





Native Plant Benefits




- Natives are **naturally occurring** in the area without human interaction
- **Promote** native **wildlife**
- Low maintenance
- Relatively few pests
- **Adapted** to our climate conditions

Photos: www.duke.edu

Enhancing Wildlife

- Fish, aquatic invertebrates, birds and small mammals need plants as sources of cover
 - **Plants** reduce water temperatures for fish
 - Submerged plants and branches provide **habitat** for fish and insects
- Plants provide food (**seeds**) for birds and small mammals
- Plants provide **nectar** and are a **larval source** for bees, butterflies, and moths

Photos: ACES

Wildlife Corridors

- Wider buffer is better (> 100 ft)
 - Abundance in reptile, amphibians, small mammals, birds, insects, and fish (Rudolf and Dickenson, 1990; Dicken and William, 1998; Sudduth and Meyer, 2006; Smith et al., 2008)
- Connect forested areas
- Promote species richness in detached wildlife communities

Photo: ACES

Photo: Dan Ballard

Photo: Jessica Roberts Brown

Photos: Dan Ballard and Jessica Roberts Brown

Right plant, right place, right time

- Wetland Indicator Status
- Where to plant
- Plant sizes
- Costs
- Timing

Photo: ACES

Hydro = water, phyte = plant

Hydrophytes

- Adapted to wet conditions, flood tolerant
- Structural adaptations


Adventitious roots

Non-hydrophytes


- Do not tolerate flooding
- Upland plants

Buttressing

Photos: ACES



Wetland Indicator Status



- Previously based on the frequency of a species occurring naturally in a wetland
- List is being revised by USACE, FWS, EPA, and NRCS
- Reorganizing regions based on ecological regions


OBL – Almost always a hydrophyte, rarely in uplands

FACW – Usually a hydrophyte, but occasionally in uplands

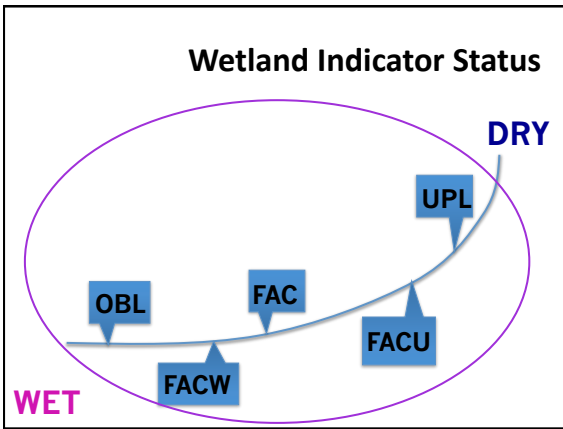
FAC – Commonly occurs as hydrophyte or non-hydrophyte

