Stream Buffer Planting Guide

Tompkins County Stream Buffer Management

Enhancing Water Resources in Tompkins County: Stream Buffer Benefits

Introduction

Cayuga Lake, along with many streams, ponds, and wetlands provide Tompkins County with a beautiful environment. Each of these waterways has its own ecological requirements in order to be sustainable over a long period of time. To meet the requisite conditions necessary for ecological development, this booklet will outline vegetation appropriate for riparian areas* and stream buffers.

When designed well, the areas along streams, lakes and rivers are important in maintaining the quality of the water, stabilizing streams, and minimizing flood damage. The condition of birds and animal habitats is enhanced by riparian buffers which, in turn, stimulates ecological diversity.

"If properly designed and maintained, riparian buffers can provide a variety of benefits, from water quality protection to ecosystem maintenance to recreation and education to flood damage prevention" (Davis and Hitchings, 2000).

Consideration of the impact of people upon such environments is primary to protecting the waterways, and surrounding environments, as it ensures riparian buffers can continue to provide ecosystem benefits. Protecting and restoring streamside areas also enables streams "to re-cover dynamic equilibrium and function at a self-sustaining level." (Federal Interagency Stream Restoration Working Group, 1998).

As communities recognize the benefits of protecting and restoring the various waterways, and their buffers, developing these areas becomes an important ecological goal. This vegetation guide is intended to educate community leaders and landowners about riparian and stream buffers, and provide a scientific foundation for implementing riparian and stream buffers in Tompkins County. Although the term "riparian buffer" includes a variety of buffer types, this document specifically discusses stream buffers, which are considered by many researchers to be the most effective.

For more information on why and how to protect riparian areas, please visit
www.tompkins-co.org/planning "water resources" section.

**Riparian areas, the areas immediately adjacent to flowing waters such as streams, lakes, shorelines, and wetlands, provide a transition between aquatic and terrestrial ecosystems (Environmental Law Institute 2003).*

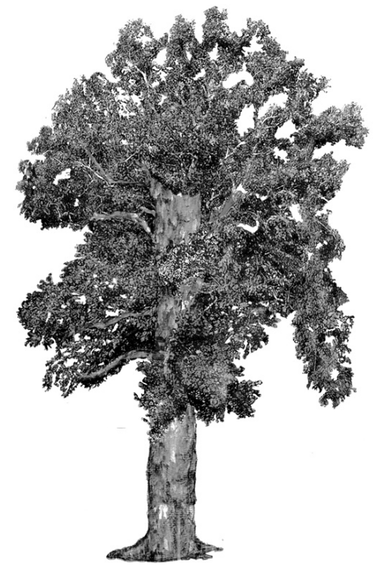
The Tompkins County Stream Corridor Protection and Management Program is a comprehensive, coordinated stream buffer program with goals to protect water quality and promote wildlife habitat throughout Tompkins County. The program seeks to advance these goals by protecting existing healthy, stream buffers in addition to establishing new ones. The program features both regulatory and non-regulatory protection tools for landowners, local governments and other conservation oriented organizations. This stream buffer planting guide is one such tool. The intention is that this planting guide is to assist in visualizing and implementing healthy stream buffers. The guide provides details on specific species appropriate for buffer areas and outlines how they should be planted. For more information on other tools available to protect local streams please visit www.tompkins-co.org/planning and see the "water resources" section or call the Tompkins County Planning Department 607-274-5560.

Tree Descriptions

Recommended Tree Species Include

Sycamore
(Platanus occidentalis):

Characteristics:
Height: 75'-90' Width: 60'-70'
Growing Conditions: Full sunlight to partial shade, moderately dry to wet conditions, prefers well-drained soil, can sustain droughts.
Rate of Growth: Fast



Description: The most striking feature of the Sycamore tree is its mottled appearance. It has multi-colored bark that dramatically peels off in large sheets. Frequently, the Sycamore tree divides into several secondary trunks, near the ground, but it has few branches leading to the canopy. The trunks of large trees are often hollow. Some of our ancestors lived in hollow Sycamore trees while building their cabins. Another unusual feature is that the leaves grow sticky, green buds. The Sycamore also grows fuzzy seed balls, about one inch in diameter, that remain intact through most of the winter.

Benefits: The growth structure of the Sycamore supports many types of birds, animals, and fish. Its massive roots substantially reduces stream bank erosion and encourages the development of deep pools of water. The stream's habitat and water quality are improved and provide protection to wildlife during flooding conditions. Many aquatic species (fish, mussels, and insects) benefit from the improved water quality. In turn, smallmouth bass, and other types of sport fish, increase their numbers provides better fishing.

The Sycamore's characteristics of height, open canopy, strong limbs and numerous cavities provide nesting sites that are preferred by great blue herons, wood ducks, and bald eagles. Purple finches, chickadees, juncos, muskrats, beavers, and squirrels also are attracted to this tree and they feed on the seeds. Sycamores can grow rapidly -- frequently at the rate of 6 feet a year -- and they can live for hundreds of years.

Silver Maple
(Acer saccharinum):

Characteristics:
Height: 75'-100' Width: 75'-100'
Growing Conditions: Full sunlight to partial shade, can withstand drought or wet conditions. It is best to plant in lowland areas, near water and away from any structure as the roots are extensive and they could damage a foundation.
Rate of Growth: Fast

Description: The Silver Maple is also called the River Maple because it is naturally found next to streams and rivers. The branches emerge out of a short, rotund trunk dividing into several large branches, to create a large canopy with gracfully shaped leaves. The Silver Maple flowers in early spring, well before the leaves. emerge The tops of the leaves are light green and a pale, silvery white underneath. Fall colors range from yellow with a trace of red to yellow-brown. It is an extremely easy tree to propagate from seed or transplants.

Benefits: Squirrels, chipmunks, and song birds, along with wild turkeys and ducks, eat Silver Maple seeds. Silver Maple sap can be used to make both maple sugar and a light syrup The flavor is good, but not as pronounced as that of the Sugar Maple. The Silver Maple is a fine shade tree due to its size and it has been known to live up to, and beyond, 130 years.

Swamp White Oak (Quercus bicolor):

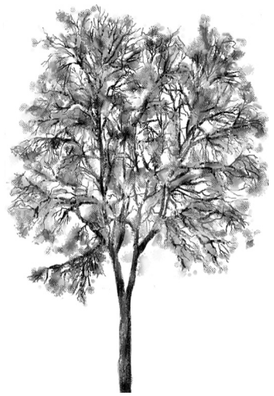
Characteristics:
Height: 75' - 100' Width: 50' - 75'
Growing Conditions: Sun to partial shade, prefers low moist areas, adapts to a variety of acidic soil types, good resistance to damage by wind and ice.
Rate of Growth: Medium - fast (for an oak)

Description: The Swamp White Oak has a single trunk with a broad crown. The dark, shiny green leaves create a distinctive pattern that radiates from the center of the leaf cluster. Fall colors vary from golden yellow, to brown, to reddish purple. Bloom period is in early spring with one inch acorns produced during the summer months. The Swamp White Oak grows an average of 24' per year and it has the potential to live 300 to 350 years. This tree is sensitive to root disturbance so it should initially be planted at the permanent site and be mulched.

