

Stream and Floodplain Vegetation



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Why do we remove vegetation
from streambanks?

Current and Past Legacies



Arthur Rothstein, WPA



Arthur Rothstein, WPA

Why is streamside vegetation important?

Shading

Temperature

Food sources for aquatic animals

Woody debris

Bank stability

Filtering nutrients and sediments



Shading - Temperature



Mike Henshaw, ACES

Shading - Temperature

Cooler water can hold more dissolved oxygen
Shade keeps temperatures more even (less stressful)



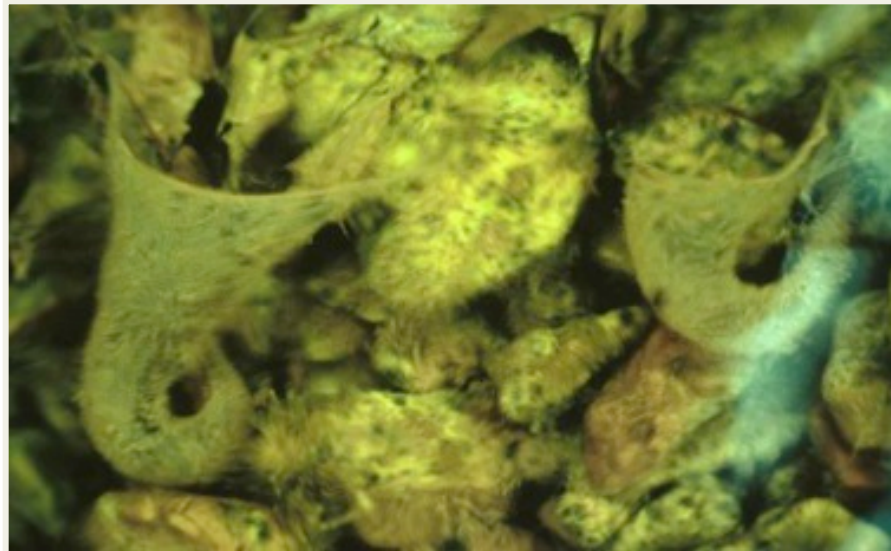
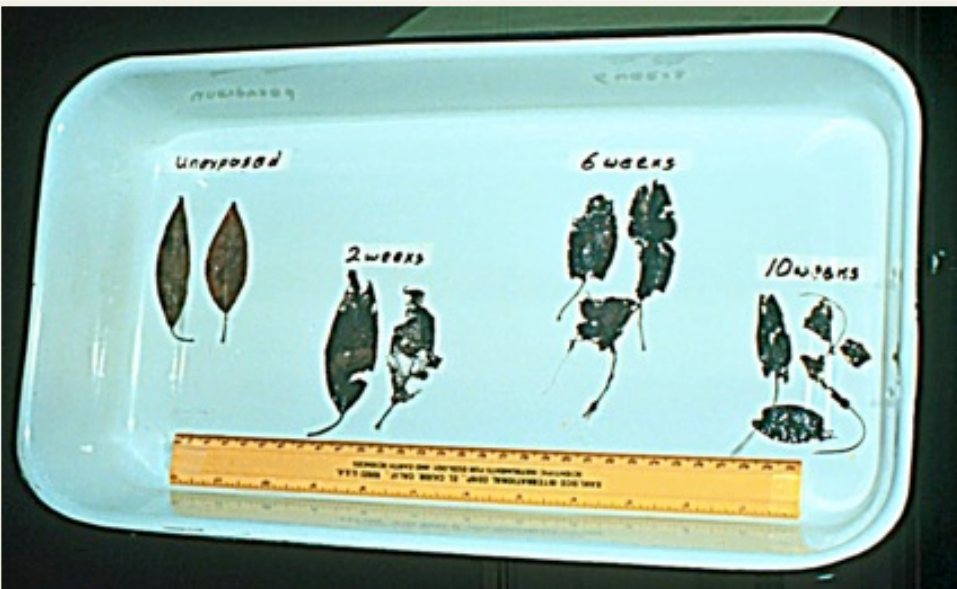
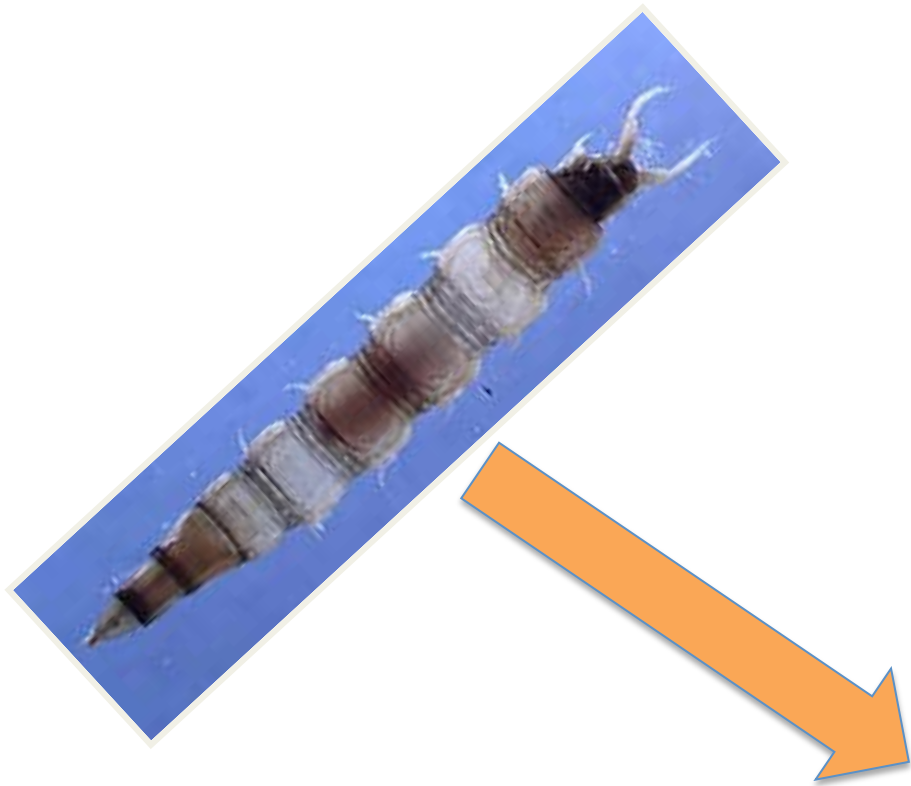
Food Source for Aquatic Animals

