

APPENDIX A - PLANT LISTS

These lists are suggestions for recommended plants and are not to be construed as exclusive lists. There are many other suitable plants for riparian buffer planting. These lists are a place to start.

MEDIUM TO LARGE DECIDUOUS CANOPY TREES

Red maple - *Acer rubrum*
 Acer saccharum - Silver maple
 Betula lenta - Black birch
 River birch - *Betula nigra*
 Shagbark hickory - *Carya ovata*-
 Mockernut hickory - *Carya tomentosa*
 Hackberry - *Celtis occidentalis*
 Washington hawthorn - *Craetagus phaenopyrum*
 Persimmon - *Diospyros virginiana*
 American Beech - *Fagus grandifolia*
 White ash - *Fraxinus americana*
 Green ash - *Fraxinus pennsylvanica*
 Water locust - *Gleditsia aquatica*-
 Black walnut - *Juglans nigra*
 Sweetgum - *Liquidamber straciflua*
 Tulip poplar - *Liriodendron tulipifera*
 Water tupelo - *Nyssa aquatica*
 Black gum - *Nyssa sylvatica*
 Sourwood - *Oxydendron arboreum*
 Sycamore - *Platanus occidentalis*
 Cottonwood poplar - *Populus deltoids*
 Swamp cottonwood - *Populus heterophylla*
 Black cherry - *Prunis serotina*
 Swamp white oak - *Quercus bicolor*
 Shingle oak - *Quercus imbricata*
 Laurel oak - *Quercus laurifolia*
 Overcup oak - *Quercus lyrata*-
 Swamp chestnut oak - *Quercus michauxii*
 Water oak - *Quercus nigra*
 Pin oak - *Quercus palustris*
 Willow oak - *Quercus phellos*
 Shumard oak - *Quercus shumardii*
 Swamp willow, Black willow - *Salix nigra*
 Weeping willow - *Salix babylonica*
 American basswood - *Tilia Americana*

SMALL CANOPY/UNDERSTORY TREES

Red buckeye - *Aesculus pavia*
 Smooth alder - *Alnus serrulata*
 Serviceberry - *Amelanchier canadensis*
 Devil's walkingstick - *Aralia spinosa*
 Pawpaw - *Asimia triloba*
 American hornbeam- *Carpinus caroliniana*
 Sugar hackberry - *Celtis laevigata*
 Redbud, Judas tree - *Cercis canadensis*
 Fringetree - *Chionanthus virginicus*
 Dogwood - *Cornus florida*
 Cockspur hawthorn - *Crataegus crus-galli*
 Green hawthorn - *Crataegus viridis*
 Parsley hawthorne - *Crataegus marshalli*
 Swamp cyrilla - *Cyrilla racemosa*
 Two-winged Silverbell - *Halesia diptera*
 American holly – *Ilex opaca*
 Possumhaw - *Ilex deciduas*
 Spicebush - *Lindera benzoin*
 Sweetbay Magnolia - *Magnolia virginiana*
 Eastern hophornbeam - *Ostrya virginiana*
 Sourwood - *Oxydendron arboreum*
 Elderberry - *Sambucus canadensis*
 Sassafras - *Sassafras albidum*
 Sparkleberry - *Vaccinium arboreum*
 Nannyberry - *Viburnum lentago*

EVERGREEN TREES

American holly - *Ilex opaca*
Eastern red cedar - *Juniperus virginiana*
Southern magnolia - *Magnolia grandiflora*
Shortleaf pine - *Pinus echinata*
Pitch pine - *Pinus rigida*
Eastern white pine - *Pinus strobus*
Loblolly pine - *Pinus taeda*
Virginia pine - *Pinus virginiana*
Darlington oak - *Quercus laurifolia*
 Darlingtonia
Live oak - *Quercus virginiana*

EVERGREEN SHRUBS

Inkberry holly - *Ilex glabra*
Common juniper - *Juniperus communis*
Shore juniper - *Juniperus conferta*
Southern wax myrtle - *Myrica cerifera*
Bayberry - *Myrica pennsylvanica*
Swamp azalea - *Rhododendrona viscosum*
Farkleberry - *Vaccinium arboreum*

LARGE SHRUBS

Alder - *Alnus serrulata*
False indigo - *Amorpha fruticosa*
Red chokeberry - *Aronia arbutifolia*
American beautyberry - *Callicarpa americana*
Eastern sweetshrub - *Calycanthus floridus*
Buttonbush - *Cephalanthus occidentalis*
Silky dogwood - *Cornus amomum*
Greystem dogwood - *Cornus racemosa*
Red twig dogwood - *Cornus stolonifera*
Witch hazel - *Hammamelis virginiana*
Wild hydrangea - *Hydrangea arborescens*
Oakleaf hydrangea - *Hydrangea quercifolia*
Winterberry holly - *Ilex verticillata*
Yaupon holly - *Ilex vomitoria*
Virginia sweetspire - *Itea virginica*
Fetterbush/ Sweetbells - *Leucothoe racemosa*
Fetterbush - *Lyonia lucida*
Male-berry - *Lyonia ligustrina*
Southern wax myrtle - *Myrica cerifera*
Bayberry - *Myrica pennsylvanica*
Common ninebark - *Physocarpus opulifolius*
Choke cherry - *Prunus virginiana*
Swamp azalea - *Rhododendrona viscosum*
Smooth sumac - *Rhus glabra*
Allegheny blackberry - *Rubus allegheniensis*
Pussy willow - *Salix discolor*
Silky willow - *Salix sericea*
Elderberry - *Sambucus canadensis*
American snowbell - *Styrax americanus*
Highbush blueberry - *Vaccinium corybosum*
Arrowwood viburnum - *Viburnum dentatum*
Swamp haw Viburnum - *Viburnum nudum*
Blackhaw viburnum - *Viburnum prunifolium*