Benefits: Quercus means "fine tree;" bicolor refers to the colors of the leaves: dark green on top and silverly white on the bottom. Oaks are indeed "fine trees." So much so that in November 2004, Congress passed legislation designating the oak as our national tree. The Swamp White Oak attracts many types of animals and birds. In the fall, deer, wild turkeys, black bear, fox, gray squirrels, and particularly wood ducks, seek out the mature acorns for food. Acorns contain significant protein, carbohydrates and fats, as well as the minerals calcium, phosphorus and potassium, and the vitamin niacin. Acorns have been a traditional food of many Native Americans. The acorn can be converted into flour, made into mush, or the meats can be added to other foods such as muffins. Acorns can be substituted for chickpeas, nuts, peanuts or olives in many recipes. Native Americans, in this area of the country, made oil from acorns and used it as a salve for burns and injuries. Brooms have been made from Swamp Oak by selecting very thin twigs with at least three leaves attached. The twigs should be long enough to form a handle when bundled.

Black Cherry (Prunus serotina):

Characteristics:
Height: 60' - 90' Width: 35' - 50'
Growing Conditions: Full sun to part shade, prefers deep, moist, fertile soil, can withstand salt, wet conditions, and drought.
Rate of Growth: Fast



Description: The Black Cherry has a single trunk with a broad crown. When grown with enough space, the tree is oval shaped, branches spreading until they hang down loosely. Leaves are oblong and shiny with a pointed tip. After the leaves have come out, white flowers bloom in late April or early May. The cherries ripen from August through October. It's an adaptable tree which will grow in old fields, along streams, or in existing forests. It is a shade tolerant tree but it will grow rapidly, and become larger than usual, in open spaces. Some trees have grown to 125 feet high and four feet in diameter. The Black Cherry has been known to live up to 258 years.

Benefits: The black cherries are especially prized by black bears (numerous pits have been found in their scat). Cubs learn to climb when they follow their mothers up the tree to get the cherries. Wild turkeys, ruffed grouse, raccoons, fox, and non game birds also eat black cherries. Porcupines, white-tailed deer, rabbits, and hare feed on Black Cherry seedlings. Although some young trees are eaten, because birds and animals spread the cherry pits, one tree can produce numerous seedlings. People eat black cherries raw or use them to make a variety of foods. It should be noted that some parts of the Black Cherry tree are poisonous to people and these parts should NOT be ingested. The seed inside the pit is poisonous as are wilted leaves, twigs and stems. On the other hand, other parts of the Black Cherry tree have traditionally been used medicinally.

Red Oak (Quercus rubra):

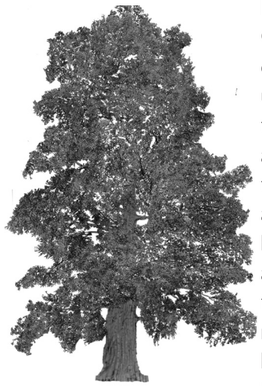
Characteristics:
Height: 50' - 80' Width: 50' - 70'
Growing Conditions: Sun to full sunlight, can withstand drought or wet conditions, prefers well-drained stream borders, must have acidic soil, withstands cold and pollution.
Rate of Growth: Moderate to fast growing, up to two vertical feet per year.

Description: The Red Oak is set apart from other oaks by a shininess on the ridges of the bark extending from the top of the tree all the way to the bottom of the trunk. The size of the trunk depends on whether the Red Oak grows in a forest (close to other trees) or in the open. Trees growing in open spaces tend to have thicker, shorter trunks while the trees in the forest are taller with thinner trunks. The dark green leaves of summer turn to a brilliant red, or rich brown, in the fall. The acorns ripen in the spring of the second year because they require 18 months to mature. This oak transplants easily and it is hardy in most conditions.

Benefits: The Red Oak is popular with a wide variety of wildlife. It is favored, for its acorns, by the wild turkey, woodpecker, blue jay, white-breasted nuthatch, sapsucker, quail, ruffed grouse, ring-necked pheasant, eastern crow, northern flicker, blue jay, brown thrasher, starling, chickadee, white-breasted nuthatch, and other songbirds. The acorns also attract the mallard duck, American pintail duck, green-winged teal duck, white-tailed deer, cottontail rabbit, white-footed mice, eastern chipmunk, fox squirrel, gray squirrel, red squirrel, hummingbird, and butterflies. Trilliums often grow under the Red Oak. This tree is fast growing, easy to transplant, tolerant of varied conditions, has beautiful colors, is a good shade tree, and it is effective in rehabilitating areas after floods or where revegetation is needed. Its wood is valued for its strength so it is used for building houses and furniture.

Pin Oak (Quercus palustris):

Characteristics:
Height: 75'-100' Width: 40'
Growing Conditions: Full sunlight to partial shade, performs best in full sun in continuously moist to wet, deep, very acidic soils; it can adapt to dry soils, prefers to be transplanted in spring. Note: The Pin Oak does not adapt easily to higher ground. It should only be planted near stream areas.
Rate of Growth: Fast: 12' - 15' in 5 - 7 years if planted in acidic soil



Description: The Pin Oak's appearance is distinctive because the upper branches ascend, the middle branches are horizontal, and the lower branches are down swept. The branch arrangement, along with the dense foliage, forms a symmetrical, pyramidal shape. It has medium sized, green leaves that becomes reddish-brown to crimson in the fall. Another distinctive feature of the Pin Oak is that it retains most of its leaves during the winter and then drops them in the spring. The acorns ripen in the spring of the second year because they require 18 months to mature. Strong, robust trees grow from the acorns found near the Pin Oak parent tree.

Benefits: The benefits of the Pin Oak are similar to the Red Oak and the White Swamp Oak. In addition, all three of these trees support migration of many birds such as hawks, owls, hummingbirds, warblers and finches by providing a retreat from the stresses and hazards of migration.. The Pin Oak, in particular, offers dense foliage for cover and by retaining its twigs, attracts insects that the migrating birds feed upon. The oaks in riparian buffer areas create optimum conditions for migrating birds by providing the combination of food, shelter, cooler water and air temperatures. The water is cleaner because the buffer assists in filtering out sediments and pollutants from runoff. Animals such as deer, fox, raccoon, quail and wild turkey are also supported by the Pin Oak's acorns and fshelter within the area of the tree.

Eastern Cottonwood (Populus deltoides):

Characteristics:
Height: 80' - 100' Width: 60' - 70'
Growing Conditions: Sun to full sun, prefers wet soils, transplants easily, can tolerate a wide variety of conditions, including high pH, pollution and salt. Seedlings will not grow in shade and should be placed in sunny locations. Planting close to buildings is discouraged because it may result in damaged foundations, walls, and pipes due to the extensive roots.
Rate of Growth: Fast: 1.5' - 3' per year

Description:
Large, deciduous cottonwoods are pyramidal during the early stage of development. As it grows, large spreading branches expand to a broad and open growth. It is one of the largest North American hardwood trees. The bark is gray, with pronounced ridges and deep fissures.
Foliage is light to medium green, turning yellow in the fall.
Tufted seeds, which have a "cotton-like" look, are easy to recognize as they float easily through the air.