Leaf packs

Branches

Logs





Food Source for Wildlife

Plant	Waterfowl (food)	Songbirds (food & nesting)	Mammals (food & shelter)	Comments
Black walnut			X	Certain plants will not grow under blk walnut
River birch		X	X	
Swamp chestnut oak	X	X	X	Attracts birds & butterfiles, sweet acorns
Hackberry		X	X	Best food & shelter for wildlife
Spice bush		X	X	Emergency food for wildlife
Rushes (Juncus)	X	X	X	Moderate deer resistance
Sedges (Carex)	X	X		
Black willow	X		X	Special value to native bees

Other Excellent Wildlife Plants

Pecan

Green ash

Red oak

Water oak

Sassafras

Winterberry

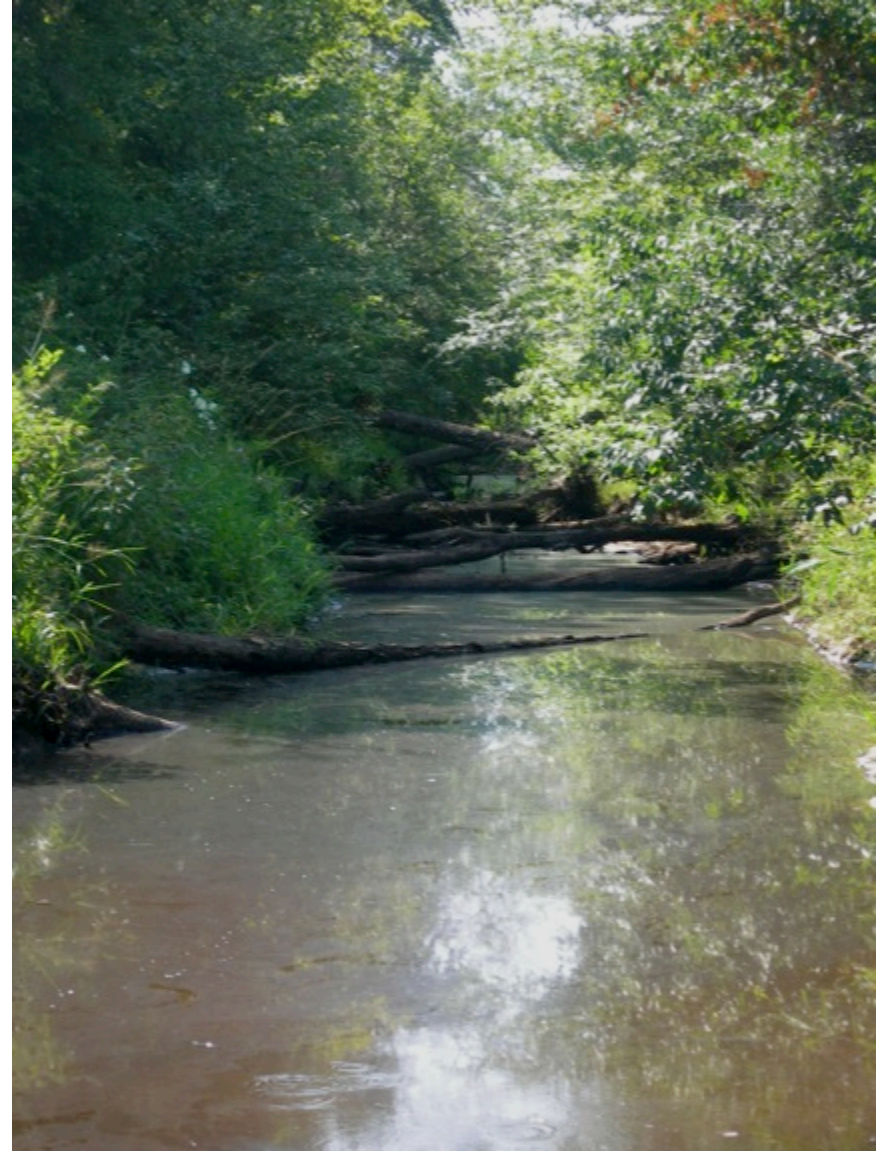


Larval host for Elf, *Microtia elva*

Habitat

In-stream flow diversity

Habitat (in the creek and
along the land)