SMALL SHRUBS

Obovate serviceberry - *Amelanchier obovalis*
 Black chokecherry - *Aronia melanocarpa*
 Sweet pepperbush - *Clethra alnifolia*
 Sweet fern - *Comptonia peregrina*
 Strawberry bush - *Euonymus americanus*
 Fothergilla - *Fothergilla gardenii*
 Black huckleberry - *Gaylussacia baccata*
 Dangleberry - *Gaylussacia frondosa*
 Wild hydrangea - *Hydrangea arborescens*
 Oakleaf hydrangea - *Hydrangea quercifolia*
 Mountain laurel - *Kalmia latifolia*
 Staggerbush - *Lyonia mariana*
 Shrubby cinquefoil - *Potentilla fruticosa*
 Beach plum - *Prunus maritima*
 Sand blackberry - *Rubus cuneifolius*
 Bankers willow - *Salix cottetii*
 White meadowsweet - *Spiraea alba*
 Meadowsweet - *Spiraea latifolia*
 Steeplebush - *Spiraea tomentosa*
 Common snowberry - *Symphoricarpos albus*
 Coralberry - *Symphocarpos orbiculatus*
 Lowbush blueberry - *Vaccinium angustifolium*
 Maple-leaved viburnum - *Vaccinium acerifolium*
 Adam's needle - *Yucca filamentosa*

NATIVE GRASSES

Big Bluestem - *Andropogon gerardi*
 Broomsedge - *Andropogon virginicus*
 Indian woodoats - *Chasmanthium latifolium*
 Coastal panic grass - *Panicum amarum*
 Switch grass - *Panicum virgatum*
 Little bluestem - *Schizachyrium scoparium*
 Indian grass - *Sorghastrum nutans*
 Easternn gama grass - *Tripsacum dactyloides*

HERBACEOUS PLANTS

Black-eyed Susan - *Rudbeckia fulgida*
 Cardinal Flower - *Lobelia cardinalis*
 Coralbell - *Heuchera Americana*
 Creeping Phlox - *Phlox stolonifera*
 Crested Iris - *Iris cristata*
 Foamflower - *Tiarella cordifolia*
 Goldenrod - *Solidago Canadensis*
 Great Blue Lobelia - *Lobelia siphilitica*
 Green and Gold - *Crysogonum virginianum*
 Ironweed - *Vernonia noveboracensis*
 Jack-in-the-Pulpit - *Arisaema triphyllum*
 Joe-Pye Weed - *Eupatorium purpureum*
 Mayapple - *Podophyllum peltatum*
 Mistflower - *Eupatorium coelestinum*
 Mouse-ear Coreopsis - *Coreopsis auriculata*
 New York Aster - *Aster novi-belgii*
 Pink Turtlehead - *Chelone lyonii*
 Purple Coneflower - *Echinacea purpurea*
 Small Solomon's Seal - *Polygonatum biflorum*
 Swamp Milkweed - *Asclepias incarnata*
 Sweet Flag - *Acorus americanus*
 Tall Gayfeather - *Liatris scarios*
 Three-toothed Cinquefoil - *Potentilla tridentata*
 Tickseed - *Coreopsis grandiflora*
 Virginia Bluebells - *Metensia virginica*
 Virginia Blue flag - *Iris virginica*
 Wild Columbine - *Aquilegia Canadensis*
 Woodland Phlox - *Phlox divaricata*

SHADE TOLERANT PLANTS

Trees

Red maple
Sugar maple
Serviceberry, Shadbush
Pawpaw
Yellow birch
Hornbeam
American beech
White ash
Sweetbay magnolia
Hop hornbeam
American basswood
Canada hemlock

Small Trees & Shrubs

Dogwood
Redbud
Fringetree
Sweet pepperbush
Gray dogwood
American hazelnut
Witchhazel
Inkberry
Mountain laurel
Spicebush
Staghorn sumac
Elderberry
Highbush blueberry
Witherod
Southern arrowwood
Highbush cranberry
Virginia sweetspire

PART SUN (semi-shade intolerant)

Trees

Silver maple
Sweet birch
Bitternut hickory
Shagbark hickory
Hackberry
Tulip poplar
Easter white pine
Sycamore
White oak
Swamp white oak
Chestnut oak
Willow oak
Northern red oak
Slippery elm

Small Trees & Shrubs

Red chokeberry
Black choke berry
Black huckleberry
Winterberry
Swamp azalea
Meadowsweet
Nannyberry
Smooth alder
Pinxterbloom azalea

FULL SUN (shade intolerant)

Trees

Persimmon
 Black ash
 Red ash
 Honey-locust
 Kentucky coffee-tree
 Black walnut
 Sweet gum
 Black gum
 Eastern cottonwood
 Black cherry
 Pin oak
 Black willow
 Sassafras

Small Trees & Shrubs

Groundsel bush
 Buttonbush
 Silky dogwood
 Red-osier dogwood
 Bayberry
 Wax myrtle
 Ninebark
 Rosebay rhododendron
 Blackhaw viburnum

FLOOD TOLERANT

Trees

Red maple
 Shadbush
 Yellow birch
 Black Ash
 Red ash
 Sweet gum
 Sweetbay magnolia
 Eastern cottonwood
 Swamp white oak
 Willow oak
 Black willow
 Slippery elm

Small Trees & Shrubs

Smooth alder
 Red chokeberry
 Black chokeberry
 Groundsel bush
 Buttonbush
 Silky Dogwood
 Red-osier dogwood
 Inkberry
 Winterberry
 Bayberry
 Ninebark
 Rosebay rhododendron
 Swamp azalea
 Swamp rose
 Meadowsweet
 Highbush blueberry
 Witherod
 Southern arrowwood
 Northern arrowwood
 Highbush cranberry

