

Backyard Stream Repair

Kaye Christian - Katie Dylewski - Eve Brantley

ACES Water Program, Auburn University Department of Agronomy and Soils



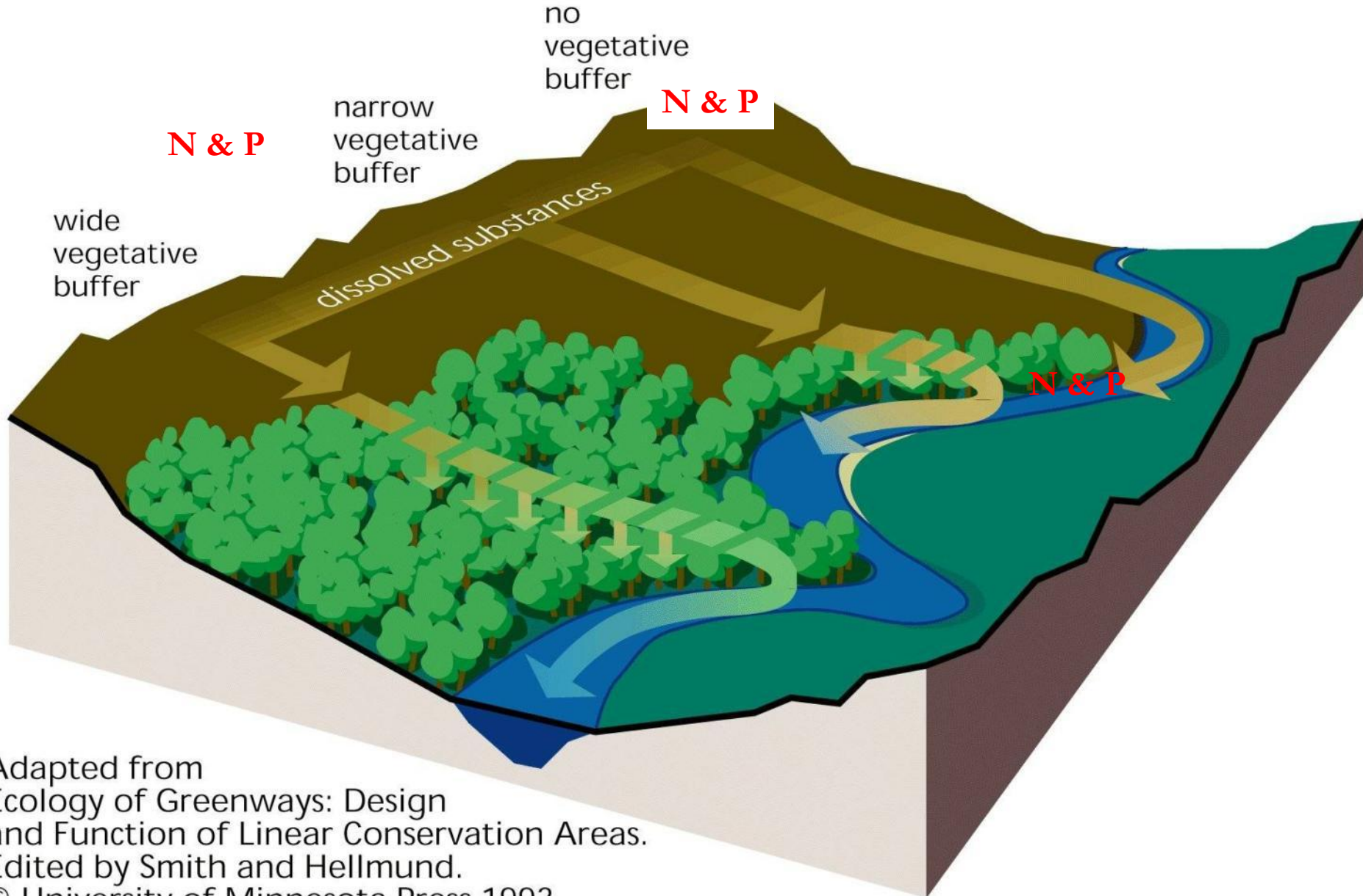
Photo: Jessica Roberts Brown

What is a Streamside Buffer?

- Permanently vegetated
- Connects upland areas to streams
- Intercepts and filters stormwater runoff
 - Promotes infiltration
 - Nutrient and sediment load reductions
- Decreases velocity

28/11/2011

Vegetative Buffer Width



Adapted from
Ecology of Greenways: Design
and Function of Linear Conservation Areas.
Edited by Smith and Hellmund.
© University of Minnesota Press 1993.