FACU – Occasionally is a hydrophyte, usually occurs in uplands

UPL – Rarely a hydrophyte, almost always in uplands





Lickvar and Minkin, 2008

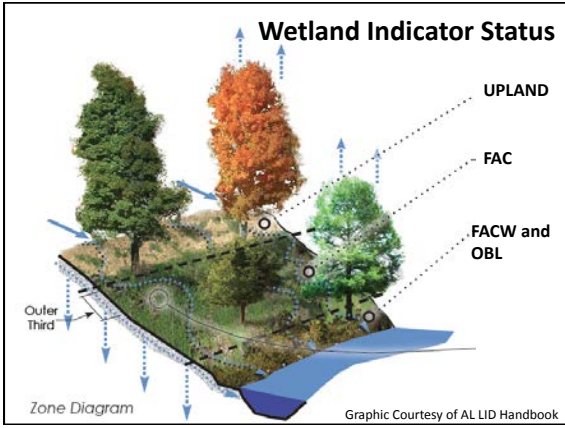


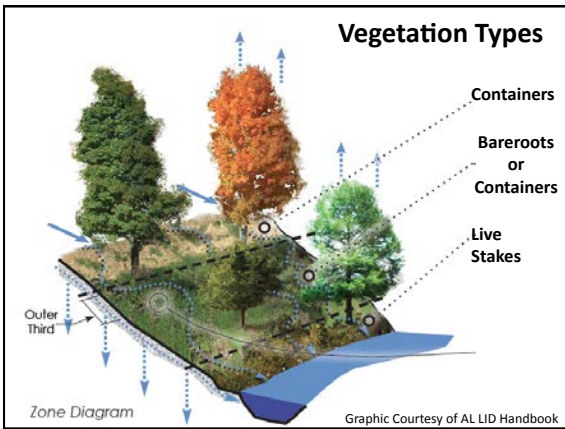
Structural Adaptations

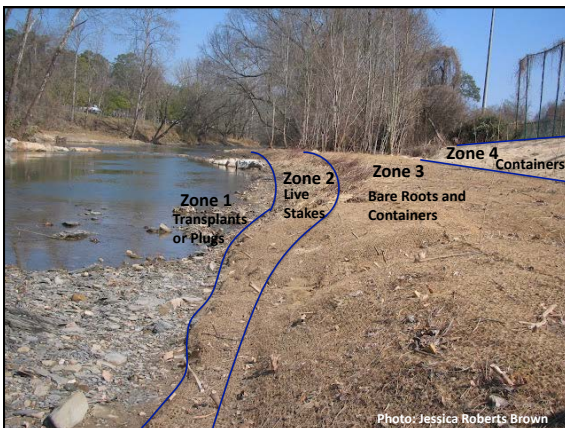
- Extensive root systems for **stability**
 - Roots can **tolerate hypoxic** conditions
 - **New roots** may form only at **surface** where oxygen is in higher concentration
- **Adventitious** root development
- **Aerenchyma** tissue development

Photos: ACES







Plant Sizes

Photo: ACES

Photo: Coastal Plain Conservation Nursery

Photo: ACES

Zone 1 Plants

- Water's edge
 - Transplants
 - plugs
 - herbaceous

Photos: ACES

Juncus effusus— soft rush Zone 1 Plants



Photo: ACES

Photo: Willow Marsh Farm

- **Indicator Status:** FACW+
- **Light Requirement:** Sun
- **Size:** 1.5 to 4' tall and 2 to 2.5' wide
- **Habit:** grass like, **evergreen**
- **Benefits:** attracts birds, can be harvested and transplanted by division
- **Comments:** flowers in Spring, rushes are round, **native to NC**

Zone 1 Plants

***Carex crinita* – fringed sedge**







- **Indicator Status:** FACW+
- **Light Requirement:** Part shade
- **Size:** up to 2' tall and as wide
- **Habit:** grass like, evergreen
- **Benefits:** seeds eaten by waterfowl, **can be divided and transplanted**
- **Comments:** drooping inflorescence blooms in May, sedges have edges, **Native to NC**

Photo: www.missouriplants.com

Photo: David Funderburk

***Iris virginica* – blue flag iris**



- **Indicator Status:** OBL
- **Light Requirement:** Sun
- **Size:** 3-6' tall
- **Habit:** Aquatic herb, **clumping** perennial
- **Benefits:** **Bird attractant**
- **Comments:** Blooms white to blue to pink Early Summer (May – July), spreads by rhizomes
- *Yellow Flag Iris is invasive – **specify** to nursery or grower that **you want Blue Flag, native to NC**

Photo: www.wildflower.org

Photo: www.ifas.ufl.edu

Zone 2 Plants

***Sparganium americanum* – bur-reed ***

- **Indicator Status:** OBL
- **Light Requirement:** Sun to Part Shade
- **Size:** 2.5' tall
- **Habit:** Aquatic herb, perennial
- **Benefits:** seeds are consumed by waterfowl
- **Comments:** Blooms yellowish green in bur-like clusters Spring to Summer (May to Sept.), **colonizes by slender underground rhizomes**, tolerates flowing water, **native to NC**



Photos: www.missouriplants.com

Zone 2 Plants



Zone 2 Plants

- Live Stakes
 - Trees or shrubs
 - Dormant hardwood cuttings
 - 0.5 – 2” diameter, 2 – 3’ long
 - Roots, leaves, and branches in one growing season

Photos Courtesy of Greg Jennings and Jess Brown

Live Stakes

- Used by homeowners or contractors
- Moderate slope (4:1) is best
- Must have contact with stream base flow
- Original soil – not fill!
- Native plants tolerant of wet conditions
- Can be used with erosion control fabric