Benefits: The Eastern Cottonwood usually lives 70 - 100 years; it's possible for them to live 200 - 400 years if the growing environment is good. A Cottonwood in Balmville, New York is reputed to be the oldest of the species in the Eastern United States. Core samples of the tree has dated its growth to the year 1699. It is 25 feet in circumference at its base and the tree was once 110 feet high before being damaged from Hurricane Floyd in 1999. Now it is 83 feet in height.

Cottonwood trees stabilize the soil when soil and moisture conditions are sufficient. Frequently these trees are found along waterways. Capable of growing in mercury-contaminated soils, Cottonwoods transform contaminants into substances that are less hazardous to humans, animals, or other plants.

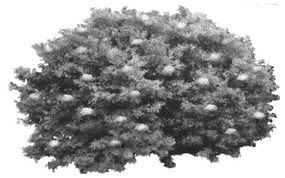
The buds and fruits are food sources for spring birds, quail, and rabbits. Deer feed on the young bark, foliage and buds. Beavers use saplings for food and dam construction.

Shrub Descriptions

Recommended Shrub Species Include

Silky Dogwood (Cornus amomum):

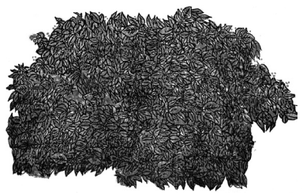
Characteristics:
Height: 6' -10' Width: 6' -10'
Growing Conditions: Full sun to partial shade, prefers moist, fertile soil (can be used on wet sites), easily transplanted. Easy to propagate from seeds or cuttings.
Rate of Growth: Fast



Description: The Silky Dogwood is a medium size, multi-stemmed shrub with dome-shaped clusters of creamy white flowers that bloom in late spring. It has blue berries later in the season. Gray-green leaves and the bush branches become an attractive red-purple in fall.
Benefits: The Silky Dogwood is a good source of food, protective cover for wildlife, and provides nesting sites. Its conspicuous flowers attract bees, butterflies and birds.

Arrowwood Viburnum (Viburnum dentatum):

Characteristics:
Height: 9' Width: 9'
Growing Conditions: Partial shade to full sun. Prefers moist, well-drained soils but can adapt to dry, poor soils. This shrub can also sustain in urban settings and cold conditions.



Rate of Growth: Medium
Description: The Arrowwood is an upright, multi-stemmed, deciduous shrub with 4" clusters of white flowers blooming in the spring and producing blue-black berries. The shrub has glossy, dark green leaves which turn into beautiful yellows, oranges or red in the fall. The berries mature in August and sometimes continue to produce into October.
Benefits: The Arrowwood's fragrant flowers provide nectar for butterflies and other pollinators. It's also the larval food source for the Azure Butterfly. The shrub provides good nesting sites and cover for birds.

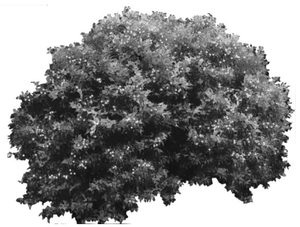
Elderberry (Sambucus canadensis):

Characteristics:
Height: 6' - 12' Width: 6' - 12'
Growing Conditions: Full sun to partial shade, tolerant of a wide range of soil moisture fluctuations from drought resistant to wet.
Rate of Growth: Fast

Description: The Elderberry is a multi-stemmed shrub with large clusters of small, fragrant white flowers that appear in spring. Clusters of dark purple to black berries form in late summer to fall.
Benefits: The Elderberry is an outstanding source of nectar for pollinators and food for birds and other wildlife. It also provides shelter for birds and insects. The flowers are used for mild tea and the berries are prized by people for wine and jam. Various parts of the Elderberry plant have traditionally been used for medicinal reasons.

Gray Dogwood (Cornus racemosa/paniculata):

Characteristics:
Height: 6' -12' Width: 6' -12'
Growing Conditions: Sun to partial shade, tolerant of a wide range of soil moisture fluctuations from drought resistant to wet.
Rate of Growth: Slow to medium
Description: The Gray Dogwood has dome-shaped clusters of white flowers that bloom in late spring. Clusters of small white berries replace the flowers. Gray-green leaves turn to a red-purple in fall.



Benefits: The Gray Dogwood is a good source of food, provides protective cover for wildlife, and a nesting site for birds and butterflies.

Eastern Redbud (Cercis canadensis):

Characteristics:
Height: 20' - 35' Width: 20' - 35'
Growing Conditions: Full sun to partial shade, tolerant of a wide range of soil moisture fluctuations: drought resistant to wet. Transplanting should be done in spring or fall.
Rate of Growth: Slow to Medium

Description: In early spring, pinkish-lavender flowers open slowly, becoming a vibrant, dramatic display. The foliage, appears after the flowers have bloomed, first as bronzed to medium green then changing to dark green. The Redbud usually branches low on the trunk and it will become multi-trunked If the branches are not pruned. This will result in a graceful arrangement of branches containing heart-shaped leaves. Seed pods appear in the fall as the leaves turn yellow.

Benefits: The Redbud is a source of nectar for pollinators and food for birds. This tree is part of the Pea family and Native Americans have lightly roasted the edible flowers. These trees can form an attractive shrub border. Frequently the border occurs naturally on woodland edges.

Nannyberry (Viburnum lentago):

Characteristics:
Height: 20' - 35' Width: 10' - 20'
Growing Conditions: Full sun to partial shade, tolerant of a wide range of soil moisture fluctuations from drought resistant to moist soil.
Rate of Growth: Medium to fast

Description: A multi-stemmed shrub (that can be trained into a tree), the size of the Nannyberry can be large to extra large. It is part of the Honeysuckle Family with white flower heads and medium to dark green leaves in early May. In the fall, the foliage becomes a mixture of faded shades of green, purple, red, and yellow. Small clusters of berries, in shades of light green, pale yellow, and pinkish-red, appear from August through December. Selective pruning, if desired, should be done in the winter. An unusual feature of the wood is that it smells like wet goat so it is not harvested for commercial use. Female goats have been referred to as "nannies" which may have been one influence for the name of this strange smelling bush.
The Nannyberry is moderately susceptible to damage by the viburnum leaf beetle. By planting single Nannyberry shrubs among other species, rather than in groups, the beetle problem is less likely to have a heavy impact.

Benefits: Nannyberry is an easy-to-grow, low-care native shrub. Native to Eastern North America, these scrubs provide cover and the berries are a source for food for birds in the fall.