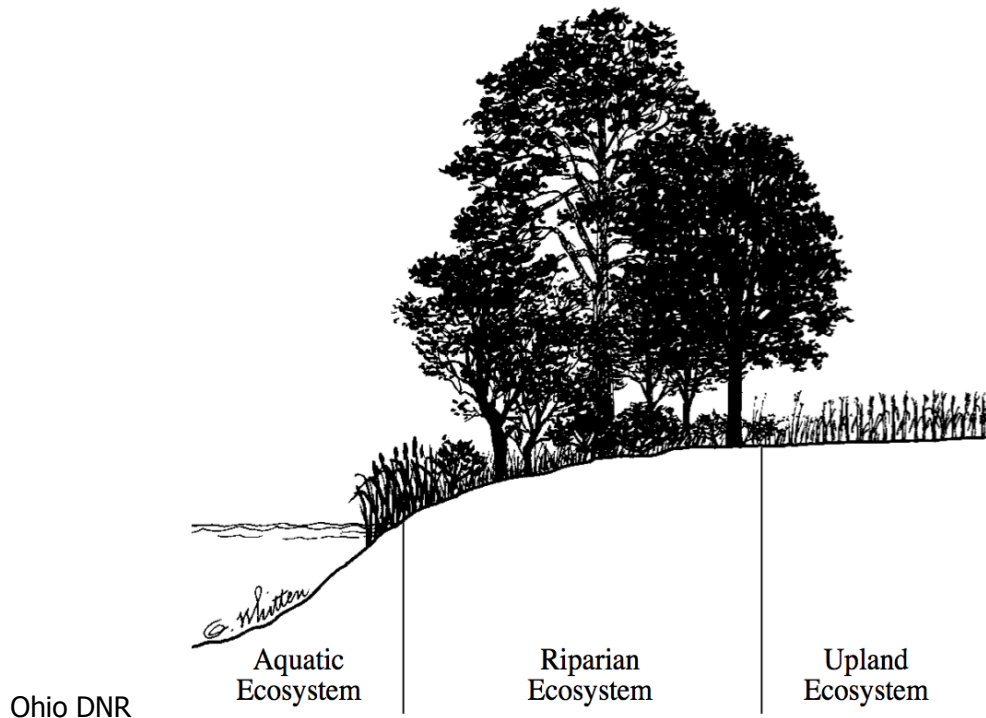


Habitat

Wildlife corridors

2 edges – stream forest and stream (birds), stream forest and upland (quail, cottontail rabbit)