A photograph of a stream in a forest. The water is shallow and reflects the surrounding greenery. A large, fallen tree trunk lies across the stream, partially submerged. The banks are sandy and show signs of erosion, with exposed roots and uneven terrain. The text "What is Erosion?" is overlaid in the center of the image.

What is Erosion?

Causes of Erosion

- **Water**
- **Runoff**
- **Steep slopes**
- **Wind**

Causes of Streambank Erosion

- Changes in stream flow
- Increased velocity
- Overland flow
- Concentrated runoff
- Removal of vegetation



Straight Streams

- Typically begin to meander over time
- Stream bends
- Portions of each bank erode
- Tight turns cause outside to erode more
- Sediment deposits on opposite bank

When to Call for Help

- Threatened infrastructure
- Unsafe conditions
- Permits are necessary
- Check local authorities for regulations and codes



www.aces.edu/bufferkit

- Resources to answer homeowner questions related to stream bank erosion
- Site preparation
- Plant selection
- Technical Resources

For the Grant

- Workshops in each state; NC, AL, GA and FL
 - Classroom time and hands-on site demonstration time
 - 500 linear feet of stream repair
 - Website
 - Webinars
- *Posted on the website at a later time



Site Prep and Assessment



Photo: ACES

Plant Selection

- What goes where
- Top native plant choices
- Information to come



Technical Resources

- Tools
- How-to instructions
- Plant lists
- Books
- Publications
- Planting diagrams for a streamside
- Erosion control material choices



Photo: C. Mitchell



2017/02/21



Photo: E. Bunker

Stream Assessment

A photograph of a stream flowing through a wooded area. The stream is surrounded by dense vegetation, including green bushes and trees. The ground is covered in fallen brown leaves, indicating autumn. The water in the stream is brownish, suggesting sediment or organic matter. The overall scene is a natural, somewhat overgrown stream environment.

28/11/2011



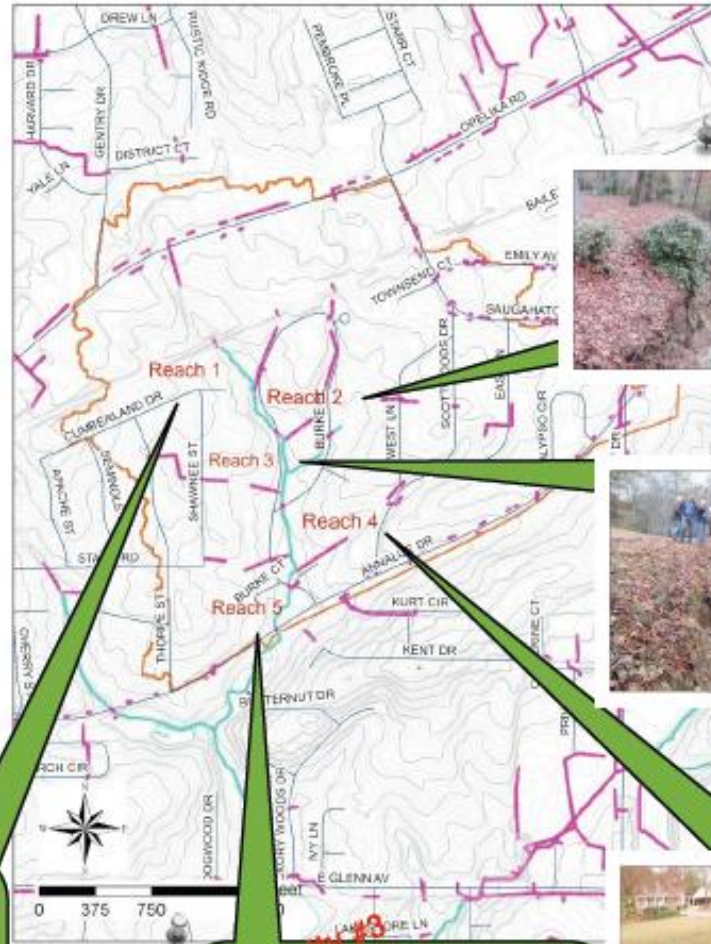
Photos: ACES

Burke Place Streamside Plantings

Streambank erosion is becoming a regular problem. Roads, parking lots, roofs and other impervious surfaces shed stormwater into nearby streams, and this rushing water carves soil away from vulnerable streambanks. When streambanks are not protected, erosion can take away much of your yard, and even threaten the stability of your house. Native plants can be installed to prevent future erosion and hold banks in place.

