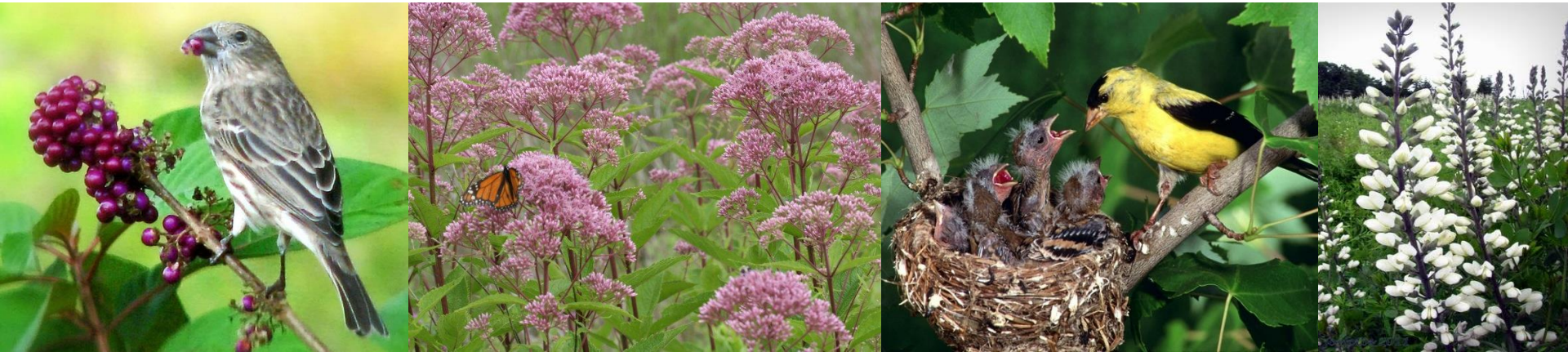


# Landscaping for Wildlife with Native Perennials



**Matt Jones**

Extension Agent – Horticulture  
NCCE Chatham County Center

16 April 2018

# Resources

<http://go.ncsu.edu/nativeplants>

# Remember this?



# Krefeld Entomological Society

- Compared insect populations in local forest reserve
  - By biomass (weight), insect populations declined by 75% in 27 years!
- Other studies focused on specific species.

87%



90%





# Sanchez-Bayo and Wyckhuys 2019

- Comprehensive meta-analysis of 73 studies
- At current rates, 40% declines in insect species by the end of the century



## 1. Introduction

For years, biologists and ecologists have been concerned about the worldwide reduction in biodiversity undergone by many terrestrial and aquatic vertebrates (Chelluru and Herlihy, 2002; Pimm and Rayen, 2000; Wilson, 2002), yet scientists have only recently voiced similar concerns about invertebrate taxa, particularly insects. Population declines imply not only less abundance but also a more restricted geographical distribution of species, and represent the first step towards extinction (Diamond, 1980). Much of the blame for biodiversity loss falls on human activities such as hunting and habitat loss through deforestation, agricultural expansion and intensification, industrialisation and urbanisation (Chelluru et al., 2017; Maxwell et al., 2016), which jointly claimed a 30–50% encroachment on natural ecosystems at the end of the 20th century (Vitousek et al., 1997).

There is compelling evidence that agricultural intensification is the main driver of population declines in unrelated taxa such as birds, insectivorous mammals and insects. In rural landscapes across the globe, the steady removal of natural habitat elements (e.g. hedgerows), elimination of natural drainage systems and other landscape features together with the recurrent use of chemical fertilisers and pesticides negatively affect overall biodiversity (Piller et al., 1995; Newton, 2004; Tilman et al., 2001). Recent analyses point to the extensive usage of pesticides as primary factor responsible for the decline of birds in grasslands (Mason and Whittow, 2013) and aquatic organisms in streams (Dolezal et al., 2013), with other factors contributing to or amplifying their effects to varying extent. Yet, we don't know whether the same factors explain the parallel entomological demise that we are witnessing.

In 2017, a 27-year long population monitoring study revealed a

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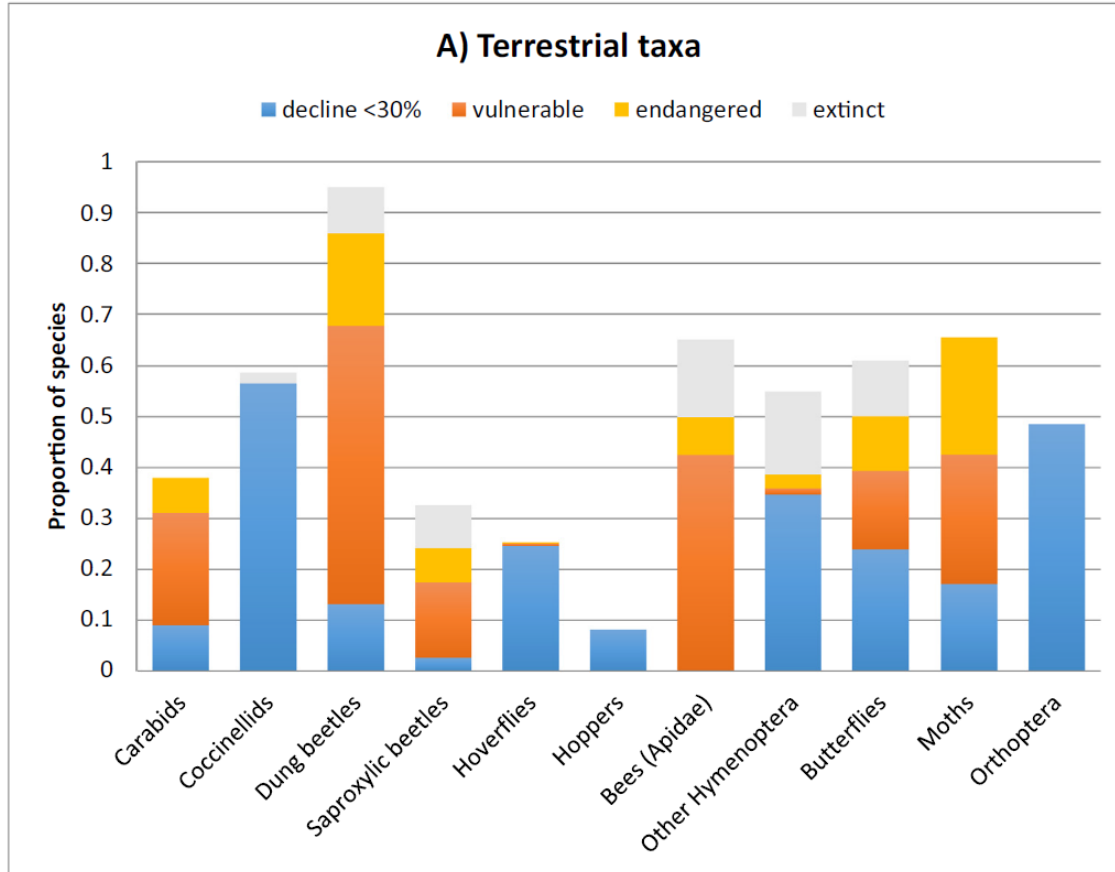
<https://doi.org/10.1016/j.biocon.2019.01.020>