Resting & feeding areas for water fowl & other migrating birds



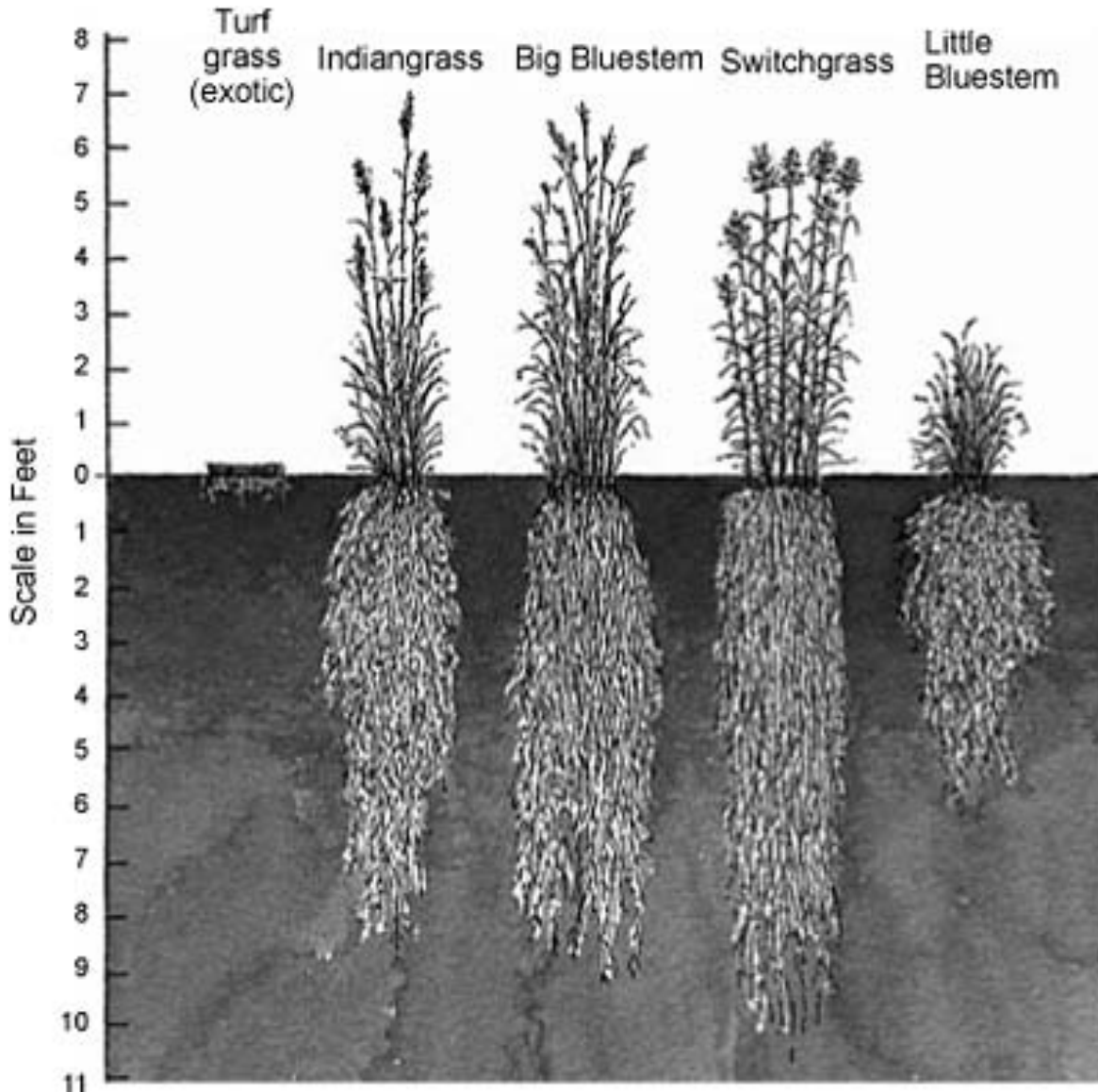
Bank Stability

Roots are rebar



Bank Stability

Deeply rooted
native vegetation



Filtering Pollutants

Stems slow runoff
Sediment drops out
Excess nutrients
transformed
Leaves lessen rain
impact



Why worry about sediment?

Smothers habitat

Abrasive to fish gills
(deep breath)

Rarely travels alone





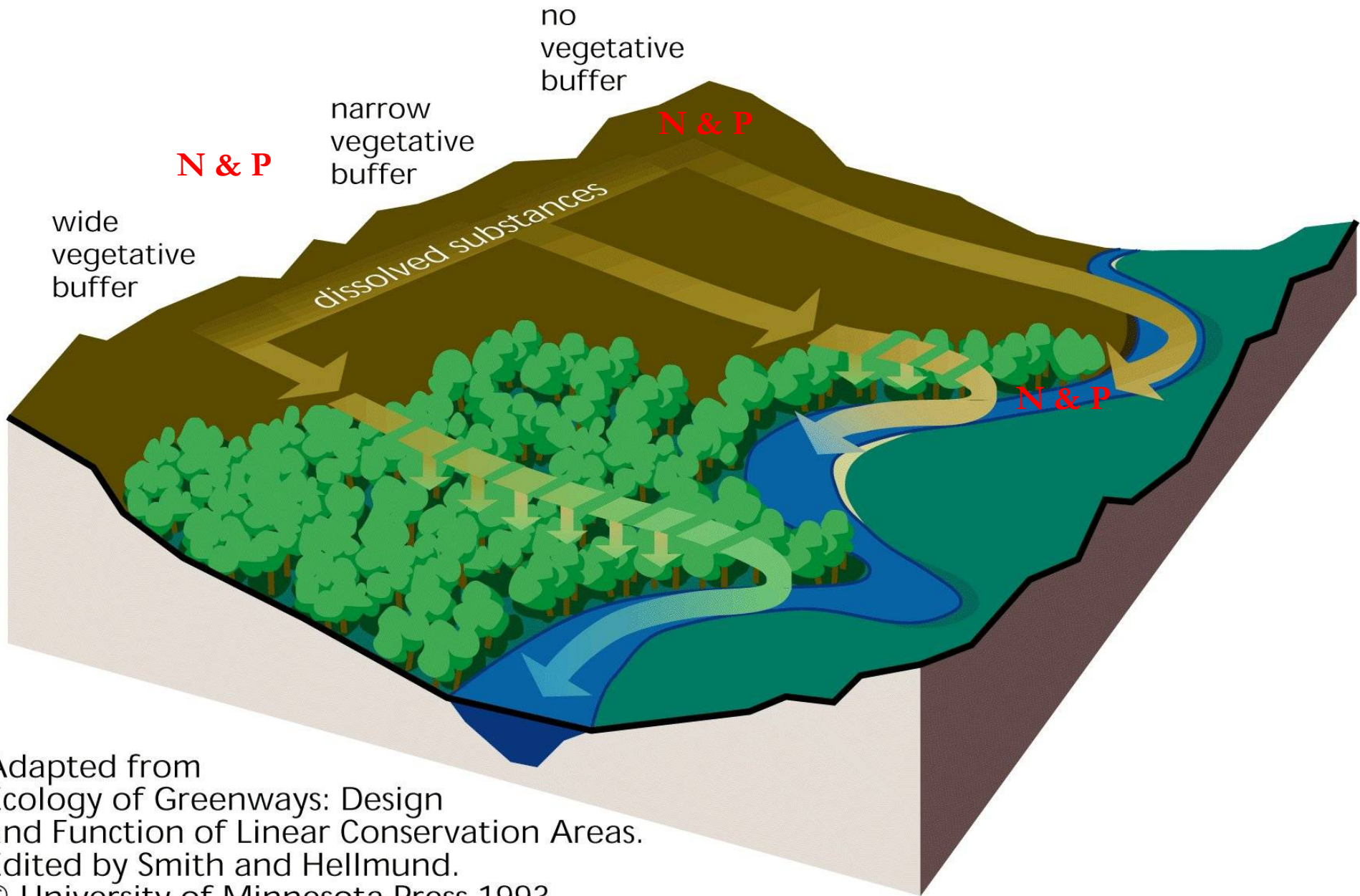
Excess Nutrients

Stimulates algal growth

Can rob oxygen from the stream
(deep breath)



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.

