

## THE IMPORTANCE OF APPROPRIATE VEGETATION IN SCMS

Plants increase pollutant removal by providing resistance to the flow of stormwater and subsequently reducing runoff velocity, allowing for the settling, filtering, infiltration, and adsorption of pollutants (Schueler, 1996). Additional benefits include:

- Providing the organic carbon needed for microbial transformation processes.
- Moderating environmental factors such as water temperature and oxygen concentrations in sediment.
- Stabilizing the soil with plant roots and removing pollutants that adhere to sediment particles in runoff.
- Improving infiltration capacities & increasing pollutant removal by vegetation up-take (phytoextraction).
- Ameliorating the heat island effect.
- Improving aesthetics & wildlife habitat

To ensure plant survival and overall functional success of your SCM, the following factors should be considered:

- Site conditions (e.g., Amount of sunlight and shade, wind direction and intensity, type and quantity of pollutants contained within stormwater runoff, etc.).
- Soil moisture and drought tolerance.
- Sediment or organic matter build-up, and other potential for outlet structure clogging (e.g., root structure).
- Maintenance, plant growth rate, and ultimate height
- Wildlife use (including mosquitoes).
- Preference for native and non-invasive species.
- Aesthetics/ability to meet both landscape and stormwater SCM requirements.

## THE PLANTING ZONES

**Deep Pool** - Open water and permanent deep pools ranges are best colonized by plants with submerged roots. The function of vegetated deep pools areas is to slow flow velocities and trap sediment, to absorb nutrients in the water column, improve oxidation and create habitat for wildlife and mosquito predators such as frogs, fish, and dragonfly nymphs during dry times:

- *Nymphaea odorata*, “White water lily”
- *Nelumbo lutea*, “American lotus”
- *Nuphar advena*, “Yellow pond lily”

## SHADE TOLERANT

*Aesculus pavia*,  
*Aesculus sylvatica*,  
*Amelanchier arborea*,  
*Carex grayi*,  
*Carex intumescens*,  
*Carex stricta*,  
*Cephalanthus occidentalis*,  
*Chasmanthium latifolium*,  
*Chelone glabra*,  
*Clethra alnifolia*,  
*Cornus amomum*,  
*Cyrilla racemiflora*,  
*Diospyros virginiana*,  
*Elymus* spp.,  
*Eubotrys racemosa*,  
*Hamamelis virginiana*,  
*Hypericum densiflorum*,  
*Ilex decidua*,  
*Ilex opaca*,  
*Iris virginica*,  
*Itea virginica*,  
*Lindera benzoin*,  
*Lobelia* spp.,  
*Lyonia lucida*,  
*Orontium aquaticum*,  
*Physocarpus opulifolius*,  
*Rhododendron viscosum*,  
*Rhododendron atlanticum*,  
*Saururus cernuus*,  
*Viburnum* spp.,  
*Xanthorhiza simplicissima*

**Shallow Water** - Shallow Water includes all areas that are inundated by the normal pool to a depth up to 9 inches. This zone does become drier during periods of drought. Shallow water zones, such as littoral shelves should be vegetated with emergent plants and provide some of the best treatment zones in the wetland.

- *Acorus americanus* "Sweetflag"
- *Dulichium arundinaceum* "Three-way sedge"
- *Eleocharis quadrangulata* "Squarestem spikerush"
- *Iris virginica* "Virginia iris"
- *Juncus effusus* "Common rush"
- *Nelumbo lutea* "American lotus"
- *Nuphar advena* "Yellow pond-lily"
- *Nymphaea odorata* "White waterlily"
- *Orontium aquaticum* "Golden club"
- *Peltandra virginica* "Arrow arum"
- *Pontederia cordata* "Pickerelweed"
- *Sagittaria latifolia* "Broadleaf arrowhead"
- *Saururus cernuus* "Lizard's tail"
- *Schoenoplectus americanus* "Chairmaker's bulrush"
- *Schoenoplectus pungens* "Common threesquare"
- *Schoenoplectus tabernaemontani* "Softstem bulrush"
- *Scirpus cyperinus* "Woolgrass"
- *Sparganium americanum* "American bur-reed"

**Shallow Land** - The shallow land zone is the temporary storage volume portion of a Wet Pond or Stormwater Wetland. The primary landscaping objectives for this zone are to stabilize the slopes characteristic of this zone and optimize pollutant removal. Shallow land zones should be planted with wetland vegetation capable of growing in alternating dry and inundated conditions.