Received 12 September 2018; Received in revised form 23 January 2019; Accepted 25 January 2019

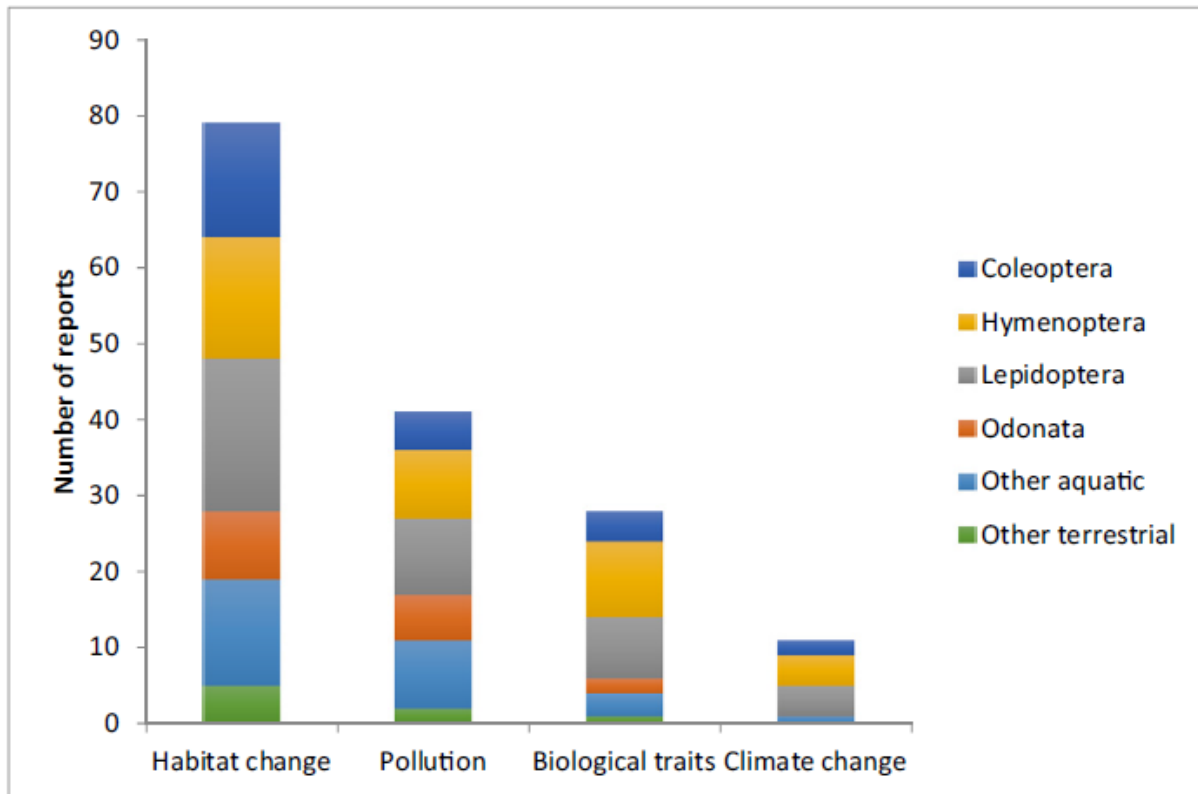
Available online 31 January 2019

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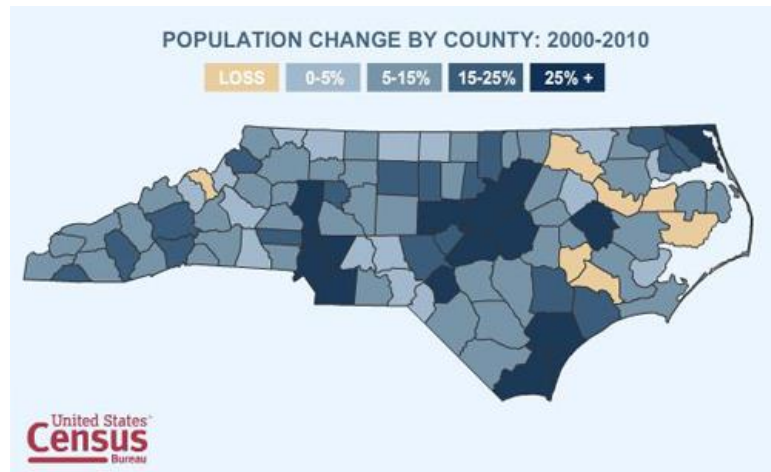
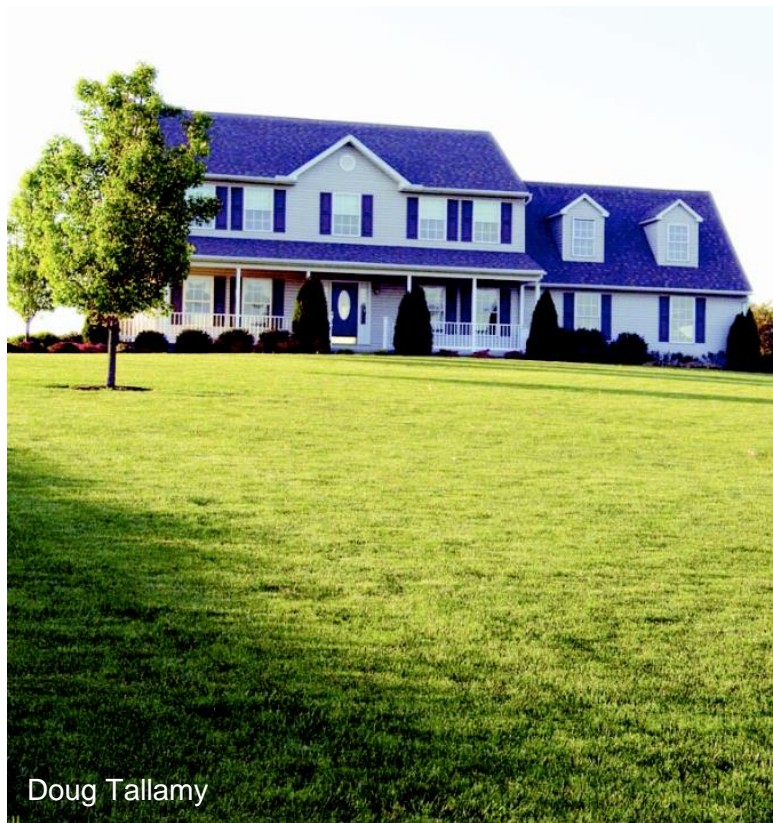
# Proportion of Insect Species in Decline



