

---

# City of Atlanta Riparian Buffer Revegetation Guidelines

Rev. 10/2014

---

Stream and wetland buffers are protected by the City of Atlanta Riparian Buffer Ordinance (Chapter 74 Article VII) because they provide water quality, stream bank stability, and wildlife habitat benefits. An ideal stream or wetland buffer is densely vegetated with native plants with diverse canopy, shrub, and groundlayer vegetation. The ideal buffer is also free from invasive species and soil erosion. When buffers are encroached upon, cleared, disturbed, improperly vegetated, or developed, water quality, stream bank stability, and wildlife habitat are adversely affected, and revegetating will restore the buffer's important ecological functions. These guidelines shall be followed when revegetation of a stream or wetland buffer is required by the City or when a property owner volunteers to revegetate a stream buffer. Note: In most circumstances, these guidelines are intended to apply to revegetation of the area above the streambank. If the streambank has been disturbed or exhibits accelerated erosion or scouring, alternate or additional stabilization utilizing geotextile, soil bioengineering, structural elements, or other techniques may be necessary to prevent further erosion. Consultation with a qualified expert is advised. For more information, visit the Georgia Soil and Water Conservation Commission's website, <http://gaswcc.georgia.gov/sites/gaswcc.georgia.gov/files/StreambankandShorelineStabilizationGuidanceBookRevisedApril2011.pdf>

## Buffer Revegetation Plan

---

- *Illegal Buffer Encroachments.* A buffer revegetation plan is required when an illegal buffer encroachment has occurred without first obtaining a City of Atlanta Authorized Encroachment (75 foot buffer), an Environmental Protection Division (EPD) stream buffer variance (25 foot buffer), or a building permit. This plan shall be submitted to the Environmental and Construction Enforcement Division for review (404-546-1300). If the encroachment affects other City Departments or Agencies (e.g. Arborist, Zoning, Sewer Operations, or US Army Corps of Engineers), plans must also be submitted through Bureau of Buildings (404-330-6152).
- *Authorized Encroachments or Buffer Restoration Projects.* When revegetation of a stream or wetland buffer is required as part of an Authorized Encroachment application, or when a property owner is conducting a voluntary buffer restoration, a Buffer Revegetation Plan shall be submitted to the Stream Buffer Technical Panel for review (404-330-6249).

Compliance with the Buffer Revegetation Plan does not relieve the owner/applicant from other responsibilities under the Atlanta City Code or applicable state or federal laws. The Buffer Revegetation Plan shall contain two components—a Buffer Revegetation Site Plan, and a Site Preparation Plan.

### Buffer Revegetation Site Plan

The Buffer Revegetation Site Plan shall contain the following items:

- A site plan stamped and signed by a GSWCC Level II certified Landscape Architect (preferred), Certified Professional in Erosion and Sedimentation Control (CPESC), or Professional Engineer registered in the State of Georgia;
- Exact location of affected stream(s) and property boundaries;
- 25 foot state waters buffer and the City's 75 foot stream buffer;
- Delineation of the exact location of the buffer encroachment (in square feet);
- Location of all temporary Erosion and Sedimentation Control BMPs per the Manual for Erosion and Sediment Control in Georgia (Green Book), including but not limited to Matting and Blankets (Mb), Type C silt fence (Sd1-C), Temporary Stabilization (Ds1, Ds2), and Construction Exit (Co);