- *Andropogon glomeratus* "Bushy Beardgrass"
- *Asclepias incarnata* "Swamp Milkweed"
- *Carex crinita* "Fringed Sedge"
- *Carex glaucescens* "Southern waxy sedge"
- *Carex gravi* "Gray's sedge"
- *Carex intumescens* "Bladder sedge"
- *Carex lupulina* "Hop sedge"
- *Carex lurida* "Lurid Sedge"
- *Carex stricta* "Tussock Sedge"
- *Carex vulpinoidea* "Fox Sedge"
- *Chasmanthium latifolium* "River Oats"
- *Chelone glabra* "White Turtlehead"

## POLLINATOR-FRIENDLY

*Aesculus* spp.,  
*Amelanchier arborea*,  
*Andropogon glomeratus*,  
*Aronia arbutifolia*,  
*Asclepias* spp.,  
*Callicarpa americana*,  
*Calycanthus floridus*,  
*Cephalanthus occidentalis*,  
*Clethra alnifolia*,  
*Coreopsis* spp.,  
*Cornus* spp.,  
*Cyrilla racemiflora*,  
*Echinacea purpurea*,  
*Eubotrys racemosus*,  
*Eupatorium perfoliatum*,  
*Eutrochium fistulosum*,  
*Gaillardia pulchella*,  
*Helenium autumnale*,  
*Helianthus angustifolius*,  
*Hibiscus* spp.,  
*Hypericum densiflorum*,  
*Ilex* spp.,  
*Itea virginica*,  
*Kosteletskya virginica*,  
*Liatris spicata*,  
*Lindera benzoin*,  
*Lobelia* spp.,  
*Lyonia lucida*,  
*Monarda fistulosa*,  
*Panicum virgatum*,  
*Physocarpus opulifolius*,  
*Pontederia cordata*,  
*Ratibida* spp.,  
*Rhododendron* spp.,  
*Rosa palustris*,  
*Salix* spp.,  
*Sambucus canadensis*,  
*Saururus cernuus*,  
*Solidago* spp.,  
*Spiraea tomentosa*,  
*Styrax americanus*,  
*Symphytotrichum* spp.,  
*Vaccinium corymbosum*,  
*Verbena hastata*,  
*Viburnum* spp.

- *Cladium jamaicense* "Saw grass"
- *Coreopsis lanceolata* "Tickseed"
- *Dulichium arundinaceum* "Three-way sedge"
- *Echinacea purpurea* "Purple cone flower"
- *Elymus hystrix* "Bottlebrush grass"
- *Elymus virginicus* "Virginia wildrye"
- *Eupatorium perfoliatum* "Boneset"
- *Eutrochium fistulosum* "Joe Pye Weed"
- *Gallardia pulchella* "Blanket flower"
- *Helenium autumnale* "Sneezeweed"
- *Helianthus angustifolius* "Swamp Sunflower"
- *Hibiscus coccineus* "Scarlet Rosemallow"
- *Hibiscus moscheutos* "Marsh Hibiscus"
- *Juncus effusus* "Common Rush"
- *Kosteletskya virginica* "Saltmarsh Mallow"
- *Liatris spicata* "Blazing star"
- *Lobelia cardinalis* "Cardinal Flower"
- *Lobelia elongate* "Blue lobelia"
- *Monarda fistulosa* "Bee balm"
- *Muhlenbergia capillaris* "Purple Muhly"
- *Panicum rigidulum* "Redtop panicgrass"
- *Panicum virgatum* "Switchgrass"
- *Ratibida columnifera* "Prairie coneflower"
- *Rhynchospora colorata* "Starrush Whitetop"
- *Saururus cernuus* "Lizard's tail"
- *Scirpus cyperinus* "Wool grass"
- *Solidago sempervirens* "Goldenrod"
- *Syphyotrichum lateriflorum* "Calico aster"
- *Syphyotrichum novae-angliae* "New England aster"
- *Syphyotrichum oblongifolium* "Aromatic aster"
- *Verbena hastata* "Swamp Verbena"
- *Vernonia noveboracensis* "Ironweed"

#### ***Shrubs for Temporary Inundation/Shallow Land Zone***

- *Aesculus pavia* "Red buckeye"
- *Aesculus sylvatica* "Painted buckeye"
- *Alnus serrulata* "Tag alder/Hazel alder"
- *Amelanchier arborea* "Downy serviceberry"
- *Amelanchier canadensis* "Serviceberry"
- *Aronia arbutifolia* "Red Chokeberry"
- *Callicarpa americana* "Beautyberry"
- *Ceanothus americanus* "New Jersey tea"
- *Cephalanthus occidentalis* "Button bush"
- *Clethra alnifolia* "Sweet pepperbush"
- *Cornus amomum* "Silky dogwood"
- *Cyrilla racemiflora* "Ti-ti"
- *Diospyros virginiana* "Persimmon"
- *Eubotrys racemosus* "Swamp dog hobble"
- *Hamamelis virginiana* "Witchhazel"
- *Hypericum densiflorum* "Bushy St John's wort"
- *Ilex decidua* "Possum haw"

