Life on the Coast is Easy?

How native plants are built for life near the beach

Matt Collogan
Area Natural Resources Agent
Brunswick County Center

NC COOPERATIVE EXTENSION

N.C. A&T STATE UNIVERSITY

NC STATE UNIVERSITY

How can we increase nature-enhancing landscaping in coastal communities with easy, available, affordable, attractive solutions?





What do you notice about this yard?

What about this yard?

Coastal Landscaping Challenges

- Poor, sandy soil (also areas of hydric, organic soils)
- Heat
- Drought conditions
- Frequent storms
- Saltwater exposure and soil salinity
- Strong coastal winds
- Salt-aerosol damage
- Rapid development – forest and ag land being converted to housing, roads, commercial

What is a sustainable coastal landscape?

- Attractive
- Environmentally-friendly
- Well adapted to coastal region
- Storm-ready
- Functional & enjoyable
- Cost-efficient & manageable

Where are we starting?

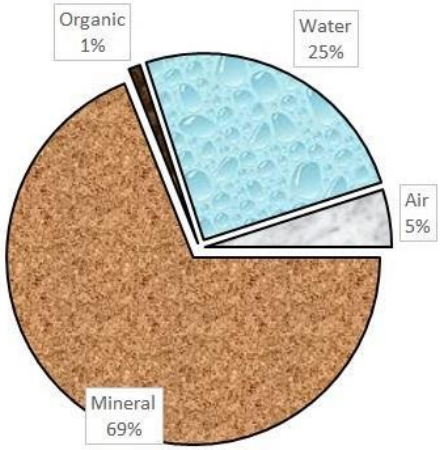
- Brand new construction
- New developments with small lots
- Rapid development, clear cutting
- Soil compaction
- Removal of topsoil
- Water drainage issues
- Polluted runoff

Residential Soil Problems

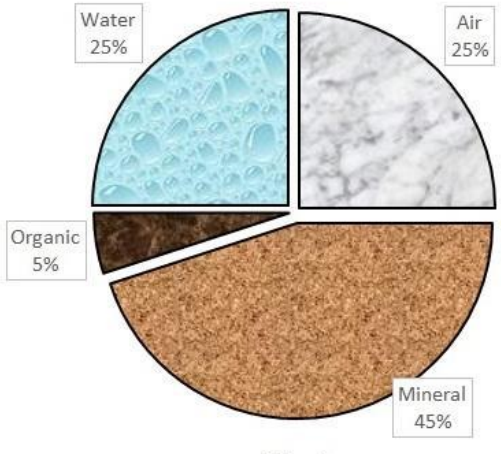
- Stripped topsoil
- Compaction
- Contamination

Every yard was a construction site at some point in the past!

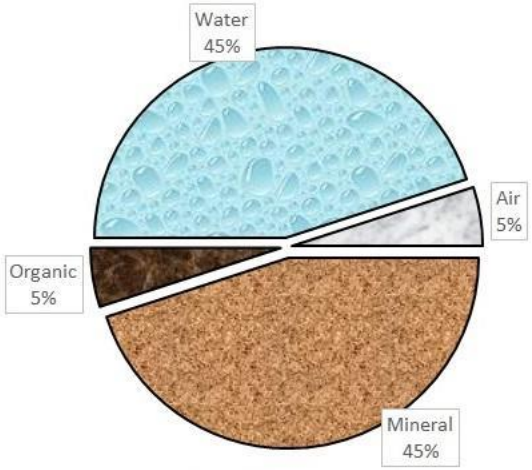
Soil Composition



Compacted



Ideal

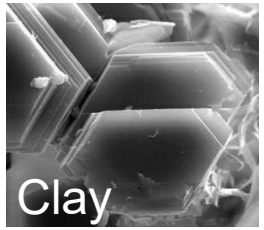


Poorly Drained

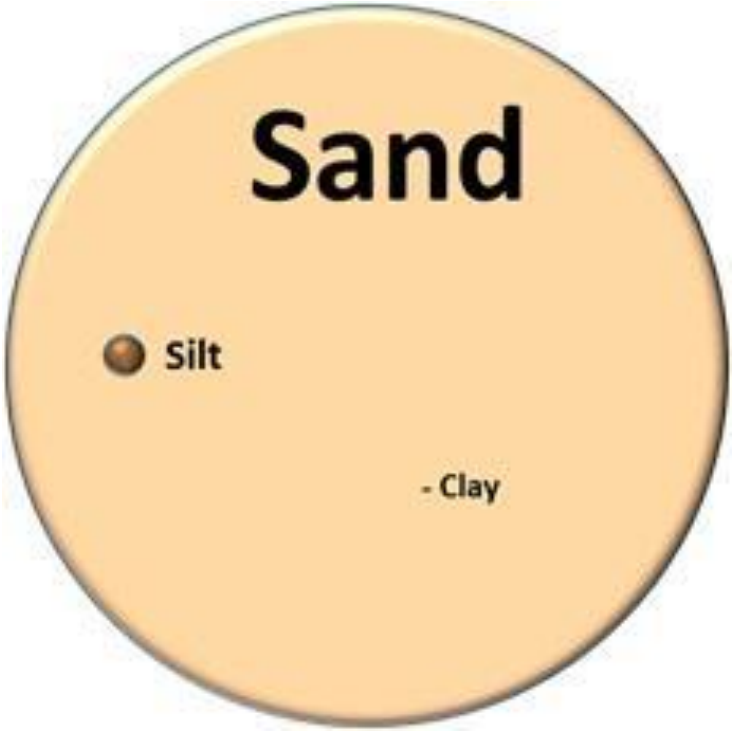
Soil Texture The Size and Shape of Soil Particles

- Course texture
- Feel gritty
- Quartz, calcium carbonate

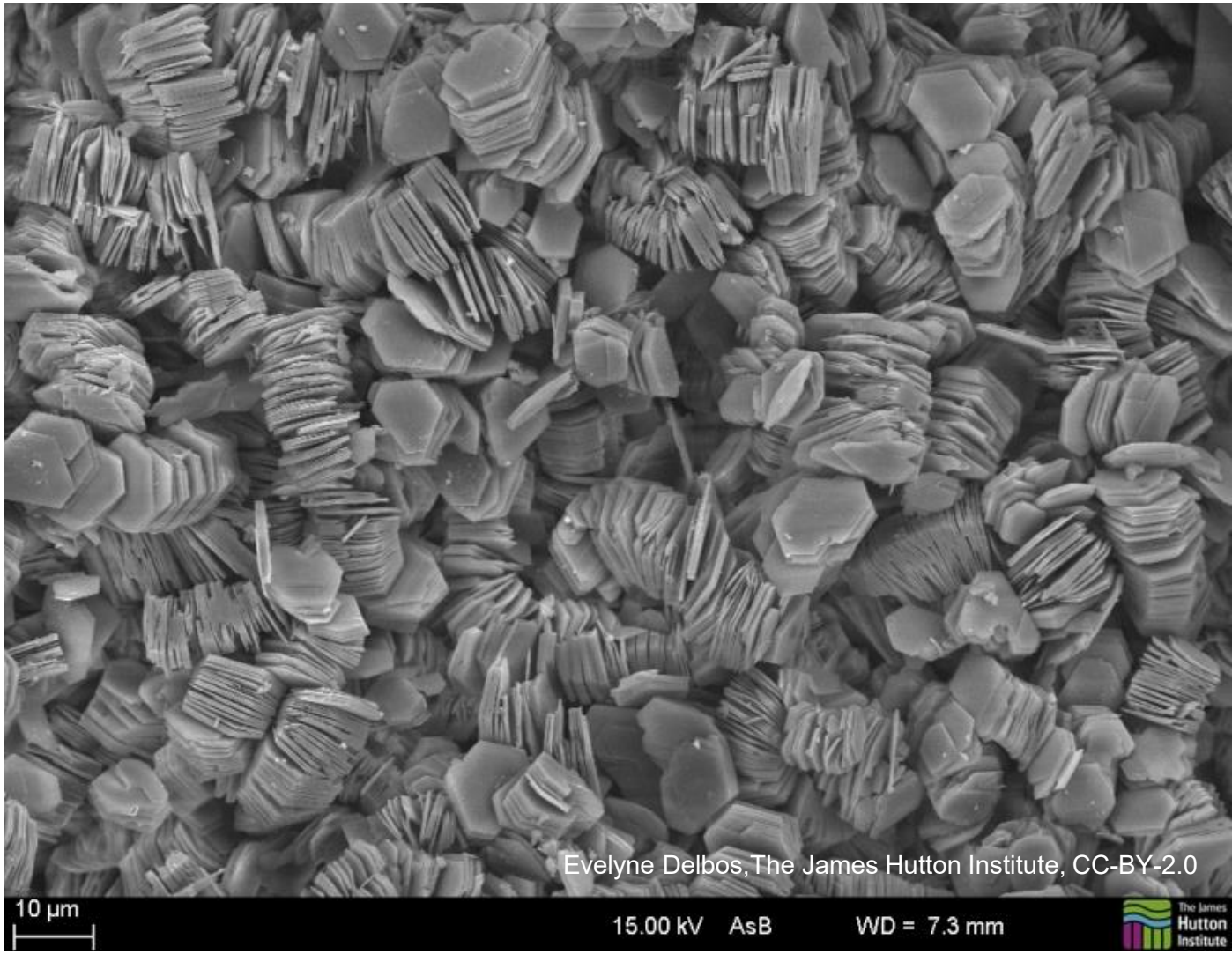
- Medium texture
- Feel like flour, slick
- Quartz, feldspar



- Fine texture
- Plate like structure
- Negatively charged (nutrients positively charged)
- Aluminum silicate sheets



Clay minerals are secondary minerals formed when primary minerals weather, dissolve, and recrystallize into new mineral structures in the soil. Large surface area; carry electrical charge.



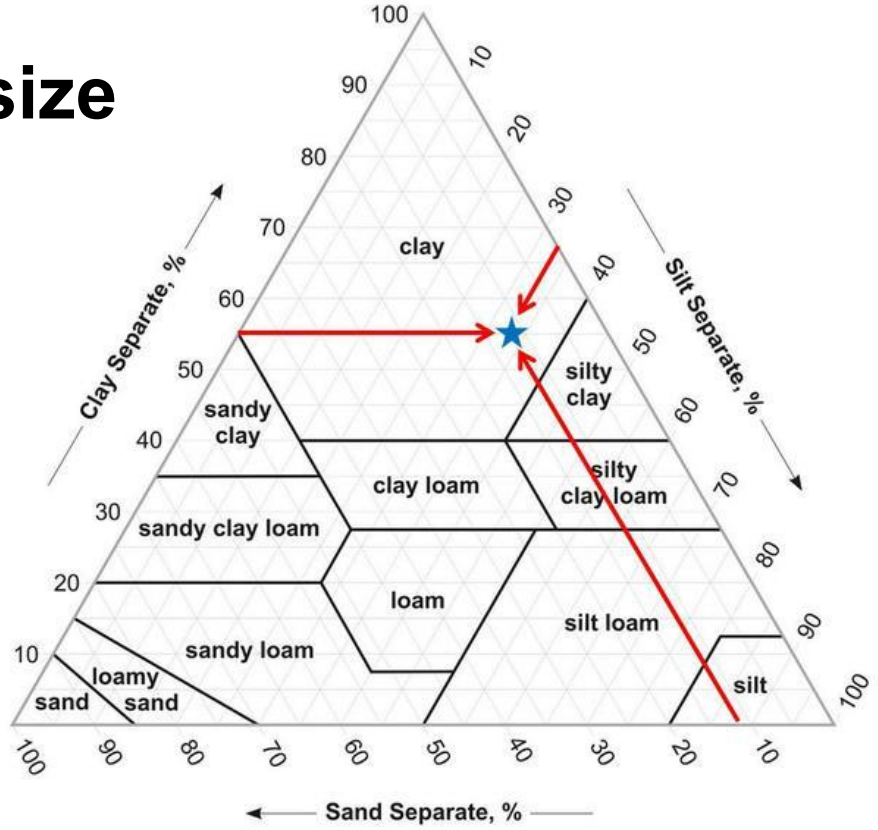
Soil Textural Class Proportion of Sand, Silt & Clay

Proportion effects pore size

- Water retention
- Nutrient retention

Jar Test

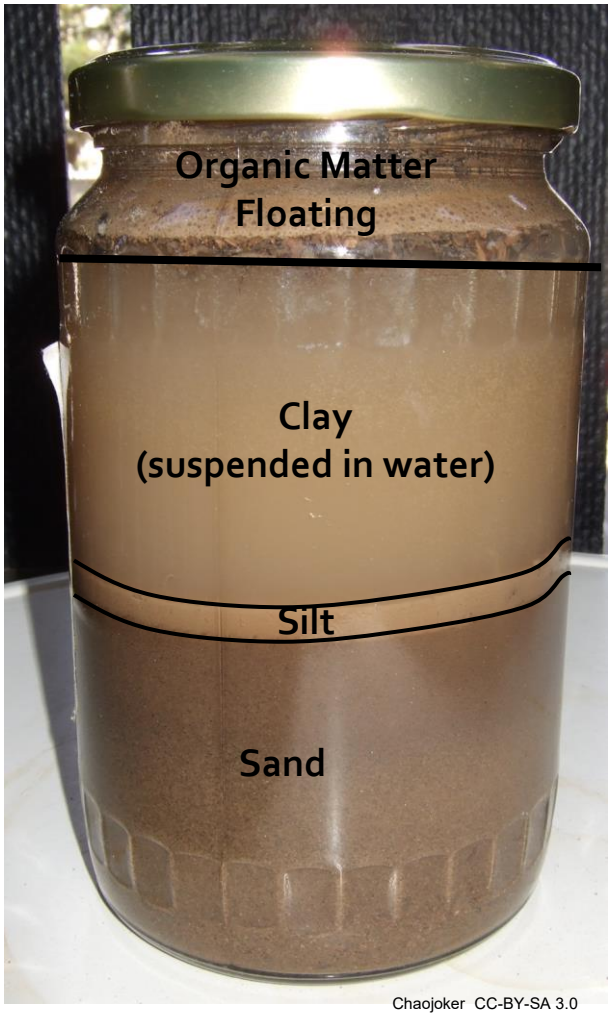
https://hgic.clemson.edu/factsheet/soil-texture-analysis-the-jar-test/



Soil Texture

- % Sand (gritty)
- % Silt (powdery dry, slippery wet)
- % Clay (hard dry, slippery wet)

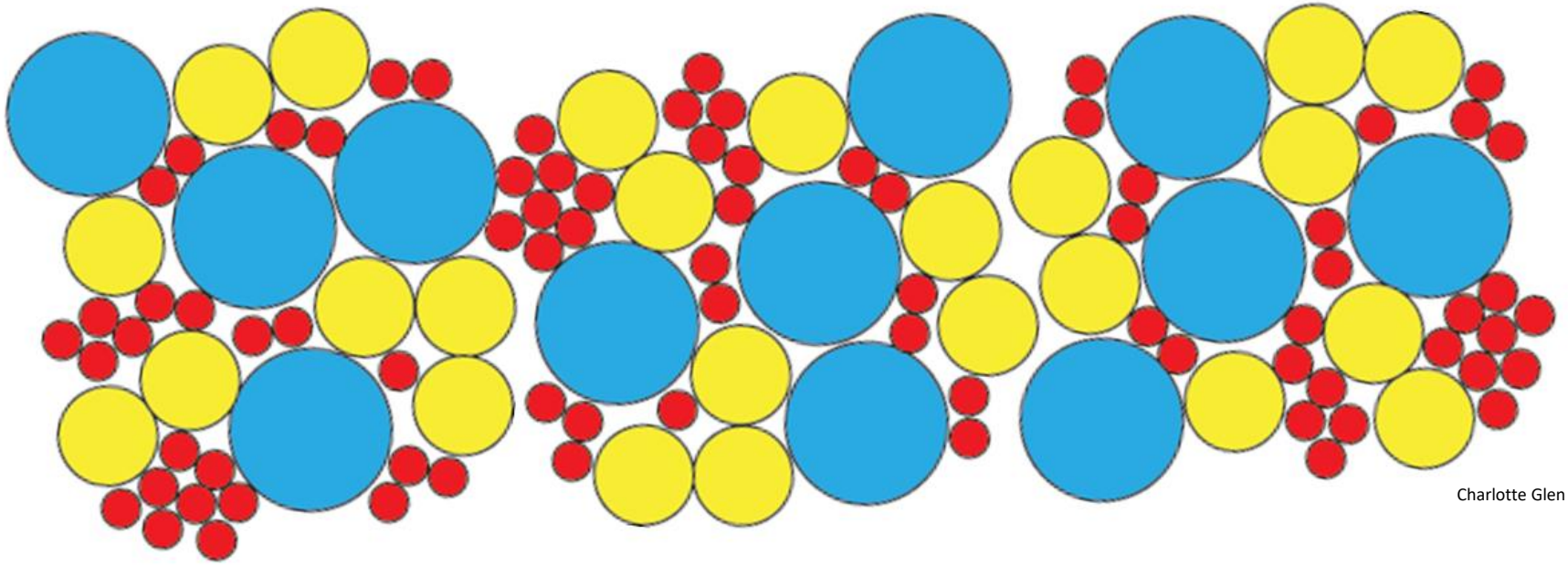
It is unrealistic to try to alter the texture of your soil.