Floodplain



Functions

Floodwater Storage



Flood Hazards



9/22/2009, Atlanta, GA

Flood Storage

Landscapes with 10 % swamps and ponds reduced downstream floods by 60%

Landscapes with 20% swamps and ponds reduced floods by 90%

Bedient (1975)



Sediment Storage



Nutrient & Pollutant Processing



Channel Stability



Habitat



Vegetation Attributes

- Fast and slow growing trees, shrubs, grasses and forbs protect waterways and diversify habitat

Benefit	Grass	Shrub	Tree
Stabilize Bank Erosion	Low / Medium	Medium / High	High
Filter Sediment & Nutrients (bound) Soluble Nutrients, Pesticides, Microbes	High Medium	Low / Medium Low	High Medium
Aquatic Habitat	Low	Medium	High
Wildlife Habitat (forest wildlife)	Low	Medium	High
Flood Protection	Low	Medium	High

Planning for Vegetation

Area that will be disturbed

Vegetation inventory

Typical species community

Transplants available

Invasive, nonnative species



Different Options for Vegetation

Seeding

Transplants

Live stakes

Bareroot plants

Container plants



Temporary Seeding

Common Name	Rate per acre	Mountains	Piedmont	Coastal Plain
Wheat	25 lbs	Nov – Apr	Aug – May	Aug – Apr
Rye Grain	30 lbs	Nov – Apr	Aug – May	Aug – Apr
Millet (Browntop or German)	10 lbs	May – Sept	May – Aug	Apr - Aug

Temporary seeding minimizes erosion

Check into season to get the best mix for the area (millet, winter wheat)