Photo: ACES

Salix sericea – silky willow Zone 2 Plants

- **Indicator Status:** OBL
- **Light Requirement:** Sun to Shade
- **Size:** 12' tall
- **Habit:** deciduous large shrub
- **Comments:** Spring bloom, larval host for Acadian Hairstreak, commonly available, native to NC

Live Stakes Roots after 9 months

Cornus amomum – silky dogwood Zone 2 Plants

- **Indicator Status:** FACW+
- **Light Requirement:** Part Shade to Shade
- **Size:** 6 - 10' tall and as wide
- **Habit:** deciduous large shrub
- **Comments:** Spring bloom, attracts birds, medium growth rate, suckers, will layer itself, native to NC

Live Stakes Roots after 9 months

*Photos: Alicia Hunolt and www.duke.edu

Physocarpus opulifolius – ninebark Zone 2 Plants

- **Indicator Status:** FACW-
- **Light Requirement:** Sun to Shade
- **Size:** 5-10' tall and as wide
- **Habit:** deciduous multi-stemmed shrub
- **Comments:** early Summer bloom, flowers showy, medium to fast growth rate, attracts birds, tolerates wet and dry, native to NC

Live Stakes Photos: www.duke.edu

Cephalanthus occidentalis – buttonbush Zone 2 Plants




Photo: www.wildflower.org




Photo: www.duke.edu

- **Indicator Status:** OBL
- **Light Requirement:** Part Shade to Shade
- **Size:** up to 12' tall and as wide
- **Habit:** deciduous multi-stemmed shrub
- **Comments:** Summer bloom, **flowers showy**, attracts birds and butterflies, fast growth rate, **native to NC**

Live Stakes *Photos: www.wildflower.org and www.duke.edu

Sambucus canadensis – elderberry Zone 2 Plants




Photo: ACES

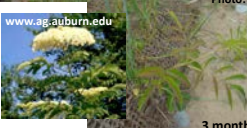


Photo: ACES
www.ag.auburn.edu
3 months old

- **Indicator Status:** FACW-
- **Light Requirement:** Part Shade
- **Size:** 5-12' tall and wider than tall
- **Habit:** deciduous multi-stemmed shrub
- **Comments:** Summer bloom, **flowers showy**, suckers, transplants well, fruit for birds, fast growth rate, **native to NC**

Live Stakes *Photos: Eve Brantley and www.ag.auburn.edu



Itea virginica - Virginia sweetspire **Cornus amomum - silky dogwood**

Salix nigra - black willow **Salix sericea - silky willow**

Photos: Alicia Hunolt



Zone 3 Plants

***Platanus occidentalis* – sycamore**

Photos: www.ag.auburn.edu

- **Indicator Status:** FACW-
- **Light Requirement:** Sun to Shade
- **Size:** 100' to 120' tall
- **Habit:** deciduous tree
- **Benefits:** attracts **birds**
- **Comments:** Fast growth rate (> 3'/yr!), good shade tree, bare root or container, **native to NC**

*Photos: www.ag.auburn.edu

Zone 3 Plants


***Viburnum nudum* – possumhaw**

Photos: www.wildflower.org

- **Indicator Status:** FACW+
- **Light Requirement:** Sun to Part Shade
- **Size:** 6-10' tall and as wide
- **Habit:** deciduous shrub
- **Benefits:** Berries consumed by **birds**
- **Comments:** White flowers in clusters in Summer, bare root or containers, fruit maturity varies, **native to NC**

Zone 3 Plants

***Clethra alnifolia* – summersweet**




Photos: www.wildflower.org

- **Indicator Status:** FACW
- **Light Requirement:** Full sun to Part Shade
- **Size:** 6' tall and as wide
- **Habit:** deciduous shrub
- **Benefits:** **attracts birds, hummingbirds, and butterflies**
- **Comments:** white to pink flowers in Summer, suckers easily to colonize, moderate growth rate, moderate salt tolerance (Glen et al., 2004), plant as containers, **Native to NC**