Native Plant Descriptions

Recommended Grass, Herbs and Flowering Plants Include

Little Bluestem (Andropogon scoparius):

Characteristics:
Height: Mature height is over 3'
Growing Conditions: A perennial, Little Bluestem prefers full sun, excessive moist, fertile soil that is well-drained. Control of competing plants is necessary when first establishing Little Bluestem plants.
Rate of Growth: Moderate but it has a long life span compare to some other grass species.

Description: New shoots have a blue tint in spring and early summer. In the fall, colors turn to a redish shade which is frequently retained throughout the winter months. Flowers bloom in late July through September.
Benefits: A good forage grass, it supplies both domestic and wild animals with food when the plant is very young and green. It attracts a variety of birds, butterflies and deer. The grass also provides effective erosion control.

Riverbank Wild Ryegrass (Elymus riparius):

Characteristics:
Height: 2 ' - 4.5'
Growing Conditions: Requires moist soil with high water availability. Adapts to a variety of soil types.
Rate of Growth: Moderate

Description: A native cool-season, bunch grass. Strong seedlings are shade tolerant. Riverbank Wild Ryegrass is not drought tolerant.
Benefits: Essential component of stream bank rehabilitation. Supplies sparrows, finches, and small mammals with food. Seed heads are available over winter for food.

Virginia Wild Ryegrass (Elymus virginicus):

Characteristics:
Height: 2½' – 4'
Growing Conditions: Virginia Wild Ryegrass prefers full sun to light shade; prefers high fertility, moist, heavy soil texture. Best established from seed.
Rate of Growth: Moderate

Description: A native, perennial, cool-season, bunchgrass that grows from May through September. Light to medium green spikes have rigid, hollow shafts with floppy blades emerging along the shaft.
Benefits: It supplies forage for birds and small mammals and it is also good grazing for livestock. Canadian Geese feed on the foliage while seed heads are sometimes eaten by ducks. A variety of wildlife use Virginia Wild Ryegrass for denning and nesting material. Attracts butterflies.

Blue Vervain (Verbena hastata):

Characteristics:
Height: 2'- 6' Width: 1' - 2.5'
Growing Conditions: Full to partial sunlight with fertile, wet soil. Blue Vervain tolerates temporary standing water. It easily adapts to wetlands. During favorable growing conditions, each spike will continue to grow, producing new flowers.
Rate of Growth: Medium

Description: An attractive perennial wild flower, with very small, blue or violet flowers on numerous spikes, Blooming period lasts from July to early September in central New York.
Benefits: Attracts many kinds of long-tongued and short-tongued bees; some bees gather nectar while others collect pollen. Wasps, moths, butterflies, and hummingbirds are also attracted to this plant. Various songbirds eat the seeds; rabbits may eat the foliage when plants are young. Historically, it has been used as an herb and valued for its medicinal qualities.

Switchgrass
(Panicum virgatum):

Characteristics:
Height: Mature height 6'
Growing Conditions: Full sun to partial shade, moist to dry, sandy soils. Switchgrass should be planted in the spring after the soil is warm. It has drought and flooding tolerance.
Rate of Growth: Rapid

Description: A warm season, perennial and self-seeding crop, Switchgrass can take up to three years to reach its full production potential. However, Switchgrass can survive for ten years or longer. It will grow in many weather conditions, soil types, and land conditions.
Benefits: The roots of Switchgrass are about as deep as the plant is tall, which makes it ideal for erosion control. Pheasant, quail, grouse, wild turkey, and song birds use Switchgrass for its plentiful small seeds and tall cover habitat. Switchgrass has become a bioenergy crop as it can be converted to pellets for heating.

Ox Eye Flower
(Heliopsis helianthoides):

Characteristics:
Height: 3' to 6' Width: 2' to 4'
Growing Conditions: Full sun to partial sun, dry to medium moist soils, prefers well drained soils but can tolerate dry poor soils. Blooms summer through fall.
Rate of Growth: Medium

Description: Double, daisy-like flowers, two to three inches in diameter, yellow-orange, on stiff stems with glossy, deep green foliage.
Benefits: Ox Eye flowers provide nectar for butterflies and other pollinators. Seeds can be eaten by songbirds during the winter. Attracts hummingbirds.

Wild Bergamont
(Monarda fistulosa):

Characteristics:
Height: 2' - 3'
Growing Conditions: Prefers sun but it can tolerate partial shade. Thrives in a wide range of soils; it prefers moist soil but is fairly drought resistant.
Rate of Growth: Fast
Description: Perennial, a part of the Mint family. Flowers cluster toward the end of branches with about 20-50 flowers per plant. Blooms July through September. Brilliant flowers that range from light pink to very bright magenta; has pleasantly fragrant, gray-green foliage.

Benefits: Considered an herb, Bergamont has been used as a tea. Attracts hummingbirds, butterflies, and bees.

Canada Wild Ryegrass
(Elymus canadensis):

Characteristics:
Height: 2'-4'
Growing Conditions: Prefers sun but it can tolerate partial shade. Growth better in moist soil but Canada Wild Ryegrass is fairly drought resistant.
Rate of Growth: Fast

Description: Stems can be 2' - 4' high, supporting spike-shaped seed heads. The seed heads cause the stems to bend and droop. It has distinct flowers and interesting foliage.
Benefits: Canada Wild Ryegrass provides nesting material and its seeds supply food for birds and small mammals. The grass attracts butterflies, it is highly deer resistant, and it requires little to no maintenance. Cut seed stalks are used in dried flower arrangements.

Rough Dropseed (Sporobolus asper):

Characteristics:
Height: 2½' – 5'
Growing Conditions: Full sun, will grow in moderate moisture to dry conditions. It tolerates a variety of soils but prefers soils that are intermittently wet and dry. Plant when soil is warm in spring. Has drought tolerance.
Rate of Growth: Rate of growth varies with type of soil.

Description: Warm season, perennial, bunchgrass that flowers from August through November. Rough Dropseed is tall, often tufted at the base, sending up multiple stems from short rootstocks. Plants have light to medium green, hollow stems with medium green leaf blades along with long white hairs on the upper surface of the leaf blades.
Benefits: Animals prefer to forage this grass in the spring when blades are tender. Excellent food source for grasshoppers, which are then consumed by songbirds and gamebirds. Seeds of Rough Dropseed are eaten by some songbirds during the winter.

Black-Eyed Susan (Rudbeckia hirta):

Characteristics:
Height: 1' - 3'
Growing Conditions: Full sun, it can adapt to a variety of soils, needs average moisture.

Rate of Growth: Medium
Description: Daisy-like, golden petals with a dark brown center. Biennial, with a two-year life cycle, it grows leaves in the first season; it blooms in the second season from late July through September.
Benefits: Very easy to grow: press seeds into bare soil any time during the growing season. Attracts birds, butterflies, and bees.

Annual Ryegrass (Lolium multiflorum):

Characteristics:
Height: Mature 2' – 4'
Growing Conditions: May be sown under unfavorable wet or dry conditions. Grows under a wide range of soils and climates. Tolerant of wet soils, Annual Ryegrass adapts easily to heavy clay or silty soils and temporary flooding. Flowers May through July.
Rate of Growth: It has a vigorous rate of growth that varies with weather conditions. Seed may be planted when soil is dry and it will germinate following rain.