Soil Texture (mineral portion)

Soil is a Mix of Sand, Silt and Clay

***cannot* change the texture**



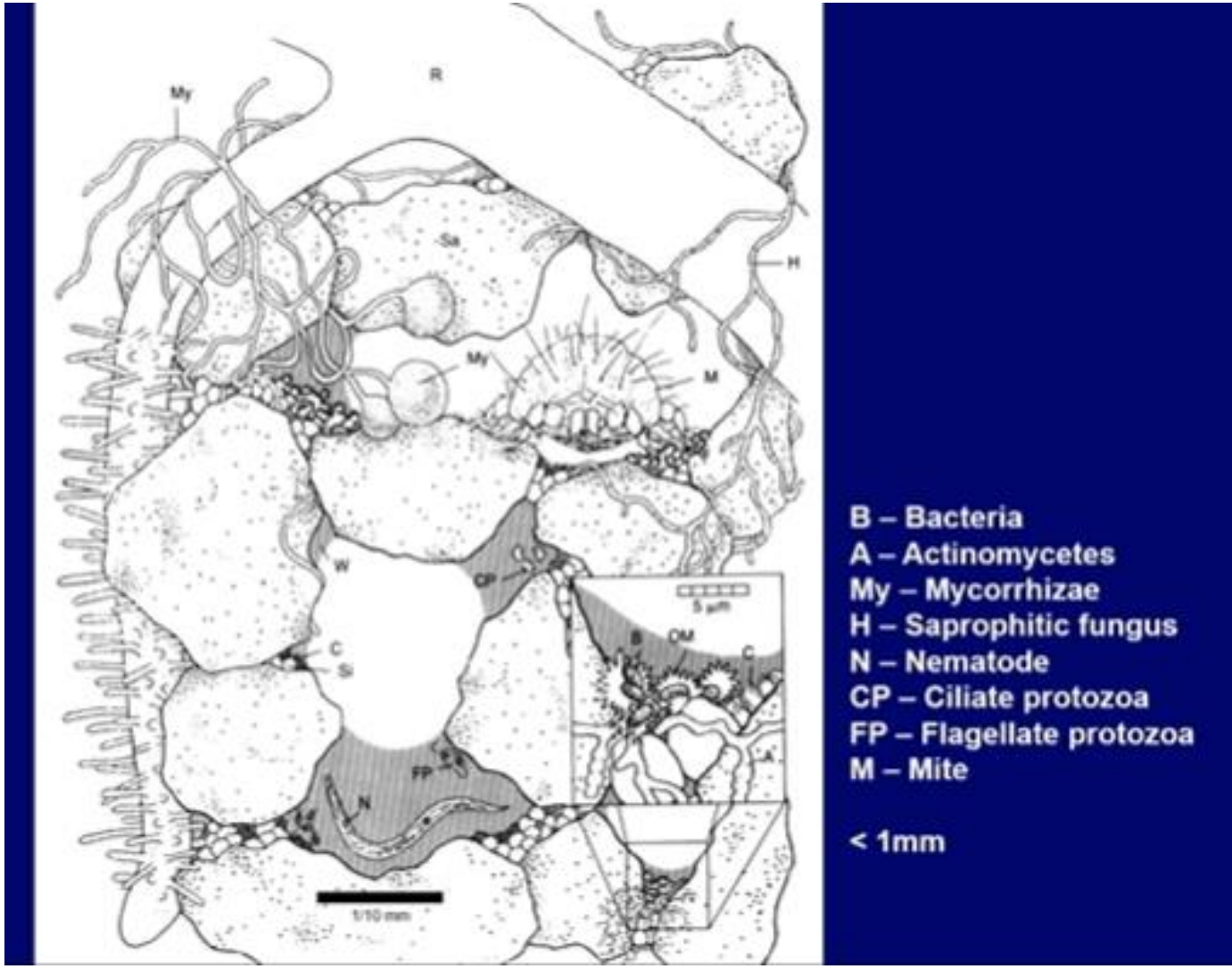
Charlotte Glen

What Is Soil Organic Matter & Why It Matters

- SOM – non-mineral component of soil made of once living residues (at various stages of decomposition), currently living things, and substance synthesized by soil organisms
- SOM retains water and nutrients due to high surface area, porosity, cation-exchange potential

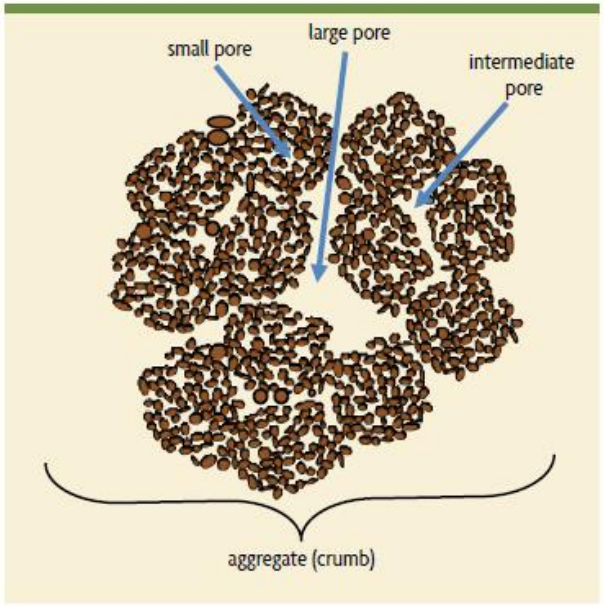
Soil life in SOM

- SOIL = HABITAT
- Plants sculpt soil with roots, leaving large pore that persists after plant death
- Microbes produce enzymes that lower activation of organic molecules into usable energy

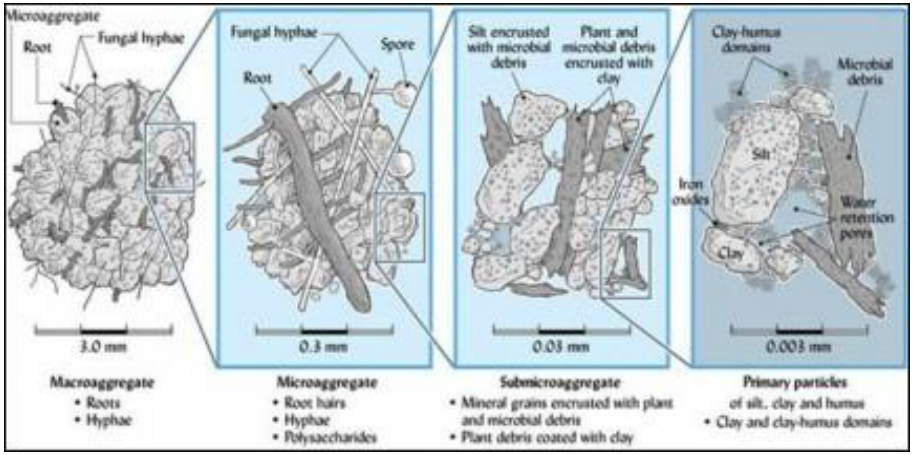


Soil Structure Aggregation of Soil Particles (organic matter)

Organic matter binds soil particles together into aggregates & creates pore spaces for water, air, and roots. Texture cannot be improved, but structure can be improved.



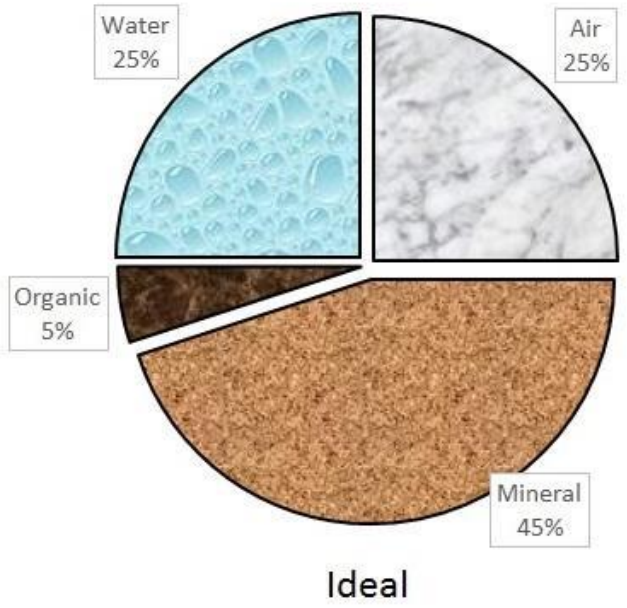
Building Soils for Better Crops
USDA SARE



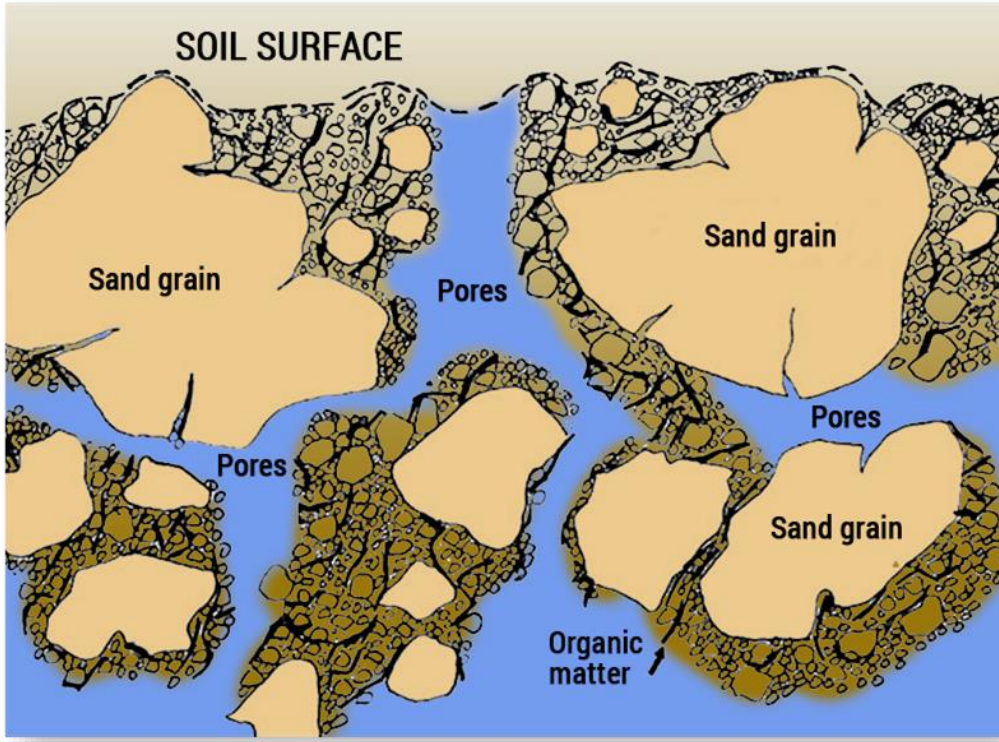
Brady and Weil 2010
Elements of the nature and properties of soils