SEMI-FLOOD TOLERANT

(good for wet sites)

Trees

Atlantic white cedar
Allegheny serviceberry
Bald cypress
Black gum
Bitternut hickory
Eldeberry
Grey birch
Green ash
Hackberry
Persimmon
White ash
Honey-locust
Kentucky coffee-tree
Black walnut
Tulip poplar
Black gum
Sycamore
Northern red oak
River birch

Shrubs

Serviceberry
Fringe tree
American hazelnut
Black huckleberry
Grey dogwood
Spicebush
Witchhazel
Mountain laurel
Staghorn sumac
Nannyberry viburnum
Blackhaw viburnum

SALT TOLERANT SPECIES

Serviceberry, Shadblow
Groundsel tree
Hackberry
American holly
Eastern red cedar
Sweetbay magnolia
Black gum
Pitch pine
Elderberry

Shrubs

Bearberry
Red chokeberry
Black chokeberry
Buttonbush
Sweet pepperbush
Inkberry
Spicebush
Southern wax myrtle
Bayberry
High tide bush
Beach plum
Winged sumac
Smooth sumac
Staghorn sumac
Rugosa rose
Arrowwood viburnum
Blackhaw viburnum
Highbush blueberry

APPENDIX B - INVASIVE ALIEN PLANT SPECIES OF VIRGINIA

This list was developed in a cooperative project between the Department of Conservation and Recreation, Division of Natural Heritage and the Virginia Native Plant Society Blandy Experimental Farm, 400 Blandy Farm Lane, Unit 2, Boyce, Virginia 22620 (540) 837-1600 <http://www.vnps.org>

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Key

M = Mountains F = Full sun P = Shade H = Hydric M = Mesic X = Xeric

COMMON NAME	SCIENTIFIC NAME	REGION			LIGHT			M O I S T U R E			
		M	P	C	F	P	S	H	M	X	
Highly Invasive Species											
Tree-of-heaven	<i>Ailanthus altissima</i>	•	•	•	•	•				•	
Garlic mustard	<i>Alliaria petiolata</i>	•	•		•	•	•			•	
Alligator weed	<i>Alternanthera philoxeroides</i>			•	•	•		•			
Porcelain-berry	<i>Ampelopsis brevipedunculata</i>		•		•	•	•			•	
Asiatic sand sedge	<i>Carex kobomugi</i>			•	•	•				•	
Oriental bittersweet	<i>Celastrus orbiculata</i>	•	•	•		•	•			•	
Short-fringed knapweed	<i>Centaurea dubia</i>	•			•	•				•	
Spotted knapweed	<i>Centaurea maculosa</i>	•	•	•	•	•				•	
Canada thistle	<i>Cirsium arvense</i>	•	•	•	•					•	
Chinese yam	<i>Dioscorea oppositifolia</i>	•	•	•		•	•			•	
Autumn olive	<i>Elaeagnus umbellata</i>	•	•	•	•	•				•	
Winged burning bush	<i>Euonymus alata</i>		•			•	•			•	
Hydrilla	<i>Hydrilla verticillata</i>			•	•	•		•			
Cogon grass	<i>Imperata cylindrica</i>			•		•	•			•	
Chinese lespedeza	<i>Lespedeza cuneata</i>	•	•		•					•	
Chinese privet	<i>Ligustrum sinense</i>	•	•	•		•	•			•	
Japanese honeysuckle	<i>Lonicera japonica</i>	•	•	•	•	•	•			•	
Morrow's honeysuckle	<i>Lonicera morrowii</i>	•	•		•	•	•			•	
Standish's honeysuckle	<i>Lonicera standishii</i>	•	•			•	•			•	
Purple loosestrife	<i>Lythrum salicaria</i> & <i>L. virgatum</i>	•	•	•	•			•		•	
White sweet clover	<i>Mellilotus alba</i>	•	•	•	•	•				•	
Yellow sweet clover	<i>Mellilotus officinalis</i>	•	•	•	•	•				•	
Japanese stilt grass	<i>Microstegium vimineum</i>	•	•	•	•	•	•	•		•	
Aneilima	<i>Murdannia keisak</i>		•	•	•	•		•			
Parrot feather	<i>Myriophyllum aquaticum</i>	•	•	•	•			•			
European water-milfoil	<i>Myriophyllum spicatum</i>	•	•	•	•			•			
Common reed	<i>Phragmites australis</i>		•	•	•	•		•		•	
Japanese knotweed	<i>Polygonum cuspidatum</i>	•	•	•	•	•				•	
Mile-a-minute	<i>Polygonum perfoliatum</i>		•		•	•	•			•	
Kudzu vine	<i>Pueraria lobata</i> (<i>P. montana</i>)	•	•	•	•	•	•			•	

Appendix B - Invasive Alien Plant Species

Lesser celandine	<i>Ranunculus ficaria</i>				•	•	•	•
Multiflora rose	<i>Rosa multiflora</i>	•	•	•	•	•	•	•
Wineberry	<i>Rubus phoenicolasius</i>	•	•	•	•	•	•	•
Johnson-grass	<i>Sorghum halepense</i>	•	•	•	•	•	•	•