Alabama Cooperative Extension System (ACES) specialists met with members of Burke Place to discuss environmentally conscious options to repair neighborhood streambank erosion problems.

This handout provides summaries of suggestions provided by the ACES. Each reach has been prioritized based on feasibility.



Priority #5

There is extensive erosion at this private property and it may require more than native plants to stabilize.

Priority #2

Live stakes, herbaceous wetland plants, and native low-growing shrubs are suggested for this area near the playground area.

Priority #1

Live stakes are recommended for the streamside near the stormwater outfall at Kevin's house.

Priority #4

Low growing native shrubs are suggested for the top of the streambank of this private property.

Priority #3

Live stakes, herbaceous wetland plants, and removal of the mid-channel bar are suggested for Bonnie's house.

Lessons Learned

- Not everyone wants your help
- It's a LONG process
- Communication is essential
- Dedicated people make a difference



Healthy Stream Indicators

Presence of aquatic life

Clear stream

No funny smells

Shade available to stream

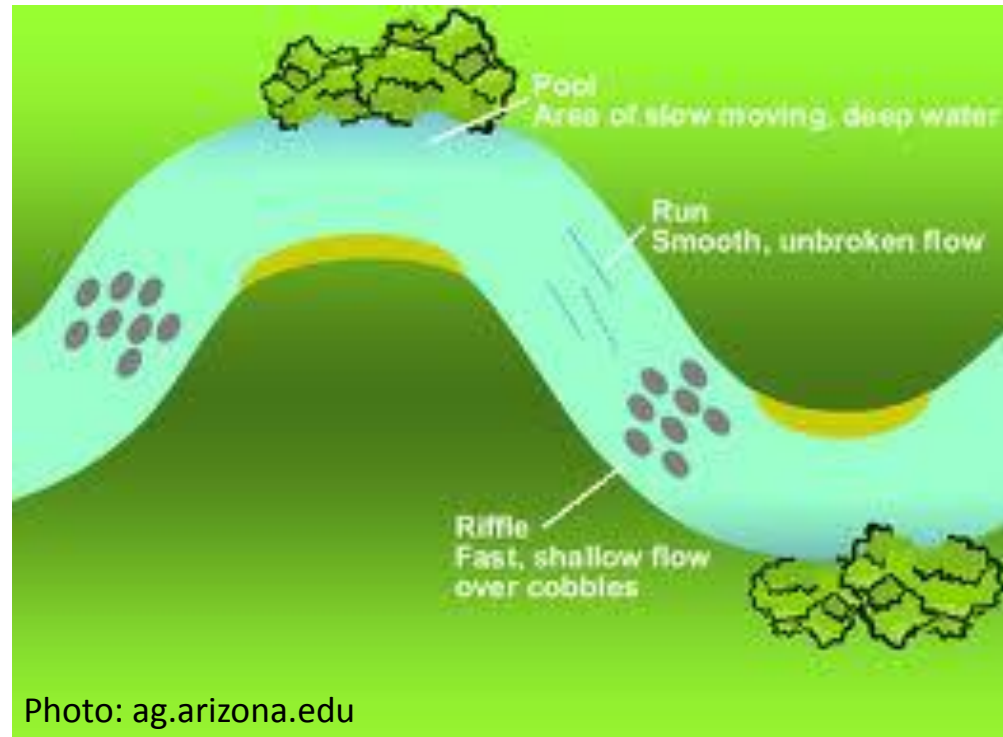
Stable stream banks

No trash or debris present

Water is flowing in a pool, run, riffle pattern

Stream meanders or moves through the land in an s-shape

Good mixture of sand, pebbles, rocks



Healthy or Unhealthy?





Photo: Joey Hundley, Lee Co.