# Major Drivers of Decline by Taxa



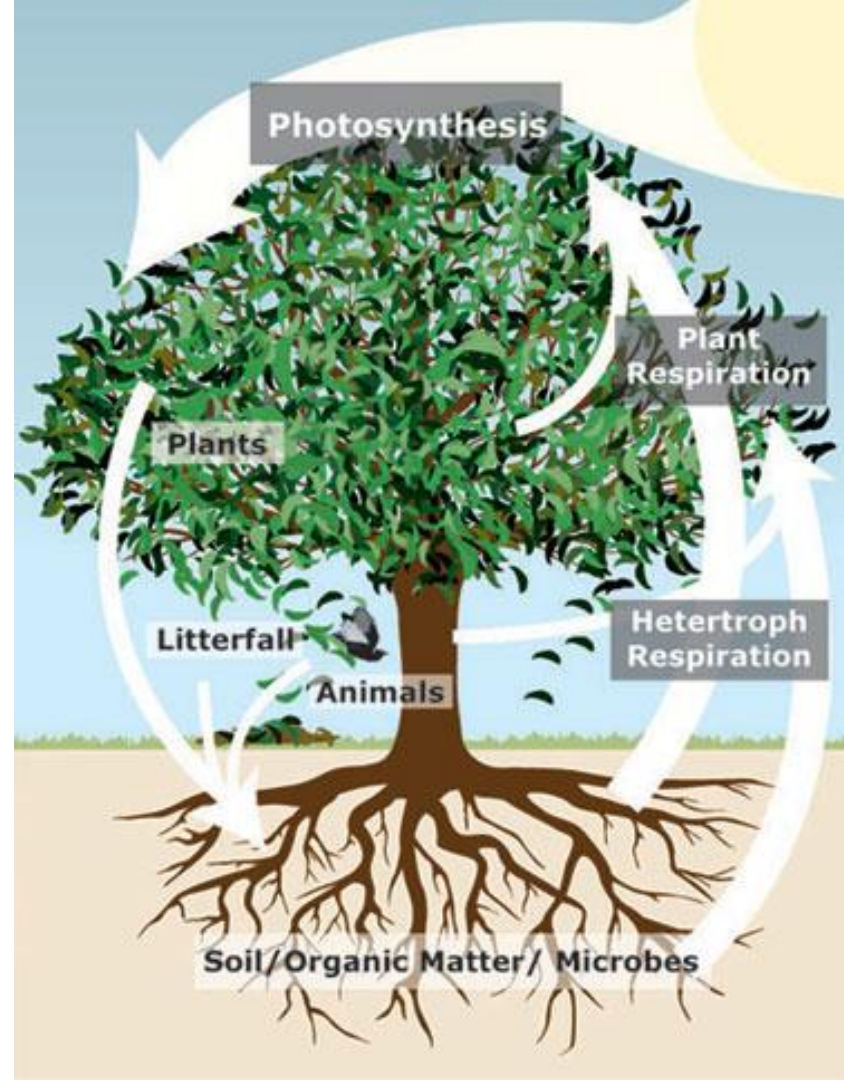
# Habit Loss and Fragmentation





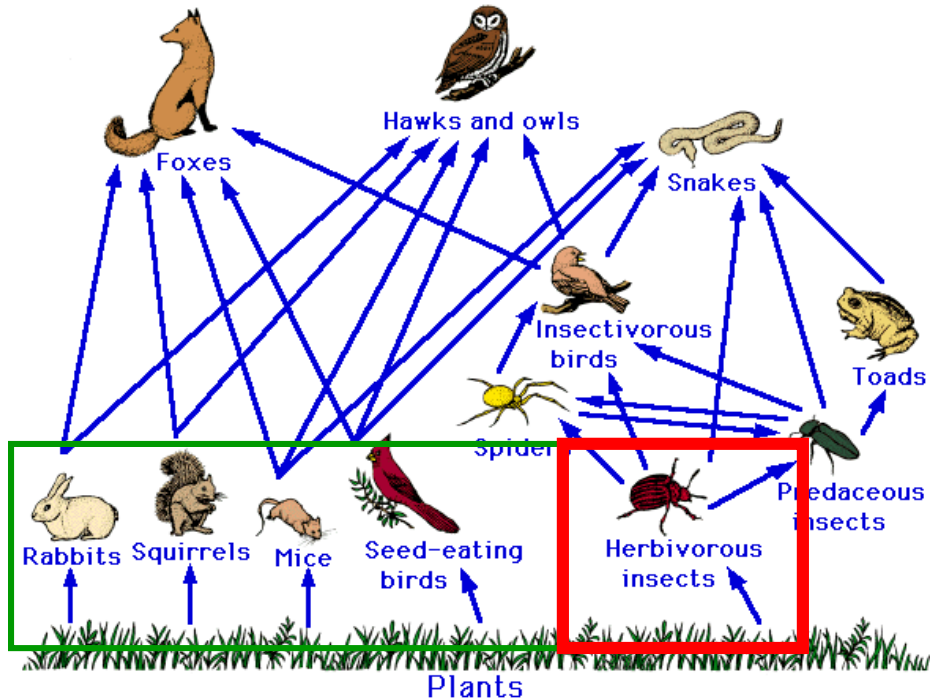
# Plants Have Many Ecosystem Functions

- Protect soil from erosion
- Help cycle nutrients
- Help cycle water
- Support soil microbes
- And...



