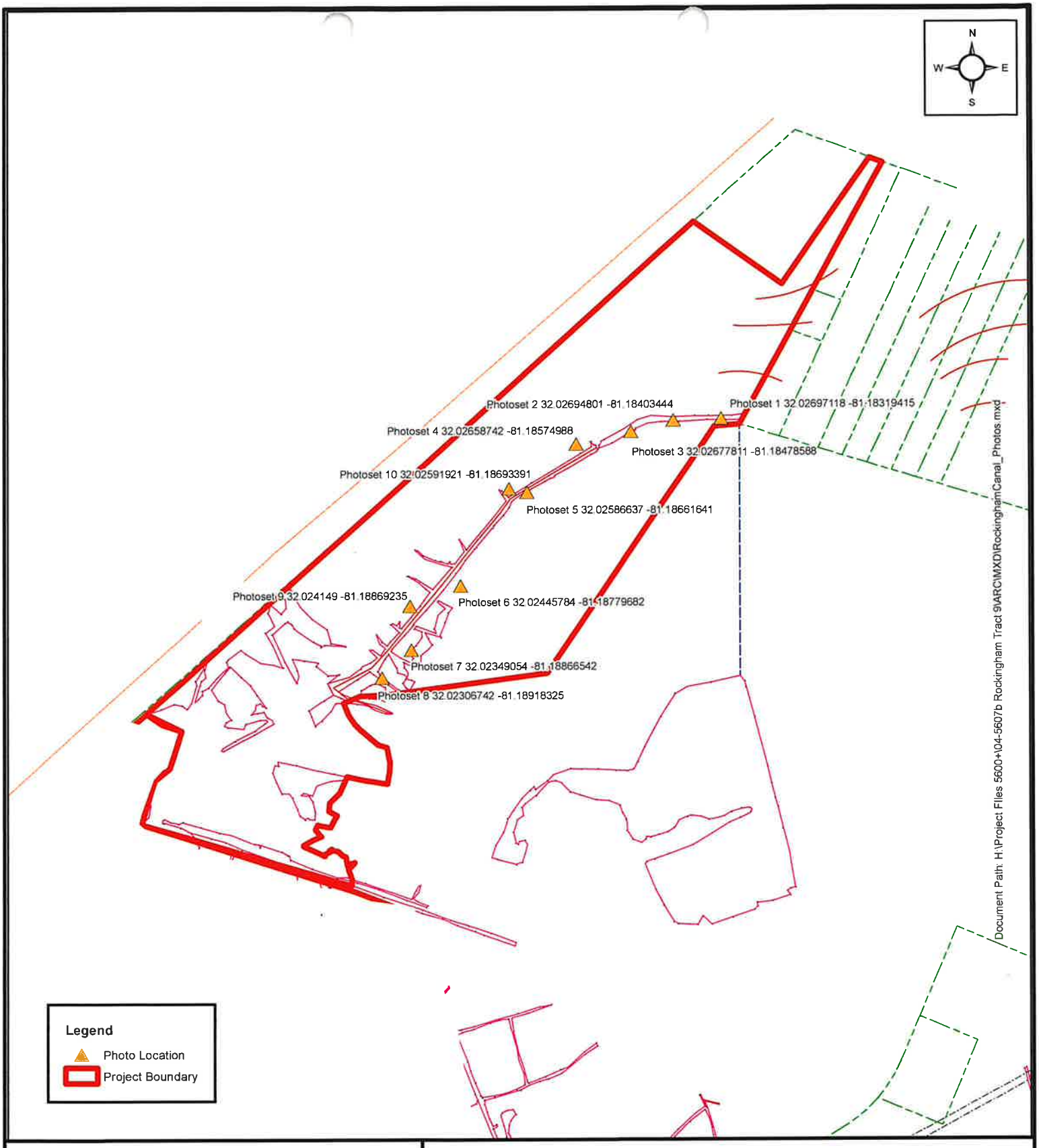

Photo Location Map

Project #: 04-5064b Date: November 2025

Created by: CAB

Newkirk ENVIRONMENTAL INC.