22/09/2011

Photo: ACES

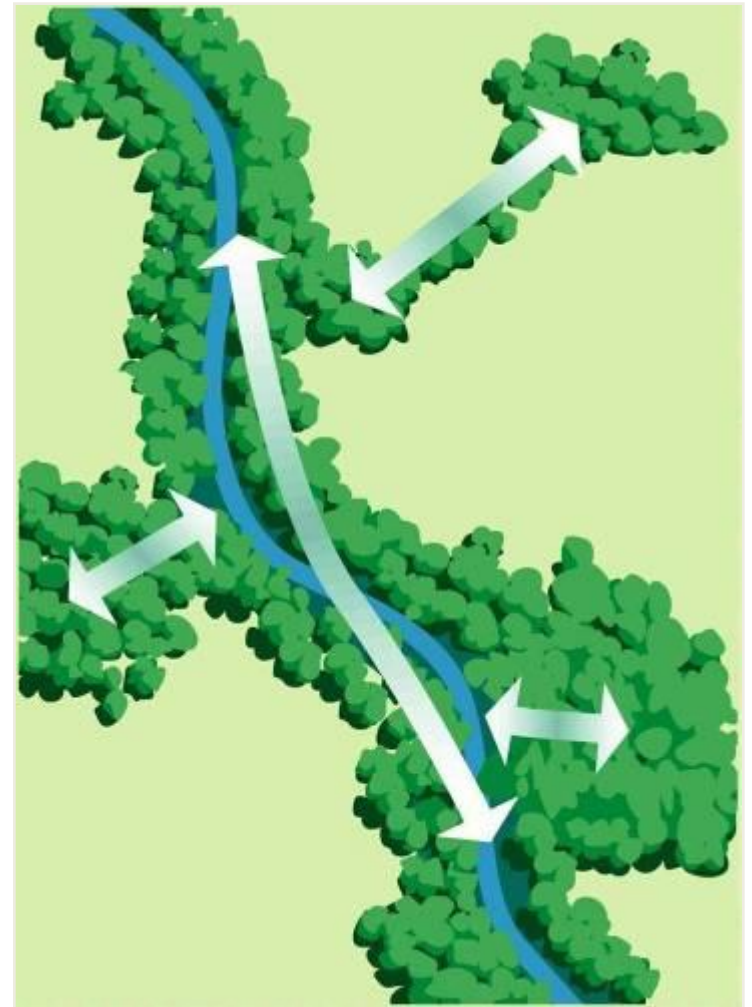


28/10/2011

Photo: ACES

What were the unhealthy streams missing?

- Native trees and shrubs
- Floodplain
- Natural Habitats
- Good Water Quality



Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FISRWG)."



Floodplains



Floodplains work to:

- a) Reduce the number and severity of floods
- b) Minimize non-point source water pollution
- c) Filter storm water
- d) Provide habitat for plants and animals
- e) Add aesthetic beauty and outdoor recreation benefits



JONESBORO NORTH

JONESBORO SOUTH

LEILA VALLEY

REBEL VALLEY FOREST

Moreland Ave SE

Cleveland Ave SE

Moreland Ave SE

Constitution Rd SE

Constitution

S River Industrial Blvd SE

54

42

23

42

23

ing™

Scale bar: 0, 1, 2 miles

Wines Ct SE

Forrest Park Rd SE

Wines Ct SE

Land Management

Land

We Need Streamside Forests

- Unstable streambanks
- Past poor vegetation choices
- Increased impervious surfaces and runoff
- Areas of high erosion and washout



Photo: ACES



Photo: Megan Reynolds

Urban Streams Need Buffers



- Water quality benefits -
Intercepts and filters pollution
- Reduces future erosion
- Provides detritus and debris for stream
- Provides habitat and food for insects and wildlife
- Provides shading for stream -
regulates temps for aquatic species
- Roots provide stability –
HOLD SOIL IN PLACE

Successful Streamside Buffer

- Scout for potential problems
- Correct planting time
- Plant a variety of woody and herbaceous plants
- Right plant, right place
- Let the plants grow, don't mow!
- Necessary upkeep and maintenance



Photos: ACES



Photos: ACES

Nonnative Invasive Plants of GA

1. Chinese privet
2. Kudzu
3. Japanese Stiltgrass
4. Mimosa
5. Wisteria
6. Japanese Honeysuckle
7. Tree of Heaven
8. Japanese Climbing Fern
9. Alligator Weed
10. Tallowtree

Compiled by GA Exotic Pest & Plant Council



Associated Problems

- **Decrease biological diversity**
- **Disrupt the ecological balance**
- **Choke out plants favored by wildlife**
- **Introduce exotic pests and diseases**
- **Inhibit growth of timber**
- **Increase wildfire hazard**
- **Increase land management costs**