Moderately Invasive Species

Norway maple	<i>Acer platanoides</i>	•	•	•	•	•		•
Quack grass	<i>Agropyron repens</i>	•	•	•	•	•		•
Rhode Island bent-grass	<i>Agrostis tenuis</i>	•	•		•	•		•
Five-leaf akebia	<i>Akebia quinata</i>		•	•	•	•	•	•
Wild onion	<i>Allium vineale</i>	•	•	•	•	•		•
Mugwort	<i>Artemisia vulgaris</i>	•	•	•	•	•		•
Jointed grass	<i>Arthraxon hispidus</i>	•	•	•	•	•	•	•
Giant reed	<i>Arundo donax</i>		•	•	•	•	•	•
Japanese barberry	<i>Berberis thunbergii</i>	•	•	•	•	•	•	•
Balloon vine	<i>Cardiospermum halicacabum</i>			•	•			•
Musk thistle	<i>Carduus nutans</i>	•	•	•	•			•
Sickle pod	<i>Cassia obtusifolia</i>		•	•	•	•		•
Brown knapweed	<i>Centaurea jacea</i>	•	•		•	•		•
Bull-thistle	<i>Cirsium vulgare</i>	•	•	•	•			•
Field-bindweed	<i>Convolvulus arvensis</i>	•	•	•	•	•		•
Cut-leaf teasel	<i>Dipsacus laciniatus</i>	•			•			•
Common teasel	<i>Dipsacus sylvestris</i>	•	•	•	•		•	•
Brazilian water-weed	<i>Egeria densa</i>	•	•	•	•	•	•	
Wintercreeper	<i>Euonymus fortunei</i>			•		•	•	•
Tall fescue	<i>Festuca elatior (F. pratensis)</i>	•	•	•	•	•		•
Fennel	<i>Foeniculum vulgare</i>		•	•	•		•	•
Gill-over-the-ground	<i>Glechoma hederacea</i>	•	•	•		•		•
English ivy	<i>Hedera helix</i>		•	•	•	•		•
Velvet-grass	<i>Holcus lanatus</i>	•	•	•	•	•	•	•
Japanese hops	<i>Humulus japonicus</i>	•	•	•	•	•	•	•
Ivy-leaved morning-glor	<i>Ipomoea hederacea</i>	•	•	•	•	•	•	•
Common morning-glory	<i>Ipomoea purpurea</i>	•	•	•	•			•
Yellow flag	<i>Iris pseudacorus</i>	•	•	•	•		•	
Shrubby bushclover	<i>Lespedeza bicolor</i>	•	•	•	•	•		•
Blunt-leaved privet	<i>Ligustrum obtusifolium</i>		•	•			•	•
Amur honeysuckle	<i>Lonicera maackii</i>	•	•			•		•
Tartarian honeysuckle	<i>Lonicera tatarica</i>	•	•		•	•		•
Moneywort	<i>Lysimachia nummularia</i>	•	•	•	•	•	•	•
China-berry	<i>Melia azedarach</i>		•	•	•	•		•
Princess tree	<i>Paulownia tomentosa</i>	•	•	•	•	•		•
Timothy	<i>Phleum pratense</i>	•	•	•	•	•		•
Golden bamboo	<i>Phyllostachys aurea</i>		•	•	•	•		•
Canada bluegrass	<i>Poa compressa</i>	•	•	•	•	•	•	•
Rough bluegrass	<i>Poa trivialis</i>	•	•	•	•	•	•	•

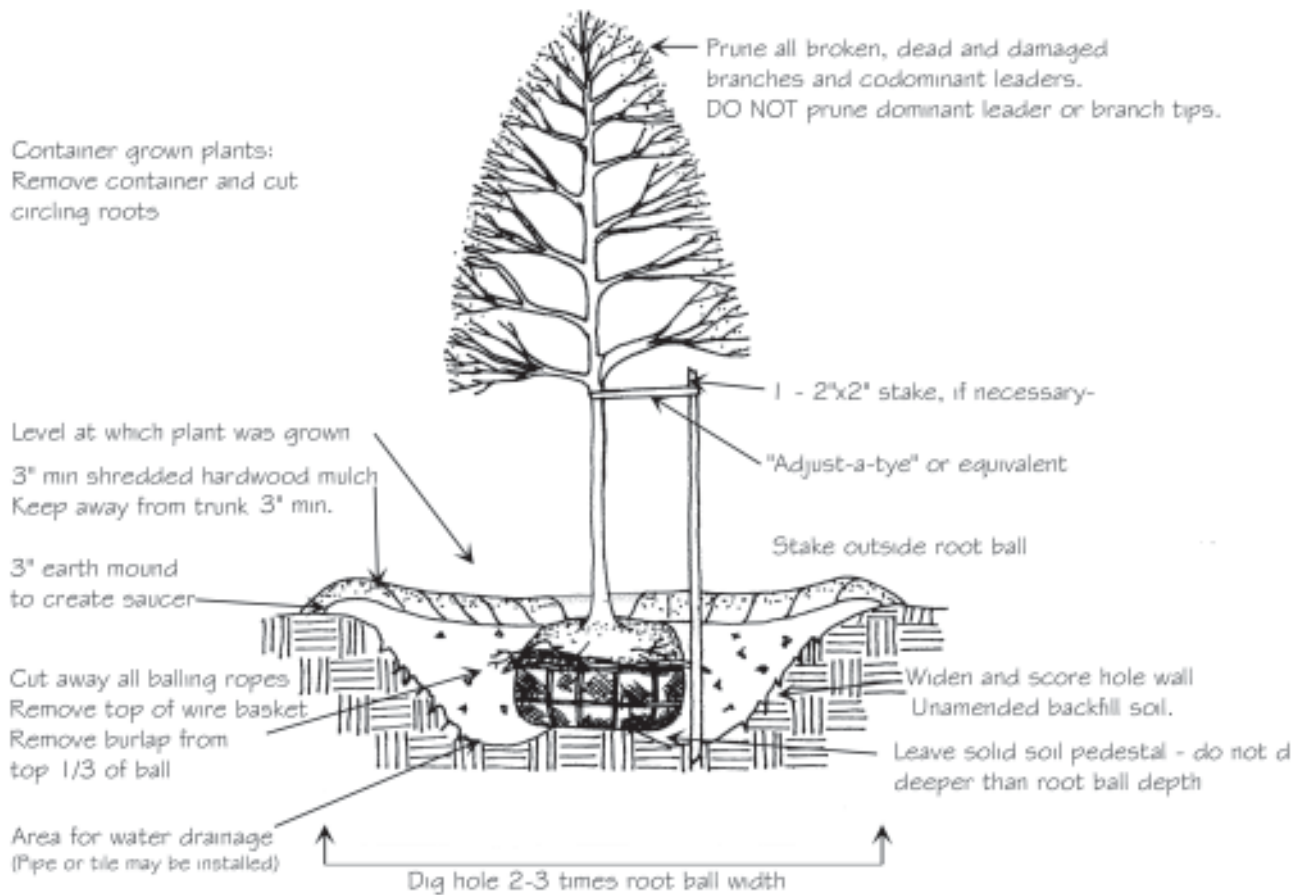
Bristled knotweed	<i>Polygonum cespitosum</i>	●	●	●	●	●	●	●	●
White poplar	<i>Populus alba</i>	●	●	●	●	●			●
Jointed charlock	<i>Raphanus raphanistrum</i>	●	●	●	●				●
Red sorrel	<i>Rumex acetosella</i>	●	●	●	●	●			●
Curled dock	<i>Rumex crispus</i>	●	●		●				● ●
Giant foxtail	<i>Setaria faberi</i>		●	●	●	●			●
Japanese spiraea	<i>Spiraea japonica</i>	●	●			●	●	●	●
Common chickweed	<i>Stellaria media</i>	●	●	●	●	●	●		●
Ivy-leaved speedwell	<i>Veronica herderifolia</i>	●	●	●	●	●	●		●
Chinese wisteria	<i>Wisteria sinensis</i>		●	●		●	●		●
Common cocklebur	<i>Xanthium strumarium</i>	●	●	●	●	●			● ●