Ok to mix if you're between seasons



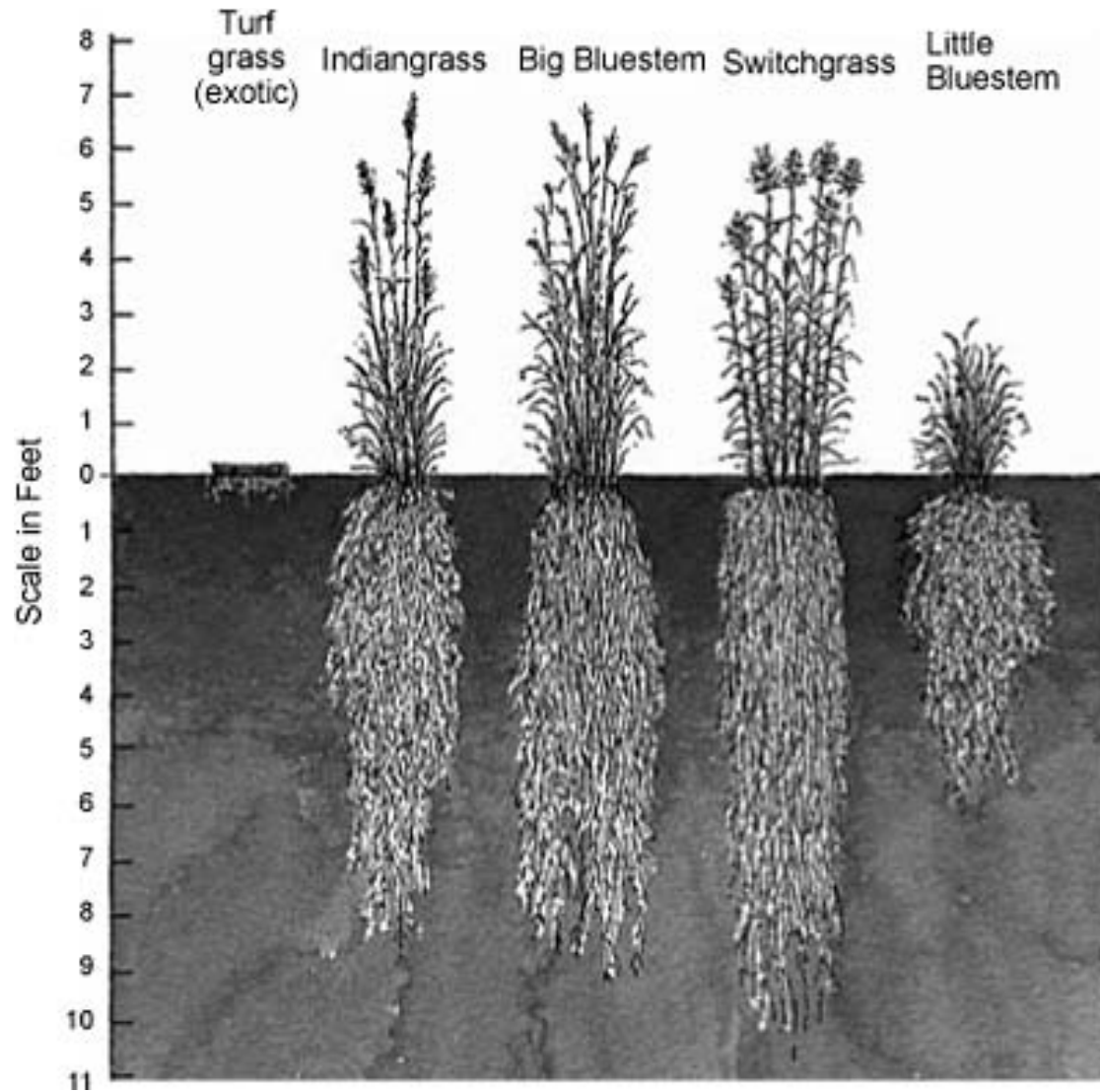
Permanent Seed Mix

Wetland

Upland

Cool season grasses

Warm season grasses



Permanent Seed Mix

Common Name	Scientific Name	% of mix	Planting Dates
Switchgrass	<i>Panicum virgatum</i>	10-15	Dec - April
Indiangrass	<i>Sorghastrum nutans</i>	10-30	Dec - April
Deertongue	<i>Dichanthelium clandestinum</i>	5-25	Dec - April
Little blue stem	<i>Schizachtrium scoparium</i>	10-30	Dec - April
Soft rush	<i>Juncus effusus</i>	1-10	Dec - May, Aug - Oct
Partridge Pea	<i>Chamaecrista fasciculata</i>	1-10	Dec - May
Sedges	<i>Carex (spp)</i>	1-10	Dec - May

*Plan different mixtures for different areas
(moist vs. upland)*



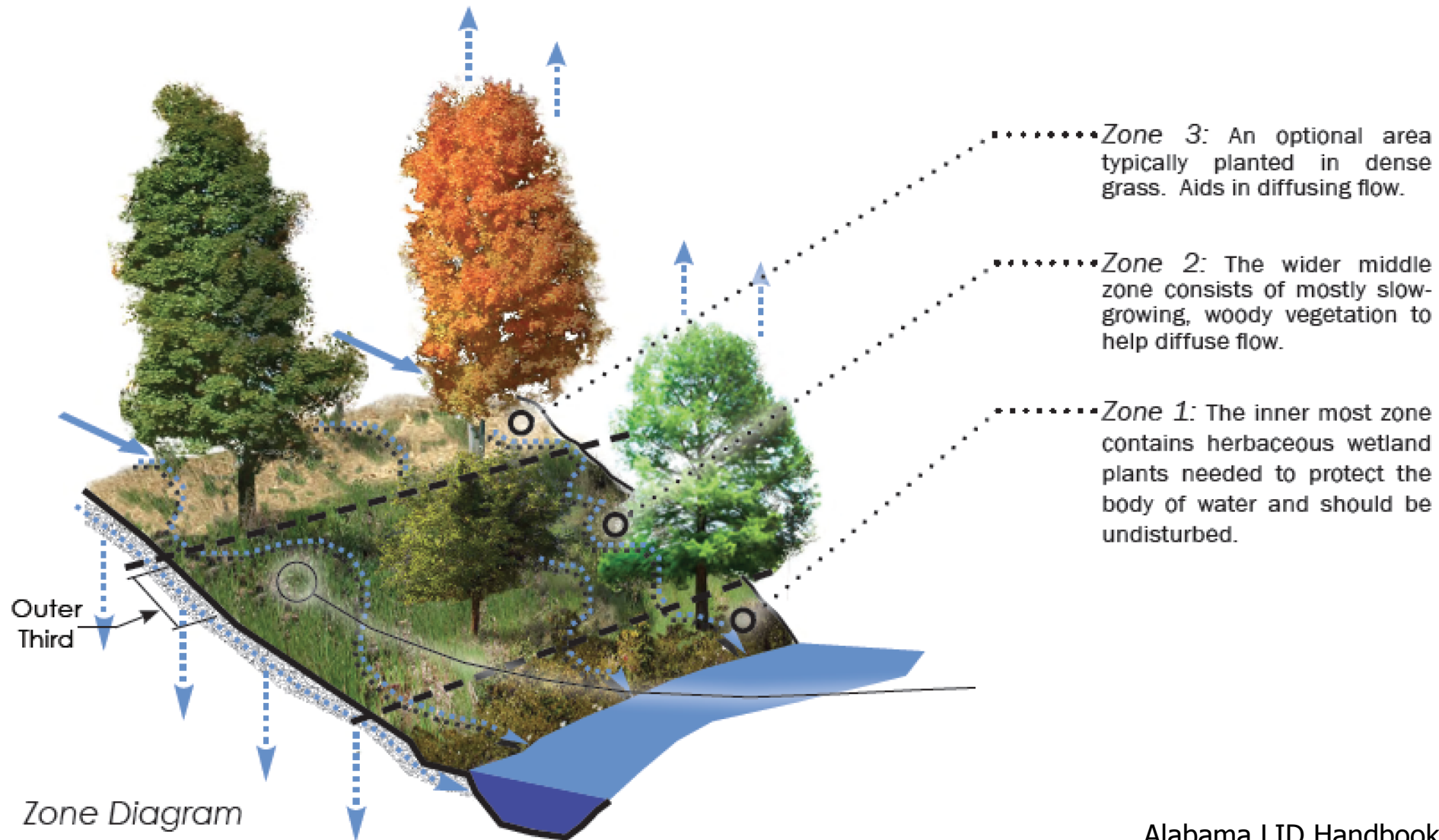


Recommended Rates

12-15 pounds per acre, pure live seed, broadcast



Vegetation Zones



Transplants

Take advantage of native vegetation & equipment on site

Get as large a rootball as you can (2' – 3' of soil)

Plant as soon as possible

Locate on outside of bend
(take advantage of roots on erosive area)



