

# Creating a Pollinator Paradise



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Photos by Debbie Roos

95% of photos taken in  
Chatham Mills Pollinator Garden



# Outline

- Primary Pollinators
  - All about Bees
- Principles of Planting a Pollinator Garden
  - Demonstration Pollinator Garden
- Top 25 Pollinator Plants
  - Web Resources

## Pollination

- Worldwide, approximately 1,000 plants grown for food, beverages, fiber, spices, and medicines need to be pollinated by animals in order to produce the goods on which we depend.





Cacao flowers are pollinated by a tiny midge

Source: [www.digitalphotography.org](http://www.digitalphotography.org)

Coffee flowers are pollinated by bees



## Pollinators: Who's Who



## Pollinators

- Most pollinators (~ 200,000 species) are beneficial insects such as flies, beetles, wasps, ants, butterflies, moths, and bees.



Bumble Bee on Joe-pye Weed



Hairstreak on Goldenrod



Great black wasp on buckwheat





## Monarch on Blazing Star



## Monarch on Milkweed





Bumble Bee on Red Milkweed



American  
Snout Butterfly

Cecropia Caterpillar on Sassafras



Hickory Horned Devil





Tiger Swallowtails on Joe-pye Weed



Honey Bee on Silverbell





Syrphid Fly on Mexican Sunflower



Syrphid Flies on Spiderwort

Leafcutter Bee on Wild Indigo



Ambush Bug on Spotted Horsemint





Purple Hairstreak on Globe Amaranth



Soldier Beetle on Blanketflower





Black Swallowtail Caterpillars on Fennel



Flower Scarab Beetle on Barbara's Buttons



# Pollinators

- A small percentage of pollinators are vertebrates such as hummingbirds, bats and small mammals.



# Pollinators Make Tequila!

*Agave tequilana*



Photo: tequilasource.com



Photo: US Fish & Wildlife Service





Farmers,  
Gardeners,  
and  
Eaters  
Rely on  
Bees!

Bees are the most important pollinators

Bees deliberately  
gather pollen  
to feed brood

Nectar is consumed  
for energy & collected  
by honey bees &  
bumble bees for  
honey production

Sweat bee on coneflower



## Bees \* Bees \* Bees

- Honey bees – native to Europe
- Native bees - ~ 3,600 species of bees native to the U.S. & Canada
- ~ 500 native bee species in NC

## Honey Bees

- 50% decline in managed hives since 1950
- >70% decline in feral colonies
- Causes for decline: pests, diseases, poor nutrition, weak queens, pesticides...







Varroa  
Mites



Native bees can be  
an insurance policy  
against honey  
bee losses

Bumble bee on  
downy wood mint

## Native Bees

- Most species are solitary so not aggressive and don't sting
- 70% of native bees nest in the ground
- Most of the rest are cavity nesters (bumble bees, leafcutter bees, mason bees, etc.)



Bumble bee nest



Leafcutter bee ([www.lbnature.co.uk](http://www.lbnature.co.uk))

## Ground Nesting Mining Bees





## Ground Nesting Colletid Bees

Also called cellophane bees  
or polyester bees



## Colletid Bee





Ground-nesting Chimney Bees



Chimney Bees





## Chimney Bees



## Native Bees are Efficient Pollinators

- ~250 mason bees are required to pollinate an acre of apples compared to two hives of honey bees
- Many species of native bees are **more active** in cold, wet conditions & low light
- Bumble bees and other native bees practice **buzz pollination**
- Some native bees **specialize** in one type of flower
- Pollen gathered by native bees is very **accessible**

## Native Bees as Crop Pollinators

- If enough natural habitat is nearby to support them, native bees can provide much or even all the pollination services for crops
- Over 50 species of native bees visit watermelon, sunflower, or tomato crops in CA
- Over 80 species of bees pollinate berry crops in MN and MA
- Native pollinators have been shown to nearly triple the production of cherry tomatoes in CA