***can* improve the structure**

Soil Structure



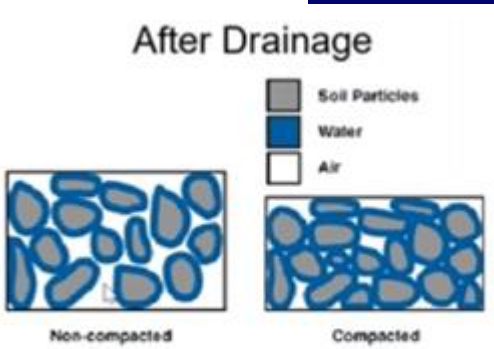
NC State Extension Gardener Handbook

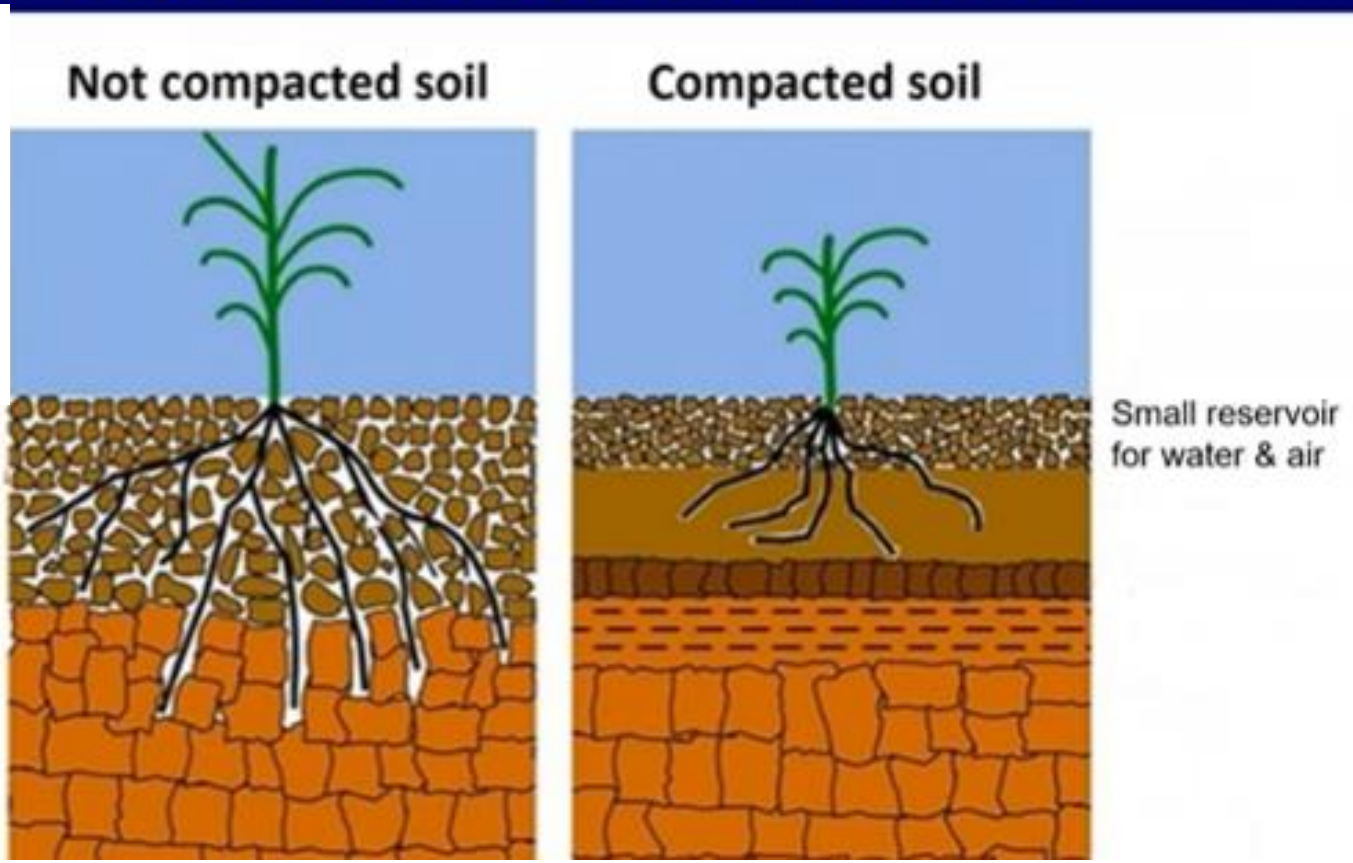


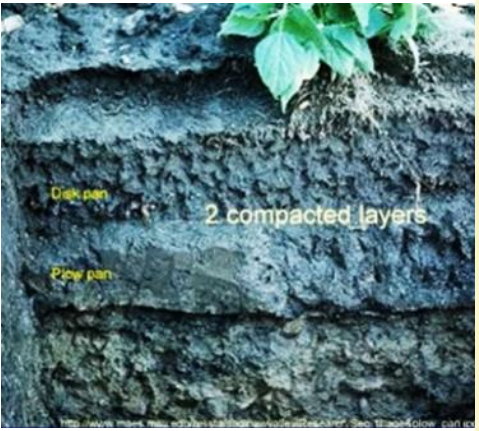
Charlotte Glen, NC State Author

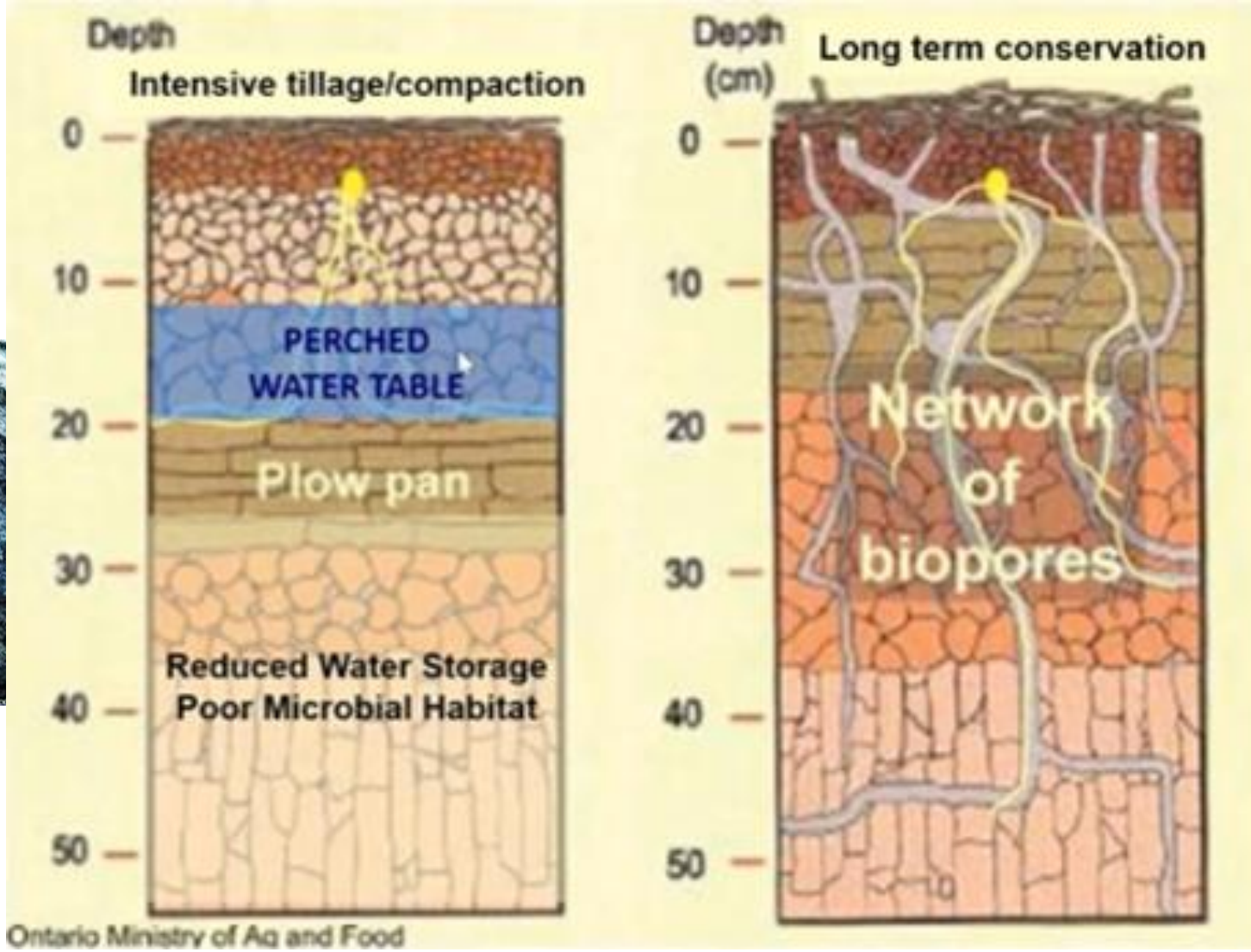
- Organic matter helps aggregate soil.
- Aggregates create pore space, allowing water to enter and then be held in the soil.

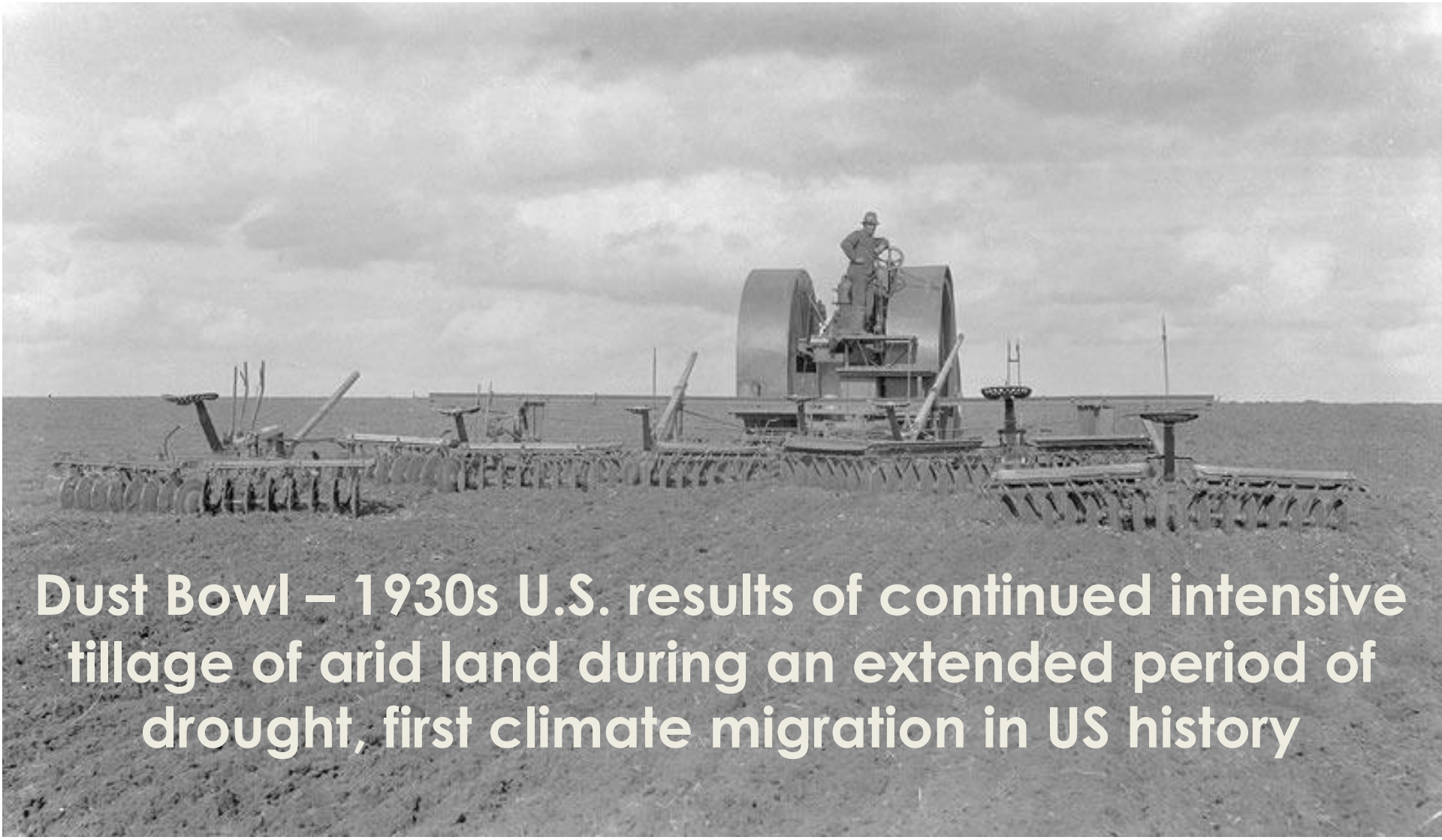
Pore Space Management
Wide Pore Size Distribution





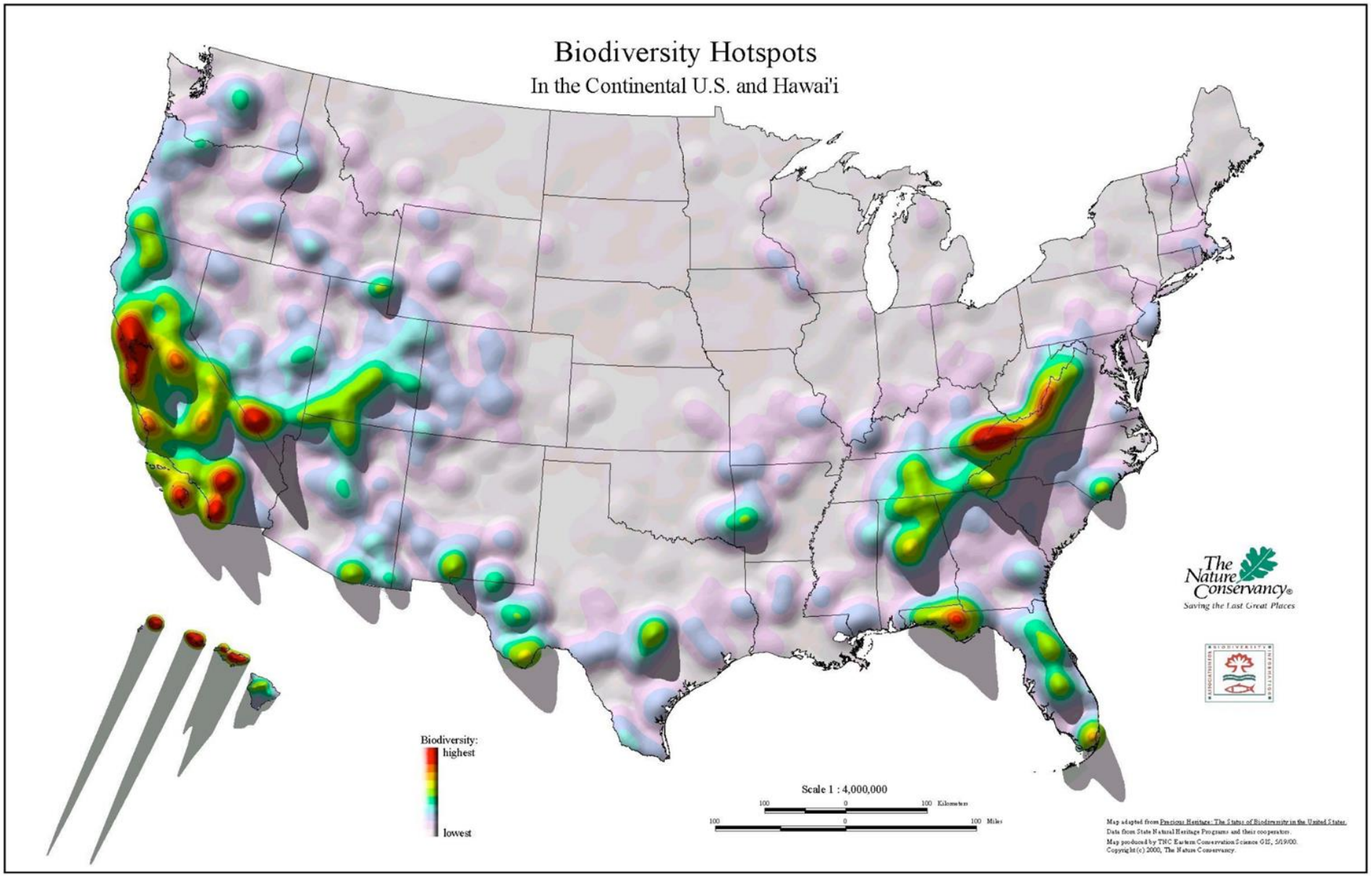

Disk pan
2 compacted layers
Plow pan


Depth
Intensive tillage/compaction
0
10
20
30
40
50
PERCHED
WATER TABLE
Plow pan
Reduced Water Storage
Poor Microbial Habitat
Depth
(cm)
Long term conservation
0
10
20
30
40
50
Network
of
biopores
Ontario Ministry of Ag and Food



Dust Bowl – 1930s U.S. results of continued intensive tillage of arid land during an extended period of drought, first climate migration in US history

NC is a biodiversity hotspot!



Choose native and non-invasive plants well suited to coastal conditions

Seashore mallow
(*Kosteletzkya virginica*)

Carolina anole searches for prey on a seashore mallow

Can you identify the native tree?




Loblolly bay (*Gordonia lasianthus*)



Mimosa (*Albizia julibrissin*)

Can you identify the native bush?

Thorny olive (*Elaeagnus pungens*)

Yaupon holly (*Ilex vomitoria*)

Shrubs are underutilized – native berries have a high fat content at a crucial time of year (migration), however, many invasive shrubs like privet have sugary berries that aren't healthy for bids

Can you identify the native vine?

Japanese honeysuckle (*Lonicera japonica*)

Coral honeysuckle (*Lonicera sempervirens*)

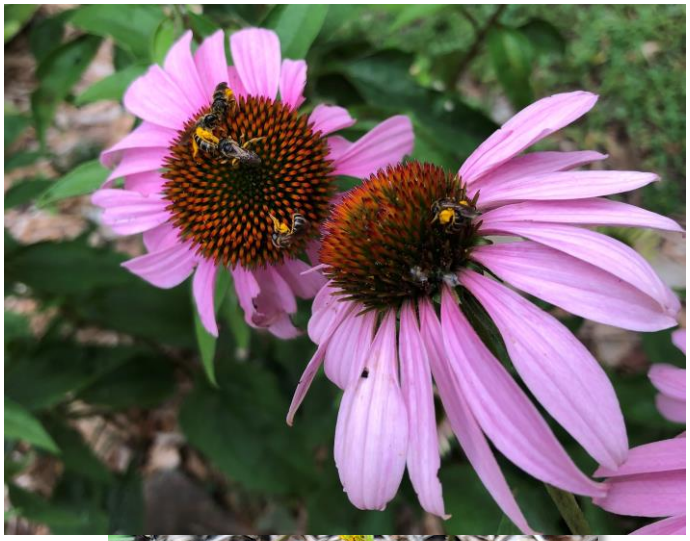
What is “Native”?

Species that evolve naturally in an environment without human intervention

Plants are adapted to local soil and climate conditions over thousands of years

Co-evolve with other species and form interdependent and highly specialized relationships that are necessary for the other’s survival

Much of our coast represents the Floristic transition between the Virginian and Carolinian biogeographic regions



Why plant Natives?

-Uniquely adapted to local environmental conditions

-Generally require less care and less water once established

-Protect local water quality by reducing the need for fertilizer

-Provide ecosystem services: clean air & water, heat mitigation, flood abatement, decreased crime, slower traffic, improved mental & physical health

-essential habitat for our native insects and wildlife

Adding Native Plants: base of food web

Ginkgo = 0

Maple = 285

River Birch = 413

Three plant types: **Contributors, Non-contributors, Detractors**

Plant choice matters! → no functional food webs without right plants

Data from Doug Tallamy's Research on Lepidopteran Use of Native and Non-native Plants

Woody Plants

Common Name	Plant Genus	Butterfly/moth species supported
Oak	Quercus	534
Black cherry	Prunus	456
Willow	Salix	455
Birch	Betula	413
Poplar	Populus	368
Crabapple	Malus	311
Blueberry	Vaccinium	288
Maple	Acer	285
Elm	Ulmus	213
Pine	Pinus	203
Hickory	Carya	200
Hawthorn	Crataegus	159
Spruce	Picea	156
Alder	Alnus	156
Basswood	Tilia	150
Ash	Fraxinus	150
Rose	Rosa	139
Filbert	Corylus	131
Walnut	Juglans	130
Beech	Fagus	126
Chestnut	Castanea	125

Herbaceous Plants

Common Name	Plant Genus	Butterfly/moth species supported
Goldenrod	Solidago	115
Asters	Aster	112
Sunflower	Helianthus	73
Joe pye, Boneset	Eupatorium	42
Morning glory	Ipomoea	39
Sedges	Carex	36
Honeysuckle	Lonicera	36
Lupine	Lupinus	33
Violets	Viola	29
Geraniums	Geranium	23
Black-eyed susan	Rudbeckia	17
Iris	Iris	17
Evening primrose	Oenothera	16
Milkweed	Asclepias	12
Verbena	Verbena	11
Beardtongue	Penstemon	8
Phlox	Phlox	8
Bee balm	Monarda	7
Veronica	Veronica	6
Little bluestem	Schizachyrium	6
Cardinal flower	Lobelia	4

From briningnaturehome.net

Carolina Chickadee

Length = 4.75”
Weight = 10.5g
(two nickels)

To raise one clutch (2-3 birds) to fledge (plus 21 days) = 10,000 caterpillars!!!

Bird seed and winter berries

Moths & Butterflies as Food

- Worldwide 37% of animal species are herbivorous insects
- Beetles and Lepidoptera
- Convert plant tissues of all types to protein, fat
- 96% of bird species eat insects

Pound for pound insects have more protein than beef—high in valuable energy! Source of carotene, birds can't make on own.

What can *you* do?