Transplants

Wetland plants transplant well – Sedges, Juncus

Collect marsh vegetation from nearby area (don't ransack it)

Keep transplants moist and plant as soon as possible





Live Stakes

A dormant hardwood stick,
pushed into wet/moist soil

Best planted in dormant
season

Not likely to be washed away

0.5 – 2” in diameter

2’ – 3’ long



Live Stakes

Install 2 to 4 feet apart, triangular spacing

Drive stakes into the ground using a rubber hammer – may have to use leader (rebar)

At least 2 buds should remain above ground

Green side up ... cut bottom at an angle



Live Stake Species

Salix nigra, black willow

Salix sericea, silky willow

Cornus amomum, silky dogwood

Physocarpus opulifolius, ninebark

Sambucus canadensis, elderberry

Itea virginica, Virginia sweetspire









C. amomum
S
9 month



Itea
S
9month



S. nigra

NS

9 month





Bare Root Seedlings

Bare root seedlings dug and stored without soil around their roots

Missing >90% of root hairs - plant's water absorbing structures

Keep plants moist and cool



Bare Root Seedlings

Ideal to plant when vegetation is dormant, winter or early spring

Benefits –

- Less expensive

- Don't need much expertise to plant (green side up)

- May be more diverse nursery selection

Drawbacks –

- May experience higher mortality than container plants

- Purchase 10 – 15% more than needed, plant additional plants in holding area



Container Plants



Container Plants

Benefits:

- Well established root system
- Higher survival than bare root
- Can be planted just about any season
- Instant tree or shrub

Drawbacks:

- Expensive
- Requires more labor in planting



Trees and Shrubs

Bare root, container, transplants, live stakes

Number planted may depend on requirements (mitigation), project goals, aesthetics

Type	Spacing	# per 1,000 sq ft
Shrubs (<10 ft)	3-6 ft	25 – 110
Shrubs & Trees (10 – 5 ft)	6-8 ft	15 – 25
Trees (> 25 ft)	8-15 ft	4 - 15



Plant Selection

Native Plants

Water Tolerance

Light Tolerance

Compatible with Soils

Wildlife Value

Aesthetics

What are the goals?



Mitigation Requirements

Tree:

10-15 species per acre

Final coverage 200-300 stems/acre

Basal area 250-325 ft²/acre

Shrub & herbaceous layer:

Initiate after 3 years if limited natural recruitment

Minimum of 3 shrub species

Target shrub cover 20-60%

Herbaceous layer depends on target forest type

Vegetation Examples

Depends on your region: North, Central, Coastal

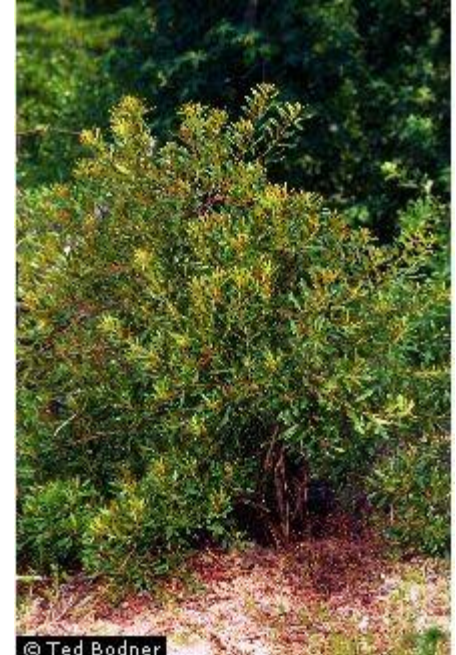
Trees: river birch, sycamore, cypress, red maple, sweet bay, tulip poplar, green ash, swamp chestnut oak, overcup oak, laurel oak



Vegetation Examples

Consider your region ...

Shrubs / Small Trees – inkberry, Virginia sweetspire, alder, Spicebush, buttonbush, wax myrtle



Vegetation Examples

Depends on your region ...

Herbaceous –cardinal flower, lizard’s tail, river oats, wild iris, purple cone flower, indian blanket, brown eyed Susan



Locating Plants

Purchase from reputable nurseries

Best to get local stock - greater wildlife benefit and better adapted to local climatic conditions

May have to work with several nurseries to get the plant diversity you wish

ALABAMA

Biophilia Native Nursery
12695 County Rd. 95, Elberts, AL 36530 Tel: 251/987-1200
Email: Biophilia@gulfnet.com Web: www.biophilia.net
%Native: 100, P

Weyerhanser Nursery
3890 Hwy. 28 W., Clenden, AL 36726 Tel: 800/635-0162, 334/682-9882 Fax:
334-682-4481
Forest industry. %Native: 100

White City Nursery, U.S. Alliance, Coosa Pines Corp.
707 Co. Road 20 West, Verbena, AL 36091 Tel: 334/365-2488 Fax: 334/365-2488
E-mail: kic4uz@galnet.com

Wildflower
234 Oak Tree Trail, Wilsonville, AL 35186 Tel: 205-669-4097 Fax: 205/669-4097
%Native: 95, R/W

WHOLESALE ONLY

Dodd & Dodd Native Nurseries
P.O. Box 439, Semmes, AL 36575 Tel: 251/945-2222
Email: dodd@dodd@mchsi.com
%Native: 100, W/C