# Most Important Function: Foundation of Food Webs

Plants capture and convert the sun's energy into a form that can be consumed by other organisms



# Within Ecosystems, All Plants Are Not Equal

- Herbivorous insects have strong host-specificity
  - Evolutionary history
- 90% species are specialists
- **Native insects need native plants**

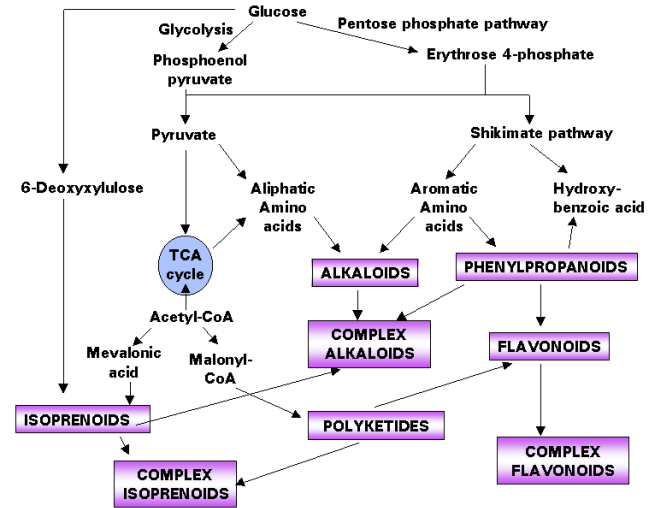


*Asclepias* are the only plants  
Monarch caterpillars can feed on

# Why Insects Evolved Host Specificity

## Chemical co-evolution

- Taste
- Digestibility
- Toxicity
- Nutritional needs



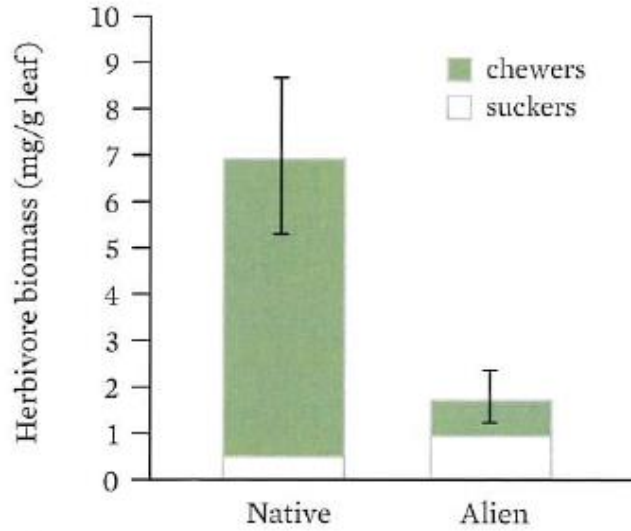


# Caterpillar Hunters

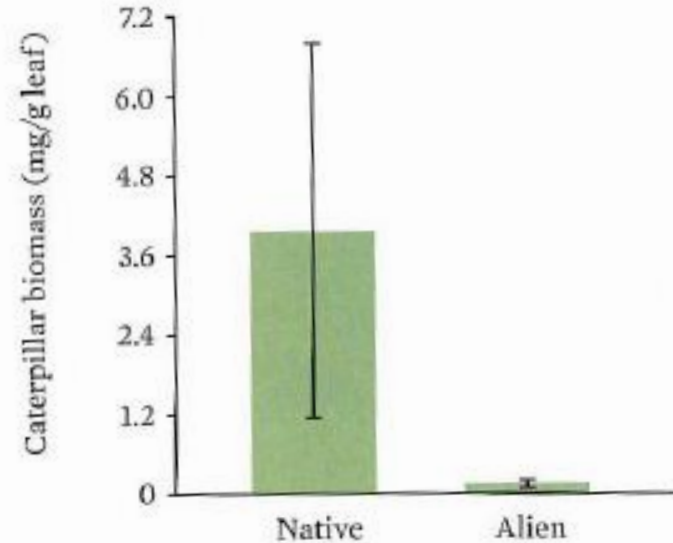
- Nearly all Passerines rear their young on insects, not seeds or berries
- Non-native trees do not support caterpillar populations birds need to rear their young



# Native Plants Support More Insects

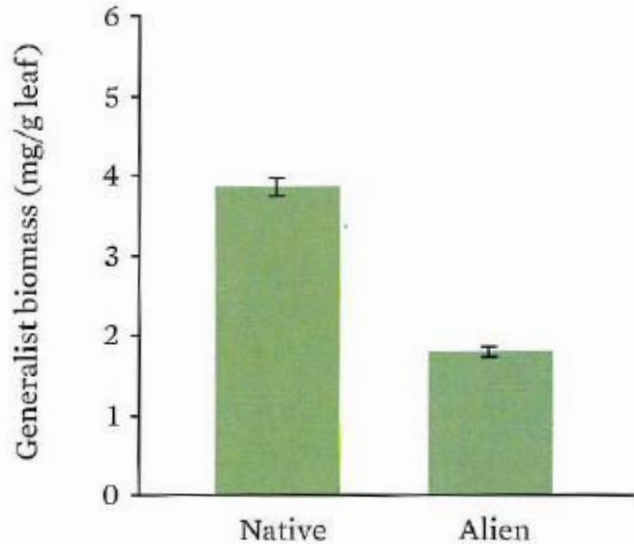


**Herbivore Biomass**

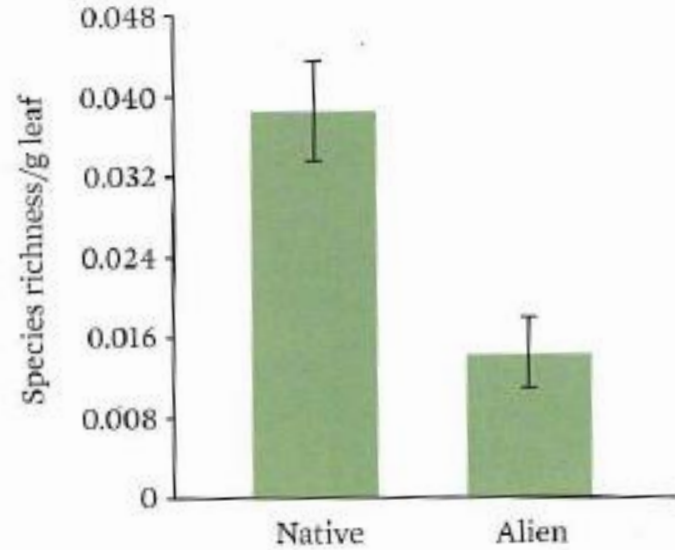


**Caterpillar Biomass**

# Native Plants Support More Insects



**Generalist Biomass**



**Species Richness**

# Extinction Terms

- **Extirpation** – localized extinction
- **Numerical Extinction** – total loss of breeding individuals
- **Functional Extinction** – present, but not in number to perform former ecological role