- Location of all existing trees six (6) inch caliper or larger and appropriate tree protection fence as required by Atlanta City Code;
- A list of all plant materials to be used and planting methods. Specifically include the types of plants, the number proposed, botanical and common names, whether planting Option 1 or Option 2 will be utilized (detailed below), sizes of plant material, proposed locations, and planting location key (where applicable). In most cases, plantings required for stream buffer mitigation will be in addition to any applicable requirements set forth in Article II Chapter 158 (Tree Protection) of the Atlanta City Code; however the use of recompense trees (subject to the requirements of Chapter 158) in buffer revegetation projects is not precluded.
- Statement guaranteeing all plant materials for two years;
- Name and direct contact information of the owner/applicant and the property address; and,
- The following statements shall appear on the plan in bold type:
  - 1. Following the complete installation of the approved Stream Buffer Revegetation Plan, a final inspection and written approval must be made by the City of Atlanta prior to the issuance of the Certificate of Occupancy (if applicable). Call (404) 546-1300 to schedule a final inspection.**
  - 2. The City of Atlanta may inspect the buffer during the two-year guarantee period. It is the responsibility of the property owner to maintain the revegetation site and repair, protect, and add additional controls to protect the buffer as necessary. Such controls and additional work shall be at the sole cost of the property owner.**

### *Site Preparation Plan.*

The Site Preparation Plan shall be site-specific and shall detail the methods used to implement the following requirements:

- **Compacted soils.** When a plan proposes to remove impervious surfaces, or where previously impervious areas or compacted soils exist, soils shall be loosened using plowing or subsoil ripping. To avoid re-compaction of loosened soils, hand-planting shall be used when possible.
- **Addition of organic matter to soils.** Where soils are lacking organic matter, compost or other suitable organic matter shall be incorporated into the soil.
- **Temporary stabilization.** Use short-lived annuals that will not hinder establishment of buffer vegetation for initial or temporary stabilization of bare soils. See Appendix C for a list of recommended stabilization species.
- **Invasive Species Management.** Growth of invasive exotics that could hinder the establishment of new vegetation shall be controlled or removed (where applicable). Ongoing management of the site shall prevent regrowth or future establishment of invasive exotics. Areas alongside streams are especially susceptible to colonization of certain invasive species.
- **Sod-forming grasses.** Existing sod-forming grasses such as fescues or Bermuda shall be controlled or removed (where applicable). These grasses will compete with newly planted native vegetation.
- **Concentrated Stormwater Flows.** To the greatest extent possible, all concentrated stormwater flows across the buffer must be dispersed to achieve sheet flow. If sheet flow is not possible due to topography, areas of concentrated flow must be fully stabilized to prevent erosion.

## **Planting and Site Guidelines**

---

- All plants shall be native to the Georgia Piedmont Region. Georgia or Southeastern ecotype plants and seed shall be used when available. See Appendix A for a list of suggested species. Plant species not listed in Appendix A may be used subject to approval by the Department of Watershed Management. Invasive species listed in Appendix D shall not be used.
- For disturbed areas within the 25 foot buffer and any disturbed areas with slopes 3:1 or greater, soil shall be stabilized with GDOT-approved matting and blankets (Mb) or other approved stabilization method until permanent vegetation is established. Only 100% biodegradable material shall be used.
- Planting allowances may be made for existing trees.

- Ordinarily, fertilizer should not be used in the 75 foot buffer due to the risk of water pollution from fertilizer in stormwater runoff. Incorporation of compost or organic matter should provide sufficient nutrients for adequate plant growth. Fertilizer should only be used in extremely infertile soils, and only after a soil test confirms the need for additional nutrients. Fertilizer should be slow-release, organic fertilizer and should only provide the nutrients deemed necessary by the soil test.

### *Species Diversity Requirements*

---

- A minimum of six species of trees shall be planted for Buffer Revegetation Plans calling for greater than twenty trees.
- A minimum of three species of shrubs shall be planted for Buffer Revegetation Plans calling for greater than fifteen (15) shrubs. A minimum of five species of shrubs shall be planted for Buffer Revegetation Plans calling for greater than 50 shrubs.
- A minimum of four species of grasses and grass-like plants, and a minimum of 2 species of forbs shall be planted when these plants are used to establish ground cover in areas greater than 1,000 square feet. For areas less than 1,000 square feet there are no minimum species requirements; however, species from Appendix A should be used.