Gary Allen

Nature at Home Principles

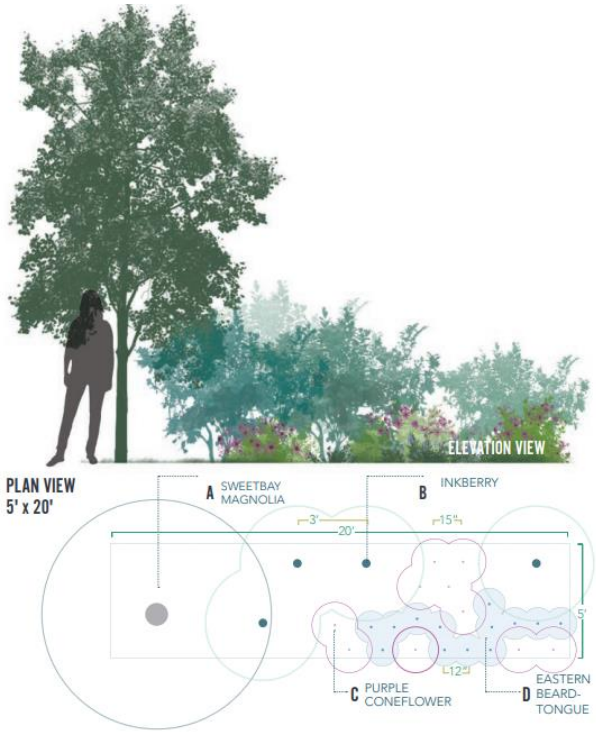
1. Add native plants: right plant, right place
2. Remove non-native invasives
3. Manage stormwater
4. Increase garden beds; reduce lawns
5. Reduce use of synthetic herbicides, pesticides, fertilizers
6. Leave the leaves; save the stems
7. Provide wildlife structures and water features
8. Reduce nighttime light pollution

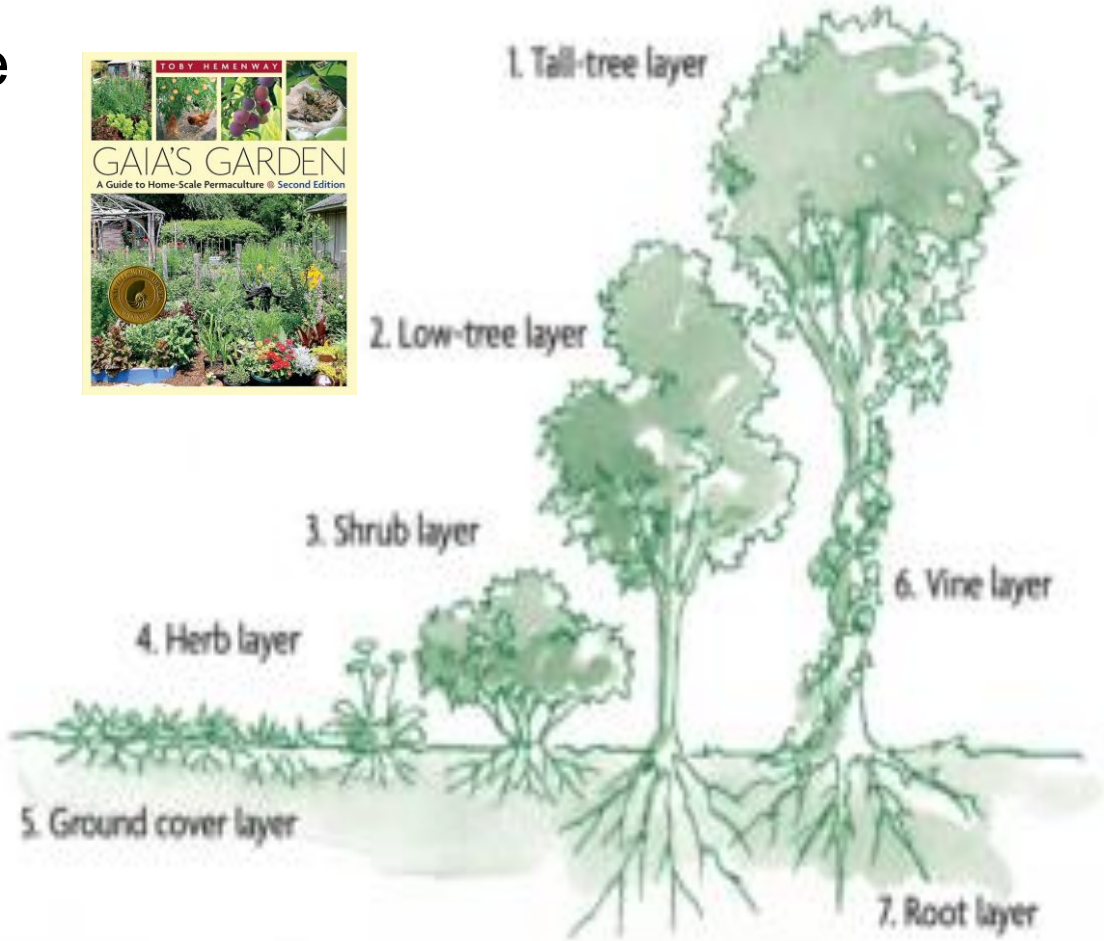
Right Plant, Right Place

- Native alone does not mean a plant is well suited to a site
- Know your soil, hydrology and habitat

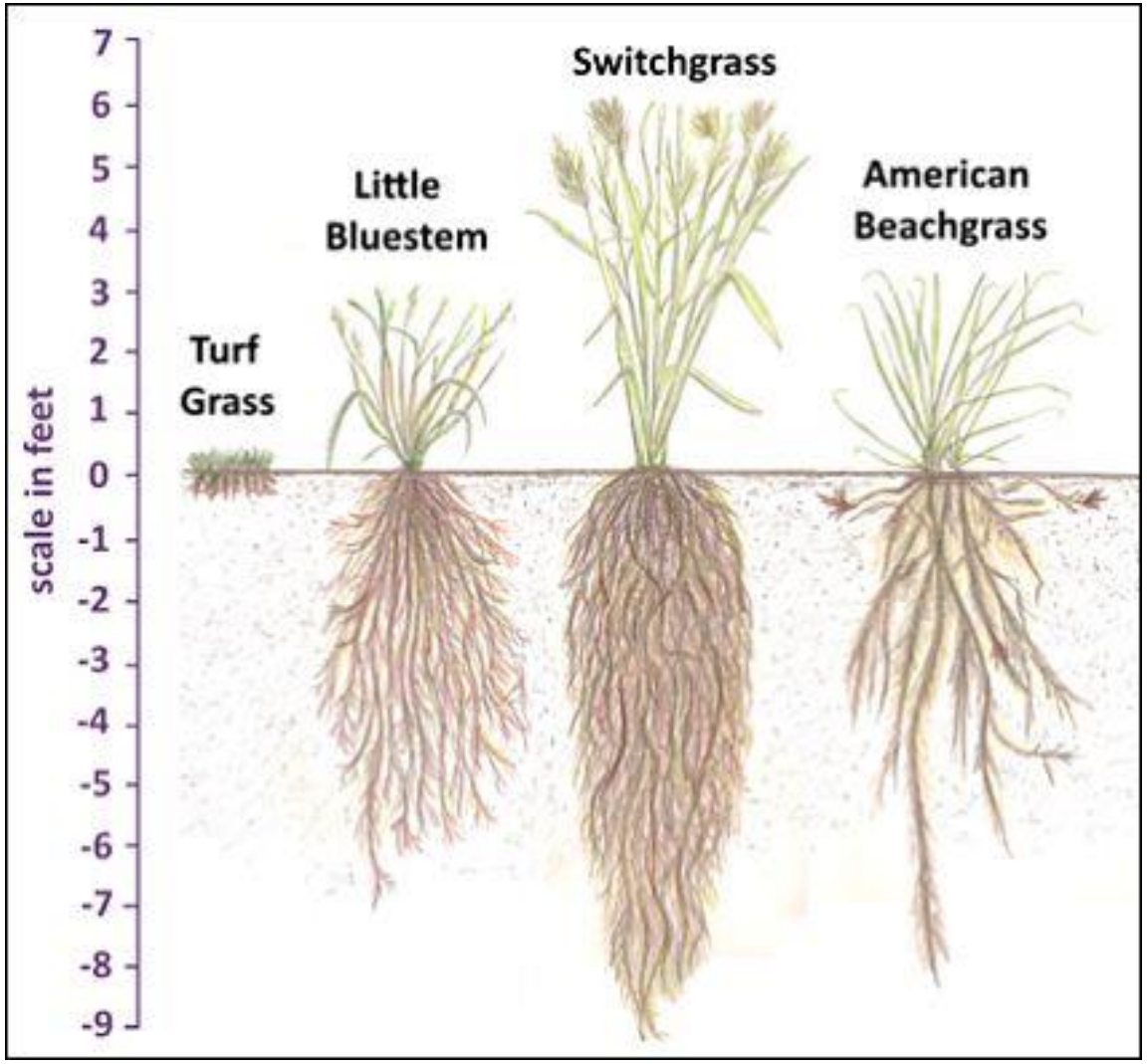
Diversity in Species and Structure

- Five layers of plantings
- Canopy trees if possible
- Try for at least three layers





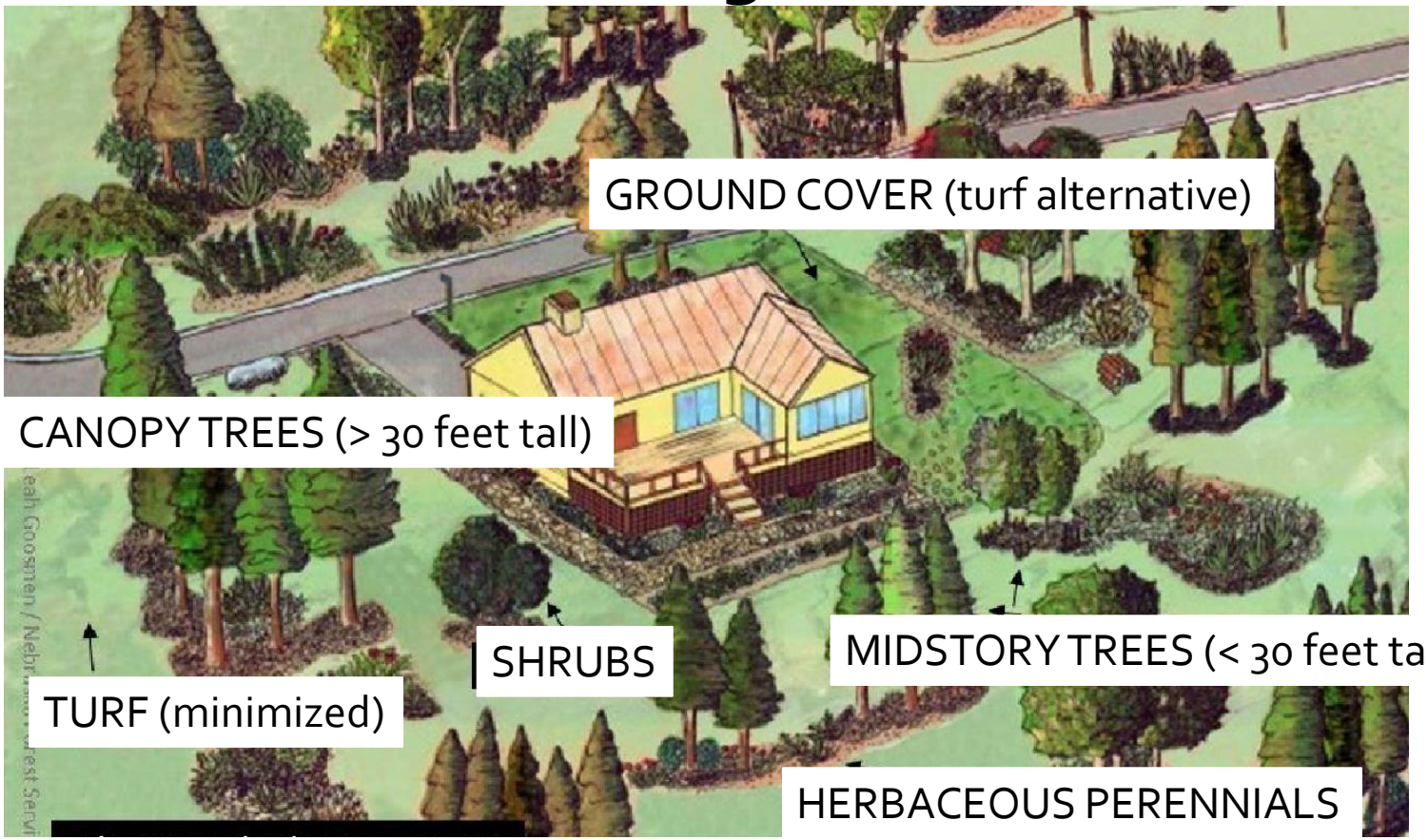
Turfgrass has very shallow roots



Native Plant Pond Buffer

Tallahassee Democrat

Use a mix of plant types for health & ecological benefits



COASTAL
NORTH CAROLINA

PLANT THIS INSTEAD!

Eco-friendly Alternatives to Harmful Ornamental Plants

From the
COASTAL
LANDSCAPES
INITIATIVE

AVOID THESE TREES

CALLERY PEAR
Pyrus calleryana 'Bradford' and other cultivars

POPCORN TREE/ CHINESE TALLOW
Triadica sebifera

MIMOSA
Albizia julibrissin

PLANT THIS INSTEAD

SERVICEBERRY *Amelanchier canadensis*

This deciduous tree or small shrub features slightly fragrant white flowers that appear before the leaves in early spring. In late spring, tasty purple-red berries appear, which songbirds and various mammals eat. Its early blooms are important to pollinators, and the *Amelanchier* genus supports over 94 species of butterflies and moths. Its attractive fall foliage is yellow to bright orange-red.

TIP A dark foliage backdrop helps to highlight this tree's attractive flower, leaf, and bark.

LIGHT: Full sun to part shade **SOIL:** Moist
HEIGHT: 10'-20' **WIDTH:** 15'-20'

REDBUD *Cercis canadensis*

In early spring before foliage emerges, this deciduous, multi-trunked understory tree blooms profusely with stunning pea-like rose-purple edible flowers which cover the bare branches. Its heart shaped leaves turn pale yellow to greenish yellow in the fall. Bean-like seed pods often remain through the winter. This tree is a larval host plant for 12 species of Lepidoptera, the insect group that includes butterflies and moths. Birds feed on redbud seeds.

LIGHT: Full sun to part shade **SOIL:** Occasionally dry to moist
HEIGHT: 20'-30' **WIDTH:** 25'-35'

FRINGETREE *Chionanthus virginicus*

A showy, deciduous, multi-trunked tree with an abundance of softly fragrant fringe-like white flowers that appear in spring. The leaves turn yellow in autumn. The tree is used for food and shelter by many animals including birds, bees, and other pollinators. It is a host plant to the Fawn Sphinx and Rustic Sphinx moths.

TIP Plant it in a mass (large group) or as a specimen.