***A 30% population decline can destabilize ecosystems!***



# Managed Landscapes

- Often dominated by **non-native plants**
- Do not sustain natural communities they replaced
- Not able to support healthy ecosystems



# The Good News





# Beyond Merely Ornamental

- Living organisms - Part of the local ecosystem
- Should support other species
- Should not require excessive resources



# A New Paradigm

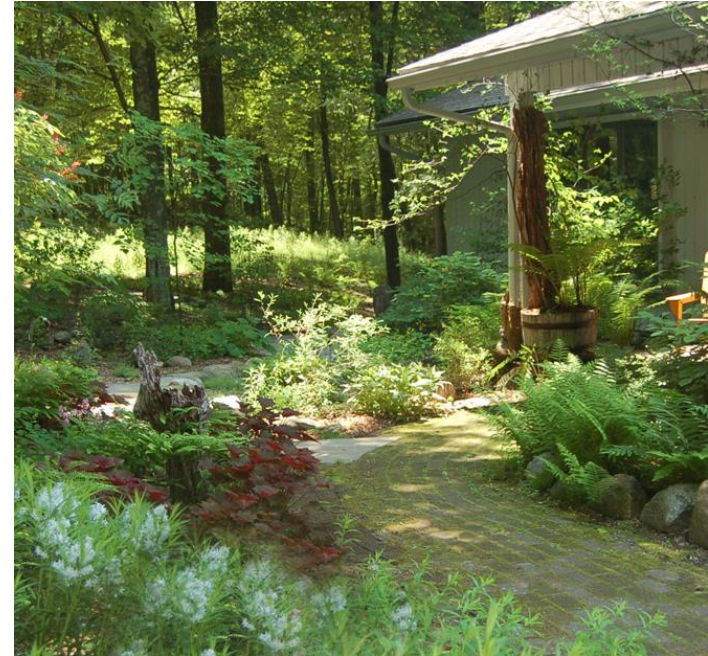
- Select landscape plants based upon traditional factors:
  - Appearance
  - Performance
  - Adaptation to site conditions
- **PLUS ability to sustain native species and support ecosystem health**





# New Paradigm: Living Landscapes

- Not dominated by lawn/turf
- Home to many different plant species, majority native to local region
- Replicate natural communities - have layers

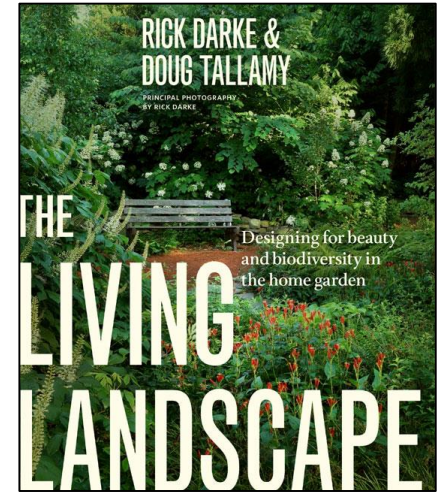


# What is native?

**“A plant or animal that has evolved in**

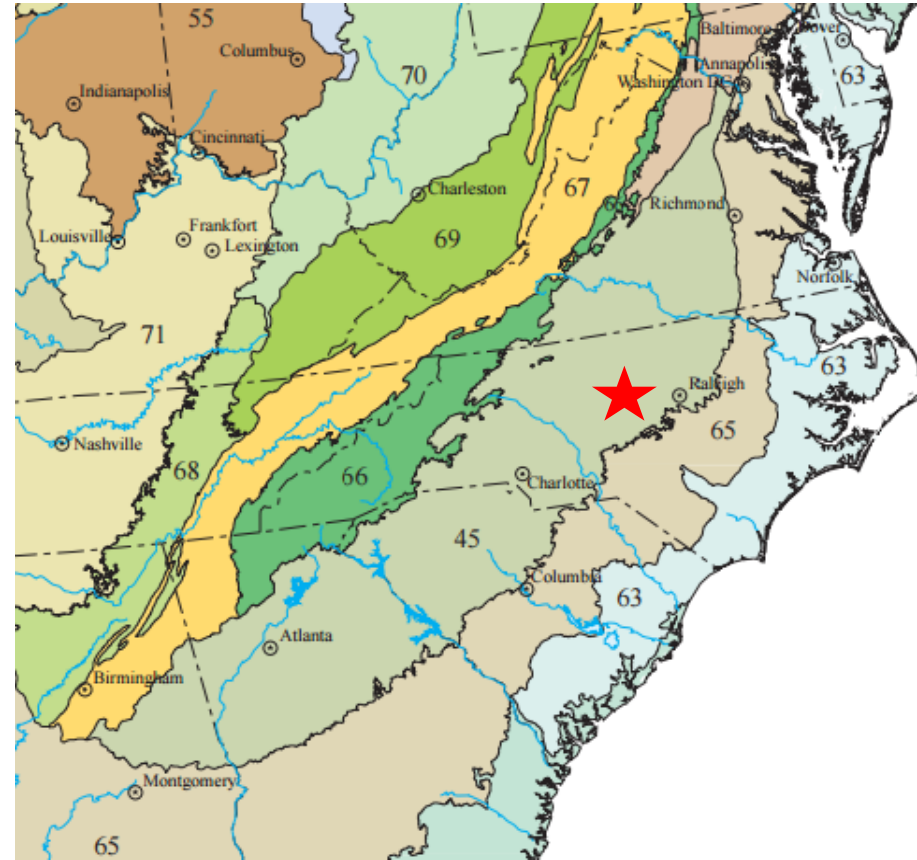
- a given place
- over a period of time
- sufficient to develop complex and essential relationships
- with the physical environment and other organisms