### *Revegetation Options and Planting Density Requirements*

---

The following options for revegetation are available. Options 1a and 1b may be used on any size site, and Options 2a and 2b may only be used on large sites (revegetation areas over 10,000 square feet). Options 1a and 1b provide quicker establishment of tree canopy and creates a better immediate environment for establishing shrubs and ground-layer plants. Options 2a and 2b provide a more cost-effective method of revegetating large buffers, but does not achieve the immediate benefits of Options 1a and 1b. Options 2a and 2b allow for denser planting of smaller plant material on large sites.

#### **Option 1a:**

- 198 trees per acre (1 tree per 220 square feet)
  - 40-60% of trees shall be understory species
  - All trees shall be a minimum 3/4 caliper inch and at least six feet in height
  - No greater than 10% of trees shall be pines
  - To achieve a natural distribution, trees do not have to be evenly spaced
- 670 shrubs per acre (1 per 65 square feet)
  - Shrubs should be planted in groups and more densely along the outer edges of the buffer to prevent light penetration and colonization by invasive species.
  - Shrubs shall be at least one gallon in size.
  - Note: Native groundlayer plants may be used in place of some of the shrubs, but must be planted at an appropriate density to achieve 75% cover at maturity.
- 100% permanent mulch cover of all exposed soil.
  - Mulch shall be maintained at a minimum of two inches thick
  - Mulch shall be shredded or chipped wood or leaf mould. Sawdust shall not be used.
  - Mulch shall not be used in areas within the 25-foot buffer that are subject to flooding. These areas should utilize native grasses, grass-like plants, and forbs to achieve 100% vegetative cover in addition to the required matting and blankets (Mb).
- All trees and shrubs shall be guaranteed for two years and replaced accordingly.

*Note- This option may not be appropriate for steep or frequently flooded sites.*

#### **Option 1b:**

- 198 trees per acre as per option 1a
- 100% permanent vegetated cover of all exposed soil (no bare areas larger than one square foot) using native grasses and grass-like plants, and forbs.
  - Native grasses can be more difficult to establish than standard turf grasses. Proper species selection and planting season are critical to successful establishment. When establishing seed, matting or an appropriate

annual nurse crop may need to be maintained for several seasons to provide soil protection while permanent vegetation is becoming established. Plugs and containerized plants can provide a quicker and more reliable establishment. Consultation with an experienced professional is strongly recommended.

- Organic mulch (shredded or chipped wood or leaf mould, not including sawdust) shall be applied in a ring around the base of new trees and shrubs to aid in establishment and prevent competition by ground layer plantings.
- All trees and shrubs shall be guaranteed for two years and replaced accordingly.

**Option 2a:** (only allowed on buffer restoration areas greater than 10,000 square feet)

- Tree Density Goal:
  - Achieve 348 live trees per acre after 2 years (1 tree for every 125 square feet).
  - Initial planting should be greater than 320 trees per acre to allow for some mortality. An initial planting rate of 435 trees per acre (10' on center spacing) would allow for 20% mortality.
  - Trees may be dormant bare-root stock, but must be at least 2' in height after planting.
  - 40-60% of trees shall be understory species
  - No greater than 10% of trees shall be pines
  - To achieve a natural distribution, trees do not have to be evenly spaced
- Shrub Density Goal:
  - Achieve 670 live shrubs per acre after 2 years. (1 shrub per 65 square feet)
  - Shrubs may be containerized or bare root stock.
  - If bare rooted or small containerized shrubs are used, initial planting should be greater than 670 shrubs per acre to allow for failure.
  - Shrubs should be planted in groups and more densely along the outer edges of the buffer to prevent light penetration and colonization by invasive species.
  - Note: Native groundlayer plants may be used in place of some of the shrubs, but must be planted at an appropriate density to achieve 75% cover at maturity.
- 100% permanent mulch cover of all exposed soil.
  - Mulch shall be maintained at a minimum of two inches thick
  - Mulch shall be shredded or chipped wood or leaf mould. Sawdust shall not be used.
  - Mulch shall not be used in areas within the 25-foot buffer that are subject to flooding. These areas should utilize native grasses, grass-like plants, and forbs to achieve 100% vegetative cover in addition to the required matting and blankets (Mb).
- All trees and shrubs shall be guaranteed for two years and replaced accordingly.  
*Note- This option may not be appropriate for steep or frequently flooded sites.*