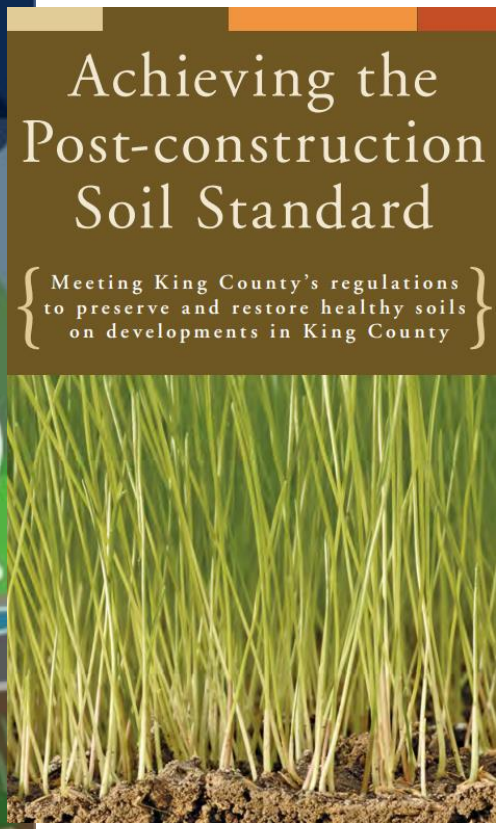
LIGHT: Full sun to part shade **SOIL:** Occasionally dry to moist
HEIGHT: 12'-30' **WIDTH:** 12'-20'

MORE SPECIMEN TREES

Flowering Dogwood *Cornus florida*
Sweetbay Magnolia *Magnolia virginiana*
Blackhaw *Viburnum prunifolium*
Red Mulberry *Morus rubra*
Sparkleberry *Vaccinium arboreum*
Red Buckeye *Aesculus pavia*
Carolina Cherry Laurel *Prunus caroliniana*
Hawthorn *Crataegus phaenopyrum*
Red Maple *Acer rubrum*

go.ncsu.edu/CoastalLandscapes


Stormwater Runoff Pollutes
HEAL OUR WATERWAYS
Runoff from Roof
Runoff from Gutters
Runoff from Street
RUNOFF PICKS UP:
• Pet Waste
• Fertilizers
• Motor Oil
• Detergents
• Chemicals
• Litter
STORMWATER RUNOFF CARRIES POLLUTANTS INTO OUR WATERWAYS.
© Heal Our Waterways


Achieving the Post-construction Soil Standard
Meeting King County's regulations to preserve and restore healthy soils on developments in King County

Manage storm water to improve water quality

Harvest and use rain water

Direct downspouts to gardens

Maintain stormwater ponds for water quality and beauty

Low Impact Development - LID

Practices that prevent stormwater runoff from polluting waterways by mimicking a site's natural surface water & groundwater hydrology

- Disconnected impervious surfaces
- Preservation of open space/natural features
- Rain Gardens or Bioretention Areas
- Porous pavement
- Water harvesting (rain barrels, cisterns
- Low-input native landscaping

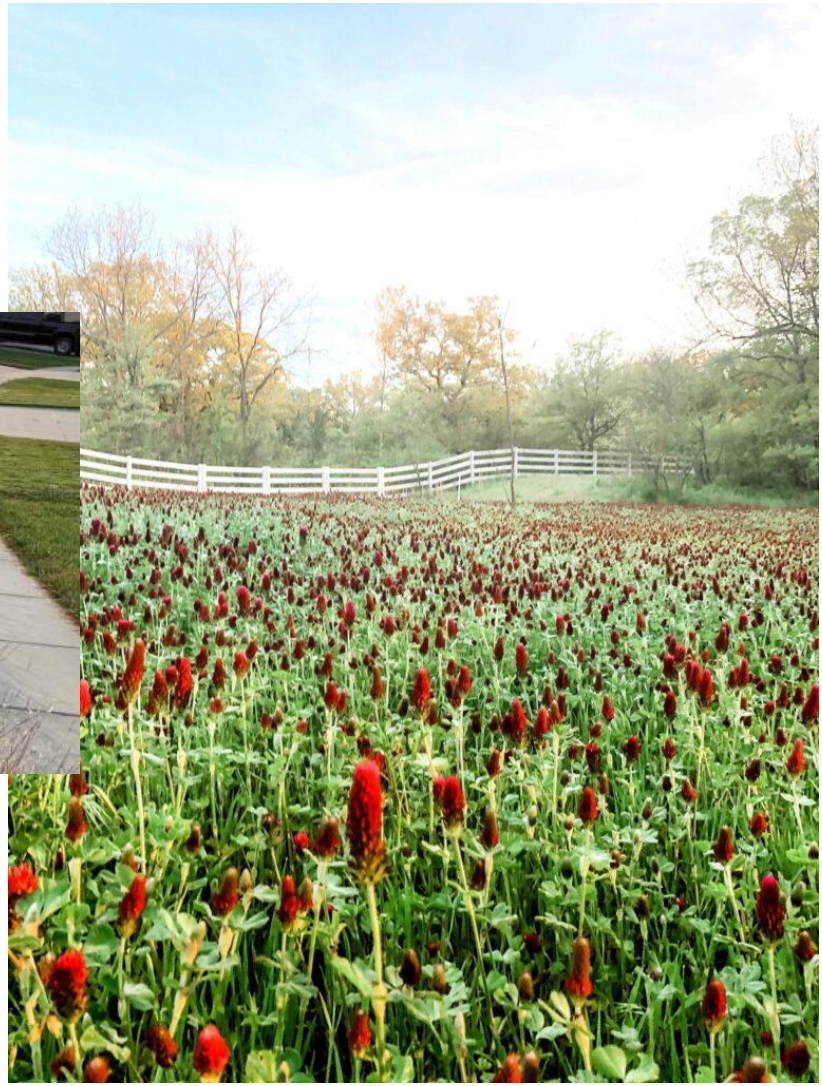
Reduce turf and adopt lawn alternatives to create habitat for wildlife

Wild ginger
(*Asarum canadense*)

Cinnamon fern
(*Osmunda cinnamomea*)

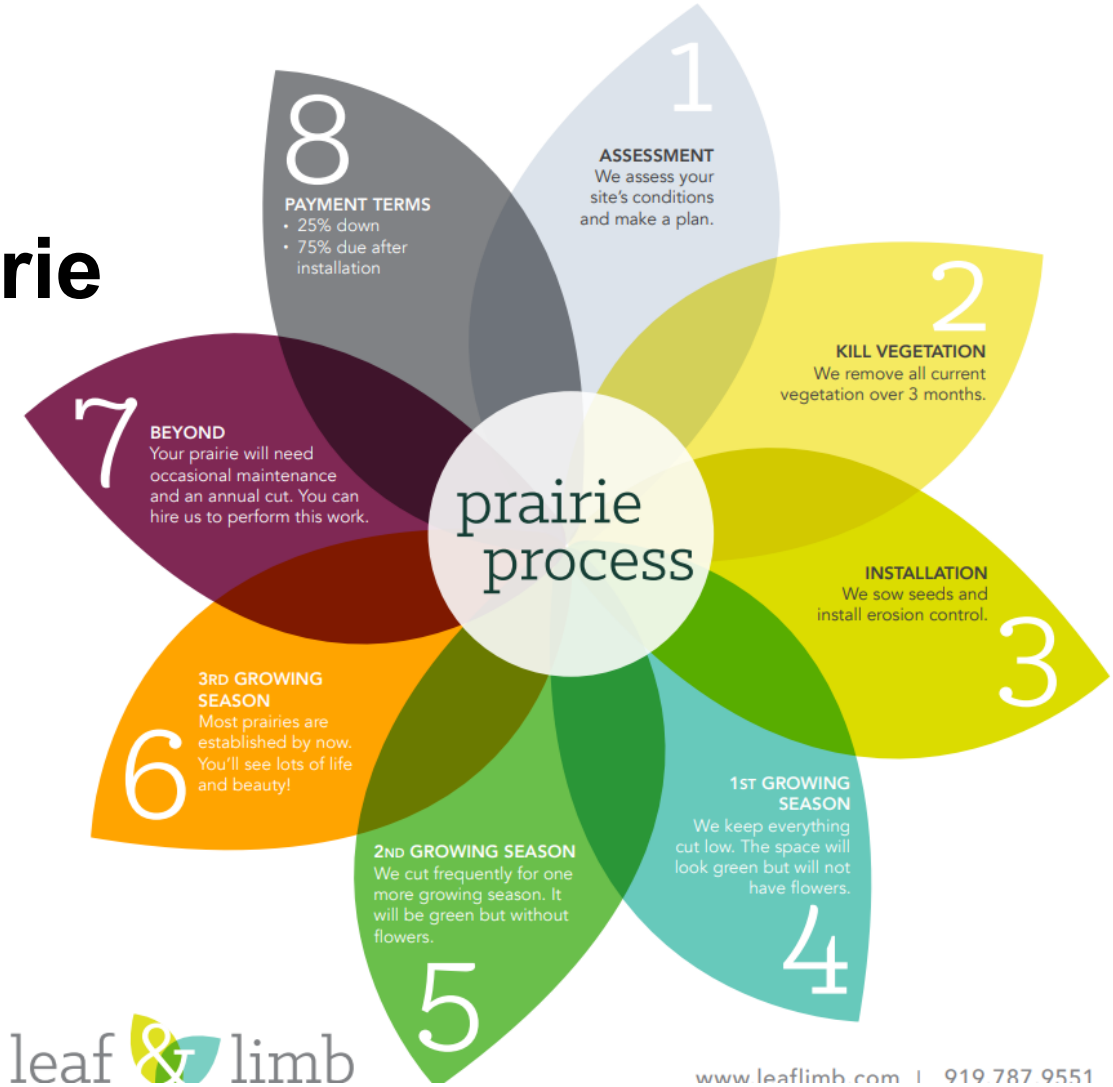
Pink muhly grass
(*Muhlenbergia capillaris*)


PRAIRIE UP



Piedmont Prairie

- Leaf & Limb Raleigh, NC
- Manage yards as meadows – less mowing, spraying; more resilient



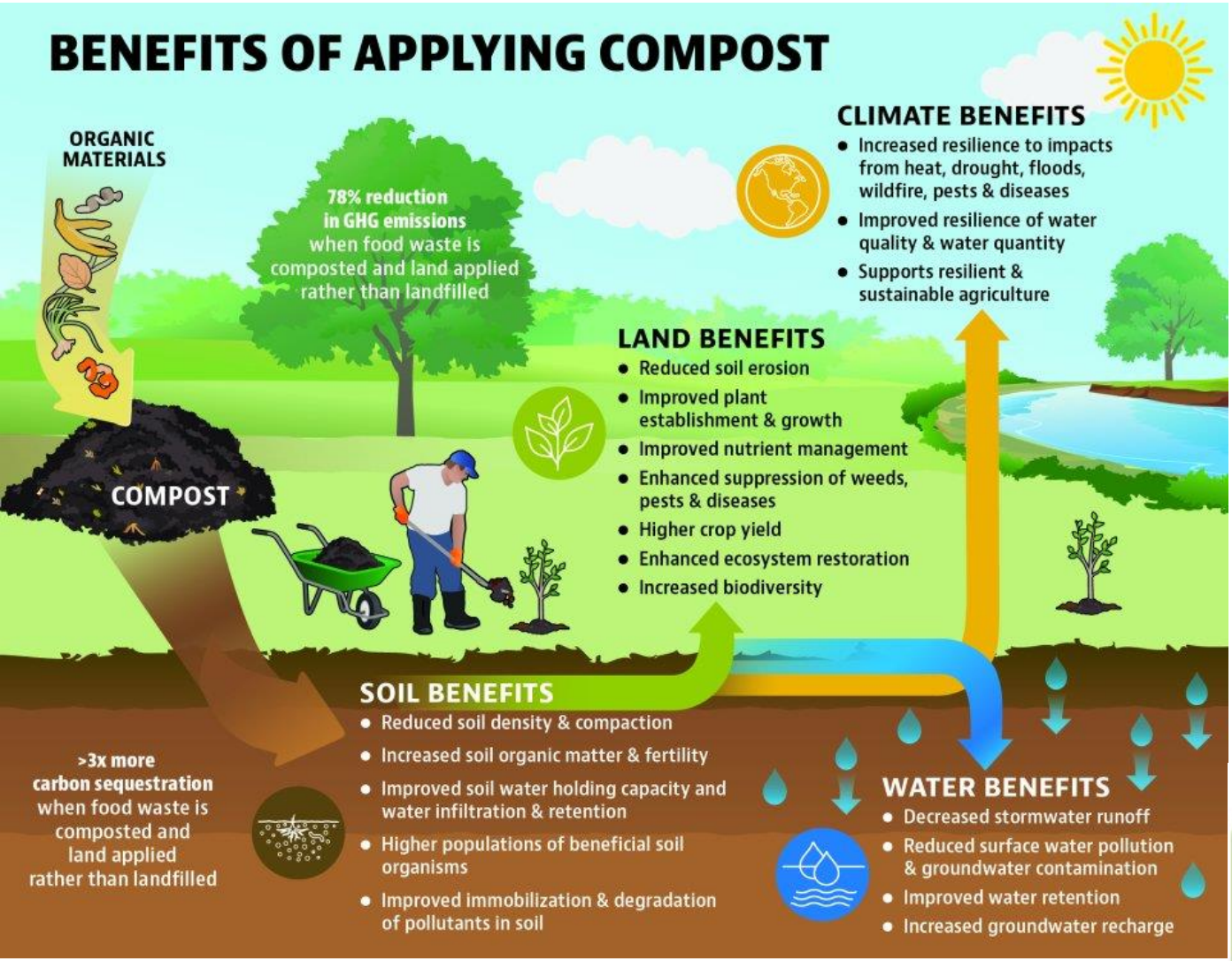
Water & fertilize strategically to maintain water quantity & quality

Incorporate Organic Matter to Build Healthy, Fertile Soil

- Adding OM improves most soil conditions
- Compost
- Cover Crops
- Mulches
- Biochar
- Crop Rotations
- Compost Teas

NRCS Factoid:

- Increasing soil organic matter (SOM) by 1% enhances water-holding capacity (WHC) by approximately 20,000 to 27,000 gallons per acre-foot.



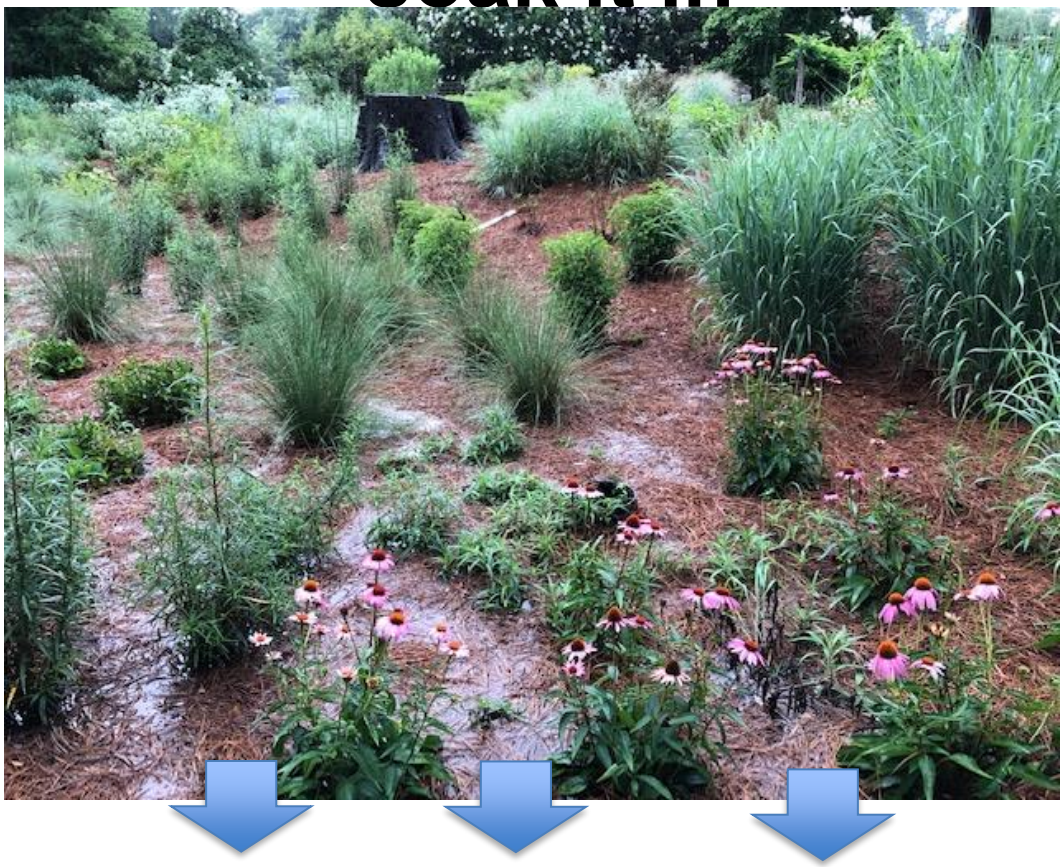
NC Composting Council
STATE CHAPTER OF THE U.S. COMPOSTING COUNCIL

Certified® Compost
STA | Seal of Testing Assurance
US Composting Council®

OMRI LISTED
For Organic Use · OMRI.org

carolinacompost.com/
Chapter of the US Composting Council
Graphic source: EPA

Slow it down, spread it out, soak it in



Compost Turf Topdress

- 1/8”-1/4” finely screened
- Timing of application
- Topdresser

Air Spade

- Restore the sponge
- Break up compacted soil without damaging roots, high-pressure air cannon
- Growing in healthy, living soil vs. surviving in hard, lifeless dirt
- Screwdriver test
- Air spade to incorporate organic matter (compost) into loosened dirt, apply arborist wood chip