Description: As a winter annual grass, Annual Ryegrass seeds quickly, establishes easily, and tolerates cold. It germinates in cooler soils more easily that other grasses. It is a bunch grass, yellow-green at the base of the plant. It has long, glossy, green leaves on the top.
Benefits: Annual Ryegrass improves the fertility of the soil and reduces erosion. It alters and balances organic matter by improving the soil structure through capturing nitrogen, increasing infiltration, stabilizing aggregate soil particles, increasing the soil's capacity for holding moisture, and suppressing weeds. Annual Ryegrass accomplishes these soil property improvements in half the time of other methods or of planting other grasses. According to the Department of Agriculture, fifty percent, or more, of nutrient and pesticide runoff into water is reduced by grasses growing in the buffer area. Other grasses do need to be planted with Annual Ryegrass because it is a winter grass. If no other grasses are planted in the area, there will be no grasses present during the spring, summer, or fall.

RECOMMENDED STREAM BUFFER VEGETATION

Common Name	Scientific Name	Near Stream	Upland Area	Light Requirements	Deer Resistant*
TREES					
Black Cherry	Prunus serotina	X	X	Full Sun	
Eastern Cottonwood	Populus deloides	X	X	Full Sun	X
Silver Maple	Acer saccharinum	X		Shade Intolerant	
Swamp White Oak	Quercus bicolor	X	X	Full Sun to Partial Shade	X
Sycamore	Plantanus occidentialis	X	X	Full Sun to Partial Shade	X
SHRUBS					
Arrowwood Virurnum	Viburnum dentatum	X	X	Full Sun to Partial Shade	
Eastern Redbud	Cercis candensis	X	X	Full Sun to Partial Shade	X
Elderberry	Sambucus canadensis	X	X	Full Sun to Partial Shade	
Gray Dogwood	Cornus racemosa	X		Full Sun to Partial Shade	
Nannyberry	Viburnum lentago	X	X	Shade Tolerant	
Silky Dogwood	Cornus amomum				
GRASSES					
Annual Ryegrass	Lolium multiflorum				
Black Eyed Susan	Rudbeckia hirta		X	Full Sun	
Blue Vervain	Verbena hastata	X	X	Full Sun to Partial Sun	
Canada Wild Rye	Elymus canadensis		X	Full Sun to Partial Shade	
Little Bluestem	Andropogon scoparius	X		Full Sun	
Ox Eye Flower	Heliopsis helianthoides		X	Full Sun to Partial Sun	
Riverbank Wild Rye	Elymus riparius	X		Full Sun	
Rough Dropseed	Sporobolius asper	X	X	Sun to Partial Shade	
Switch Grass	Panicum virgatum	X	X	Full Sun to Partial Shade	
Virginia Wild Rye	Elymus virginicus	X		Full Sun to Light Shade	
Wild Bergamot	Monarda fistulosa		X	Full Sun to Partial Shade	

*Plants rarely damaged by deer

ADDITIONAL TREE SPECIES
PLANTING AREAS & LIGHT REQUIREMENTS
DEER RESISTANT SPECIES

Common Name	Scientific Name	Near Stream	Upland Area	Light Requirements	Deer Resistant*
Allegheny Serviceberry	Amelanchier laevis			Shade to Partial Shade	X
Bald Cypress	Taxodium distichum	X	X	Full Sun to Partial Shade	X
Black Oak	Quercus velutina			Full Sun to Partial Shade	X
Black Walnut	Juglans nigra	X	X	Full Sun	
Box Elder	Acer negundo	X	X	Shade Tolerant	
Buttonbush	Cephalanthus occidentalis	X		Full Sun to Partial Shade	
Bur Oak	Quercus macrocarpa	X	X	Full Sun	X
Cherry Birch	Betula lenta		X	Full Sun to Partial Shade	
Cockspur Hawthorn	Crataegus crusgalli		X	Full Sun	X
Common Ninebark	Physocarpus opulifolius	X	X	Full Sun to Partial Shade	X
Eastern Redcedar	Juniperus virginiana		X	Full Sun	X
Honeylocust	Gleditsia triacanthos	X	X	Full Sun	X
Meadowsweet	Spiraea alba	X	X	Full Sun to Partial Shade	X
Northern Bayberry	Morella pensylvanica	X	X	Full Sun to Partial Shade	
Pagoda Dogwood	Cornus alternifolia	X	X	Shade Tolerant	
Red Maple	Acer rubrum	X	X	Shade Tolerant	
Redosier Dogwood	Cornus sericea	X	X	Full Sun to Partial Shade	
Roughleaf Dogwood	Cornus drummondii	X	X		
Scarlet Oak	Quercus coccinea		X	Full Sun	X
Staghorn Sumac	Rhus typhina	X	X	Full Sun	
Sugar Maple	Acer saccharum		X	Shade Tolerant	
Sweet Gum	Liquidambar styraciflua	X	X	Full Sun	
Tamarack	Larix laricina	X	X	Full Sun	
Tuliptree	Liriodendron tulipifera	X		Full Sun to Partial Shade	X
Virginia Rose	Rosa virginiana	X	X	Full Sun to Partial Shade	
White Oak	Quercus alba		X	Full Sun	X

*Plants rarely damaged by deer

DEVELOPING A STREAM BUFFER

What's The Difference Between Healthy And Unhealthy Buffers?

"A healthy buffer has many different species of native trees, shrubs and grasses with minimal encroachment and human disturbance. Varying buffer widths correspond to different purposes in support of human needs and the ecosystem, but in general, the wider the better. Unhealthy buffers have plants with weak root systems and they will be unable to filter nutrients and release sediment runoff. Other unhealthy examples include: grass growing to the waters edge; invasive plant species, such as Japanese knotweed; grazing animals; inadequate buffer widths; hardened shorelines, and impervious surfaces, such as pavement" (Hudson River Estuary Program, NYSDEC).

1. Getting To Know The Landscape

To begin the process to plant a riparian buffer zone, it's important to become familiar with the landscape. To bring the plants and the environment together successfully, knowing many details about landscape conditions is essential. This can be done by spending time at the site, at different times of the day, and in different conditions. Site assessment tools available through Cornell Cooperative Extension can assist in this process. (www.gardening.cornell.edu)

In addition, looking around the neighborhood near your property can provide ideas about what plants have adapted well to the area. You may want to include these plants in your buffer zone. There also may be seeds or scions you could collect for planting on your site.

Next, making observations in order to know where the sun is the strongest, or weakest, what the wind is like in different areas of the site, where the soil is most fertile, and where it is not, how much space is available for the plants, and what the condition of the water is will give you information for making decisions about what other plants to select for the area.