**Option 2b:** (only allowed on buffer restoration areas greater than 10,000 square feet)

- Tree Density Goal:
  - Achieve 348 live trees per acre after 2 years as per option 2a
- 100% permanent vegetated cover of all exposed soil (no bare areas larger than one square foot) using native grasses and grass-like plants, and forbs.
  - Native grasses can be more difficult to establish than standard turf grasses. Proper species selection and planting season are critical to successful establishment. When establishing seed, matting or an appropriate annual nurse crop may need to be maintained for several seasons to provide soil protection while permanent vegetation is becoming established. Plugs and containerized plants can provide a quicker and more reliable establishment. Consultation with an experienced professional is strongly recommended.
  - When establishing smaller trees, if grasses and forbs are planted in the ground layer, only the shorter growing species (noted in Appendix A) should be used in order to limit competition and shading of the trees
  - Mulch should be applied around the bases of the trees to limit competition

## Appendix A: Plant List

---

Note that this list is not a comprehensive list of all plants native to the Georgia Piedmont, but instead represents a list of most native plant material available in commercial nurseries. This list also does not take into account the assemblages of plants found in nature. Consult an expert with knowledge of native plant communities for details.

### A. Canopy Trees

---

<i>Common Name</i>	<i>Botanical Name</i>	<i>Planting Zone</i>
Red Maple	<i>Acer rubrum</i>	1,2,3
River birch	<i>Betula nigra</i>	1,2,3
Hickories	<i>Carya ovata</i> , <i>C. tomentosa</i> , <i>C. Ovalis</i>	2,3
Sugarberry	<i>Celtis laevigata</i>	1,2,3
Persimmon	<i>Diospyros virginiana</i>	2,3
American Beech	<i>Fagus grandifolia</i>	2,3
White Ash	<i>Fraxinus americana</i>	2,3
Green Ash	<i>Fraxinus pennsylvanica</i>	1,2,3
Sweetgum	<i>Liquidambar styraciflua</i>	1,2,3
Tulip Poplar	<i>Liriodendron tulipifera</i>	2,3
Black Gum	<i>Nyssa sylvatica</i>	2,3
Loblolly Pine	<i>Pinus taeda</i>	2,3
Sycamore	<i>Platanus occidentalis</i>	1,2,3
White Oak	<i>Quercus alba</i>	2,3
Overcup Oak	<i>Q. lyrata</i>	1,2,3
Swamp Chestnut Oak	<i>Q. michauxii</i>	1,2,
Shumard Oak	<i>Q. shumardii</i>	1,2,3
Water Oak	<i>Q. nigra</i>	1,2,3
Willow Oak	<i>Q. phellos</i>	1,2,3
Black Willow	<i>Salix nigra</i>	1,2
Slippery Elm	<i>Ulmus rubra</i>	2,3

### B. Understory Trees

---

<i>Common Name</i>	<i>Botanical Name</i>	<i>Planting Zone</i>
Southern Sugar Maple	<i>Acer barbatum</i>	2,3
Serviceberry	<i>Amelanchier canadensis</i>	2,3
Pawpaw	<i>Asimina triloba</i>	2,3
Ironwood	<i>Carpinus caroliniana</i>	1,2,3
Redbud	<i>Cercis canadensis</i>	2,3
Flowering Dogwood	<i>Cornus florida</i>	2,3
Cockspur Hawthorn	<i>Craetagus crus-galli</i>	2,3
Parsley Hawthorn	<i>Craetagus marshalii</i>	1,2
Green Hawthorn	<i>Craetagus viridis</i>	1,2
Carolina Silverbell	<i>Halesia carolina</i>	2,3
American Holly	<i>Ilex opaca</i>	2,3
Big-leaf Magnolia	<i>Magnolia macrophylla</i>	1,2
Umbrella Magnolia	<i>Magnolia tripetala</i>	1,2
Hophornbeam	<i>Ostrya virginiana</i>	2,3
Sourwood	<i>Oxydendrum arboreum</i>	3