Rahn Dairy Canal
Chatham County, Georgia

0 450 900 1,800 Feet

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 1

Overhead Transmission Line #1

Herbaceous Vegetation

Lat Lon from photo
32.02695833, -81.18322222

30 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:06 AM EST

Sampling Point:
Photoset 1

Overhead Transmission Line #2

Herbaceous Vegetation

Lat Lon from photo
32.02687222, -81.18330277

16 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:07 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 2

Forested Buffer

Dominant Vegetation: Tallow, Privet

Lat Lon from photo
32.02675555, -81.18413055

10 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:10 AM EST

Sampling Point:
Photoset 2

Forested Buffer

Lat Lon from photo
32.02671666, -81.18420277

26 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:11 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 2

Forested Buffer

Lat Lon from photo
32.02673333, -81.18418888

23 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:11 AM EST

Sampling Point:
Photoset 3

Typical Maintenance Shelf

Lat Lon from photo
32.02676666, -81.18476944

10 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:12 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 3

Typical Maintenance Shelf

Lat Lon from photo
32.02674444, -81.18475833

0 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:13 AM EST

Sampling Point:
Photoset 4

Forested Buffer

Dominant: Pine/Sweetgum

Lat Lon from photo
32.02657222, -81.18573333

7 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:15 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 4

Forested Buffer

Dominant: Pine/Sweetgum

Lat Lon from photo
32.02657777, -81.18575833

52 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:16 AM EST

Sampling Point:
Photoset 4

Forested Buffer

Dominant: Pine/Sweetgum

Lat Lon from photo
32.02658888, -81.18577222

46 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:16 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 5

Adjacent to Canal

Live Oaks bordering edge of canal

Lat Lon from photo
32.02584722, -81.18659722

26 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:18 AM EST

Sampling Point:
Photoset 6

Forested Buffer

Lat Lon from photo
32.024475, -81.18778888

30 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:22 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 6

Forested Buffer

Lat Lon from photo
32.02447222, -81.18778055

Direction

36 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:22 AM EST

Sampling Point:
Photoset 6

Forested Buffer

Lat Lon from photo
32.024475, -81.18778333

Direction

36 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:22 AM EST

Survey: Rockingham Canal Butter Photos

Region: General Field Observation

Sampling Point:
Photoset 7

Forested Buffer

Direction

Lat Lon from photo
32.02349444, -81.18866388

20 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:24 AM EST

Sampling Point:
Photoset 7

Forested Buffer

Direction

Lat Lon from photo
32.0235, -81.18865833

26 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:24 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 7

Forested Buffer

Direction

Lat Lon from photo
32.02349444, -81.18865555

26 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:24 AM EST

Sampling Point:
Photoset 8

Overhead Transmission Line

Herbaceous Vegetation

Direction

Lat Lon from photo
32.02306944, -81.18917222

23 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:27 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 8

Overhead Transmission Line

Herbaceous Vegetation

Direction

Lat Lon from photo
32.02306944, -81.18916944

23 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:27 AM EST

Sampling Point:
Photoset 9

Forested Buffer

Direction

Lat Lon from photo
32.02418333, -81.18867777

85 Elevation in feet

Photo date: Fri, Nov 14, 2025 10:32 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 9

Forested Buffer

Lat Lon from photo
32.02425277, -81.18865555

69 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:32 AM EST

Sampling Point:
Photoset 10

Forested Buffer

Lat Lon from photo
32.02591388, -81.18692777

0 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:37 AM EST

Survey: Rockingham Canal Buffer Photos

Region: General Field Observation

Sampling Point:
Photoset 10

Forested Buffer

Lat Lon from photo
32.02591388, -81.18692777

0 Elevation in feet

Direction

Photo date: Fri, Nov 14, 2025 10:37 AM EST

Generated with ecobot

Buffer Zone

Bf

DEFINITION

A strip of undisturbed, original vegetation, enhanced or restored existing vegetation or the re-establishment of vegetation surrounding an area of disturbance or bordering streams, ponds, wetlands, lakes and coastal waters.

PURPOSE

To provide a buffer zone serving one or more of the following purposes:

- Reduce storm runoff velocities
- Act as screen for "visual pollution"
- Reduce construction noise
- Improve aesthetics on the disturbed land
- Filtering and infiltrating runoff
- Cooling rivers and streams by creating shade provide food and cover for wildlife and aquatic organisms
- Flood protection
- Protect channel banks from scour and erosion

CONDITIONS

A natural strip of vegetation should be preserved and, if needed, supplemented to form the buffer zone. There are two types of buffer zones.