12/01/2012

Ligustrum – Chinese and Japanese Privets



Photos: AU Hort



12/01/2012
Photo: ACES

Ligustrum spp.– Chinese and Japanese Privets

- Evergreen
- Opposite leaves
 - Japanese – leathery
 - Chinese – thin and papery
- White flowers –
 - April to June
- Black fruits in clusters –
 - July to March
- Prominent lenticels
- Choke out native vegetation
- Poor habitat and food source



Pueraria montana– Kudzu



Photos: ACES

Photo AU Hort

Pueraria montana– Kudzu

- Deciduous climbing, twining, ropelike vine
- 3-leaflet leaves: alternate, pinnately compound
- Cordate, trifoliate hairy leaves, slightly lobed
- Purple, grape-scented flowers in clusters – June to September
- Green to brown hairy flat, dry legume seed pods in clusters – Sept to Jan
- Leaves are killed with first frost



Microstegium - Stiltgrass

- Annual grass closely resembles bamboo
- 6" to 3.5' tall
- Lance shaped leaves, 3" length
- Flowers in Sept, fruit form in late Sept through Oct
- Can be hand pulled or herbicides are available



Photo James Miller, USDA



Photo Bill Johnson, USDA

Microstegium - Stiltgrass

- Invades forested floodplains, also found in ditches, forest edges, fields, and trails.
- Very shade tolerant and can completely displace native vegetation – forms dense patches
- Native to Asia and was accidentally introduced into North America around 1920
- Had previously been used as packing material for porcelain, possibly explaining its accidental introduction



Albizia julibrissin - Mimosa

- Small tree – 10-50' tall
- Multi-trunked
- Delicate-looking, bi-pinnately compound leaves, resemble ferns
- Flowers in summer - very showy, fragrant, pink
- Fruit – 6" long flat seed pods, develop in late summer
- Herbicides are available for control



Albizia julibrissin - Mimosa

- Invades any type of disturbed habitat
- Commonly found in old fields, stream banks, and roadsides
- difficult to remove - long lived seeds and ability to re-sprout vigorously
- Native to Asia and was first introduced into the U.S. in 1745
- Widely used as an ornamental



Wisteria sinensis– Chinese Wisteria



Ted Budner



James H. Miller
UGA2307174



Chris Evans

UGA2188069

Wisteria sinensis – Chinese Wisteria

- Deciduous high climbing, twining, or trailing woody vine or shrub
- Leaf with 9, 11, or 13 leaflets; Alternate and odd-pinnately compound
- Very fragrant lavender or white flowers in clusters—March to May
- Flattened legume seed pod – July to November
- Occur on wet or dry sites
- *Native wisteria blooms AFTER leaves emerge
- *Non-native wisteria blooms BEFORE leaves emerge

Lonicera japonica – Japanese Honeysuckle



Photos: AU Horticulture

Photos: ACES

Lonicera japonica – Japanese Honeysuckle

- Semi-evergreen to evergreen woody vine
- Vigorous climbing and trailing vine
- Red-brown stems
- Fragrant white flowers that fade to yellow
 - April to August
- Flowers in pairs at leaf base,
 - tubular shaped
- Opposite simple leaves
- Rounded base with pointed tip
- Shiny black fruit - June to March



Ailanthus altissima - Tree of Heaven



Photos: AU Horticulture



Photo by:
Richard Old
www.xidservices.com

UGA5225034

Ailanthus altissima - Tree of Heaven

- Deciduous tree with a shallow root system
- Leaf with 10 to 41 leaflets; Alternate, odd or even pinnately compound
- Long tapering tips and lobed bases
- Light green to red stalks
- Small yellow-green flowers – April to June
- Single samara fruit, twisted tips – July to February