Occasionally Invasive Species

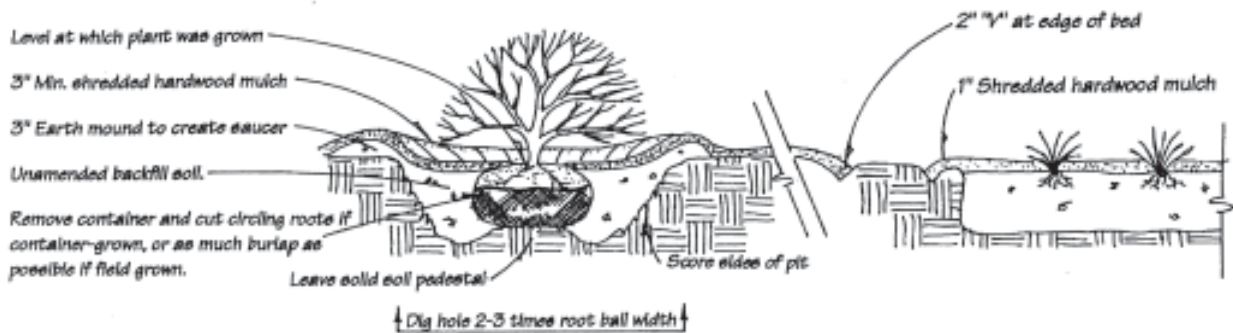
Redtop	<i>Agrostis gigantea</i>	●	●	●	●	●			●
Bugleweed	<i>Ajuga reptans</i>	●	●	●	●	●			● ●
Mimosa	<i>Albizia julibrissin</i>	●	●	●	●	●			●
Oatgrass	<i>Arrhenatherum elatius</i>	●	●	●	●	●			●
Common dayflower	<i>Commelina communis</i>	●	●	●	●	●			●
Poison hemlock	<i>Conium maculatum</i>	●	●	●	●	●			●
Crown-vetch	<i>Coronilla varia</i>	●	●	●	●				● ●
Orchard grass	<i>Dactylis glomerata</i>	●	●	●	●	●			●
Russian olive	<i>Elaeagnus angustifolia</i>	●	●	●	●	●			●
Thorny elaeagnus	<i>Elaeagnus pungens</i>		●	●		●			●
Weeping lovegrass	<i>Eragrostis curvula</i>	●	●	●	●				● ●
Leafy spurge	<i>Euphorbia esula</i>	●	●			●	●		●
Red morning-glory	<i>Ipomoea coccinea</i>	●	●	●	●				●
Nipplewort	<i>Lapsana communis</i>	●			●	●			●
Sweet breath of spring	<i>Lonicera fragrantissima</i>		●		●	●			●
Bell's honeysuckle	<i>Lonicera x bella</i>	●	●	●	●	●			●
Birdsfoot trefoil	<i>Lotus corniculatus</i>	●	●	●	●	●			● ●
Silver grass	<i>Miscanthus sinensis</i>	●	●	●	●	●			●
White mulberry	<i>Morus alba</i>	●	●	●	●	●			●
Wild parsnip	<i>Pastinaca sativa</i>	●	●	●	●	●			●
Beefsteak plant	<i>Perilla frutescens</i>	●	●	●		●	●		●
Black pine	<i>Pinus thunbergii</i>			●	●	●			●
Sawtooth oak	<i>Quercus acutissima</i>	●			●				●
Water chestnut	<i>Trapa natans</i>			●	●			●	●
Siberian elm	<i>Ulmus pumila</i>		●		●	●			●
Linden viburnum	<i>Viburnum dilatatum</i>		●		●	●			●
Periwinkle	<i>Vinca minor & V. major</i>	●	●	●	●	●	●		●
Japanese wisteria	<i>Wisteria floribunda</i>			●		●	●		●