Bumble Bee



Leafcutter  
Bee





## Leafcutter Bee Nests



## Hibiscus Bee





Sweat Bee on Coneflower



Cuckoo-leafcutter Bee  
on Oxeye Daisy



Sunflower Bee on Blazing Star



Shaggy Fuzzyfoot Bee  
on Mexican Hat



Carpenter Bees on Passionflower



Carpenter Bee on Coneflower



Carpenter-mimic Leafcutter Bee  
on Butterfly Weed



Two-spotted Longhorned Bee on Zinnia



Sweat Bee on Joe-pye Weed



Sweat Bee



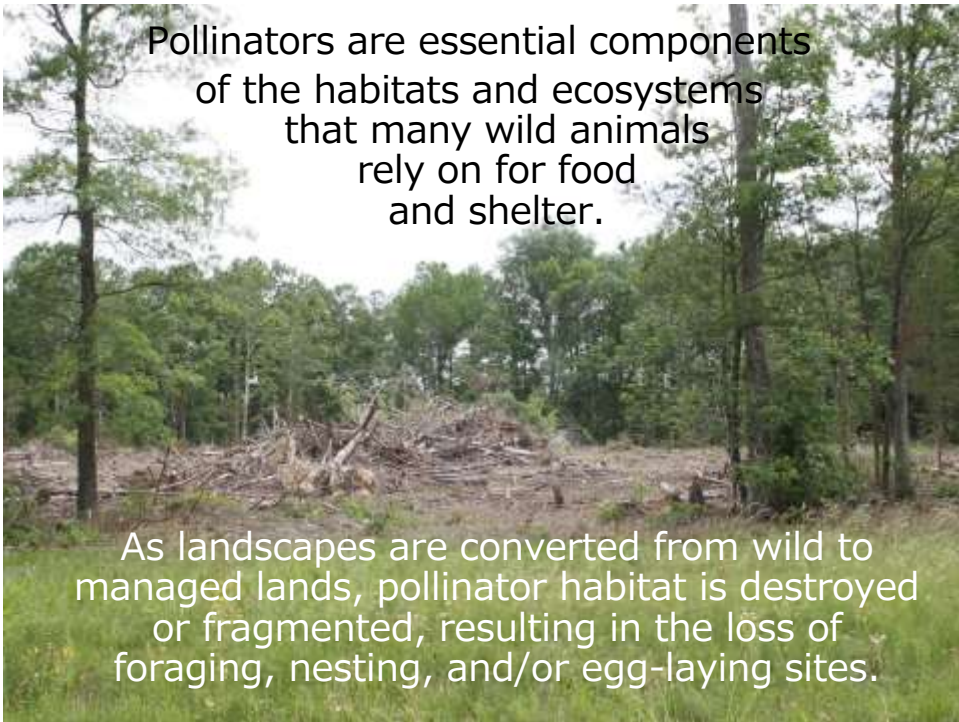
Bat-faced Cuphea



So what can you do to protect and enhance pollinator populations?



Pollinators are essential components of the habitats and ecosystems that many wild animals rely on for food and shelter.



As landscapes are converted from wild to managed lands, pollinator habitat is destroyed or fragmented, resulting in the loss of foraging, nesting, and/or egg-laying sites.

## Adapt Existing Management Practices to Minimize Negative Impacts on Bees

- Leave areas supporting native bees alone: identify and protect nesting sites!
- Pesticides & pollinators: Charlotte is covering this!

## Planting for Pollinators

- Garden Design
- Garden Installation
- Garden Maintenance

## Garden DESIGN: Site Inventory & Analysis

- Opportunities & constraints
- Exposure
- Sun/shade patterns
- Moisture
- Soil
- Topography
- Microclimate, temperatures
- Existing vegetation & structures
- Wind

## Garden DESIGN: Your Goals & Objectives

- Besides pollinator habitat, what else do you want to use the space for?
- Consider maintenance – available time for maintenance helps determine size, style, and type of plants
- **Lower maintenance** = long-lived, minimal pruning, minimal division, minimal fertilizer, drought-tolerant, minimal pest problems...



# Garden DESIGN

## *Elements of Design*

Line  
Form  
Texture  
Color  
Smell/sound

## *Principles of Design*

Order  
Unity  
Proportion  
Repetition

*Plant in clumps or drifts when possible - group plants together instead of planting one of each*

And now the fun part: selecting the plants for your garden!



## Plant Selection: Identify Dearth Times in Bloom Calendar

- Identify the dearth times in the natural bloom calendar in your area – which pollinator plants are already present and when do they bloom?
- Identify pollinator plants that bloom during these dearth times
- Have plants flowering throughout the growing season, early spring-late fall, with overlapping bloom periods

## Plant Selection

- Use mostly **perennials** as these tend to have richer nectar sources and provide a dependable food source
- Straight species vs. cultivars: which is better?
- Important to have a **diversity of flower size, shape, and color** to attract pollinators of different sizes
- Include native bunch **grasses** for nesting habitat and winter interest

## Plant Selection: Flower Diversity



Bumble Bee  
on Hyssop





## Plant Selection

- Emphasize local native plants: research has shown that *native plants are 4 times more likely than non-native plants to attract native bees*
- Native plant genera support 3 times as many species of butterflies and moths as introduced plants
- Ex.: joe-pye weed and butterfly bush both attract butterflies but only the native joe-pye weed supports over 3 dozen species of Lepidopterans

## Plant Selection

- Design for constant color, interest, and forage!
- Focus on **WORKHORSE** plants that are appealing for at least 3 seasons:
  - Long bloom period
  - Food and shelter for pollinators & wildlife
  - Pleasant fragrance and/or feel
  - Nice foliage texture
  - Seasonal interest: fall color, interesting bark, seed heads, berries, winter interest