General Buffers

A strip of undisturbed, original land surrounding the disturbed site. It can be useful not only to filter and infiltrate runoff, but also to act as a screen for "visual pollution" and reduce construction noise. General buffers may be enhanced to achieve desired goals.

Vegetated Stream Buffers

Buffers bordering streams are critical due to the invaluable protection of streams from sedimentation. Stream buffers are also useful in cooling rivers and providing food and cover for wildlife. Refer to the minimum requirements in Act 599 (O.C.G.A. 1-7-1, et. seq.) and Chapters 16 and 18 of the NRCS Engineering Field Handbook.

In most cases, the buffer zone will be incorporated into the permanent vegetative cover. Refer to specification **Ds3 - Disturbed Area Stabilization (With Permanent Vegetation).**

DESIGN SPECIFICATIONS

Important design factors such as slope, hydrology, width and structure shall be considered. While Georgia's Environmental Protection Division enforces minimum stream buffer requirements, expanding the stream buffer width is always encouraged. If any land-disturbing activity, including exempt and non-exempt practices, occurs within the GA EPD mandated stream buffers, cut and fills within the buffer shall be stabilized with appropriate matting or blanket.

General Buffers

A width should be selected to permit the zone to serve the purpose(s) as listed above. Supplemental plantings may be used to increase the effectiveness of the buffer zone.

Vegetated Stream Buffers

The structure of vegetated stream buffers should be considered to determine if the buffer must be enhanced to achieve the necessary goals. The size of the stream as well as the topography of the area must be considered to determine the appropriate width of the vegetated stream buffer. A vegetated stream buffer of 50 feet or greater can protect waters from excess sedimentation. The buffer should be increased 2 feet in width for every 1% slope (measured along a line perpendicular to the stream bank). Surface water pollution can be reduced with a 100 foot or wider vegetative buffer.

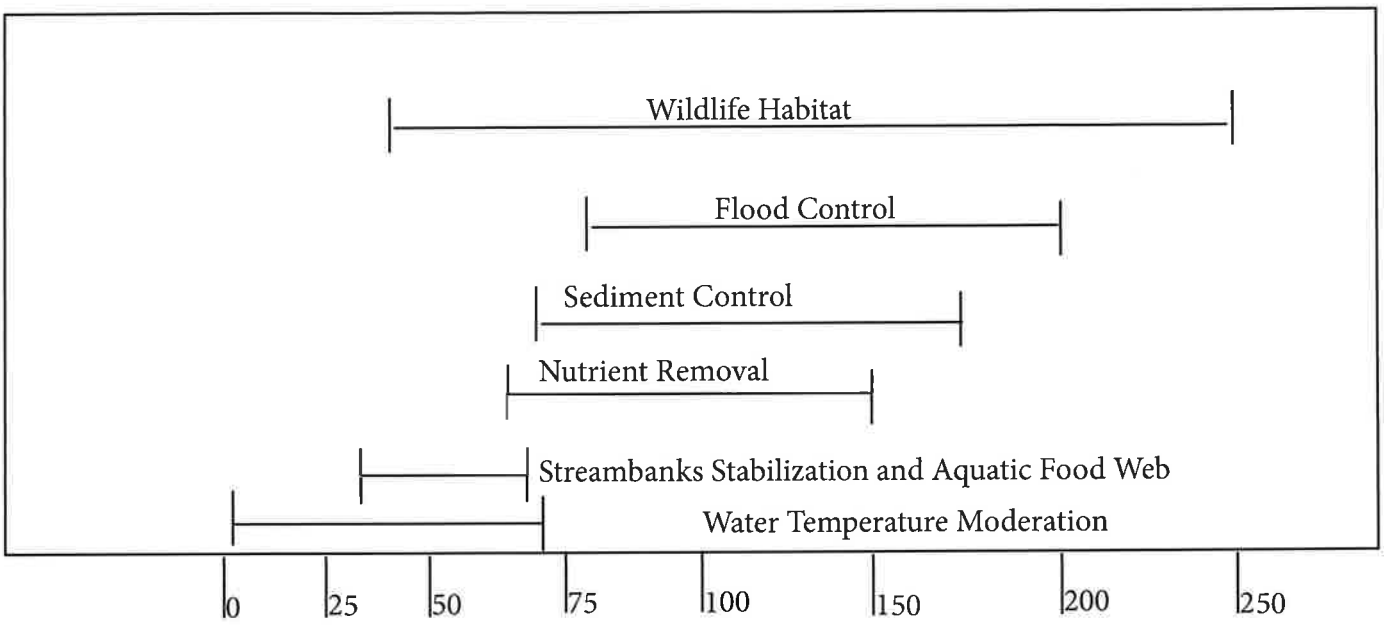

Figure 6-1.1 - Range of Minimum Width for Meeting Specific Buffer Objectives (Palone and Todd, draft)

A general multipurpose riparian buffer consists of three zones.