E.A. Hauss Nursery
Alabama Forestry Commission, 4165 Ross Rd., Annemo, AL 36502 Tel: 251/368-4354
Fax: 251/368-8824
Email: haussnursery@forestry.state.al.us
%Native: 50, WC

Joshua Timberlands Nursery
26660 G. L. P. Rd., Ft. Payne, AL 35967 Tel: 256/844-1111 Fax: 256/844-1111



Variety	Liner	1G	FullG	2G	3G	4G	5G	7G	10G	15G	20G	25G
Azaleas		🍷	🍷	🍷	🍷		🍷	🍷	🍷	🍷		
Boxwood		🍷										
Camellias, japonicas												
Camellias, sasanqua types			🍷		🍷			🍷				
Carnivorous	🍷	🍷		🍷			🍷					
Crape Myrtles								🍷		🍷		
Cypress			🍷		🍷			🍷				
Daylilies		🍷										
Ferns - Hardy & Tender		🍷		🍷			🍷	🍷				
Ferns - Allies (Selaginellas & Horsetails)		🍷										
Grasses	🍷	🍷	🍷		🍷			🍷				
Groundcovers	🍷	🍷										
Hollies		🍷	🍷	🍷	🍷			🍷	🍷	🍷		🍷
Hydrangeas												
Loropetalums					🍷							
Nandinas		🍷			🍷							
Ornamentals		🍷	🍷	🍷	🍷			🍷	🍷	🍷		
Pines						🍷		🍷		🍷		
Rhododendrons (Native Azaleas)			🍷		🍷			🍷				

Check around and see which planting type best suits your budget:

- bare root
- plugs
- container



Considering your Vegetation



Plant Protection



Managing Livestock (People) Access

Encourage livestock (people) to access streams at reinforced crossings

Consider alternative water and shade sources

Protects livestock health and stream health



Why is streamside vegetation important?

Shading

Temperature

Food sources for aquatic animals

Woody debris

Bank stability

Filtering nutrients and sediments



Invasive, Nonnative Plants



Invasive, Nonnative Plants

Chinese privet

Japanese honeysuckle

Popcorn tree

Cogon grass

Japanese climbing fern

Nepalese stilt grass



Invasive, Nonnative Plants

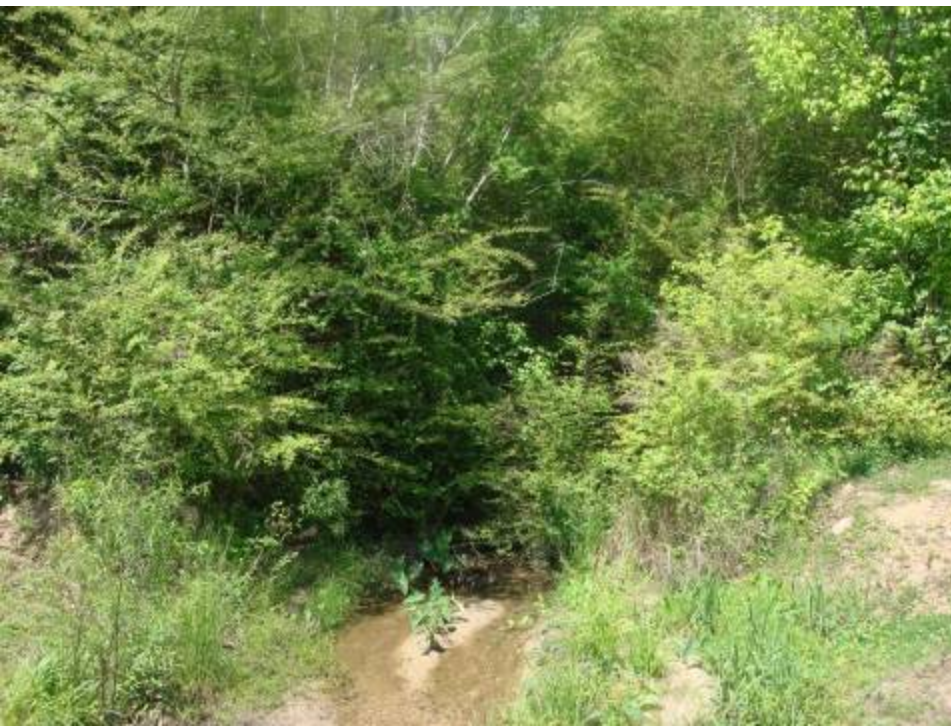
Remove and replace with
native vegetation

Low habitat value

May not be providing
erosion control



Streams = Conveyor Belts



Invasive Removal

Physical removal

Foliar Application

Basal spray

Cut and paint



Mitigation requirements

< 1% cover

No seed bearing
plants

Recipes for management

Available online



A Management Guide for Invasive Plants in Southern Forests

James H. Miller, Steven T. Manning, and Stephen F. Enloe



United States Department of Agriculture • Forest Service • Southern Research Station
General Technical Report SRS-131

A Field Guide for the Identification of Invasive Plants in Southern Forests



United States
Department
of Agriculture

Forest Service
Southern Research Station
General Technical Report

James H. Miller, Erwin B. Chambliss, and Nancy J. Loewenstein









Vegetation Resources

USDA Plant Database

<http://plants.usda.gov/>

National Native Plant Nursery Selector

http://www.plantnative.org/national_nursery_dir_main.htm

Lady Bird Johnson Wildflower Center

www.wildflower.org/plants/

