

Kingman and Heritage Islands Conservation Area Restoration Plant Community Descriptions

Developed by:



In Collaboration With:



RESTORATION PHILOSOPHY

In creating the plant communities for restoration of the site, we considered multiple factors, including existing native plant community structure and floristics, locally and regionally appropriate reference communities, historical records, soil chemistry, levels of contamination, spatial ecology for target wildlife, viewsheds, and opportunities to explore novel species assemblages based upon the edaphic conditions present on these anthropogenic islands.

Soil Chemistry

The restoration approach for Kingman and Heritage Islands leans heavily on the use of species suited to circumneutral pH and tolerant of high soil Calcium and moderately high Magnesium levels. Broadly, Calcium levels on the site are at least comparable to those of rich Piedmont soils, and in some areas are even higher, approaching the levels found in Coastal Plain shell middens and other calcareous marine deposit sites. Thus, many of our proposed plant communities lean heavily on calciphile species expected to perform well under these conditions.

Table 1. Selected Regionally Appropriate Calciphile Species

		Aristolochia serpentaria	Hill (1992)
Acer negundo	Hill (1992)	Asarum canadense	Hill (1992)
Acer saccharinum	Hill (1992)	Asimina triloba	Hill (1992)
Aconitum uncinatum	Hill (1992)	Asplenium platyneuron	XX
Anemone virginiana	Hill (1992)	Carex blanda	Hill (1992)
Anemonella thalictroides	Hill (1992)	Carex bromoides	Hill (1992)
Arisaema triphyllum	Cook-patton et al. (2014)	Carex granularis	Hill (1992)
		Carex louisianica	Hill (1992)
		Carex oxylepis	Hill (1992)
		Carpinus caroliniana	Hill (1992)

<i>Celtis occidentalis</i>	XX
<i>Cercis canadensis</i>	Hill (1992)
<i>Collinsonia canadensis</i>	XX
<i>Erigeron pulchellus</i>	Hill (1992)
<i>Geranium maculatum</i>	Hill (1992)
<i>Hamamelis virginiana</i>	Hill (1992)
<i>Heuchera americana</i>	Hill (1992)
<i>Hylodesmum glutinosum</i>	Hill (1992)
<i>Juniperus virginiana</i>	Hill (1992)
<i>Lindera benzoin</i>	Hill (1992)
<i>Matelea carolinensis</i>	Hill (1992)
<i>Menispermum canadense</i>	Hill (1992)

<i>Morus rubra</i>	Hill (1992)
<i>Ostrya virginiana</i>	Hill (1992)
<i>Quercus muehlenbergii</i>	Hill (1992)
<i>Quercus shumardii</i>	Hill (1992)
<i>Sanguinaria canadensis</i>	Hill (1992)
<i>Staphylea trifolia</i>	Hill (1992)
<i>Symphotrichum cordifolium</i>	Hill (1992)
<i>Tilia americana</i>	XX
<i>Ulmus americana</i>	Hill (1992)
<i>Viburnum dentatum</i>	Cook-patton et al. (2014)
<i>Viburnum prunifolium</i>	Hill (1992)

Soil Contaminants

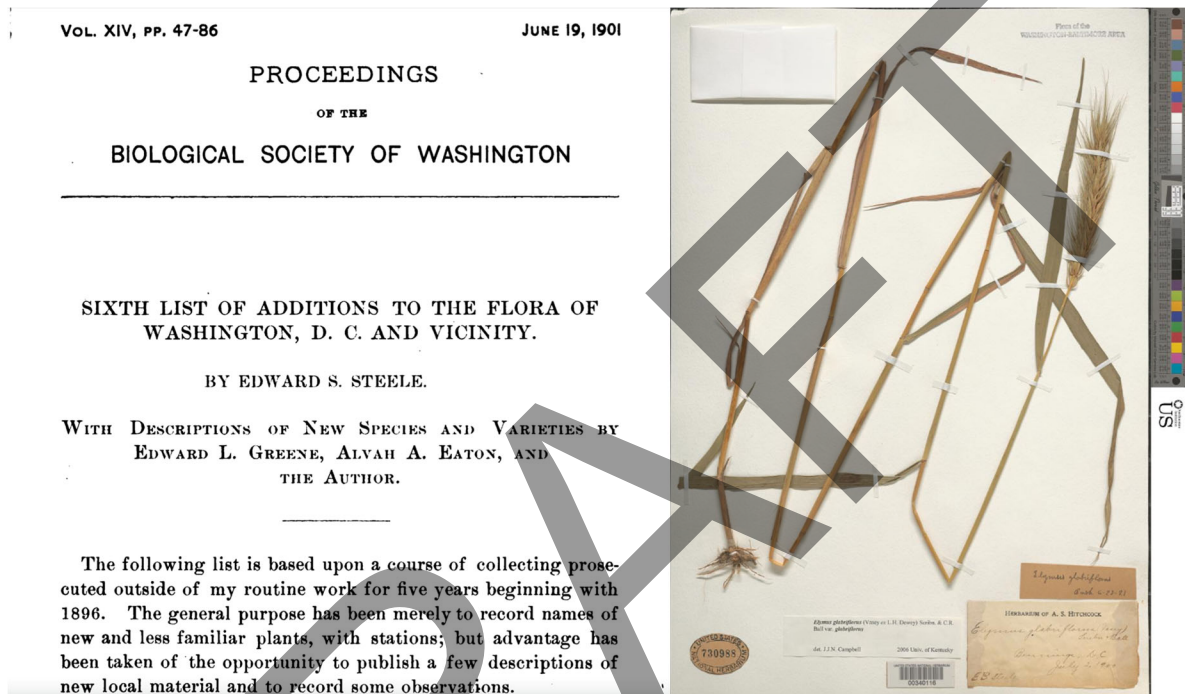
Due to relatively high total metal concentrations in surficial soils at the site, we have identified a few areas where extra care will be taken to reduce the density of fruiting species or to use species known not to transfer metals to reproductive parts (Polygons 32 and 33 on Heritage Island and Polygons 18, 29, 20, and 38 on Kingman Island).