*Photos: www.wildflower.org

Zone 3 Plants

***Magnolia virginiana* – sweetbay magnolia**



Photos: www.wildflower.org

- **Indicator Status:** FACW+
- **Light Requirement:** Part Shade
- **Size:** 20 - 60' tall, 20' spread
- **Habit:** Multi-stemmed **semi-evergreen to evergreen** small tree, open or pyramidal form
- **Benefits:** Attracts **Sweetbay silkmoths**
- **Comments:** Blooms creamy white in Summer, medium growth rate, **native to NC**

*Photos: www.wildflower.org

Zone 3 Plants

***Betula nigra* – river birch**




Photo: www.duke.edu

Photo: www.clemson.edu

Photo: www.duke.edu

- **Indicator Status:** FACW
- **Light Requirement:** Sun to Part Shade
- **Size:** 40-70' tall, 40' spread
- **Habit:** Deciduous tree, more attractive as **multi-trunked tree**, spreading crown and weeping branches create nice form
- **Benefits:** **Seeds** are **food source** for birds and small mammals
- **Comments:** Blooms early Spring (Feb. – Mar.), nice **exfoliating bark**, insect/disease free, medium to fast growth rate, **native to NC**

*Photos: www.clemson.edu

Itea virginica – Virginia sweetspire

Zone 3 Plants

- **Indicator Status:** FACW+
- **Light Requirement:** Sun to Part Shade
- **Size:** 3-6' tall and wider than tall
- **Habit:** semi-evergreen to deciduous shrub
- **Comments:** Spring bloom, **flowers showy**, lightly fragrant, good fall color, **native NC**, can be difficult to install as live stakes, best for "soft" soils

Photo: ACES

Photo: ACES

Photo: Alicia Hunolt

Photo: ACES

Roots after 9 months

Labellia cardinalis – cardinal flower

Helianthus angustifolius – swamp sunflower

Eupatoriadelphus fistulosus – Joe Pye weed

Acer rubrum – red maple

Verbena hastata – swamp verbena

Ilex decidua – possumhaw

Viburnum dentatum – arrowwood


Photos: www.wildflower.org

Zone 4 Plants

Photo: Jessica Roberts Brown

Asimina parviflora
– Dwarf Paw Paw

Photos: www.wildflower.org




Zone 4 Plants

- **Indicator Status:** FACU
- **Light Requirement:** Shade
- **Size:** 3-5' tall, 5' spread
- **Habit:** Small deciduous shrub, open form
- **Benefits:** **Fruit** attracts small mammals
- **Comments:** Blooms maroon early Spring, good **understory shrub, native to NC**

Callicarpa americana –
Beautyberry

Photo: ACES




Zone 4 Plants

- **Indicator Status:** FACU-
- **Light Requirement:** Part Shade to Shade
- **Size:** 3-6' tall, 6' spread
- **Habit:** Small deciduous shrub, open form, somewhat arching
- **Benefits:** **Fruit** attracts birds (40+ species!), rodents, leaves browsed by **deer**, flowers butterfly attractant
- **Comments:** Blooms light lavender to pink in Summer (June – Aug.), good **understory shrub, native to NC**

*Photos: www.wildflower.org, www.missouriplants.com

Calycanthus floridus –
Sweetshrub

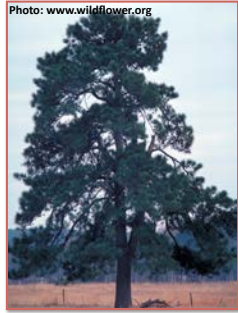
Photos: www.wildflower.org



Zone 4 Plants

- **Indicator Status:** FACU+
- **Light Requirement:** Part Shade
- **Size:** 6-9' tall, 12' spread
- **Habit:** Deciduous multi stemmed shrub
- **Benefits:** White-tailed **deer browse**, very adaptable
- **Comments:** Blooms maroon in Summer (May – July), flowers fragrant, **suckers easily, native to NC**

***Pinus taeda* – Loblolly Pine**



Zone 4 Plants

- **Indicator Status:** FAC
- **Light Requirement:** Sun to Part Shade
- **Size:** 72-100' tall, 40' spread
- **Habit:** Large **evergreen** tree, open and **oval form** at maturity
- **Benefits:** **Nesting** site for birds, small mammals and **birds eat seeds, larval host** for moths
- **Comments:** **fast growing**, pioneer species, **native to NC**