“About the List” This advisory list is published by Virginia Department of Conservation and Recreation (VDCR) to inform land managers of potential risks associated with certain plant species known to exhibit invasive behavior in some situations. It should also be noted the list is not regulatory in nature, and thus does not prohibit the use of the listed plant species. VDCR Natural Heritage and Virginia Native Plant Society use detailed criteria to assess the invasiveness of a plant. Factors used to rank each species include: cumulative impacts on natural areas; potential to disperse and invade natural landscapes; distribution and abundance; difficulty to manage; and impacts on other species. The list is periodically reviewed and updated by land managers, nurserymen, landscape architects, horticulturalists, botanists, wildlife biologists, and other conservation partners. **“Invasiveness Ranking”** Each species on the list is assessed according to its cumulative effects on natural areas and native plant habitats where it typically occurs. The A-ranked species exhibit the most invasive tendencies in natural areas and native plant habitats. They may disrupt ecosystem processes and cause major alterations in plant community composition and structure. They establish readily in natural systems and spread rapidly. The B-ranked species exhibit moderate invasiveness in natural areas. They may have minor influence on ecosystem processes, alter plant community composition and affect community structure in at least one layer. They may become dominant in the understory layer without threatening all species found in the community. These species usually require a minor disturbance to become established. The C-ranked species generally do not affect ecosystem processes but may alter plant community composition by outcompeting one or more native plant species. They often establish in severely disturbed areas. The disturbance may be natural or human origin, such as ice- storm damage, windthrow, or road construction. These species spread slowly or not at all from disturbed sites. **“Regions”** For purposes of this list, the state has been divided into three regions. Coastal Plain and Piedmont follow conventional boundaries. Blue Ridge, Ridge and Valley, and Cumberland Plateau are grouped together into one region called Mountain. **“Habitat Requirements”** The categories for light and soil requirements are very broad and are meant only to give general indication of habitat adaptations for these plants.

APPENDIX C - PLANTING DETAILS



Tree Planting Detail



Shrub and Groundcover Planting Detail

BARE ROOT SEEDLINGS AND YEAR TRANSPLANTS

(Taken from Section VII of *The Chesapeake Bay Riparian Handbook*. Palone, Roxanne S. and Albert H. Todd, eds. 1998)

Generally, seedlings and year transplants should have the following characteristics when planted:

1. They should be at the same level that they were grown at the nursery. Look for the root collar to determine depth.
2. The roots should be straight down or spread out, but not curved, bent or doubled back to form a “U” or “J” shape.
3. The plant should be firmly tamped in removing any air pockets around the roots.
4. The plant should be in an upright position, even with the ground, not in a hole or on a mound of soil.

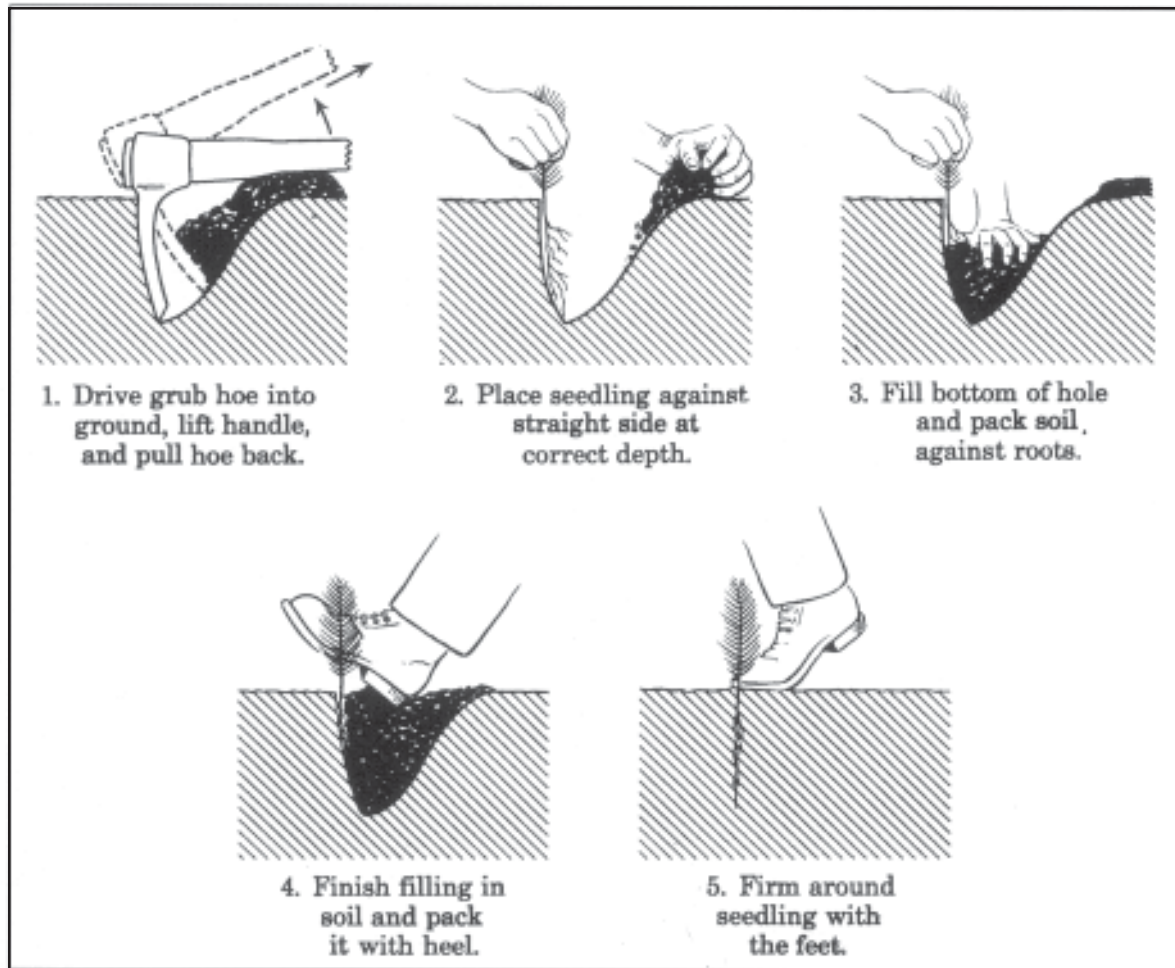


Figure 7 - 8. The Side-Hole Method of Planting. (Sketch adapted from U.S. Forest Service and *The Practice of Silviculture*, Smith, 1986.)