If you haven't made observations of this type before, take time to do it over multiple visits to the site. Look around carefully but don't come to immediate conclusions. It's helpful to make a map of the area and list observations you feel are important. Taking photos can also be useful to refer to when developing a plan. You want to understand what your site offers to you and what you can bring to the site that it doesn't already have. Be aware of what limitations it may have such as a steep drop-off down to the water.

Your map should include whatever is near the area that is to be in the buffer. In addition to streams, marshes, swamps, woodlots and fields, make note of roads, buildings or other structures. Trees that you may want to keep, or ones that need to be removed, should also be indicated. A tree guide can help you identify trees if you are not familiar with the species. As many species as can be identified should be recorded.

The more time you spend there, the more you will notice how conditions alter. For example, how long does the sun shine in various parts of the site? It is necessary to have at least six hours a day of strong sunlight to be considered "Full Sun." The sun should not be blocked by foliage in order to be considered "Full Sun." Dappled sunlight usually produces lighting conditions called "Partial Sun/ Some Shade." If an area doesn't get any significant sun, it is usually "Deep Shade." Different plants require different amounts of sun and if they don't have the proper amount, they won't grow well.

Is the site flat or does it have one or more hills? Is the landscape very uneven and "rough?" The nature of the land will affect light and it will also affect how strong the wind may be. If plants are exposed to strong wind, they have more survival challenges. Weather patterns can affect the growing patterns of plants and how they will look.

The best way to have a successful buffer area is to work with nature. This means adjusting ourselves to the rhythm and characteristics of nature instead of imposing our personal ideas upon nature. By making careful observations, nature will tell us about how the plants we select may do on the site. If there are some trees already there, what is their condition? Are they strong and straight or are they weak with broken branches? Do they have a lot of insects on them? What is the condition of the leaves: is the color good or are the leaves blotchy? If a plant appears weak and in poor condition, it may be the wrong plant for the site or it may be that it's not receiving the amount of sun it needs. There may be some plants that do well on a site and some that do not. The more you notice about conditions on the site, the more it will help during the planning process.

2. Planning

Botanist Diana Beresford-Kroeger coined the word "bioplan." In creating this term, Beresford-Kroeger wanted to consider all the "connectivity of life in nature" (Beresford-Kroeger, 2004). Trees, shrubs, grasses and flowers do not passively sit on a patch of earth. They interact with the elements of nature and with all living creatures. A good bioplan will restore balance in a habitat and create health for all living parts of it. Plants can assist in cleaning the air and water and they can support wildlife and insects. In the interaction of all these things is an ongoing process of a biological system that makes healthy soil that contains a microsystem of living organisms which, in turn, makes the earth sustainable. Our job is to learn how to support and maintain the living topography. This is the goal of planning.

After gathering observations, the next step is to plan what changes will be made on the site. Think about how to use the optimal areas and how to use the less than optimal ones. Nature is not consistent and it's important to work with that in mind because diversity is one of the greatest strengths of a good ecosystem.

Compare your map and observation list to the charts that outline the characteristics of the trees, shrubs, wild grasses and flowers. What seems like it will work in what area? One of the most important considerations is whether the plants will have enough space to grow to their mature size. Some of the trees will get to be very large and they need to have the space to expand as they grow.

Based on what you know, make an initial planting map that shows the size of the mature plant and its location. If you will not be planting the entire area all at once, indicate which plants will be planted first and when the others may be planted. At that point, a visit back to the site, with the map in hand, is advisable.

Next compare your choices to what you see at the site. Do the plants and the condition of the site match up? Is there anything you hadn't considered that needs to be included in the decision process? Sometimes, after looking at the site along with the initial choices of plants, you may find that you want to get more information about the plant before investing in it and putting it on the site.

There are people you can consult with in order to decide if a plant is a good choice. There are nursery and landscape companies lists available through the Tompkins County Planning Department (607-274-5560) and Cornell Cooperative Extension (607-272-2292).

Please note: special care should be taken to avoid planting any invasive species as noted by the Tompkins County Environmental Management Council. Invasives can dominate buffer areas and choke out healthy, native vegetation. A list of invasive plants native to this area is at the following website: www.tompkins-co.org/emc/docs/13_invasive_plants_of_tompkins_county.pdf

Two basic considerations are whether your plan is biologically feasible and whether it is economically realistic. The biological feasibility depends on how carefully you have matched the conditions of the site and the selection of appropriate plants. The expenses when making changes also requires planning. You may want to develop the site over several years. Decide what is most critical and what can be accomplished in a given amount of time so that it's possible to successfully develop the buffer.

3. Site Preparation

Once the decisions have been made about the plants to use, the next step is to prepare the site. Site preparation should be completed before purchasing the plants. As carefully as you may have planned, there can be unexpected conditions that will have to be worked out before anything can be planted. For example, when digging holes for trees, there may be large rocks under the soil that will have to be removed before the tree can be planted. Or, if there was heavy rain for several days, you may discover areas that are prone to becoming overly saturated. Some plants are quite at home in that condition whereas others may not survive. Knowing where these saturated areas are can affect the decision as to what to plant there. These situations are usually not complicated but they require patience to work through.

Before embarking upon making physical change to the environment, it is recommended to consult with people knowledgeable about site preparation. Work and money have the potential of being wasted if the efforts

made are not really suitable for the site. If you choose to hire professional landscapers to do the site preparation for you, discuss with them the methods they will use and why they choose their techniques. The methods they use will have an impact on the ecosystem. Invasive techniques may cause damage; be sure whatever they choose to do is the best choice for the environment.

4. Implementing The Plan

Now that the planning and site preparation are completed, the next step is to plant the buffer zone. The following recommendations will help to ensure the success of the ecosystem.

5. Planting Trees And Shrubs

Tips to ensure
a successful planting:

WHEN: Plant when you know the plants are going to be able to easily survive transplant stress. The heat of summer is usually not a good time. Most transplanting is done in the fall and early spring when the weather is somewhat cool. Then the roots have the opportunity to grow and develop before summer. However, some trees must be planted only in the spring because they establish new roots very slowly. Check with the plant nursery before purchasing.

WHERE: Refer to the site map and observation notes that you have made. It is very important to allow enough space for the plant to expand as it grows to maturity. The mature size of the plant may be considerably larger than the young plant. Consult the plant descriptions, in this guide, for the types of plants that can fit into smaller spaces on the buffer. Plants should not be too close to buildings or power lines because they can be damaged as a result. A useful method is to use a length of rope that can form the circumference of the plant when laid upon the ground. It will be easy to see how much space the mature plant will require.

It's important to match the plant to an area that meets its water needs. Some plants can thrive in very moist or wet conditions but other plants that need dryer conditions might not survive. The advice of a professional on the types of plants and moisture conditions can be valuable in the decision making process.

Also, if there are drainage problems on the land, it would be best to consult a professional from Cornell Cooperative Extension or a landscape company. They would be able to advise you on how to change or control drainage issues.