1. Zone 1 The first 20 feet nearest the stream should consist of trees spaced 6-10 feet apart.

2. Zone 2 The next 10 feet should consist of managed forest.

3. Zone 3 The following 20 feet should be comprised of grasses.

This general multipurpose design contains trees and shrubs that help to stabilize stream banks and grasses that spread and reduce the flow from adjacent areas as well as increase settling and infiltration. See Tables 6-1.1 and 6-1.2 for suggested plant species.

If the ideal vegetated buffer width cannot be achieved; narrower buffers can still be used to obtain the goals concerning forest structure and riparian habitat. If this is the case, several design principles should be considered:

1. Sheet flow should be encouraged at the edge of the vegetated stream buffer.

2. The structure of the buffer should consist of under-story and canopy species.

3. The width should be proportional to the watershed area and slope.

4. Native and non-invasive plant species should be used.

5. Density must be considered to determine if the existing buffer must be enhanced to achieve the necessary goals. Vegetation must be dense enough to filter sediment and provide detrital nutrients for aquatic organisms.

Streambank stabilization techniques may be required if steep slopes and hydrologic patterns deem it necessary. Refer to specification **Sb - Streambank Stabilization (Using Permanent Vegetation)**. Vegetated stream buffers on steep slopes may need to be wider to effectively filter overland flow. Corridors subject to intense flooding may require additional streambank stabilization measures.

PLANTING TECHNIQUES

Plantings for buffer re-establishment and enhancement can consist of bare root seedlings, container-grown seedlings, container-grown plants, and balled and burlapped plants. Refer to Tables 6-1.1 and 6-1.2, and Wildlife Plantings in **Ds3 - Disturbed Area Stabilization (With Permanent Vegetation**). Standard permanent ero-

sion control grasses and legumes may be used in denuded areas for quick stabilization. Refer to specification **Ds3 - Disturbed Area Stabilization (With Permanent Vegetation).** Availability, cost, associated risk, equipment, planting procedures, and planting density must be considered when choosing planting types.

Soil preparation and maintenance are essential for the establishment of planted vegetation. Soil fertility, weed control, herbaceous cover, as well as additional associated products may be required.

OPERATIONS AND MAINTENANCE

Areas closest to the stream should be maintained with minimal impact.

Watering

During periods of drought as well as during the initial year, watering may be necessary in all buffer areas planted for enhancement.

Weed Control

Weeds can be removed by hand or with careful spraying.

Replanting

It is imperative that the structure of the vegetated stream buffer be maintained. If the buffer has been planted, it is suggested that the area be monitored to determine if plant material must be replaced. See Tables 6-1.1 and 6-1.2 for suggested plant species. Provisions for the protection of new plantings from destruction or damage from beavers shall be incorporated into the plan.

Fertilizer

If appropriate vegetation is chosen, it is unlikely that fertilizer will be necessary.

Local Contacts:

USDA Natural Resources Conservation Service
Georgia Forestry Commission

Table 6-1.1 - Unrooted Hardwood Cuttings

Species	Region	Tolerance To Flooding	Tolerance To Drought	Tolerance To Deposition	Tolerance To Shade
Acer negundo Boxelder	C,P,M	H	H	H	L
Baccharis halimifolia Groundsel bush	C,P (lower)	M	M	H	L
Cornus amomum Silky dogwood	P,M	L	M	L	M
Cornus sericia Ssp. slolonifera Red osier dogwood	P,M	L	M	H	M
Crataegus sp. Hawthon	C,P,M	M	H	L	L
Populus deltoids Eastern cottonwood	C,P,M	M	M	H	L
Salix sp. interior Sandbar willow	C,P,M	H	L	H	L
Salix nigra Black willow	C,P,M	H	H	H	L
Salix purpurea Streamco willow	C,P,M	H	M	H	L
Salix x colleti Bankers willow	P,M	H	M	H	L
Sambucus canadensis American elderberry	P,M	H	M	M	M
Viburnum denlatum Arrowwood viburnum	C,P,M	M	M	M	M
Viburnum lentago Nannyberry viburnum	C,P,M	M	M	L	M

Adapted from the USDA/NRCS Engineering Field Handbook, Chapter 18

Legend

Tolerance to Flooding, Drought, Deposition, and Shade:
H = High
M = Medium
L = Low

Region:
C = Coastal
P = Piedmont
M =Mountain

Rooting of all species will be improved if nearby vegetation is pruned to increase sunlight penetration.

