), cottonwood (*Populus deltoides*), mountain ash (*Sorbus americana*), and willow (*Salix* spp.).
		Black Swallowtail	*Papilio polyxenes*	Parsley family (*Apiaceae*) including , carrot, celery and dill. Sometimes plants in the citrus family (*Rutaceae*) are preferred.
		Zebra Swallowtail	*Eurytides marcellus*	Pawpaw (*Asimina triloba*). Young plants are preferred.

Note for all charts: When more than one species of the same genus is useful, the genus name is followed by "spp."

"MONARCH BUTTERFLIES NEVER FAIL TO CATCH THE VISITOR'S EYE AND ALWAYS LEAD TO A TEACHABLE MOMENT."

-- LOGAN LEE, PRAIRIE SUPERVISOR
MIDEWIN NATIONAL TALLGRASS PRAIRIE

A BASIC CHECKLIST

BECOME FAMILIAR WITH POLLINATORS IN YOUR LANDSCAPE.

- Watch for activity throughout the day and the seasons.
- Keep a simple notebook of when and what comes to your garden. NOTE: It is not necessary to identify each species when you first get started. Simply note if it is a bee that likes the yellow flower that blooms in the fall.
- Consult a local field guide or web site when you are ready to learn more details.

ADD NATIVE PLANTS TO ATTRACT MORE NATIVE POLLINATORS.

- List the plants you currently have in your landscape.
- Determine when you need additional flowers to provide nectar and pollen throughout the growing season.
- Add plants that provide additional seasons of bloom, create variable heights for shelter, and attract the types of pollinators you want.
- Don't forget to include host plants that provide food and shelter for larval development.
- Contact your local native plant society or extension agent for more help.

USE POLLINATOR FRIENDLY LANDSCAPE PRACTICES TO SUPPORT THE POLLINATORS YOU ATTRACT.

- Use Integrated Pest Management Practices to address pest concerns.
- Tolerate a little mess – leave dead snags and leaf litter, keep areas bare for ground nesting insects, and leave some weeds that provide food for pollinators.
- Provide safe access to clean water.

NOTICE THE CHANGES THAT YOU HAVE HELPED TO CREATE!

RESOURCES

Many books, websites, and people were consulted to gather information for this guide. Use this list as a starting point to learn more about pollinators and plants in your area.

BAILEY'S ECOREGION MAPS

USDA Forest Service
http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html

POLLINATION/POLLINATORS

Pollinator Partnership
www.pollinator.org

Coevolution Institute
www.coevolution.org

Natural Resources Conservation Service
www.nrcs.usda.gov

North American Pollinator Protection Campaign
www.nappc.org

USDA Forest Service
www.fs.fed.us/wildflowers/pollinators/

Wild Farm Alliance
www.wildfarmalliance.org

The Xerces Society
www.xerces.org

Illinois Natural History Survey
www.inhs.uiuc.edu

Buchmann, S.L. and G.P. Nabhan. 1997. *The Forgotten Pollinators* Island Press: Washington, DC.

Committee on the Status of Pollinators in North America. 2007. *Status of Pollinators in North America* The National Academies Press: Washington, DC.

NATIVE PLANTS

Plant Conservation Alliance
www.nps.gov/plants

Seeds of Success
www.nps.gov/plants/sos

Lady Bird Johnson Wildflower Center
www.wildflower.org/plants/

USDA Hardiness Zone Map
www.usna.usda/Hardzone/

U.S. National Arboretum
www.usna.usda.gov/Hardzone/ushzmap.html

USDA, NRCS. 2007. The PLANTS Database
www.plants.usda.gov, 19 July, 2007
National Plant Data Center,
Baton Rouge, LA 70874-4490 USA

NATIVE BEES

National Sustainable Information Service
"Alternative Pollinators: Native Bees" by Lane Greer, NCAT Agriculture Specialist, Published 1999, ATTRA Publication #IP126
www.attra.ncat.org/attra-pub/nativebee.html

Agriculture Research Service
Plants Attractive to Native Bees table
www.ars.usda.gov/Research/docs.htm?docid=12052

BUTTERFLIES AND MOTHS

Opler, Paul A., Harry Pavulaan, Ray E. Stanford, Michael Pogue, coordinators. 2006. Butterflies and Moths of North America. Bozeman, MT: NBII Mountain Prairie Information Node. www.butterfliesandmoths.org/ (Version 07192007)

Pyle, Robert Michael. 1981. National Audubon Society Field Guide to Butterflies. Alfred A. Knopf: New York, NY.

North American Buterfly Association
www.naba.org

FEEDBACK

We need your help to create better guides for other parts of North America. Please e-mail your input to **feedback@pollinator.org** or fax to **415-362-3070**.

- How will you use this guide?
- Do you find the directions clear? If not, please tell us what is unclear.
- Is there any information you feel is missing from the guide?
- Any other comments?

THANK YOU FOR TAKING THE TIME TO HELP!

POLLINATOR PARTNERSHIP

NAPPC

Plant Conservation Alliance

NRCS

CSREES

USGS
science for a changing world

conserving natural resources for our future

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Bureau of Land Management, Peggy Olwell, Carol Spurrier, Mary Byrne, Mary Tisdale, Elizabeth Wooster
National Garden Association, Susanne DeJohn
Plant Conservation Alliance – Edward Fletcher, Jean Giblette, Mary Ann Lawler, Ron Smith
Smithsonian Institute, Department of Botany, Gary Krupnick, Ph.D.
USDA - CSREES, Greg Crosby, Ph.D., Leslie Gilbert, Ph.D.
USDA - Forest Service, David Pivorunas, Larry Stritch, Ph.D.
USDA - Natural Resource Conservation Service, Doug Holy, Hilda Diaz-Soltero
USDOI - US Fish and Wildlife Service, Karen Anderson, Don MacLean, Patricia DeAngelis, Ph.D.
USGS - Steve Hilburger, Elizabeth Sellers

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