**in a given ecological community”**



# Given Place

- Greatest benefit – plants from local ecoregion
- Piedmont
- Southeast



## Native Range: Geography and Habitat



*Amsonia tabernaemontana*



*Amsonia hubrichtii*



# Benefits of Natives

- Better adapted?
- Less of a nuisance?
- Fewer pest and disease issues
- **More food sources for more native wildlife species**



# Natives Not Always the Answer



**Gloomy Scale on Red Maple (*Acer rubrum*)**  
planted near impervious surfaces





# Bed Preparation

## Bed Establishment

- Soil test!
  - Lime and fertilizers as appropriate
- Incorporate 2-3" organic matter into the top 6-8" of soil
  - Compost
  - Pine bark



# Bed Preparation

## Existing Beds

- Add 2-3 as mulch annually
  - Compost
  - Pine bark nuggets
  - Pine straw
- Soil test every 2 years



# How to determine soil pH?

## Soil Testing from the NCDA!

- Only reliable method to assess soil nutrient content and pH
- Boxes and forms available from NC Cooperative Extension
- Analysis is *free* for NC residents (Apr.-Nov.)
  - \$4/sample: Dec-Mar



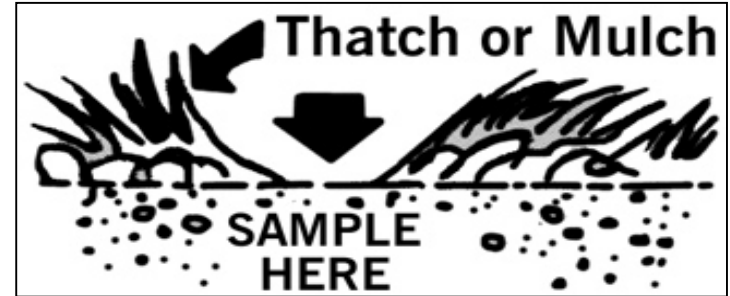
**NC STATE** EXTENSION

Master Gardener | Chatham County

**Chatham MGVs deliver  
soil samples monthly  
during the free period!**

# How to Take Soil Samples

- Avoid thatch or mulch
- Take a 'slice' of soil
- **Turf:** 4" deep
- **Landscape beds,**  
**Vegetables:** 6" deep
- Mix subsamples together to make one composite sample for each unique area



# How to Sample Soil

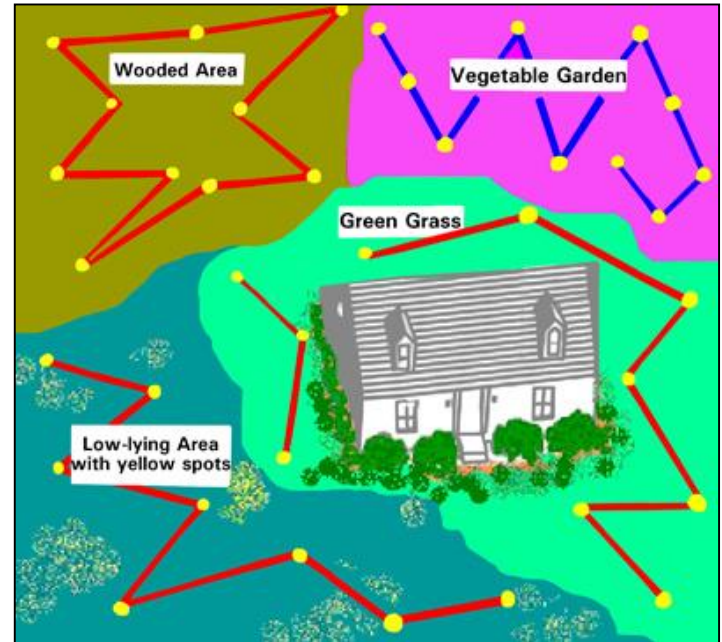
## Sample different areas separately

- Plants/Crops
- Topography
- Soil texture
- Plant health

## Avoid areas that will obviously skew results

- Compost piles
- Burn piles
- Animal 'minefields'