Whenever possible, harvest hardwood cuttings as close to the repair site as possible. Many of the above grow naturally along streams, in adjacent wetlands, along sewer and power line easements, and where streams enter lakes and along lake shores. Willows generally grow profusely in stormwater detention ponds in urban areas.

ALWAYS OBTAIN PERMISSION FROM THE PROPERTY OWNER BEFORE HARVESTING PLANTS!

NATIVE PLANT GUIDE FOR STREAMBANK PLANTING ROOTED STOCK

Species	Region	Stream Zone	Wildlife Value	Notes
Acer rubrum Red Maple	M,P,C	Tree	High seed and browse.	Rapid growth.
Alnus serrulata Smooth alder	M,P,C	Shrub	Moderate, Cover	Rapid growth. Stablizes streambank. Sun.
Amorpha fruticosa False indigo	M,P,C	Shrub	Moderate	Sun.
Aronia arbutifolia Red chokeberry	M,P,C	Shrub	Moderate cover and food.	Rhizomatous Colonial Shrub.
Asimina triloba Pawpaw	M,P,C	Tree	Important food for fox and possum.	
Betula nigra River Burch	M,P,C	Tree	Good for cavity nester.	Full sun.
Carpinus caroliniana American hornbeam	M,P,C	Tree	Low	Partial shade.
Carya cordiformis Bitternut hickory	P,C	Tree	Moderate, food	Wet bottoms.
Catalpa bignonioides Catalpa tree	P,C	Tree	Unknown	
Celtis laevigata Sugarberry	P,C	Tree	High food cover	Partial shade.
Celtis occidentalis Hackberry	P,C	Tree	High	Partial shade.
Cephalantus Occidentalis Buttonbush	M,P,C	Shrub	Moderate, ducks and shorebirds are users. Nectar for hummingbirds.	Sun.
Chionanthus virginicus Fringe tree	P,C	Tree	Moderate	Tolerant of shade.
Clethra alnifolia Sweet pepperbush	P,C	Shrub	Moderate	Partial shade. Good landscape value
Cornus amomum Silky dogwood	M,P	Shrub	High, songbirds, Mammals	Shade tolerant. Good bank stabilizer.
Cornus stricta Swamp dogwood	M,P	Shrub	High	Good bank stabilizer in shade.
Cornus florida Flowering dogwood	M,P,C	Tree	High, birds, food	Shade tolerant.
Cyrilla racemiflora Titi	C	Tree	Low	Light shade.
Diospyros Virginia Persimmon	M,P,C	Tree	Extremely high Mammals	Not shade tolerant.
Fraxinus caroliniana Carolina ash	C	Tree	Moderate	Rapid growing. Streambank grower. Sun to partial shade.
Fraxinus pennsylvanica Green ash	M,P,C	Tree	Low	Rapid grower. Full sun.
Gleditsia aquatica Water locust	P,C	Tree	Low	Sun.
Gleditsia triacanthos Honey locust	P,C	Tree	Low	Full sun, thorns.