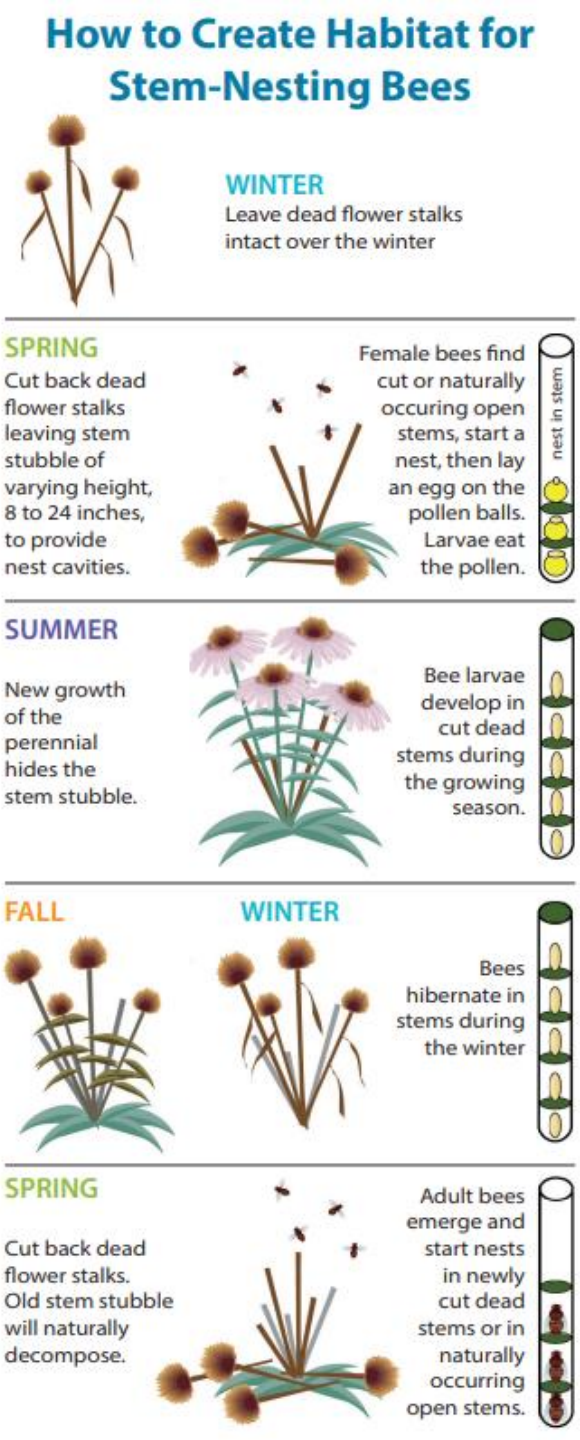
Leave the Leaves

- Save labor, time, material – still tidy
- Keep carbon where it falls: leaf pile, leaf litter mulched areas, brush pile, dead wood
- Many species rely on fallen leaves for insulation (eggs, larvae, pupae, adults – bees, beetles, butterflies & moths, spiders, snails, worms, millipedes, mites → turtles, birds, amphibians); life in the litter
- Fireflies – larvae love leaves

NC STATE UNIVERSITY

Save the Stems

- For overwintering pollinators
- Safe to cut stems only in first winter – trim back after first frost or before last frost (seeds for birds)
- 18”-24” stubble
- Stems unoccupied 1st winter, used as nesting sites in spring & summer
- Stems biodegrade



Save the Stems

Many hollow or pithy plant stems and branches provide excellent places for cavity-nesting insects to call home. Small carpenter bees (*Ceratina* spp.) frequently carve out their nests in last year's dead raspberry (*Rubus* spp.) canes or wildflower stems, often only a few inches away from the blossoms that provide pollen to feed their young. Still tinier yellow-faced bees (*Hylaeus* spp.) use the hollow center of smaller stems, like bee balm (*Monarda* spp.) or roses (*Rosa* spp.), and larger leaf-cutter bees (*Megachile* spp.) prefer the larger stems of plants like native thistles (*Cirsium* spp.), cup plant (*Silphium perfoliatum*), or desert willow (*Chilopsis linearis*). The biggest stem-nesting bees in North America, large carpenter bees (*Xylocopa* spp.), sometimes use the pithy stems of large plants like yucca (*Yucca* spp.) and agave (*Agave* spp.) in regions where wood is uncommon or unavailable. Other common occupants of dead stems and twigs include cavity-nesting wasps, stem-boring moths, and even some spiders. In addition, some beneficial insects insert their eggs into the stems of wildflowers and grasses for safe keeping over the winter.

Learn more about how you can help provide nesting habitat for native bees at: xerces.org/pollinator-conservation/nesting-resources.

Print additional copies of this brochure at: xerces.org/publications/brochures/save-the-stems

XERCES SOCIETY for Invertebrate Conservation

Acknowledgments

How to Create Habitat for Stem-Nesting Bees graphic provided by Colleen Satyshur, Elaine Evans, Heather Holm, and Sarah Foltz Jordan. Text above adapted from ***Nesting & Overwintering Habitat for Pollinators & Other Beneficial Insects*** by Sarah Foltz Jordan, Jennifer Hopwood, and Sara Morris of The Xerces Society for Invertebrate Conservation (available at: xerces.org/publications/fact-sheets/nesting-overwintering-habitat).

22-005_01

Provide Wildlife Structures & Water Features

- cats…

Reduce Nighttime Light Pollution

- Outdoor light major cause of insect decline (moths = majority of caterpillar diversity)
- Save on power bill

- Change bulbs to yellow/amber bug light (insects attracted to white & blue wavelengths, converting to yellow reduces interference); motion sensor, direct lighting downward

Create storm-ready, resilient landscapes

Travis Klondike

Consider nature-enhancing alternatives when replacing deteriorating bulkheads

Install living shorelines to protect your property & wildlife

Select storm-ready trees to protect your home

Common Name	Storm Observations
Coastal American hornbeam (*Carpinus caroliniana*)	Hard, dense wood; limbs resist breakage; medium-high wind resistance
Flowering dogwood (*Cornus florida*)	Hard, dense wood; high wind resistance; limbs resist breakage; wind defoliates tree
Common persimmon (*Diospyros virginiana*)	Hard, dense wood; medium-high wind resistance
American holly (*Ilex opaca*)	High wind resistance
Yaupon (*Ilex vomitoria*)	High wind resistance; high flood tolerance

Source: Paul E. Hosier, Seacoast Plants of the Carolinas

Select storm-ready trees to protect your home

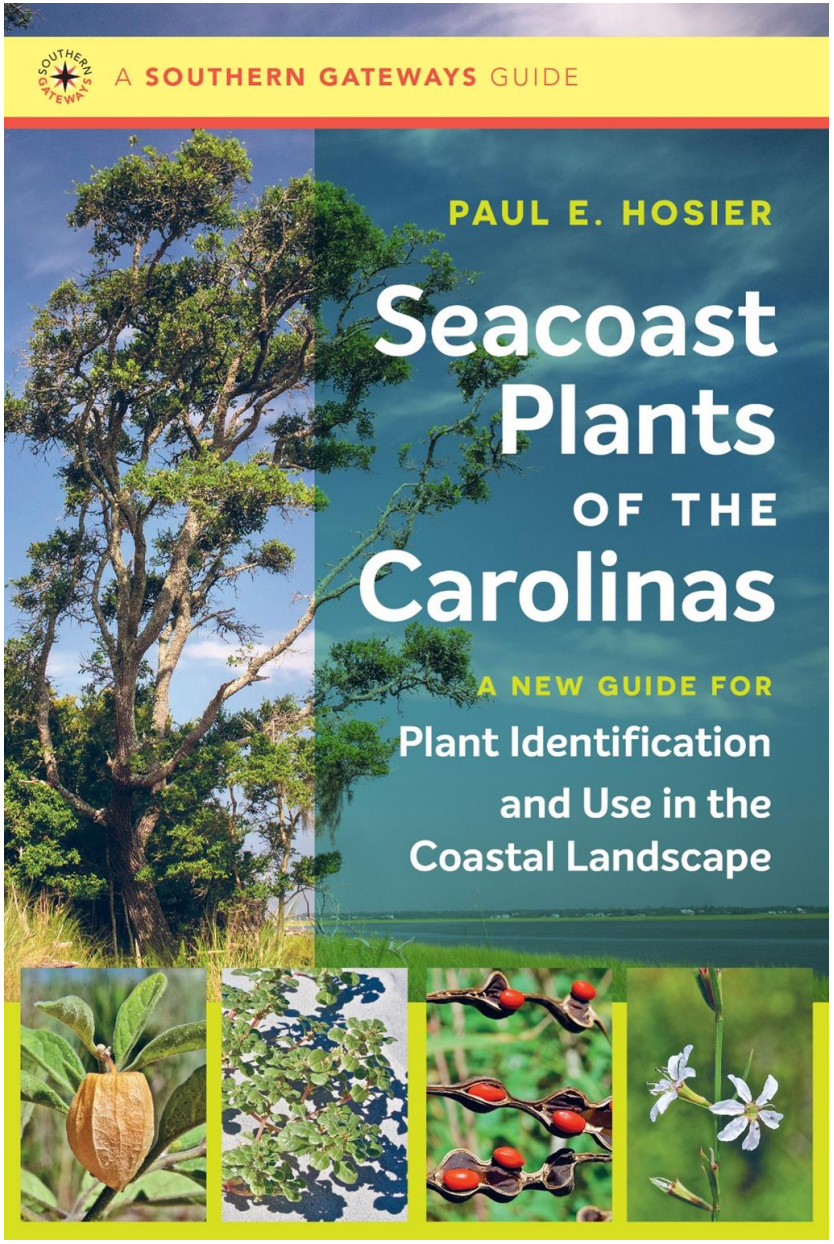
Common Name	Storm Observations
Southern magnolia (*Magnolia grandiflora*)	High wind resistance; wind defoliates tree; flood tolerant
Black gum (*Nyssa sylvatica*)	High flood tolerance; good wind resistance
Live oak (*Quercus virginiana*)	High wind resistance; wind defoliates tree; deep roots when in well-drained soil; somewhat low profile
Cabbage palmetto (*Sabal palmetto*)	High flood tolerance; high wind resistance
Bald Cypress (*Taxodium distichum*)	High wind resistance; widespread roots; few branches and leaves; flood-tolerant (fresh water only)

Source: Paul E. Hosier, Seacoast Plants of the Carolinas

Select storm-ready trees

See Chapter 7 on Native Vegetation and Coastal Storms

Live oak (*Quercus virginiana)*



Live Oak

Quercus virginiana

40-80’ tall, 40-100’ spread, not a “true” evergreen

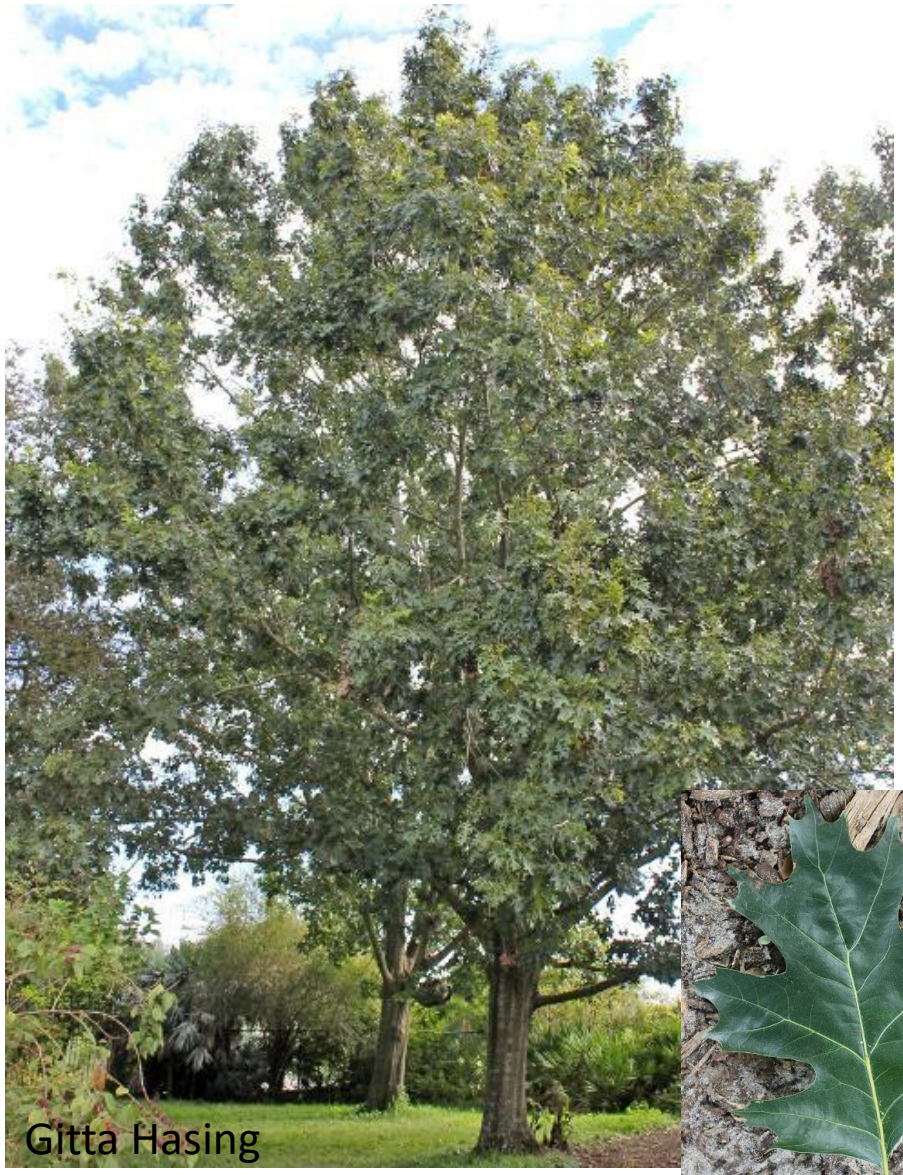
Adaptable to both clay and sandy soils that are acidic and well-drained

Most wind resistant tree

‘Cathedral’ cultivar

Imperial Moth (*Eacles imperialis*)

Hosts: *Pinus* sp., *Acer* sp., *Quercus* sp. *Liquidambar styraciflua*, *Sassafras albidum*



Shumard Oak

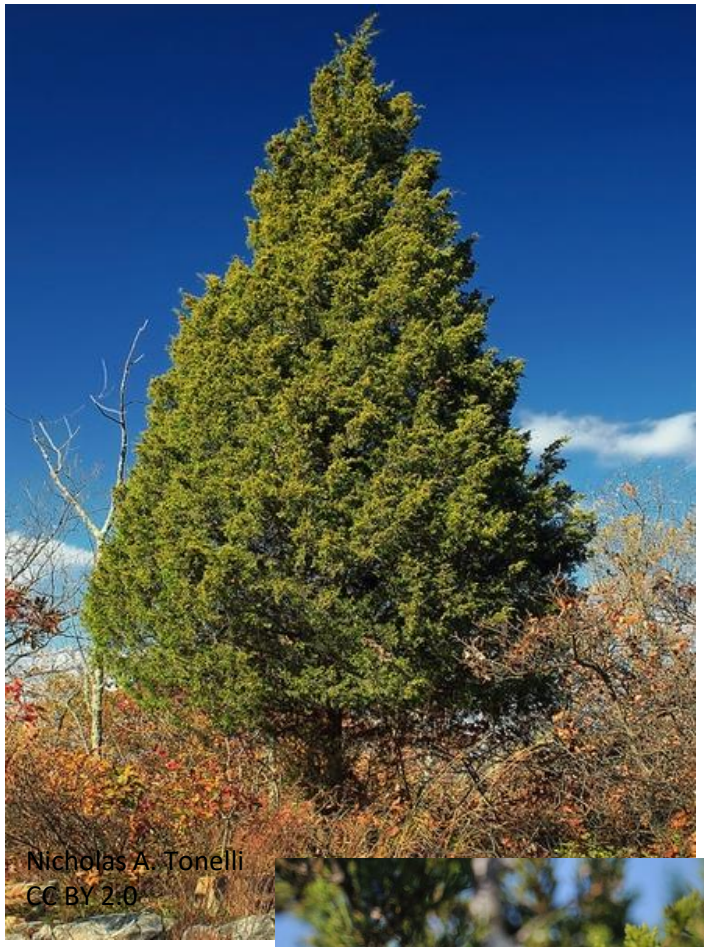
Quercus shumardii

40-80’ tall, 40-50’ spread

Adaptable to wide variety of soils, very stress tolerant

Great tree for urban settings

Wildlife value



Nicholas A. Tonelli
CC BY 2.0

JanetandPhil
CC BY-NC-ND 2.0

Eastern Red Cedar

Juniperus virginiana

Evergreen tree that can grow to 30+’ tall, width 12-24’

Fast growing conifer

Extremely drought tolerant

Provides cover and food for wildlife

Sweetbay Magnolia

Magnolia virginiana

20+’ tall, semi-evergreen tree or multi-stemmed shrub, deer resistant, 10-20’width