Lygodium japonicum - Japanese Climbing Fern

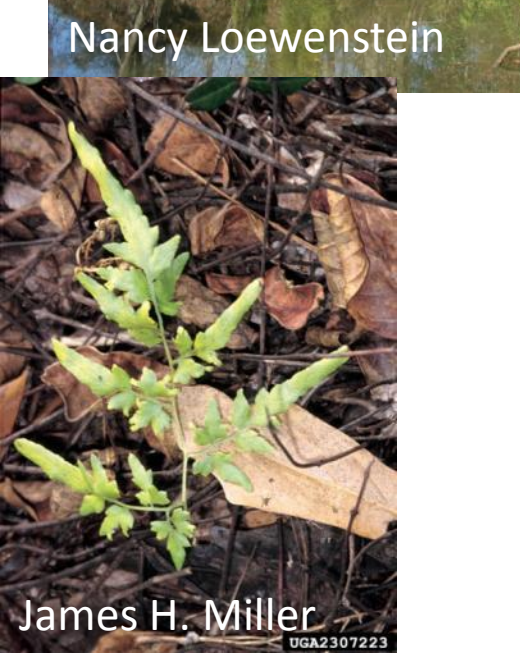


Nancy Loewenstein



Lygodium japonicum

Japanese climbing fern
Photo by Ann Murray
Copyright 1999 University of Florida



James H. Miller

UGA2307223



Chris Evans

UGA2122082



Japanese climbing fern
Lygodium japonicum
Photo by Ann Murray
© 1999 University of Florida

Lygodium japonicum - Japanese Climbing Fern

- Perennial fern with climbing twining fronds
- Deciduous lacey, finely divided fronds
- Light green fronds spring to fall turning to tan brown in winter months
- Red or green wiry stem, hard to break
- Forms dense canopy, chokes out other vegetation
- Wind and water dispersed spores, rhizomes below ground
- Chemical, mechanical, biological, and preventative controls



Alternanthera philoxeroides - Alligatorweed

- Emergent or rooted floating plant that invades areas and adjoining uplands
- Hollow stems and can grow to 3' tall
- Opposite, elliptical leaves are thick but non-succulent and are up to 4" long
- Flowers occur in summer with white, clover-like heads in leaf axils
- Roots in wet soils or shallow water and grows out into waterways
- Chemical and biological controls



Alternanthera philoxeroides - Alligatorweed



Triadica sebifera - Chinese tallowtree

- Deciduous tree reaching 60' tall with 3' wide trunk base
- Alternate, heart-shaped leaves 2-3" long with a long, pointed tip
- Yellowish flowers occur from April to June on 8" long, dangling spikes
- Three-lobed, greenish fruit are found in clusters at the end of branches
- Fruit mature to black and then open to reveal white wax covered seeds
- Chemical, mechanical and preventative control



Triadica sebifera - Chinese tallowtree



Invasive Removal

- Physical removal
- Cut and paint
- Foliar application
- Basal spray



Cut Stump Treatments

- Selective
- Little to no damage to surrounding vegetation
- Allows roots to stay in hold soil in place
- Minimal amount of herbicide used
- Herbicide dyes available
- Safety glasses
- Check label for other PPE



Photos: ACES

Cut Stump Treatment - Chinese Privet



Cut Stump Before



Cut Stump After



Foliar Application

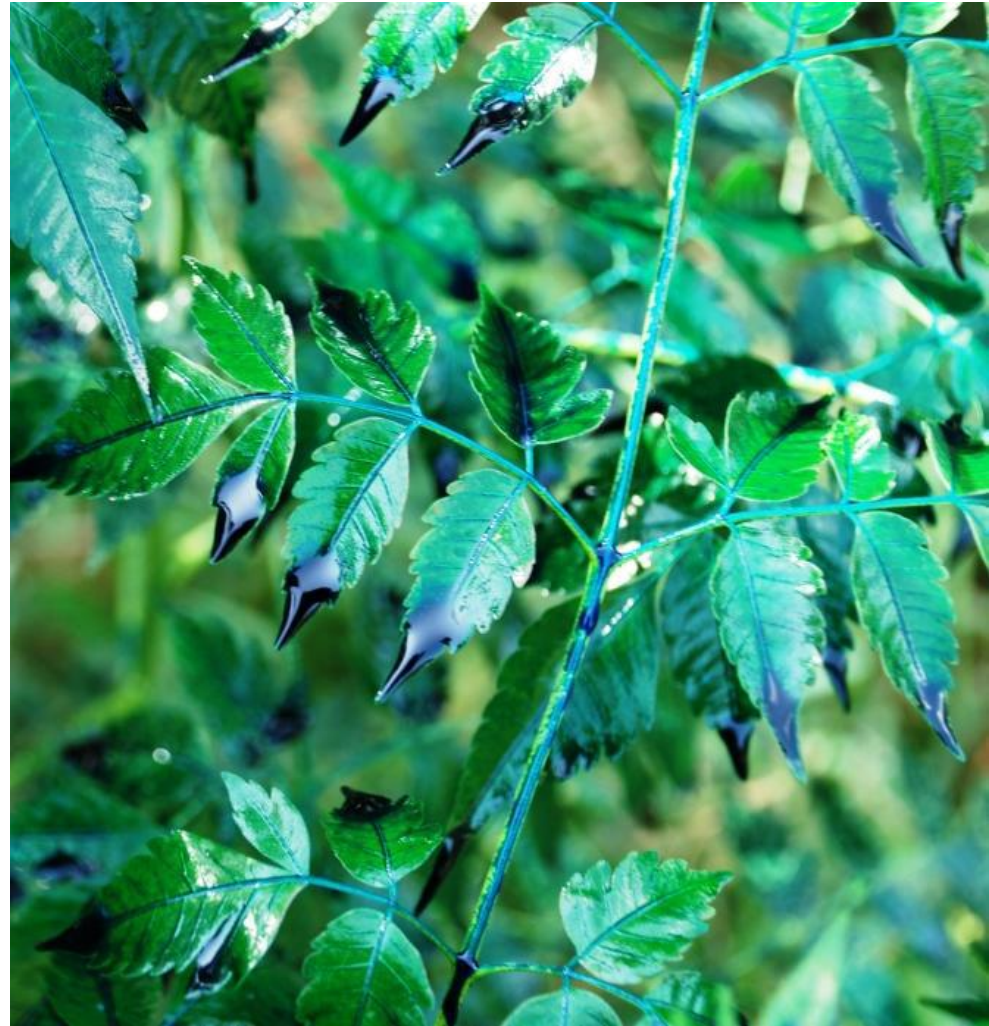
- Woody and herbaceous vegetation
- Late spring, summer and early fall treatment
- Woody species up to 8'
- Climbing vines
- Herbaceous species at least 12-24" tall
- Active ingredient is species dependent