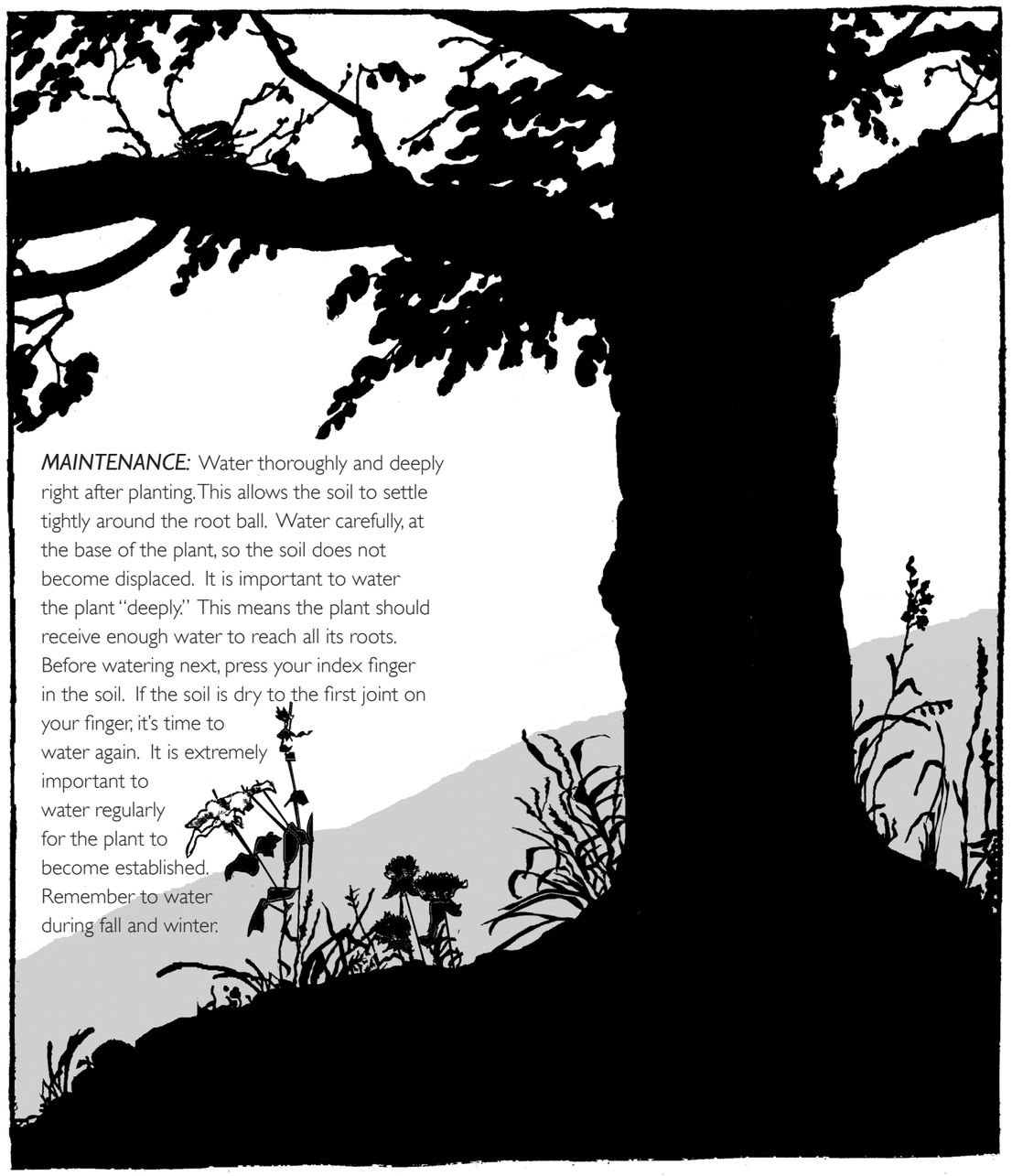
HOW: Dig the planting hole first and dig it to be twice as wide as the root ball. Remove the plant from its container by tapping or squeezing the container. Once out of the container, use a fork or other tool that is pointed to gently loosen the roots. This will help the plant's roots be able to spread so it will grow as it should. If the trees or shrubs have their root ball wrapped in burlap, they can be planted without removing the burlap. The burlap will biodegrade and compost itself into the soil.

Mix the soil from the planting hole with slow-releasing, organic fertilizers. Select one that is suitable for your particular plant. Many times fertilizing information is included with the plant. During the first year, fertilize only at the first watering.

After placing the plant in the soil, cut any strings or wire that may be tied around the trunk. Once the plant is in the hole, secure it with some soil. Then step back and check to see if the plant is standing straight, and if the base of the stalks, or trunk, will be level with the ground. The plant can be adjusted if needed by adding or subtracting soil. Keep stepping back to check to see if it's straight and level. Some plants have what is called a "crown." This type of plant must have it's crown even with the ground or it won't survive. It is typical to find a planting diagram showing crown planting information included with the plant.

Based on the vegetation in your buffer, you may want to consider controlling weeds using barriers and, also, using tree guards to protect the young tree trunks from damage caused by mice or deer.

Once the plant looks level, and the soil has been put into the hole, tamp the soil down with your foot. This will help to force air holes to compress; air that gets trapped next to the roots will dry them out and the plant may die. Tamp from the base of the plant to the edge of where the hole was. So that bad weather won't up root the planting, support tall trees using at least three wires and some stakes.



MAINTENANCE: Water thoroughly and deeply right after planting. This allows the soil to settle tightly around the root ball. Water carefully, at the base of the plant, so the soil does not become displaced. It is important to water the plant "deeply." This means the plant should receive enough water to reach all its roots. Before watering next, press your index finger in the soil. If the soil is dry to the first joint on your finger, it's time to water again. It is extremely important to water regularly for the plant to become established. Remember to water during fall and winter.

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Blair-Richards Creative Services

Recommended Species for the Stream Buffer Planting Guide

TOMPKINS COUNTY STREAM BUFFER MANAGEMENT

NATIVE PLANTS

13 - Black Eyed Susan (Rudbeckia hirta)

14 - Wild Bergamon (Monarda fistulosa)

15 - Canada Wild Rye (Elymus canadensis)

16 - Annual Rye Mix (Lolium multiflorum)

17 - Riverbank Wild Rye (Elymus riparius)

18 - Ox Eye Flower (Heliopsis helianthoides)

19 - Rough Dropseed (Sporobolus asper)

20 - Little Bluestem (Andropogon scoparius)

21 - Blue Vervain (Verbena hastata)

22 - Virginia wild rye (Elymus virginicus)

23 - Switch Grass (Panicum virgatum)

SHRUBS

8 - Eastern Redbud (Cercis canadensis)

9 - Silky Dogwood (Cornus amomum)

10 - Elderberry (Sambucus canadensis)

11 - Gray Dogwood (Cornus racemosa/ paniculata)

12 - Arrowwood Viburnum (Viburnum dentatum)

24 - Nannyberry (Viburnum lentago)

TREES

1 - Red Oak (Quercus rubra)

2 - Eastern Cottonwood (Populus deltoides)

3 - Pin Oak (Quercus palustris)

4 - Swamp White Oak (Quercus bicolor)

5 - Sycamore (Platanus occidentalis)

6 - Silver Maple (Acer saccharinum)

7 - Black Cherry (Prunus serotina)

Agricultural Field

- *Illustration - Not to Scale*
- *Not all Plants Bloom at the Same Time*

UPLAND AREA

NEAR STREAM

RIPARIAN BUFFER

NEAR STREAM

UPLAND AREA

STREAM BUFFER PLAN at PLANTING

TOMPKINS COUNTY STREAM CORRIDOR & MANAGEMENT PROGRAM

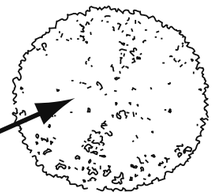
One Inch = 50 ft.