Research is still limited on the details of how various native species differentially accumulate metals and other contaminants in various plant parts. For example, *Sambucus* may not accumulate heavy metals in the flowers (Topolska et al., 2020), but does accumulate PAHs in leaf tissue (Alexandrino et al., 2024). Sycamores accumulate and shed lead, zinc, and other heavy metals in leaves and exfoliating bark (Heiman et al., 2022). While not enough research exists to fully guide plant choices based upon uptake characteristics of various contaminants, by excluding some species known to translocate the contaminants of concern in the high concentration areas listed above, we hope to avoid creating attractive nuisance concerns in these areas of the island.

Plant Communities and Species Occurrence Records

Plant selection for the restoration is guided by reference plant communities of the National Capital Region and the broader Coastal Plain and Piedmont of the Mid-Atlantic. We draw heavily upon community descriptions of relevant plant community Associations of the US National Vegetation Classification. Associations are “defined on the basis of a characteristic range of species composition, diagnostic species occurrence, habitat conditions, and physiognomy”

(Jennings et al., 2009). Proposed planting plans contain links directly to the NatureServe Explorer descriptions of Associations. Plant species selection also relies on underlying plot data from VegBank and from Virginia DCR's plot data. In addition, species occurrence in the area was evaluated using the Smithsonian's botanical collections, as well as iNaturalist records and the annotated checklists of Shetler and Orli (Shetler & Orli, 2000, 2002)



UPLAND FORESTS

High Terrace Rich Floodplain Forest – Map Code: FPUPL

Much of Kingman Island consists of uplands elevated significantly from the natural floodplain of the Anacostia. These upland terraces, with sandy clay loam soils, basic pH, and elevated Calcium and base saturation share similar edaphic conditions with the [Piedmont-Central Appalachian Rich Floodplain Forest \(CEGL004073\)](#) (Soil samples collected from plots of the latter have a mean pH of 6.1, mean Calcium of about 2200 ppm, and 80-100% total base saturation). Kingman soils are slightly less acidic than nearby reference sites of the adjacent Piedmont, but broadly within the pH range of rich basic forests of the region. The presence of sycamore and cottonwood, both successional pioneers in this community type, also indicates suitable site conditions for restoration of this community.

Canopy Trees (222 stems/acre):	Understory Trees (109 stems/acre):	Shrubs (most areas at 134 stems/acre, however two areas have 435 stems/acre):
<i>Platanus occidentalis</i> – 14% <i>Acer saccharinum</i> – 6% <i>Juglans nigra</i> – 4% <i>Carya cordiformis</i> – 6% <i>Celtis occidentalis</i> – 4% <i>Quercus rubra</i> – 6% <i>Quercus alba</i> – 6% <i>Quercus phellos</i> – 4%	<i>Acer negundo</i> – 4% <i>Betula nigra</i> – 4% <i>Carpinus caroliniana</i> – 5% <i>Sassafras albidum</i> – 5% <i>Prunus serotina</i> – 4%	<i>Asimina triloba</i> – 6% <i>Lindera benzoin</i> – 4% <i>Chionanthus virginicus</i> – 5% <i>Hamamelis virginiana</i> – 5% <i>Corylus americana</i> – 4% <i>Euonymus americana</i> – 4%
Quarts (12 ft-on-center):	Plugs (clusters of 4 plants every 15 feet-on-center):	
<i>Mertensia virginica</i> – 60% <i>Dryopteris intermedia</i> – 15% <i>Dryopteris marginalis</i> – 25%	<i>Ageratina altissima</i> – 5% <i>Packera aurea</i> – 15% <i>Eurybia divaricata</i> – 15% <i>Phlox divaricata</i> – 20% <i>Elymus villosus</i> – 10% <i>Carex rosea</i> – 10% <i>Carex blanda</i> – 10% <i>Festuca subverticillata</i> – 10% <i>Solidago flexicaulis</i> – 5% (still trying to source <i>Asarum canadense</i> and <i>Viola sororia</i>)	