Backpack foliar treatment of Chinaberry

Photo: Stephen Enloe

- Good coverage at terminal growing point
- Spray to wet coverage
- Over-application = wasted herbicide
- Safety equipment
 - Eye protection
 - Check label for required PPE
- Surfactants, spray indicators, and antifoaming agents available



Excessive herbicide application. Note the pooling at the leaf tips.

Photo: Stephen Enloe

Basal Bark Herbicide

- Moderate to low target tree or shrub density
- Can tolerate small dead standing trees and shrubs
- Use selectively with little to no damage to surrounding vegetation
- Woody plants or vines, less than 6-8" in diameter
- Late fall application is best, NOT recommended for early spring
- NOT labeled for use around water



What a stem should look like after basal bark treatment.

What happens when we ignore it?



Photo: Jessica Roberts Brown

There is hope!



06/10/2011

Photo: ACES

Resources

GA Exotic Plant Pest Council - www.gaeppc.org

Center for Invasive Species & Ecosystem Health invasive.org

NC State Cooperative Extension - <http://www.ces.ncsu.edu/>

NCSU Riparian Buffers www.bae.ncsu.edu/programs/extension/wqg/sri/riparian5.pdf

Alabama Smart Yards <http://www.aces.edu/pubs/docs/A/ANR-1359/ANR-1359.pdf>

NC Forest Health Highlights http://fhm.fs.fed.us/fhh/fhh_10/nc_fhh_10.pdf

NC Forest Service <http://ncforestservice.gov/publications/Forestry%20Leaflets/FM15.pdf>

A Field Guide for the Identification of Invasive Plants
in Southern Forests J. Miller, E. Chambliss, S. Enloe and N. Loewenstein

Resources

City of Raleigh - Environment and Sustainability

<http://www.raleighnc.gov/environment>

City of Winston-Salem Stormwater Division

<http://www.cityofws.org/default.aspx?mod=Article&id=411>

Alabama Smart Yards, Florida Friendly Landscaping, Tennessee Yards and Neighborhoods

ACES Timely Information Articles

http://www.aces.edu/timelyinfo/Ag%20Soil/2010/December/Dec_2010_E.pdf

http://www.aces.edu/timelyinfo/Ag%20Soil/2010/December/Dec_2010.pdf

http://www.aces.edu/anr/crops/documents/Timelyinformationsheet_CutStumpHerbicideTreatmentforControllingInvasivePlants.pdf

Invasive Plants of the U.S.

www.invasives.org

Contact Information

Kaye Christian

jernikj@auburn.edu

334.844.7618

Katie Dylewski

wernekl@auburn.edu

334.844.7618

Eve Brantley

brantef@auburn.edu

334.844.3927