### C. Shrubs

---

<i>Common Name</i>	<i>Botanical Name</i>	<i>Planting Zone</i>
Buckeye	Aesculus sylvatica	2,3
Tag Alder	Alnus serrulata	1,2
Red Chokeberry	Aronia arbutifolia	1,2,3
Sweetshrub	Calycanthus floridus	2,3
American Beautyberry	Callicarpa americana	2,3
Buttonbush	Cephalanthus occidentalis	1,2
Sweet Pepperbush	Clethra alnifolia	1,2,3
Silky Dogwood	Cornus amomum	1,2
American Strawberry Bush	Euonymus americanus	2,3
Witchhazel	Hamamelis virginiana	2,3
Wild Hydrangea	Hydrangea arborescens	2,3
Possumhaw	Ilex decidua	1,2
Winterberry	I. verticillata	1,2
Itea, Virginia Sweetspire	Itea virginica	1,2
Spice Bush	Lindera benzoin	2
American Devilwood	Osmanthus americanus	2,3
Chickasaw and Hog Plum	Prunus angustifolia, P. umbellata	2,3
Wild Plum	P. americana	2,3
Piedmont Azalea	Rhododendron canescens,	2,3
Oconee Azalea	Rhododendron flammeum	2,3
Smooth or Winged Sumac	Rhus glabra, R. copallinum	3
Elderberry	Sambucus canadensis	1,2
Maple-leaf Viburnum	Viburnum acerifolium	2,3
Swamphaw Viburnum	Viburnum nudum, V. cassinoides	1,2

#### D. Groundlayer Plants

<i>Common Name</i>	<i>Botanical Name</i>	<i>Planting Zone</i>
<i>Ferns</i>		
Southern Lady Fern	Athyrium filix-femina	2
Sensitive fern	Onoclea sensibilis	2
Cinnamon fern	Osmunda cinnamomea	2
Royal fern	Osmunda regalis	2
Christmas fern	Polystichum acrostichoides	2
Southern Chain fern	Woodwardia aereolata	2
<i>Flowering Perennials</i>		
Butterflyweed	Asclepias tuberosa	2,3
New England Aster	Aster novae-angliae	2,3
Turtlehead	Chelone lyonii	2,3
Lanceleaved Coreopsis	Coreopsis lanceolata	2,3
Bleeding heart	Dicentra eximia	2,3
Hardy ageratum	Eupatorium coelestinum	2,3
Joe-Pye Weed	Eupatorium fistulosum	2,3
Wild Geranium	Geranium maculatum	2,3
Narrow-leaved sunflower	Helianthus angustifolius	2
Hibiscus (not shrub althea)	Hibiscus coccineus, H. moscheutos	2
Gayfeather	Liatris spicata, L. aspera	2,3
Cardinal Flower	Lobelia cardinalis	2

Great Lobelia	Lobelia siphilitica	2
Partridgeberry	Mitchella repens	2
Evening Primrose	Oenothera speciosa, O. fruticosa	2
False Dragonhead, Obedient Plant	Physostegia virginiana	2,3
Solomon's Seal	Polygonatum biflorum	2
Black-Eyed Susan	Rudbeckia hirta	2,3
Cutleaf Coneflower	Rudbeckia lacinata	2,3
False Solomon's Seal	Smilacina racemosa	2,3
Goldenrod	Solidago spp.	2,3
Stoke's Aster	Stokesia laevis	2,3
Foamflower	Tiarella cordifolia	2
Spiderwort	Tradescantia virginiana	2,3
Ironweed	Vernonia noveboracensis	2,3
Yellow-root	Xanthorhiza simplicissima	1,2