***Cercis canadensis* – Eastern Redbud**



Zone 4 Plants

- **Indicator Status:** FACU
- **Light Requirement:** Sun to Part Shade
- **Size:** 20-30' tall, 35' wide
- **Habit:** small deciduous **multi trunked tree**
- **Benefits:** **Attracts birds**
- **Comments:** Blooms pink in Spring (Mar.), flowers edible, **native to NC**

*Photos: www.ag.auburn.edu, www.ces.ncsu.edu



Scheduling

- Live stakes and bare root seedlings – Winter
 - When plants are dormant
 - Before bud break
- Transplants/plugs – Spring and Fall are best
- Containers – anytime of year
 - Summer = more water to irrigate
- Wetland herbaceous
 - After last spring frost

Costs

- Live stakes - ~ \$22/
bundle of 50
- 3 gals – ~ \$9 - 12 per
- 1 gals – ~\$4 – 6 per
- Plugs – ~\$1 - 2.15 per
- Bare root seedlings - ~
\$.75 – 1 each



How to Plant - Containers

- Dig hole 2 to 3x size of
container
- Loosen pot bound roots
- Roots matted - cut
- Never plant in compacted
soil



Large Scale Projects

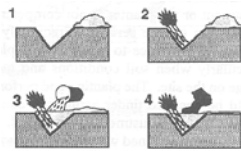


Photo: Riparian and Wetland Tree Planting Guide for NC


Photo: ACES

Bare Root Seedlings

- Temporary Storage (> 2 days)
 - V shaped trench in shady spot
 - Keep moist
- Use dibble, KBC, or planting bar




Graphic from Riparian and Wetland Tree Planting Guide for North Carolina, photo: www.state.sc.us



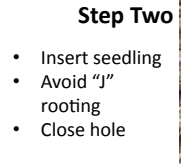
Step One

- Make hole
- Work bar back and forth



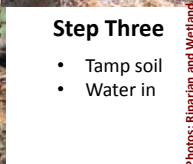
Step Two

- Insert seedling
- Avoid "J" rooting
- Close hole



Step Three

- Tamp soil
- Water in



Photos: Riparian and Wetland Tree Planting Guide for North Carolina

Live Stakes

- Dead blow hammer
- Rebar, 18 – 36" long
- Harvest or order
- Install immediately or soak bundles until installation



Installing Live Stakes

- Install at 90° angle in streambank below bankfull
- Make pilot hole with rebar
- Use dead blow hammer to pound stakes into streambank



Photos: ACES

Installing Live Stakes

- Remove damaged hammered tip of live stake by making a fresh cut
- 3 to 4" should be left above the soil line
- Orient leaf buds facing upward
- One stake every 2 – 3' in triangular spacing pattern



Photos: ACES









Photo: ACES



Photo: ACES

Working Together

- Not a lot of \$ to spend
- Live stakes
 - Shipping just as much as stakes - @ \$280 total
- Containers on top of bank
 - Donated from past project
- Cut stump treatments on privet
 - Expertise from ACES agents – FREE!

Photo: ACES
















Photos: ACES



Photos: ACES

Harvesting Live Stakes



- Angle cut branch just below a leaf node
- Straight cut above a leaf node at top
- Remove leaves and branches from stakes
- These branches or “whips” can be pushed into the streambank as well

Photos: ACES

Harvesting Tips

- Angled cut aids in driving stake into soil and helps avoid confusion later
- Fix cut on parent plant to be straight to help plant recover more quickly from pruning
- Can dip top ends in paint to differentiate between species
- Never leave stored live stakes in the sun or let them dry out

Photo: ACES

Where to Buy Plants

- Foggy Mountain Nursery – live stakes, bare roots, containers
- Mellow Marsh Farm – live stakes, bare roots, containers
- Coastal Plain Conservation Nursery – plugs
- Carolina Native nursery – containers
- Carolina Wild – containers
- Meadowbrook Nursery - containers

Resources

- Dirr, Michael – Manual of Woody Landscape Plants
- National List of Plant Species That Occur in Wetlands
- www.wildflower.org
- www.ag.auburn.edu/hort/landscape
- www.plants.usda.gov
- www.duke.edu
- Riparian and tree planting guide – NC
- Check out www.aces.edu/bufferkit