SETBACK AREA

UPLAND AREA

50 ft. RIPARIAN BUFFER

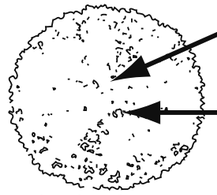
NEAR STREAM



Black Cherry

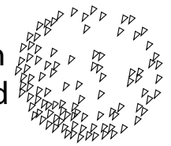
20′

20′



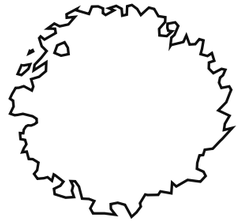
Black Cherry

Eastern Redbud

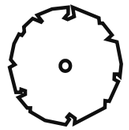


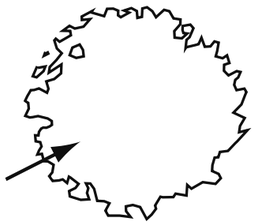
Eastern Redbud

This stream plan represents a 50′ setback from top of stream bank. This is the recommended setback width for intermittent streams and on agricultural properties. Please note: a minimum 100′ setback is recommended for perennial streams. In such cases the spacing and species listed in the Upland area should be replicated for the next 50′. Native grasses should be planted, and not cut, between all trees and shrubs.



Silver Maple

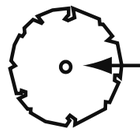




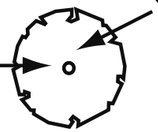
Silver Maple

10′

10′

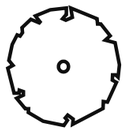


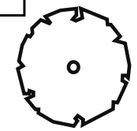
Silky Dogwood

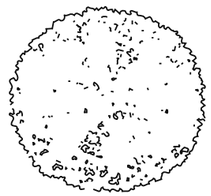


Gray Dogwood

Elderberry



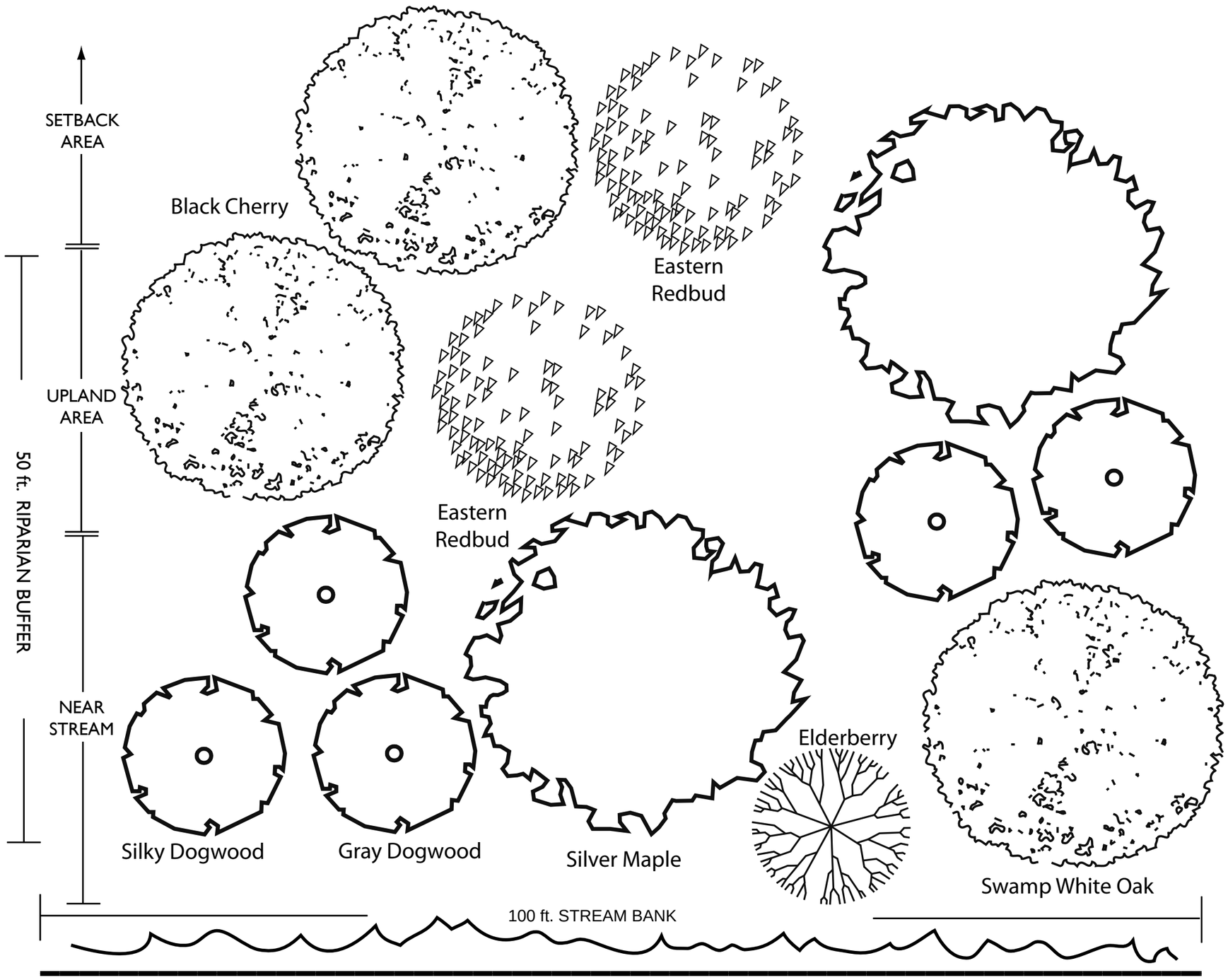




Swamp White Oak

100 ft. STREAM BANK

STREAM BUFFER PLAN -- MATURE PLANTS



Thank You

for your interest
in Stream Buffer Plantings

Planting a buffer area is one way in which you can make a lasting difference to the health of our waterways. A well-planned stream buffer can limit erosion, improve soil and water conditions as well as increase wildlife habitat.

Many of the trees recommended in this booklet can live a century or longer. By planting and protecting a healthy stream buffer, you can contribute to positive improvements in water quality and wildlife habitat that will last for generations.

You can make a difference that will have lasting significance.

Tompkins County Stream Buffer Management