#### E. Emergents for Wetland/Bog Areas (Not Applicable for most Buffer Revegetation)

---

<u>Common Name</u>	<u>Botanical Name</u>
Blue-flag Iris	Iris virginica, I.versicolor
Soft Rush or other native rushes	Juncus effusus
Arrow Arum	Peltandra virginica
Pickernelweed	Pontederia cordata
Arrowhead-Duck Potato	Sagittaria latifolia
Lizardtail	Saururus cernuus
Bulrush	Scirpus validus
Fire Flag	Thalia dealbata

#### F. Grasses and Grass-like Plants (from seed, plug, or pot)

---

<u>Common Name</u>	<u>Botanical Name</u>	<u>Notes</u>
Autumn bentgrass	Agrostis perennans	shorter
Andropogon virginicus	Broomsedge	shorter
River cane	Arundinaria gigantea	root propagated
Tussock sedge	Carex stricta	shorter
River oats	Chasmanthium latifolium	shorter
Wood oats	Chasmanthium sessiliflorum	shorter
Virginia wildrye	Elymus virginicus	
Leathery rush	Juncus coriaceous	shorter
Soft rush	Juncus effuses	shorter
Path rush	Juncus tenuis	shorter
Beaked panic grass	Panicum anceps	
Red-Topped Panic Grass	Panicum rigidulum	
Switchgrass	Panicum virgatum	
Indian grass	Sorghastrum nutans	
Purple top	Tridens flavus	
Eastern Gammagrass	Tripsacum dactyloides	