Table 6-1.2 - Native Plant Guide - continued

Species	Region	Stream Zone	Wildlife Value	Notes
Hibiscus aculeatus Hibiscus Comfort root	C	Shrub	Unknown	Use on open level floodplain areas and Depression in C.
Hibiscus militaris Hibiscus Halberd-leaved Marshmallow	C	Shrub	Unknown	Use on open level floodplain areas and Depression in C.
Hibiscus lasiocarpus Hibiscus	C	Shrub	Unknown	Use on open level floodplain areas and
Hibiscus moscheutos Hibiscus	C	Shrub	Unknown	Use on open level floodplain areas and
Ilex coriacea Sweet Gallberry	C	Shrub	Unknown	
Ilex decidua Possumhaw	P,C	Shrub	High, food, nest sites.	Sun or shade.
Ilex glabra Bitter gallberry or Inkberry	C	Shrub	High	Stoloniferous. Sun to some shade.
Ilex opaca American holly	M,P,C	Tree	High, food, cover nests.	Prefers shade.
Ilex verticilata Winterberry	M,P	Shrub	High, cover and fruits for birds. Holds berries in winter.	Full sun to some shade seasonally flooded areas.
Ilex vomitoria Yaupon	C	Shrub	High, songbirds	Small tree, very adaptable, suckers.
Juglans nigra Black Walnut	M,P	Tree	Good	Temporarily flooded wetlands along
Juniperus virginiana Eastern red cedar	M,P,C	Tree	High, food	Tolerant to some shad in youth.
Leucothoe axillaris Leucothoe	C	Shrub	Low	Partial shade.
Lindera benzoin Common spicebush	M	Shrub	High, songbirds	Shade, acidic soils. Good Understory
Liriondendron tulipefera Tulip poplar	M,P	Tree	Low	Tolerant to partial shade.
Liquidambar styraciflua Sweetgum	M,P,C	Tree	Low	Partial shade.
Lyonia lucida Lyonia or Fetterbush	C	Shrub	Low	Sun.
Magnolia Virginia Sweetbay	P,C	Tree	Very low	Shade tolerant.
Myrica cerifera Southern wax myrtle	C	Shrub	Moderate	Light shade.
Nyssa ogeche Ogeechee lime	C	Tree	High, fruit, cavity nesters.	Wetland tree
Nyssa sylvatica Blackgum or sourgum	M,P,C	Tree	Moderate, seeds	Sun to partial shade.
Nyssa aquatica Swamp tupelo	C	Tree	High	Prefers shade.

Species	Region	Stream Zone	Wildlife Value	Notes
Ostrya Virginiana Hophornbeam	M,P,C	Tree	Moderate	Tolerant of all sunlight conditions.
Persea borbonia Red bay	C	Tree	Good food, for quail and bluebirds.	Understory tree.
Pinus taeda Loblolly pine	P,C	Tree	Moderate	Poor sites.
Platanus occidentalis Sycamore	M,P,C	Tree	Low. Cavity Nesters	Transplants well. Rapid growth in full sun.
Populus deltoides Eastern cottonwood	M,P,C	Tree	High	Invasive roots. Rapid growth.
Quercus alba White oak	M,P,C	Tree	High, food	Prefers moist well drained soils.
Quercus laurifolia Swamp laurel oak	C	Tree	High	
Quercus lyrata Overcup oak	P,C	Tree	High	Sloughs & bottoms.
Quercus michauxii Swamp chestnut oak	M,P,C	Tree	High	Wetter sites than white oak.
Quercus nigra Water oak	M,P,C	Tree	High	
Quercus pagoda Cherrybark oak	M,P	Tree	High	
Quercus phellos Willow oak	M,P,C	Tree	High, mast	Full to partial sun.
Quercus shumardii Shumard oak	P,C	Tree	High	
Salix nigra Black willow	M,P,C	Shrub & Tree	Nesting	Rapid growth, full sun.
Rhododendron atlanticum Coast azelea	P,C	Shrub	Very low	Very fragrant suckers.
Rhododendron viscosum Swamp azelea	C	Shrub	Low	
Styrax american	C	Shrub	Unknown	
Taxodium distichum Bald cypress	C	Tree	Good perching site	Full sun.
Tsuga canadensis Eastern hemlock	M	Tree	Moderate	Tolerates all light conditions.
Viburnum nudum Swamp haw	M,P,C	Shrub	High	Shade tolerant

Legend

Region:
M = Mountains
P = Piedmont
C = Coastal Plain

Table 6-1.2 - Native Plant Guide - continued

Plant List Sources:

Brown, Claude L. & Kirkman, Katherine L. 1990. Trees of Georgia and Adjacent States.

Foote, Leonard E. & Jones, Samuel B., Jr. 1989. Native Shrubs and Woody Vines of the Southeast.

Georgia Cooperative Extension Service. Native Plants for Georgia Gardens.

Hightshoe, Gary L. 1988. Native Trees, Shrubs and Vines for Urban & Rural America.

USDA Natural Resources Conservation Service. 1973. Seacoast Plants of the Carolinas.

USDA Natural Resources Conservation Service, Engineering Field Handbook, Chapter 18, Soil Bioengineering for Upland Slope Protection and Erosion Reduction.