#### **DROUGHT TOLERANT**

*Aronia arbutifolia*,  
*Callicarpa americana*,  
*Ceanothus americanus*,  
*Coreopsis lanceolata*,  
*Diospyros virginiana*,  
*Echinacea purpurea*,  
*Elymus* spp.,  
*Gaillardia pulchella*,  
*Helianthus angustifolius*,  
*Hypericum densiflorum*,  
*Ilex decidua*,  
*Itea virginica*,  
*Juncus effusus*,  
*Lobelia cardinalis*,  
*Monarda fistulosa*,  
*Muhlenbergia capillaris*,  
*Panicum virgatum*,  
*Physocarpus opulifolius*,  
*Ratibida columnifera*,  
*Rhododendron viscosum*,  
*Rhododendron atlanticum*,  
*Sambucus canadensis*,  
*Scirpus cyperinus*,  
*Solidago sempervirens*,  
*Spiraea tomentosa*,  
*Symphoricarpos orbiculatus*,  
*Symphyotrichum oblongifolium*,  
*Viburnum dentatum*,  
*Viburnum prunifolium*,  
*Xanthorhiza simplicissima*

- *Ilex glabra* “Inkberry”
- *Ilex verticillata* “Winterberry”
- *Ilex vomitoria* “Yaupon”
- *Itea virginica* “Virginia sweetspire”
- *Lindera benzoin* “Northern spicebush”
- *Lyonia lucida* “Fetterbush”
- *Rhododendron viscosum* “Swamp azalea”
- *Rhododendron atlanticum* “Dwarf azalea”
- *Physocarpus opulifolius* “Ninebark”
- *Rosa palustris* “Swamp rose”
- *Salix caroliniana* “Carolina willow”
- *Salix serica* “Silky willow”
- *Sambucus canadensis* “Elderberry”
- *Spiraea tomentosa* “Hardhack”
- *Styrax americanus* “American snowbell”
- *Symphoricarpos orbiculatus* “Coralberry”
- *Vaccinium corymbosum* “Highbush blueberry”
- *Viburnum dentatum* “Arrowwood”
- *Viburnum prunifolium* “Blackhaw”
- *Viburnum nudum* “Possumhaw”
- *Xanthorhiza simplicissima* “Yellowroot”

**Upland** - This zone extends above the maximum design water surface elevation (never inundated) and often includes the outermost buffer of a pond or wetland. Plant selections should be made based on soil condition, slope stability, light, ease of maintenance, and function within the landscape because little or no water inundation will occur.

#### Grasses

- *Andropogon virginicus* “Broomsedge”
- *Elymus hystrix* “Bottlebrush grass”
- *Eragrostis spectabilis* “Purple lovegrass”
- *Chasmanthium latifolium* “River oats”
- *Muhlenbergia capillaris* “Sweet grass”
- *Schizachyrium scoparium* “Little bluestem”
- *Sorghastrum nutans* “Indian grass”
- *Tridens flavus* “Purpletop tridens”

#### Flowering perennials

- *Baptisia alba* “White wild indigo”
- *Coreopsis lanceolata* “Lance-leaf coreopsis”
- *Gaillardia pulchella* “Indian blanket”
- *Monarda fistulosa* “Wild bergamot”
- *Rudbeckia hirta* “Black-eyed susan”

#### Trees

- *Carya glabra* “Pignut hickory”
- *Carya ovata* “Shagbark hickory”
- *Celtis occidentalis* “Hackberry”
- *Cercis canadensis* “Eastern redbud”
- *Cornus florida* “Flowering dogwood”

- *Corylus Americana* “American hazelnut”
- *Fagus grandifolia* “American beech”
- *Ilex opaca* “American holly”
- *Juniperus virginiana* “Eastern red cedar”
- *Liriodendron tulipifera* “Tulip poplar”
- *Oxydendrum arboreum* “Sourwood”
- *Prunus serotina* “Black cherry”
- *Quercus alba* “White oak”
- *Quercus falcata* “Southern red oak”
- *Quercus montana* “Chestnut oak”
- *Quercus rubra* “Northern red oak”
- *Sassafras albidum* “Sassafras”

#### Shrubs

- *Aesculus flava* “Yellow buckeye”
- *Callicarpa Americana* “Beautyberry”
- *Calycanthus floridus* “Sweetshrub”
- *Hamamelis virginiana* “Witch hazel”
- *Symphoricarpos orbiculatus* “Coralberry”
- *Ulmus alata* “Winged elm”
- *Viburnum prunifolium* “Black haw”

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#### References:

1. Stormwater Program, *Stormwater Design Manual* (2017), NC Department of Environmental Quality, accessed from: <https://deq.nc.gov/sw-bmp-manual>
2. NC State Cooperative Extension: <https://plants.ces.ncsu.edu/plants/plant-list>
3. USDA, NRCS. 2019. The PLANTS Database (<http://plants.usda.gov>, 30 May 2019). National Plant Data Team, Greensboro, NC 27401-4901 USA.