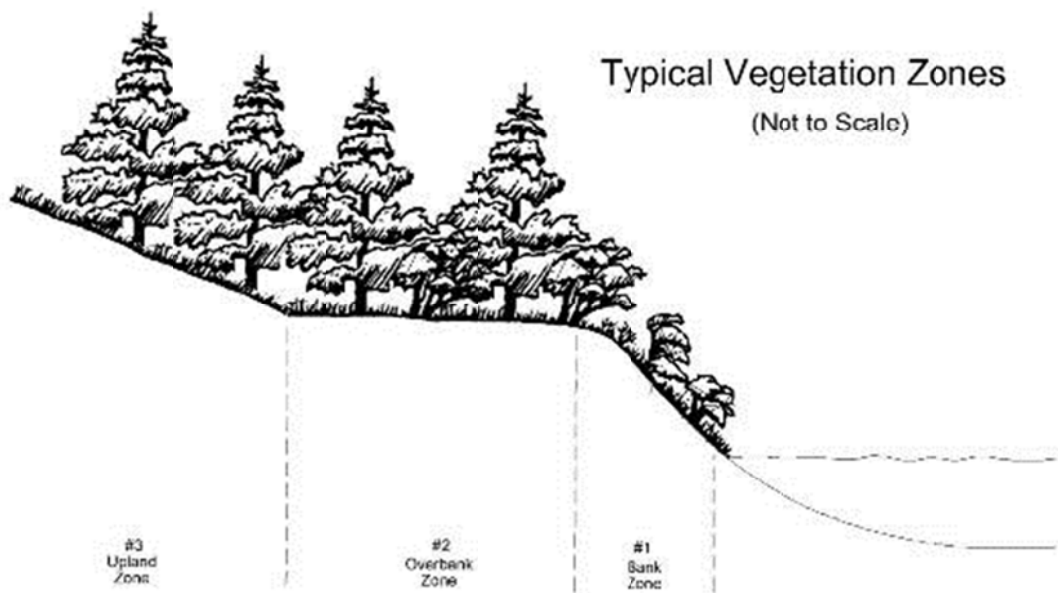
#### Notes

---

1. Seeding rates vary by species, but generally 15-20 lbs/ acre for a seed mixture;
  2. Plant species selected are based on commercial availability.
  3. Other commercially available native seed mixtures can be used.
  4. Use nurse or annual nurse crop may be necessary. Nurse crop may need to be maintained for several seasons to provide soil protection while permanent vegetation is becoming established.
- Nurse crops:
- |         |  |                |
|---------|--|----------------|
| Spring: | Oats ( <i>Avena sativa</i> )                   | 30 lbs/ acre   |
| Summer: | Brown top Millet ( <i>Pennisetum glaucum</i> ) | 5-10 lbs/ acre |
| Fall:   | Winter/ grain rye ( <i>Secale cereale</i> )    | 30 lbs/ acre   |
|         | or Winter Wheat ( <i>Triticum aestivum</i> )   | 30 lbs/ acre   |

## Appendix B: Riparian Zones

---



## Appendix C: Seed for Temporary Stabilization

---

Note: Fescue, annual ryegrass, and Bermuda grasses are not appropriate as they will compete with later plantings.

Scientific Name	Common Name
<i>Avena sativa</i>	Oats
<i>Secale cereale</i>	Grain/Winter Rye
<i>Pennisetum glaucum</i>	Browntop millet
<i>Trifolium incarnatum</i>	Crimson clover
<i>Triticum aestivum</i>	Winter Wheat

## Appendix D: Invasive Plant List

---

This list includes some exotic plants that cause serious problems in Georgia's natural areas by extensively invading native plant communities and displacing native species.



Scientific NameCommon Name

<i>Ailanthus altissima</i> (P. Mill.) Swingle	tree-of-heaven
<i>Achyranthes aspera</i>	Devil's Horsewhip/ Chaff flower
<i>Albizia julibrissin</i> Durazz.	mimosa
<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Alligator weed
<i>Ampelopsis Brevipedunculata</i>	Porcelain berry
<i>Celastrus orbiculatus</i> Thunb.	oriental bittersweet
<i>Dioscorea oppositifolia</i> L.	Chinese yam
<i>Eichhornia crassipes</i> (Mart.) Solms	water hyacinth
<i>Elaeagnus pungens</i> Thunb.	thorny olive
<i>Elaeagnus umbellata</i> Thunb.	autumn-olive
<i>Glechoma hederacea</i>	Ground Ivy
<i>Humulus japonicus</i>	Japanese hops
<i>Hedera helix</i> L.	English ivy
<i>Hydrilla verticillata</i> (L. f.) Royle	hydrilla
<i>Lespedeza bicolor</i> Turcz.	shrubby lespedeza
<i>Lespedeza cuneata</i> (Dum.-Cours.) G. Don	sericea lespedeza
<i>Ligustrum sinense</i> Lour.	Chinese privet
<i>Lonicera japonica</i> Thunb.	Japanese honeysuckle
<i>Lonicera maackii</i> (Rupr.) Herder	Amur honeysuckle
<i>Lygodium japonicum</i> (Thunb. ex Murr.) Sw.	Japanese climbing fern
<i>Microstegium vimineum</i> (Trin.) A. Camus	Nepalese browntop
<i>Murdannia keisak</i> (Hassk.) Hand.-Maz.	marsh dayflower
<i>Paulownia tomentosa</i> (Thunb.) Sieb. & Zucc. ex Steud.	princesstree
<i>Phyllostachys aurea</i> Carr. ex A. & C. Rivière	golden bamboo
<i>Polygonum cuspidatum</i> Siebold & Zucc.	Japanese knotweed
<i>Pueraria montana</i> var. <i>lobata</i> (Lour.) Merr.	kudzu
<i>Rosa multiflora</i> Thunb. ex Murr.	multiflora rose
<i>Triadica sebifera</i> (L.) Small	Chinese tallowtree
<i>Vinca major</i> L.	big periwinkle
<i>Vinca minor</i> L.	common periwinkle
<i>Wisteria sinensis</i> (Sims) DC.	Chinese wisteria