Fragrant flowers

Larval host for Spicebush Swallowtail and Eastern Tiger Swallowtail butterflies

Medium-high wind resistance

UNCW Campus- Longleaf Pine and Sweetbay Magnolia

Eastern Tiger Swallowtail Butterfly

American Holly

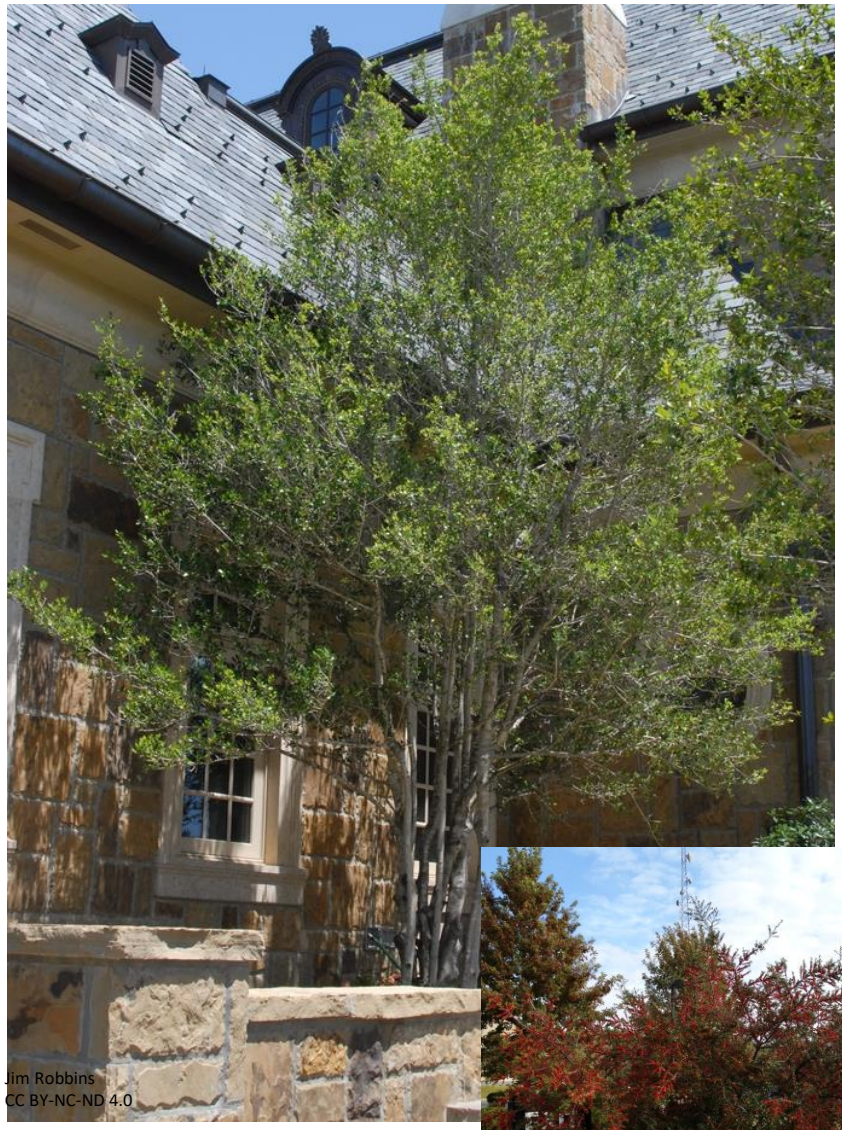
Ilex opaca

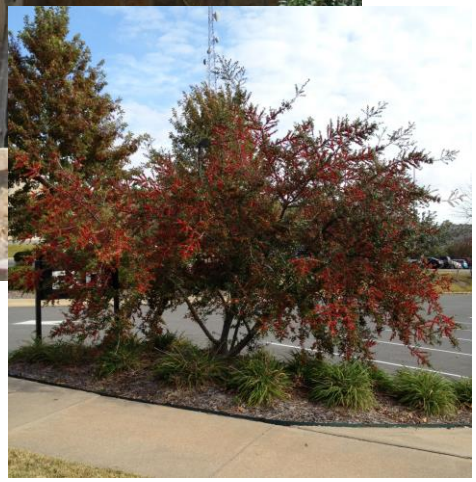
40-60’ tall, full sun to part shade

Will take a broad range or soils and is pollution tolerant

Flowers are attractive to pollinators and fruits for wildlife

Highly wind resistant





Yaupon Holly

Ilex vomitoria

Large shrub or small tree, can reach 10-20’ tall, 8-12’ width

Very drought tolerant

Female plants produce attractive red berries

Very attractive to pollinators

Dwarf Yaupon Holly

Ilex vomitoria 'Nana'

Dense, compact, evergreen shrub 3-5' tall, 3-6' width

Drought and salt spray tolerant

Grows rapidly

Has a more formal appearance

Inkberry

Ilex glabra

Evergreen shrub

Slow growing, 5-8’ tall

Tolerates a variety of soils, moderately salt tolerant

Cover and food for birds and pollinators enjoy flowers

Dwarf cultivar:
‘Shamrock’
3-4’ tall

Dwarf Palmetto

Sabal minor

2-5’ tall, 4-6’ width

Drought and moderately salt tolerant

Most cold hardy native palm

Fruits eaten by robins, raccoons, and other birds and mammals

Wax Myrtle

Myrica cerifera

Evergreen tree/shrub, 15-20’ at maturity

Native to NC marshes, swamps, fresh-brackish streams

Great for erosion, wind and salt spray tolerant

Wildlife value

Beautyberry

Callicarpa americana

3-8’ tall, Full sun

Deciduous Shrub

Fruits appear August-Oct
Valuable food source for songbirds and small mammals

‘Color Guard’

Yucca

Yucca filamentosa

Evergreen sword-shaped leaves with curly filaments

Prefers coarse, sandy soils in full sun

Tall panicle of white flowers attracts pollinators

Muhly Grass

Muhlenbergia capillaris

4’ tall, 3’ width

Long-lived, little to no insect or disease pests and highly resistant to deer grazing

Tolerates heat, humidity, drought, poor soil and is highly salt tolerant

Little Bluestem

Schizachyrium scoparium

2’ tall, Vigorous, long rooted grass

Good for erosion control: Stream banks, slopes, rain gardens

Larval host plant for skippers, seeds eaten by birds

Cut back in March

Cultivar ‘Northwind’

Switchgrass

Panicum virgatum

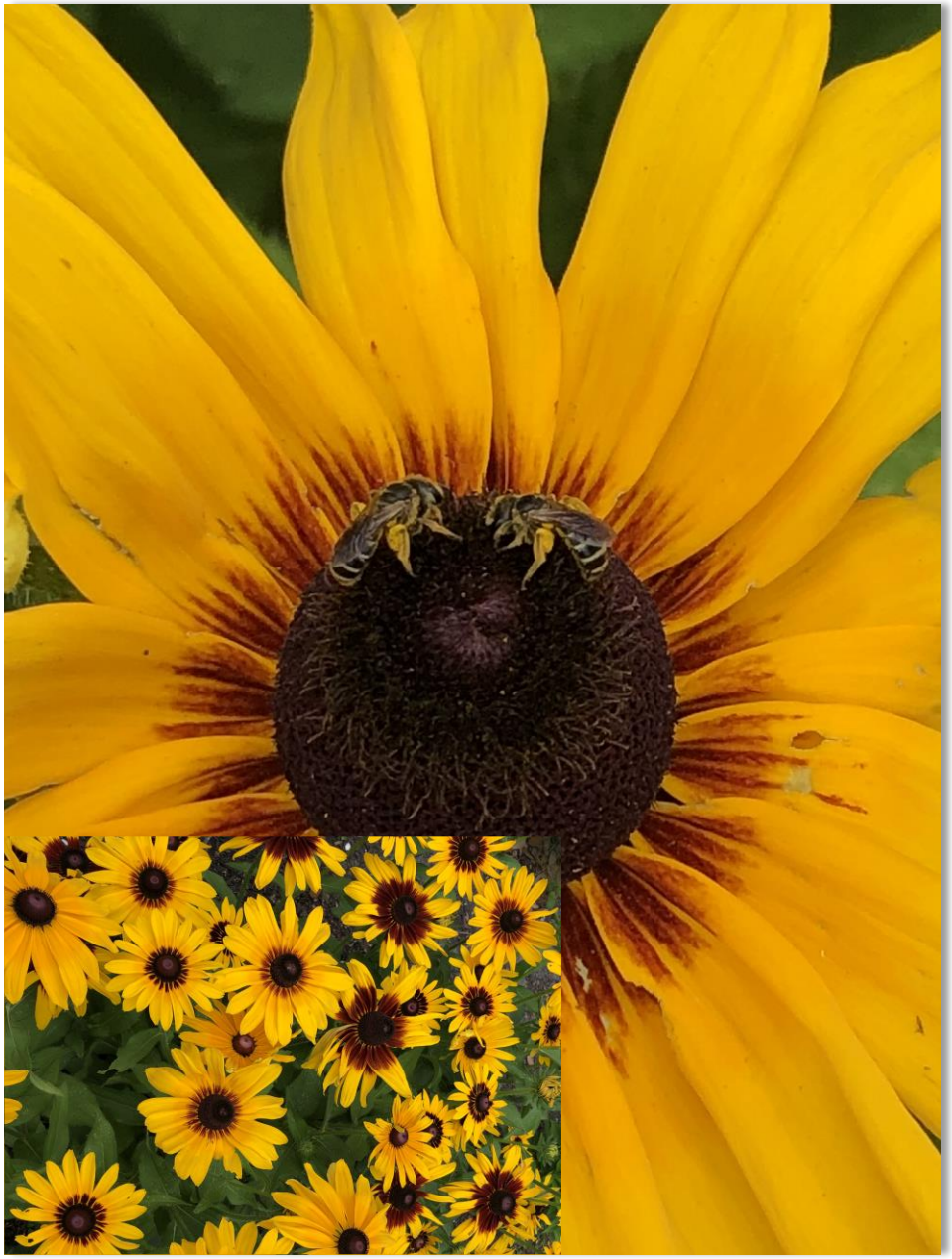
3-5’ tall, full sun

Moist clay or sandy soils

Bluish cast in the summer, pink flowers in fall

Slightly salt tolerant

Plant in masses



Black-eyed Susan

Rudbeckia hirta

Full Sun

Blooms summer through fall

Short lived perennial, easily reseeds

Blanket Flower

Gaillardia pulchella

Naturalized in NC

Barrier island, sandy soils, full sun

Drought and salt tolerant

Blooms summer to fall

Attracts butterflies

Spotted Horsemint

Monarda punctata

2-4’ tall

Herbaceous perennial

Drought tolerant

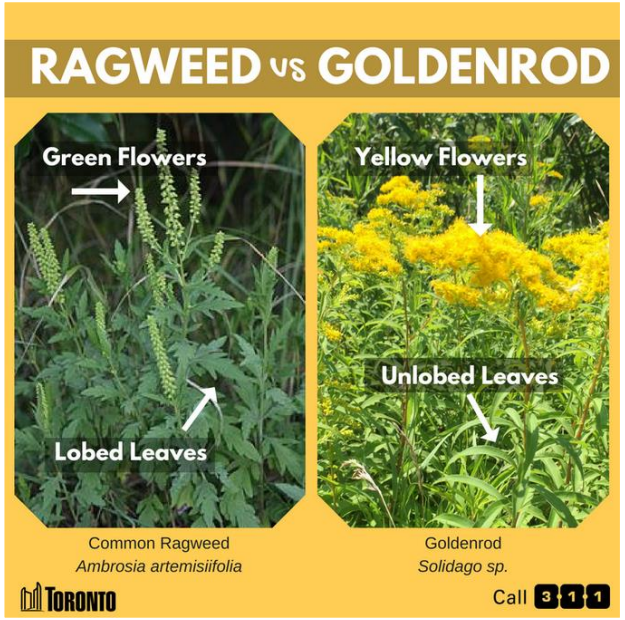
Excellent cut flower

Deer and rabbit resistant

Beautiful, Beneficial Goldenrods…

solidago spp

…different from ragweed!



NORTH CAROLINA AQUARIUM Roanoke Island

The Goldenrods
Solidago spp

Solidago odora:
(anise–scented goldenrod)
Early and short-statured

S. speciosa (showy) & *S. rigidum* (prairie):
Back of the border, late summer pollinator magnets

Solidago
'Fireworks':
Heralds the fall, evergreen foliage

S. sempervirens:
(seaside goldenrod)
Late fall monarch favorite, prefers low nutrient soils

Surf City Roundabout

Eastern Red Cedar
Dwarf Palmetto
Dwarf Yaupon Holly
Yaupon Holly
Magnolia ‘Little Gem’
Laurel Oak or
Darlington Oak

COASTAL LANDSCAPES INITIATIVE

Sea Grant NORTH CAROLINA

NC COOPERATIVE EXTENSION · NC STATE Design · UNCW · Coastal Studies Institute · Sea Grant North Carolina

- Public & private sector partners collaborating to encourage sustainable practices in coastal communities by fostering coastal landscapes that are beautiful, functional, cost efficient and environmentally friendly
- https://ncseagrant.ncsu.edu/program-areas/healthy-ecosystems/coastal-landscapes
- "Native Plant Picks" videos featuring beautiful, maintainable, cost-efficient, and environmentally beneficial selections adapted to thrive in the harsh conditions of coastal NC, strong sun and wind, the dry, sandy soil, and the salty air and water; check out Sea Grant's Youtube Channel https://ncseagrant.ncsu.edu/news/2021/09/new-video-series-highlights-native-plants-for-coastal-landscapes/
- Design Templates
- Booklet (A Native Plant Guide Provided by the Coastal Landscapes Initiative – 34 plants) and Brochure
- Videos, webinars, presentations
- Container gardens with natives

CLI Design Templates

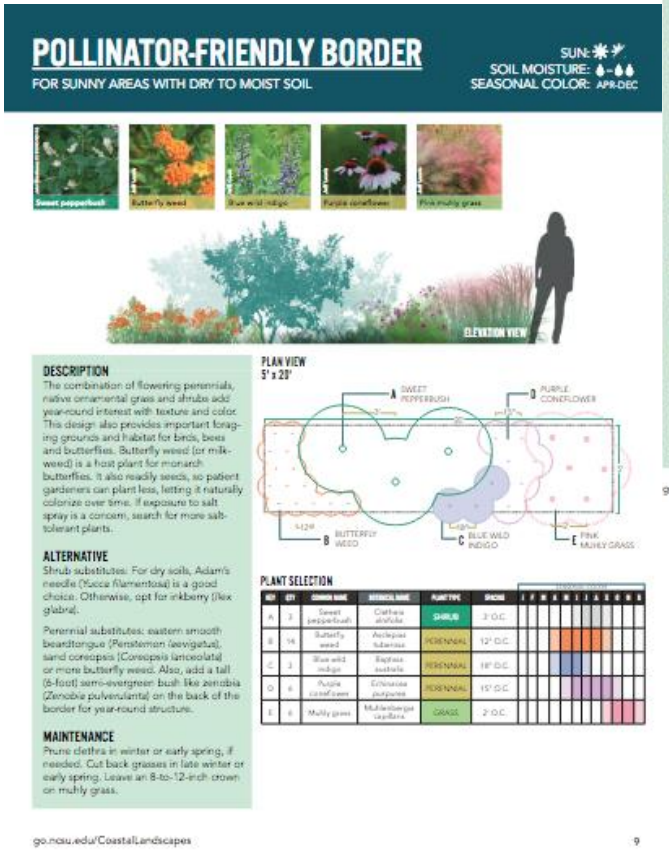
COASTAL LANDSCAPES INITIATIVE

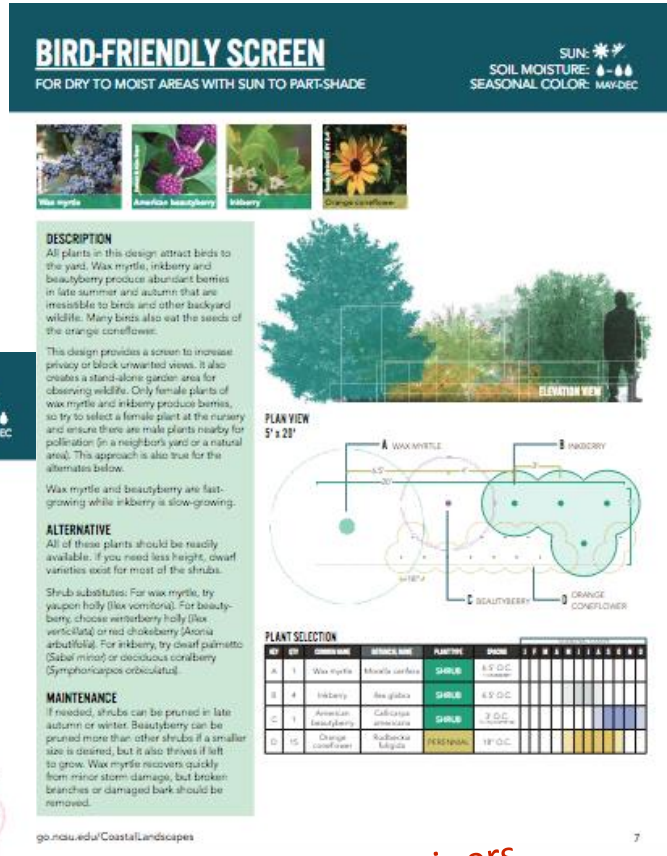
Screening Designs

- Screening with Trees
- Pollinator-Friendly Border
- Screening High & Low
- Foundation
- Evergreen Screen