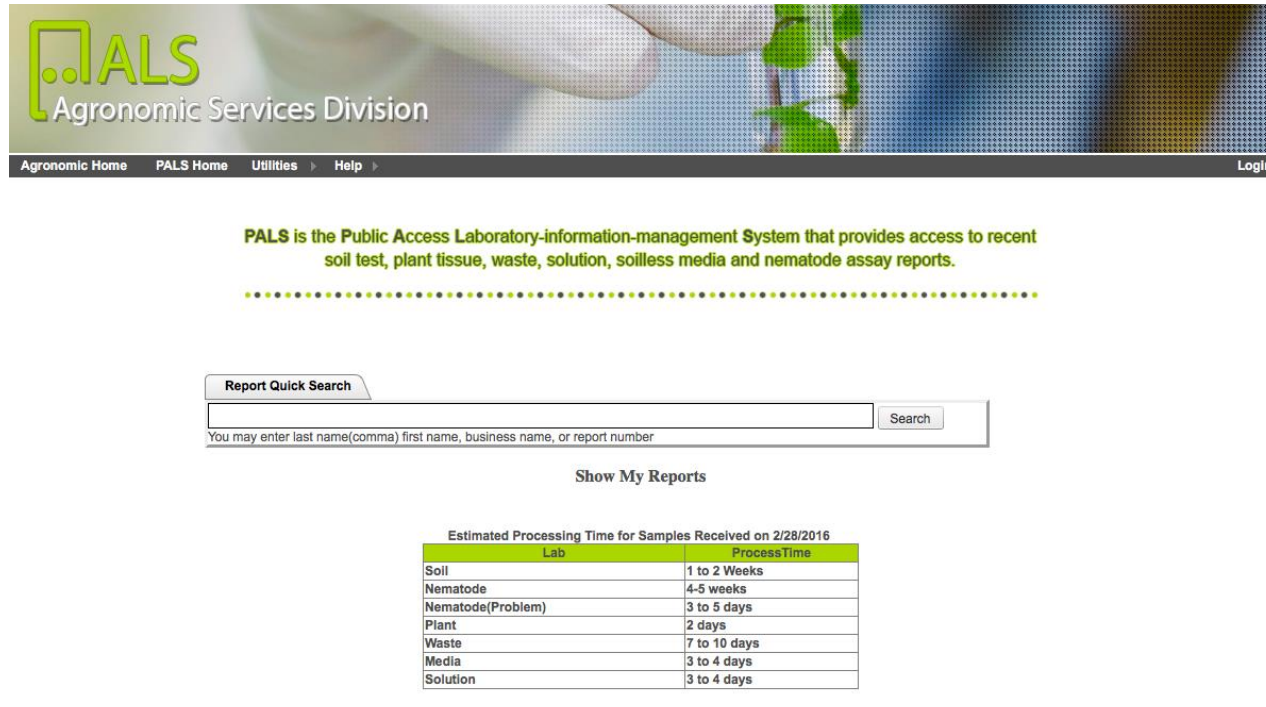
**Take 5-10 subsamples per area**





# Where to Find Sample Results

<http://www.ncagr.gov/agronomi/pals/>



**ALS**  
Agronomic Services Division

Agronomic Home PALS Home Utilities Help Login

PALS is the Public Access Laboratory-information-management System that provides access to recent soil test, plant tissue, waste, solution, soilless media and nematode assay reports.

Report Quick Search

Search

You may enter last name(comma) first name, business name, or report number

Show My Reports

Estimated Processing Time for Samples Received on 2/28/2016

Lab	ProcessTime
Soil	1 to 2 Weeks
Nematode	4-5 weeks
Nematode(Problem)	3 to 5 days
Plant	2 days
Waste	7 to 10 days
Media	3 to 4 days
Solution	3 to 4 days

**We will help  
your interpret  
the soil test  
report!**



# Planting Perennials

## Fall ideal

- Enhanced root growth before spring
- Spring flowering perennials

## Spring good

- Summer/fall flowering perennials
- Supplemental watering until well established



# A Few of Matt's Favorite Native Perennials



Amount of Sunlight



Soil/drainage requirements



Mature dimensions,  
Height x Width



Wildlife Benefits



Bloom Period

# Green and Gold

## *Chrysogonum virginianum*



Shade to part-sun



Medium to well-drained



Spring



6-12" x 8-18"



Pollinators, birds





# False Indigo

## *Baptisia spp.*



Sun to part shade



Spring



Medium to well-drained



1-3' x 1-1.5'



Bees, butterflies, larval host



*Baptisia australis*

# *Baptisia alba*





# *Baptisia* cultivars

**‘Purple Smoke’**



**‘Carolina Moonlight’**





# Eastern Columbine

## *Aquilegia canadensis*



Part sun to part shade



Spring



Medium to well-drained



1-3' x 1-1.5'



Hummingbirds, birds



# Joe Pye Weed

*Eutrochium spp.*



Sun to part shade



Summer



Moist to wet



3-7' x 1-4'



Butterflies, bees, larval host, birds





# Bluestar

## *Amsonia tabernaemontana*



Sun to part-shade



Moist to well-drained



Spring



2-3' x 2-3'



Butterflies



# Cardinal Flower

*Lobelia cardinalis*



Part shade to sun



Moist to wet



Late Summer



2-4' x 1-2'



Hummingbirds, butterflies





Part shade



Moist to wet



# Great Blue Lobelia

## *Lobelia siphilitica*



2-3' x 1-1.5'



Bees, hummingbirds, butterflies



Late Summer



# Carolina Phlox

## *Phlox carolina*



Sun to part sun



Moist, well-drained



2-4' x 1-1.5'



Summer



Hummingbirds, butterflies



# Orange Coneflower

## *Rudbeckia fulgida*



Sun



Moist to well drained



2-3' x 2-2.5'



Butterflies, bees, wasps, birds



Summer to fall



# Close Relatives

## *Rudbeckia* spp.



**Cuteaf Conflower**  
*Rudbeckia laciniata*



**Black-eyed Susan**  
*Rudbeckia hirta*



# Stokes' Aster

*Stokesia laevis*



Sun to part sun



Early summer



Moist\*, well-drained



1-2' x 1-1.5'



Bees, butterflies, etc.





# Mountain Mints

## *Pycnanthemum spp.*



Sun to part-shade



Medium-well drained



Butterflies, bees



Summer-fall



2-3' x 3-4'



*P. incanum*



*P. loomisii*

Clump forming, less aggressive



# Aromatic Aster

*Symphyotrichum oblongifolium*



Sun to part sun



Medium-well drained



Mid-late fall



Butterflies, bees, birds.



1-3' x 1-3'





# Swamp Milkweed

*Asclepias incarnata*



Sun to part sun



Summer



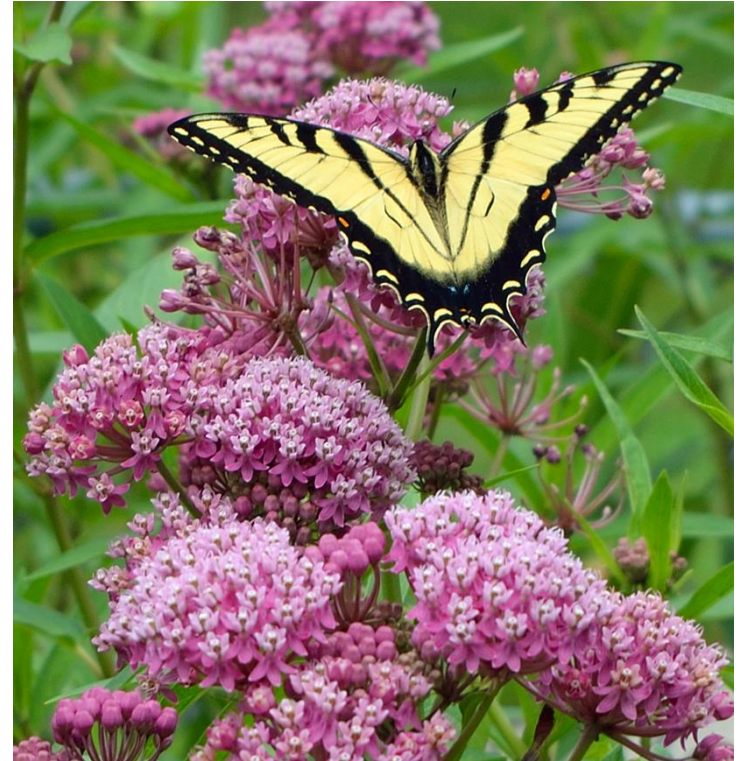
Medium to wet



3-4' x 2-3'