## WORKHORSE: Bluestar



## WORKHORSE: Oakleaf Hydrangea



## Examples of Nice Plant Combinations





Butterfly Weed + Coneflower



Rattlesnake Master + Mountain Mint



Blazing Star + Brown-eyed Susan



Bluestar + Catmint + Columbine





## American Beautyberry + NE Aster



### Garden INSTALLATION

- Fall is the best time for planting but can do it year-round as long as the ground is not frozen!
- Optimal pH for perennial flower bed is 6.2-6.8
- Do site prep to remove weeds/turf and improve soil; incorporate 3-6" of compost before planting
- Apply 3-4" of mulch after planting
- Need to make sure garden gets sufficient irrigation the first year after planting until established



# Garden MAINTENANCE

- Balance having attractive garden with leaving food & shelter
- Stay on top of weeds year-round!
- Deadhead flowers to prolong blooming or to improve appearance but make sure and leave some seed for the birds!
- Divide plants when needed
- Relocate or replace plants when needed
- Cut back plants before spring growth begins (leave through fall/winter for shelter and food)
- Replenish mulch annually in the spring

## Deadheading Example: Gaillardia

BEFORE



AFTER



# Chatham County Cooperative Extension's Demonstration Pollinator Garden at Chatham Mills

180 Unique species...  
85% native to North Carolina!

Garden is managed **organically**

## Pollinator Paradise Garden Before



## Pollinator Paradise Garden After





























































Pollinator Habitat  
Supports Other Wildlife Too!



Pollinator Gardens Support  
Predators and Parasitoids



Ambush Bug



Lady Beetle







# Great Black Wasp



# Potter Wasp



# Sand Wasps Prey on Brown Marmorated Stink Bugs

Mountain mint provides nectar for sand wasps



Brown marmorated stink bug



# Predatory Stink Bug



Predatory Stink Bug



Predatory Stink Bug Nymphs







Soldier Beetles



Praying Mantis





Praying Mantis



Carolina Mantid  
Egg Case



Chinese Mantid  
Egg Case





Robber Fly



Syrphid Fly



## Syrphid Fly Larvae Are Predators!



## Assassin Bug





Wheel Bug



## Native Pollinator Gardens Support Many Species of Wildlife

- Doug Tallamy: [Bringing Nature Home: How You Can Sustain Wildlife with Native Plants](#)
- *What we plant in our landscapes determines what can live in our landscapes*
- When non-native plants replace natives, food webs can be disrupted by the loss of plant-feeding insects, important food for other insects, spiders, reptiles, amphibians, birds, & mammals

## Pollinator Gardens Support Songbirds

- 96% of terrestrial birds rear their young on insects, mainly caterpillars
- Tallamy: it takes 6,000-9,000 caterpillars to raise a clutch of chickadees, and chickadees prefer foraging on native plants because that's where they find the caterpillars
- He has seen nests full of dead nestlings because the parents could not find enough caterpillars to feed them



Photo by Doug Tallamy

Goldfinch Feeding on Tall Tickseed



Celebrate Caterpillars!





## Pollinator Gardens Support Reptiles & Amphibians



Gray treefrog



Broadhead skink



Carolina anole

## Pollinator Gardens Support Bats



Pest control services provided by bats estimated at over \$3 billion a year for U.S. farmers!

Photo by Jim White

## Top 25 Native Pollinator Plants



Spring Blooming

Spiderwort



Beard tongue





Beard tongue



Wild  
indigo





Wild  
indigo



Coneflower

Blanketflower



Stoke's Aster





## Golden Alexander





Bee Balm



Summer Blooming

Passionflower



Blazing Star





Mountain Mint



Butterfly Weed



Monarch  
caterpillar  
on  
*Asclepias*



Swamp Milkweed





Culver's Root



Great Blue Lobelia





Rattlesnake Master



Blue Vervain



New Jersey Tea



St. John's Wort







Joe-pye Weed







Aster



Goldenrod





Spotted  
Horsemint



# Climbing Aster







Want to Learn More?



## Pollinator Paradise Garden Website

[carolinapollinatorgarden.org](http://carolinapollinatorgarden.org)

- Slide Show of Pollinator Garden
- [List of Plants in the Garden](#)
- What's in Bloom List with Photos
- [Garden Tour Schedule](#)
- My Top 25 Pollinator Plants
- [Nursery & Seed Suppliers + more!](#)

## Find Me on Social Media!

- Lots of pollinator postings with photos and videos
- [www.facebook.com/debbie.roos.nc](http://www.facebook.com/debbie.roos.nc)
- Instagram: Debbie.Roos
- Twitter: @GrowSmallFarms