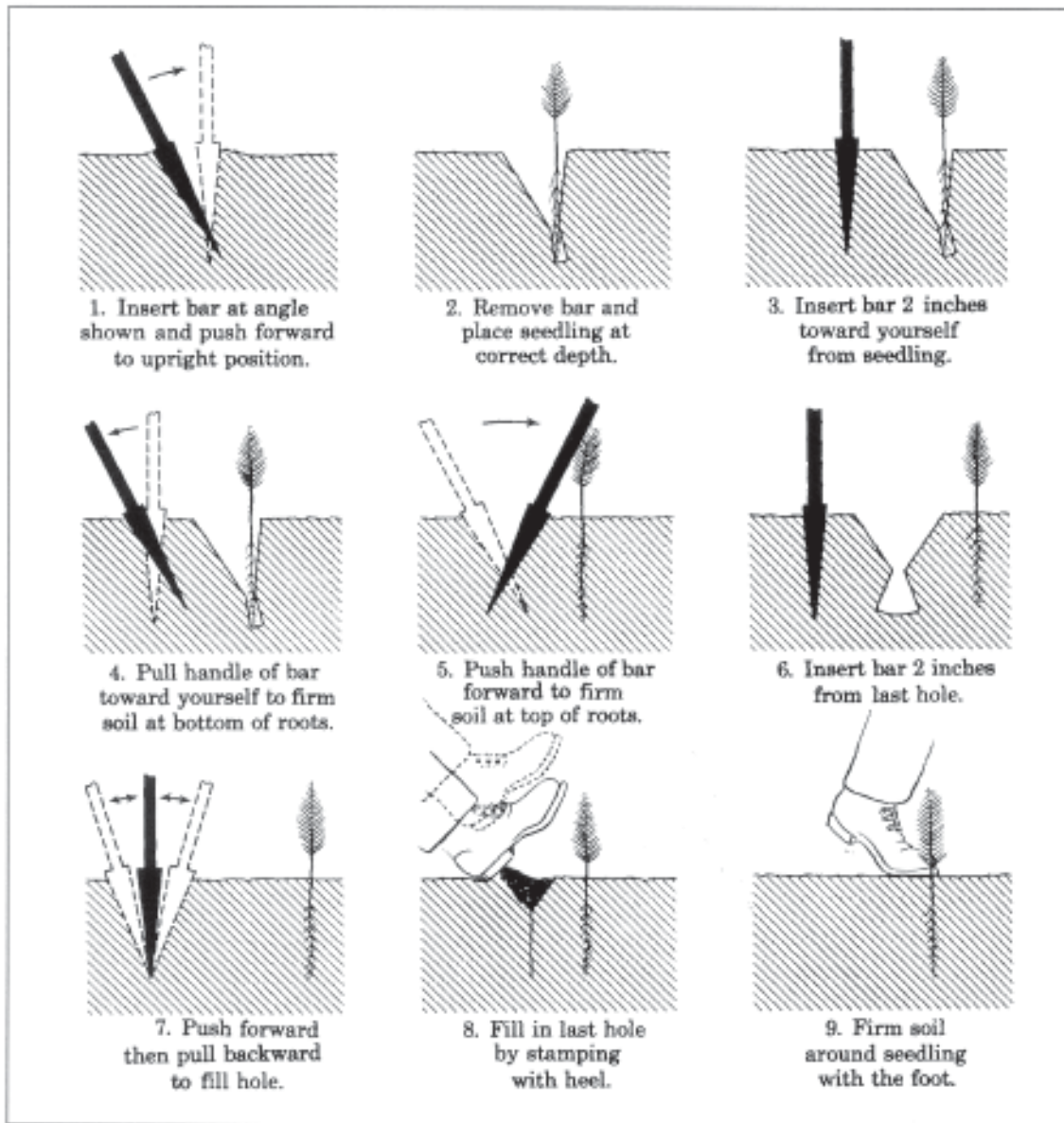


Figure 7 - 7. Slit Method. Steps in the use of the slit method of planting seedlings in sandy soil. (Sketch by U.S. Forest Service.)

Taken from *A Case Study of The Difficult Run Riparian Project: A Guide for Riparian Restoration Projects*. (December 1998) Judith A. Okay. Virginia Department of Forestry. Appendix C, p. 16.

Installing Tree Protectors

3) The flared end of a Supertube is the top. Gently guide the Supertube down over the seedling, making sure the seedling doesn't get caught under the ties.

4) Fasten the ties loosely around the stake. Do not tighten them yet.

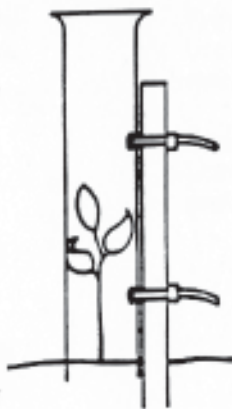
5) Place your gloved hand over the top of the Supertube and push down until the base of the tube sits $\frac{1}{2}$ - 1" deep in the soil.

This is easiest to do right after planting when the soil is loose, or when the soil is moist.

If the soil is packed or dry, try this: Place a board on top of the Supertube (the board should be at least 6" x 6"). Pound the board with a mallet or hammer, to push the base of the Supertube $\frac{1}{2}$ - 1" into the soil.

It is critical that the base of every Supertube be well seated in the soil.