Pollinators, monarch larvae





# Ferns



**Dixie Wood Fern**  
*Dryopteris x australis*



**Cinnamon Fern**  
*Osmunda cinnamomea*



**Southern Maidenhair Fern**  
*Adiantum capillus-veneris*



**Christmas Fern**  
*Polystichum acrost*



# Pollinator Paradise Garden


- Chatham Mills (Pittsboro)
- NC Coop. Ext.
  - Debbie Roos, Sustainable Agriculture Agent
- Upcoming tours:
- <https://growingsmallfarms.ces.ncsu.edu/>



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NC STATE UNIVERSITY



## GOING NATIVE

### URBAN LANDSCAPING FOR WILDLIFE WITH NATIVE PLANTS

HOME | NATIVE PLANT ATTRACTIVE TO WILDLIFE | WHERE TO GET NATIVE PLANTS | INVASIVE, EXOTIC PLANTS OF THE SOUTHEAST | MY PLANT LIST

Home > How to Go Native > Step Two - Map Existing Site and Vegetation

WHY GO NATIVE

HOW TO GO NATIVE

Identify Wildlife Needs

Map Existing Site and Vegetation

Invasive, Exotic Plants of the Southeast

Native Plants Attractive to Wildlife

Design a Native Plant Landscape

Implement a Native Plant Landscape

CREATE YOUR OWN NATIVE LANDSCAPE

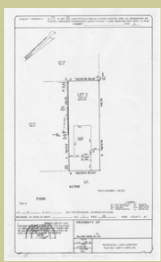
#### Step Two - Map Existing Site and Vegetation

Landscape design is essentially a creative problem-solving process. It involves developing a design that is tailored to your site, meets your needs and desires, and also provides valuable wildlife habitat. So before you begin to make any landscape improvements to your property, you should thoroughly familiarize yourself with all aspects of your existing property. This will mean conducting an inventory and analysis of your property to identify opportunities and assets as well as constraints and liabilities. To help organize this information, you will need an accurate map of your property on which to record your observations and subsequent analysis.


##### Base Map

The first step in this process is the creation of an accurate base map, which shows all existing permanent physical site elements. The base map will be useful when considering design changes to the landscape. At its simplest, it is developed from your existing plot plan. When purchasing your house, you should have received a property survey, also called a plat or plot plan of your property. This is a plan drawing that typically includes the lot configuration, right-of-ways, sidewalks, easements, and position and dimensioning of the house (and permanent structures such as decks and steps), garage, and driveway. If you don't have one, request one from the tax assessor's office or download a copy from your county's GIS website. You can also develop one entirely from your own field measurements, but that will take you longer.

A typical plot plan always includes a drawing scale, for instance 1"=40', which means that every inch on the map is equal to 40' on your property. Plot plans need to be enlarged to allow you to show more details of the landscape. You can take your plan to a copy shop and have it enlarged to a minimum of 1"=10' for smaller properties or small areas of your garden, or up to 1"=20' for larger properties. The plan should have the north arrow on it as well, which will be needed to assess your growing conditions.



A typical plot plan, larger version.



On the base map of your property, you want to show the property lines and house footprint for your residence. On this sample base map, information from the plot plan has been re-drawn on 5 x 5 graph paper (when 1"=10', each square equals 2'). If your property or area of interest is larger, adjust the scale of your squares as needed. For instance, 1" could equal 20', which would make each square equal to 4'. For this, you can use a plot plan you had enlarged or take the dimensions directly off

## Going Native Portal

<https://projects.ncsu.edu/goingnative/index.html>

# NC STATE

# EXTENSION

NC STATE UNIVERSITY

CAMPUS DIRECTORY

LIBRARIES

MYPACK PORTAL

CAMPUS MAP

**NC STATE** EXTENSION

Search

Plants

Grow Plants Buy Plants

Annuals

Poisonous Plants

Carnivorous Plants

Roses

Edible Plants

Shrubs

Ferns

Spring Bulbs

Groundcover

Summer Bulbs

Herbs

Trees

Native Plants

Vines

Ornamental Grass

Water Garden

Perennial Bulbs

Wildflowers

Perennials

Search

search term



## NCSU Plants Database

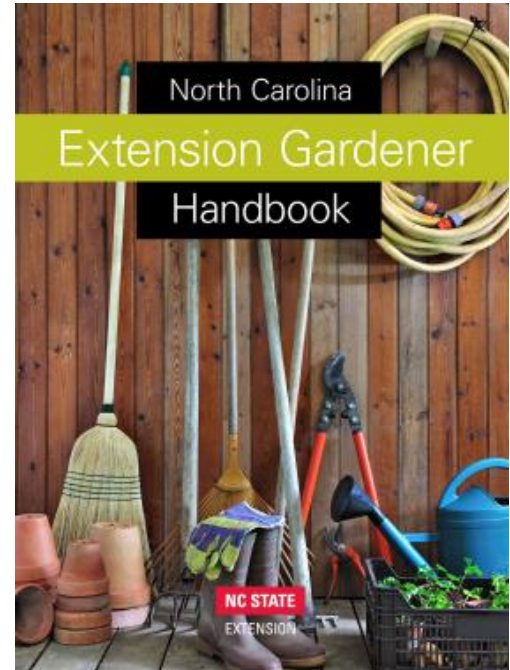
<https://plants.ces.ncsu.edu/>

# Extension Gardener Handbook

- Available online for **FREE**  
<https://content.ces.ncsu.edu/extension-gardener-handbook>
- Full-color, hardback copy available from UNC Press (\$60)

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# Chatham County Native Plant Nurseries



<http://www.curenursery.com/>

GROWING  
WILD  
NURSERY

<https://www.growingwildnursery.com/>



Mellow Marsh Farm, Inc.  
Wholesale Native Plants

<https://mellowmarshfarm.com/>

**Need help? Contact:**

**NC STATE**

**EXTENSION**

Master Gardener | Chatham County

Plant Clinic: MW 1:00-4:00, F 9:00-12:00

[chathamemgv@gmail.com](mailto:chathamemgv@gmail.com)

919-545-2715

## Door Prizes brought to you by...



<http://www.curenursery.com/>

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WILD  
NURSERY

<https://www.growingwildnursery.com/>



# Evaluations

Please Complete!