Border Designs

- Low Evergreen Border
- Bird-Friendly Screen
- Shoreline Border
- Screening with Vines
- Filter strip





NEW! Containers

Greening Your Space

Creating Eco-Friendly Container Gardens for Coastal North Carolina

From the COASTAL LANDSCAPES INITIATIVE

FILTER STRIP

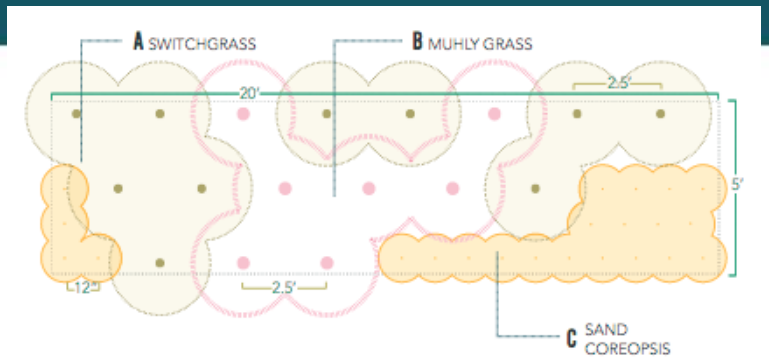
FOR SUNNY AREAS WITH DRY TO MOIST SOIL

SUN:
SOIL MOISTURE:
SEASONAL COLOR: SPRING & FALL

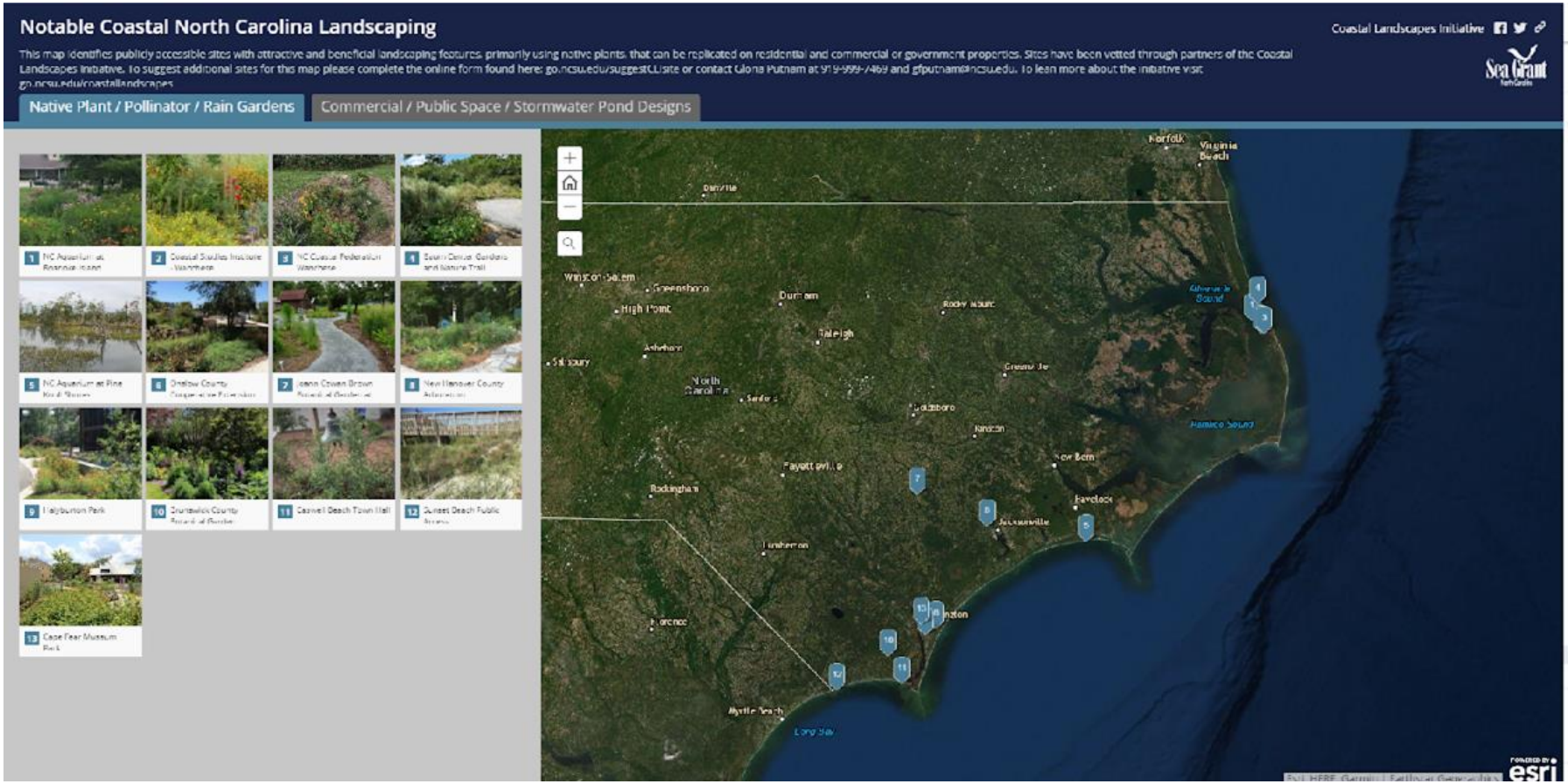

Switchgrass


Pink muhly grass

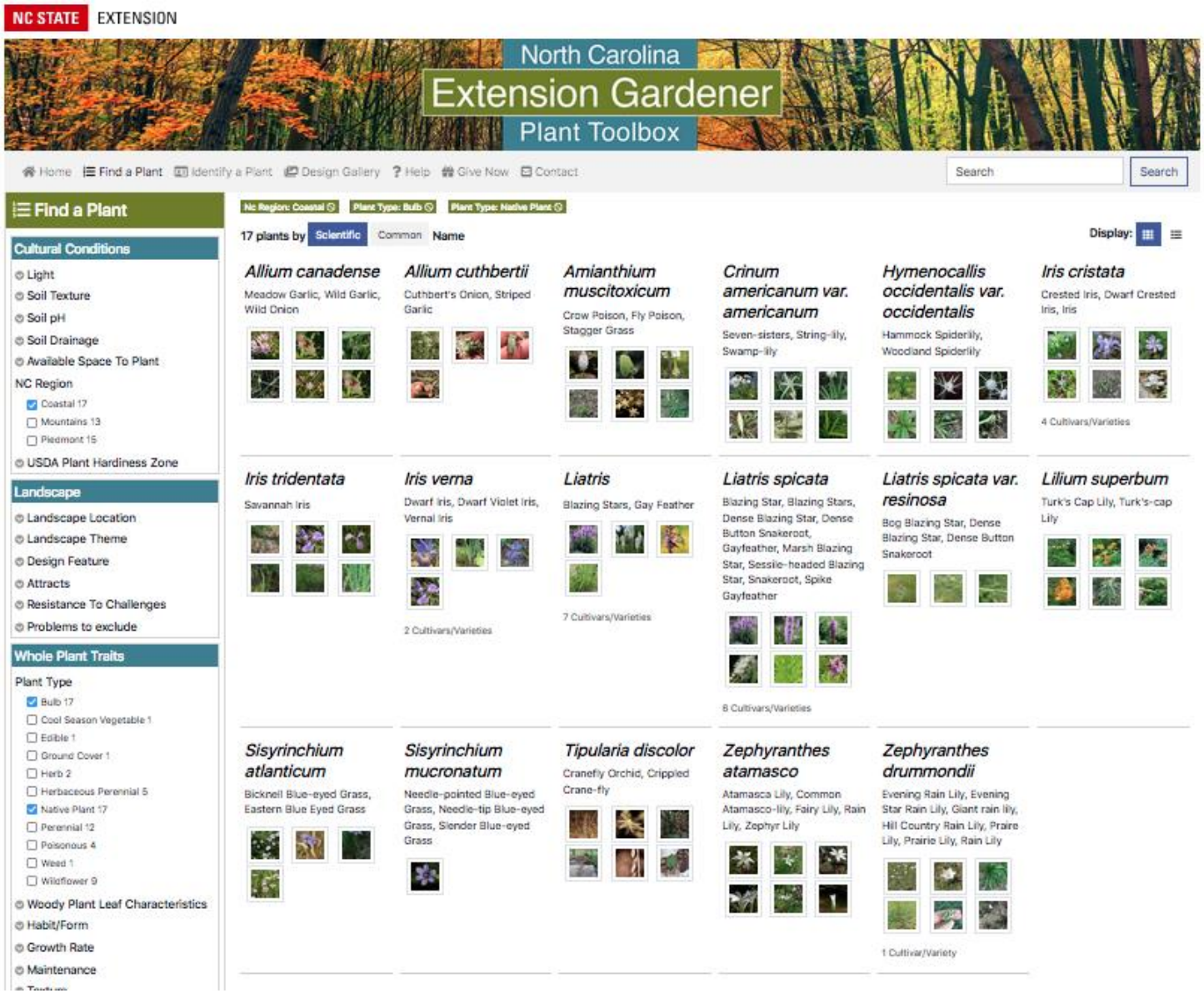

Sand coreopsis



go.ncsu.edu/ModelLandscapes

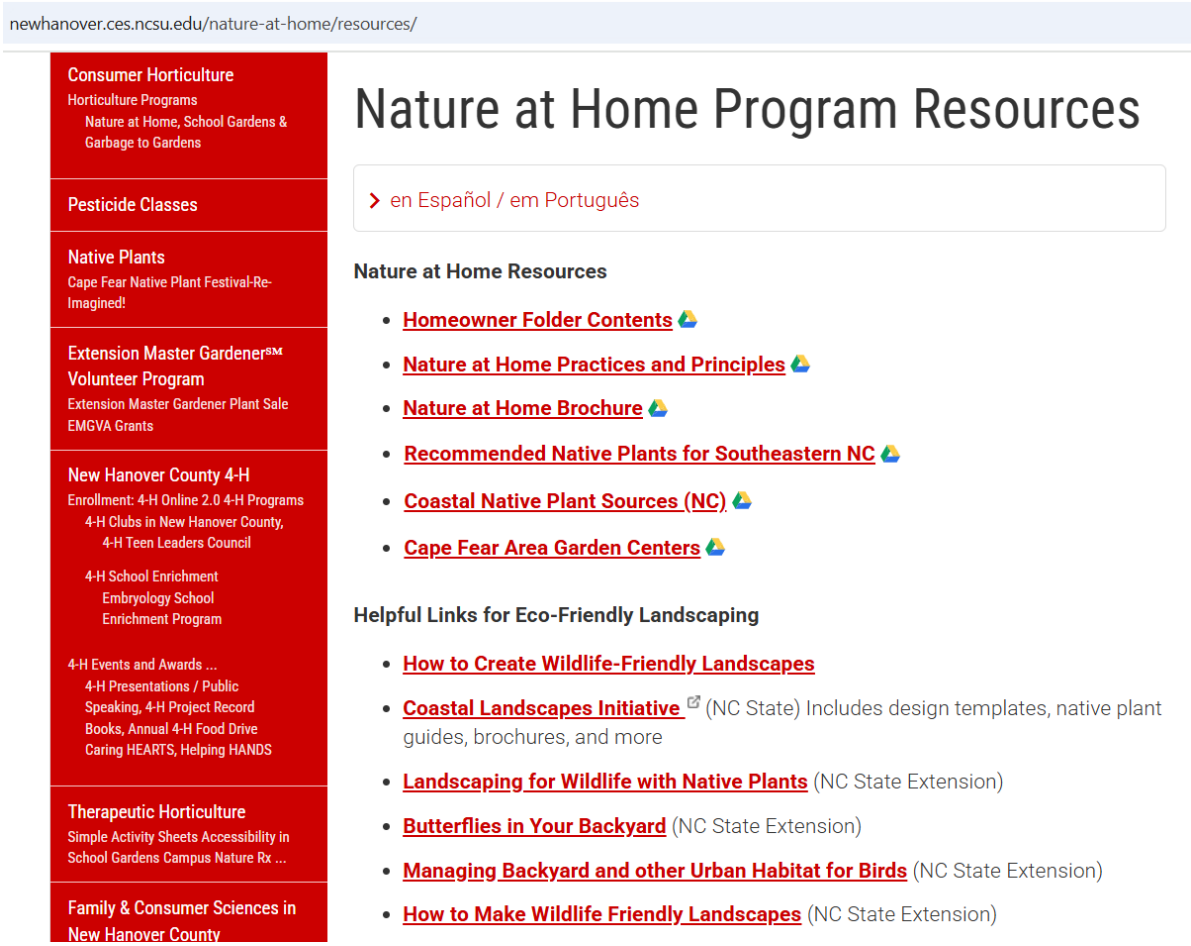


NC Extension Gardener **Plant Toolbox** plants.ces.ncsu.edu



- Find a Plant
- Identify a Plant
- Gallery of Garden Designs
- **Filter to generate lists of plants to fill niche**
- Photographs
- Botanical features
- Life cycle
- Seasonal interest
- Native alternatives
- Better adapted options

Nature At Home



https://newhanover.ces.ncsu.edu/nature-at-home/

NFWF

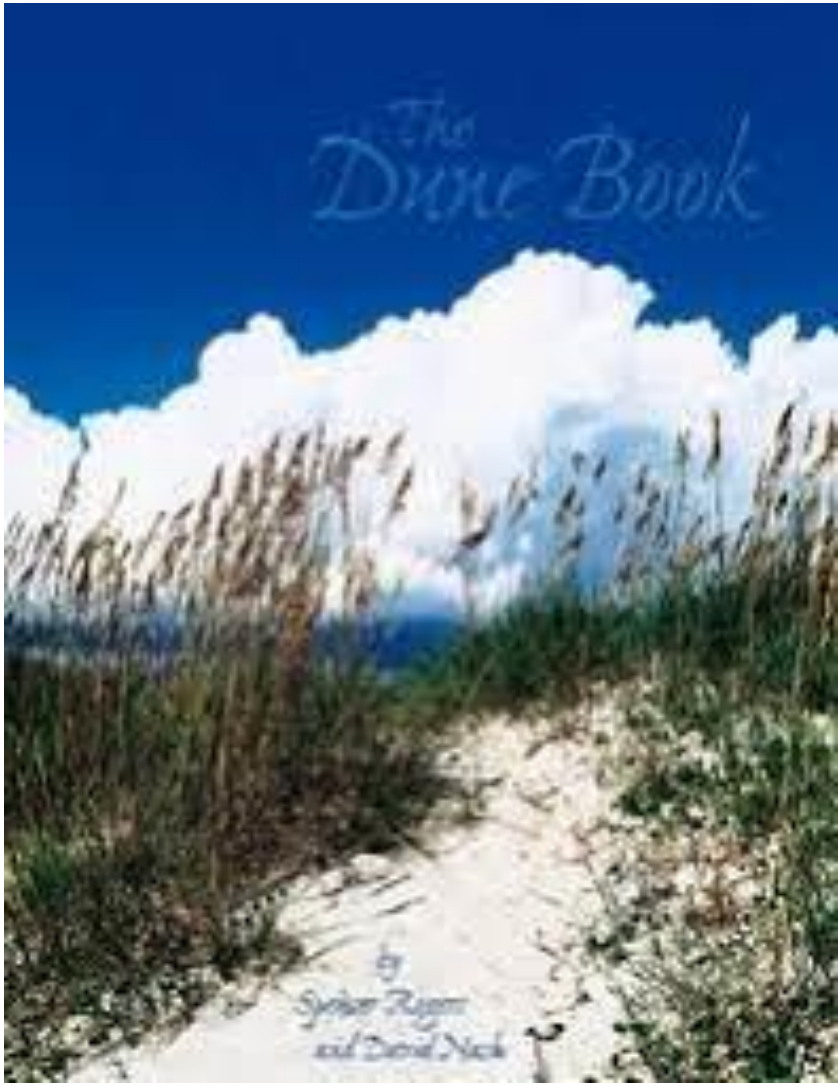
BEACH VITEX TASK FORCE

NC State University A&T State University COOPERATIVE EXTENSION
Empowering People · Providing Solutions

NORTH·CAROLINA AQUARIUM at Fort Fisher

Sea Grant North Carolina

The Dune Book



Matt Collogan

- Area Natural Resources Agent – NC Cooperative Extension Brunswick, New Hanover, Pender counties
  - Plant Clinic at NHC Arboretum – Monday through Friday, 10am-4pm, 6206 Oleander Drive, Wilmington, NC
  - https://brunswick.ces.ncsu.edu – 25 Referendum Dr NE, Building N in Bolivia, Brunswick County, Monday through Friday, 8:30am-5pm
  - mecollog@ncsu.edu
  - 910-253-2584
- Supervisor – New Hanover Soil & Water Conservation District
  - https://soilwater.nhcgov.com/