6) Cinch the ties tight.



Installing Protective Net

The plastic net included with your shipment of Supertubes (2' and taller) prevents birds from entering the Supertube and harming themselves or the tree.

The net breaks down over 18 months in the sun. It is designed to allow buds to grow through. However, buds can get caught on the net. Each time you are checking your trees, remove the net from those Supertubes where the tree is a few inches from the top or has already emerged. Bird entry is not a problem after the tree emerges.

1) Expand the bottom of the net.

2) Pull the net 7-8" down the Supertube.

3) Adjust the net so that the ends of the net are just touching.



APPENDIX D - VEGETATIVE REPLACEMENT STANDARDS

The vegetation replacement standards are a compilation of information from many sources. The following list reflects the major sources of information used to develop the replacement and restoration standards:

USDA :

Natural Resources Conservation Service

Forest Service

Virginia Department of Conservation and Recreation

Virginia Department of Forestry

Chesapeake Bay Local Assistance Department

Conversations and emails with members of the Technical Committee.

Maryland Chesapeake Bay Critical Area Commission

Maryland Department of Natural Resources Forest Service

Pennsylvania Releaf

Local governments in Virginia and Maryland

VEGETATION REPLACEMENT RATES		
VEGETATION REMOVED	PREFERRED REPLACEMENT VEGETATION	ACCEPTABLE ALTERNATIVE VEGETATION
1 tree or sapling 1/2"-2 1/2" caliper	1 tree @ equal caliper or greater	Or 2 large shrubs @ 3'-4' Or 10 small shrubs or woody groundcover * @ 15"-18"
1 tree ≥ 2 1/2" caliper	1 tree @ 1 1/2" - 2" caliper, or 1 evergreen tree @ 6' min. ht., per every 4" caliper of tree removed (ex: a 12" cal. tree would require 3 trees to replace it)	Or 75% trees @ 1 1/2" - 2" and 25% large shrubs @ 3'-4' per every 4" caliper of tree removed. (ex: a 16" cal. tree removed would require 3 trees and 1 large shrub) Or 10 small shrubs or woody groundcover @ 15"-18" per 4" caliper of tree removed (ex: a 8" caliper tree removed requires 20 small shrubs)
1 large shrub	1 large shrub @ 3'-4'	Or 5 small shrubs or woody groundcover @ 15"-18"
* Woody groundcover is considered to be a woody, spreading shrub that remains close to the ground, to 18" high, such as a shore juniper, <i>juniperus conferta</i> . Vines may not be considered "woody groundcover" for the purpose of vegetation replacement.		

RESTORATION / ESTABLISHMENT TABLE A

Definitions:

Canopy tree: a tree that reaches 35 feet in height or larger when mature

Understory tree: a tree that matures to a height of 12 feet to 35'

Large shrub: a shrub that reaches 10 feet of height or greater at maturity

Small shrub: a woody plant that can reach up to 10 feet of height at maturity

¼ acre or less of buffer

Up to 10,890 square feet or less

For every 400 square-foot unit (20'x20') or fraction thereof plant:

one (1) canopy tree @ 1½" - 2" caliper or large evergreen @ 6'

two (2) understory trees @ ¾" – 1 ½" caliper or evergreen @ 4'

or *one (1)* understory tree and *two (2)* large shrubs @ 3' -4'

three (3) small shrubs or woody groundcover @ 15" – 18"

Example:

A 100-foot wide lot x 100-foot wide buffer is 10,000 square feet.

Divide by 400 square feet (20'x20' unit) to get:

25 units

<u>Units</u> x	<u>plant/unit</u>	<u>Number of plants</u>
25 units x	1 canopy tree	25 canopy trees
	2 understory trees	50 understory trees
	3 small shrubs	<u>75 small shrubs</u>
		150 plants

RESTORATION / ESTABLISHMENT TABLE B

Greater than ¼ acre of buffer

More than 10,890 square feet

- A. Plant at the same rate as for ¼ acre or less.
- B. The waterside 50% of the buffer (from the waterline inland for the first 50 feet):
For every 400 square-foot unit (20'x20') or fraction thereof plant:

one (1) canopy tree @ 1½" - 2" caliper or large evergreen @ 6'
two (2) understory trees @ ¾" - 1 ½" caliper or evergreen @ 4'
or one (1) understory tree and two (2) large shrubs @ 3'-4'
three (3) small shrubs or woody groundcover @ 15" - 18"

AND

The landward 50% of buffer (from 50 feet inland to 100 feet inland):

either plant

Bare root seedlings or whips at 1,210 stems per acre¹, approximately 6'x6' on center
(Minimum survival required after two growing seasons: 600 plants)

or

Container grown seedling tubes at 700 per acre approximately 8'x 8' on center (Minimum survival required after two growing seasons: 490 plants)

- C. If the applicant is willing to enter into a five year maintenance and performance guarantee:
100% of buffer planted with:
Bare root seedlings or whips at 1,210 per acre, approximately 6'x 6' on center (Minimum survival required after two growing seasons: 600 plants)
or
Container grown seedling tubes at 700 per acre approximately 8'x 8' on center (Minimum survival required after two growing seasons: 490 plants)

1 acre or more of buffer

With an evaluation from an arborist or forester or other professional, natural regeneration may be an acceptable method of buffer establishment, however, a forestry management plan must be in place prior to any vegetation being removed. A minimum of 35 feet next to the water must be left in forest and protected prior to any vegetation being removed. If over 20 percent of the vegetation must be removed for the health of the woodlot, within the 35 feet closest to the shoreline, vegetation must be reestablished by seedling plantings at the rates above.

¹ Palone, Roxanne S., and Al Todd, *Chesapeake Bay riparian handbook: A guide for establishing and maintaining riparian forest buffers*. May 1977. p. 7-20.