Seed:

Elymus virginicus/*glabriflorus*

Elymus riparius

Elymus hystrix

Lindera benzoin

Parthenocissus quinquefolia
Dichanthelium clandestinum
Ptelea trifoliata



The upland terrace along the “spine” of lower Kingman Island will be restored to Rich Floodplain Forest.



Proposed area of Rich Floodplain Forest near the future location of the FLOAT classroom, with Kingman Lake and the bridge to Heritage Island in the background.

West Kingman Steep Slopes – Map Code: SLOPE

These steep, west-facing slopes, dropping precipitously to Kingman Lake, are unlike any natural habitat present in the area, with edaphic conditions perhaps most similar to the rare dry calcareous forests found scattered along the Atlantic Coastal Plain from Maryland to South Carolina, where rivers have downcut into marine deposits. The concrete debris and other coarse fill present at the surface mimics thin soil rocky conditions and contributes to circumneutral pH and high Calcium levels. The planting plan includes a wide diversity of locally-appropriate species tolerant of dry mesic to xeric calcareous and mafic soil conditions.

Canopy Trees (222 stems/acre):	Understory Trees (222 stems/acre):	Shrubs (435 stems/acre):
<i>Quercus alba</i> – 2% <i>Quercus rubra</i> – 2% <i>Quercus velutina</i> – 4% <i>Quercus montana</i> – 4% <i>Quercus muehlenbergii</i> – 4% <i>Quercus shumardii</i> – 4% <i>Carya glabra</i> – 4% <i>Tilia americana</i> – 2% <i>Celtis occidentalis</i> – 2%	<i>Cercis canadensis</i> – 4% <i>Ostrya virginiana</i> – 5% <i>Cornus florida</i> – 4% <i>Juniperus virginiana</i> – 3% <i>Ilex opaca</i> – 3% <i>Diospyros virginiana</i> – 3% <i>Sassafras albidum</i> – 4%	<i>Viburnum acerifolium</i> – 18% <i>Viburnum prunifolium</i> – 5% <i>Aronia melanocarpa</i> – 15% <i>Euonymus americanus</i> – 12%
Quarts (10 ft-on-center):	Plugs (8 ft-on-center):	
<i>Polystichum acrostichoides</i> – 100%	<i>Carex pensylvanica</i> – 20% <i>Heuchera americana</i> – 20% <i>Solidago flexicaulis</i> – 20% <i>Festuca subverticillata</i> – 10% <i>Danthonia spicata</i> – 15% <i>Eurybia divaricata</i> – 10%	

Seed

Elymus hystrix
Aquilegia canadensis
Anemone virginiana
Ptelea trifoliata

Sandy Dry-Mesic Oak-Hickory Forest – Map Code: OAKHKY

The large twin mounds just north of the main meadow area on Kingman Island are ideal sandy oak habitats. They are currently dominated by *Robinia pseudoacacia*. With soil pH ranging from 5.2 in the sandy “saddle” between the mounds to 6.2 – 6.4 on top of the mounds, and moderate calcium and Magnesium levels, these hills are well-suited to mixed-oak / hickory composition. In addition, the northern of the two “soil piles” to the east of the main meadow is composed of similarly sandy surficial soils, with sandy clay loam on the mound tops, and loamy sand on the adjacent low flat.

Canopy Trees (435 stems/acre):	Understory Trees (222 stems/acre):	Shrub (None)
<i>Quercus alba</i> – 10% <i>Quercus montana</i> – 15% <i>Quercus rubra</i> – 5% <i>Carya glabra</i> – 20% <i>Quercus velutina</i> – 15%	<i>Juniperus virginiana</i> – 10% <i>Cornus florida</i> – 15% <i>Ostrya virginiana</i> – 10%	N/A
Quarts (none)	Plugs (cluster of 4 every 15 ft-on-center):	
N/A	<i>Danthonia spicata</i> – 10% <i>Carex pensylvanica</i> – 10% <i>Carex rosea</i> – 5% <i>Eurybia divaricata</i> – 20% <i>Solidago caesia</i> – 20% <i>Ageratina altissima</i> – 5% <i>Festuca subverticillata</i> – 10% <i>Symphotrichum cordifolium</i> – 20%	

Seed:

Elymus hystrix
Solidago bicolor
Anemone virginiana

SHOWY WOODLAND TRAIL MIX – Map Code: SWYTRL

This plant community will be along the west side of the main access road south of the main meadow but north of the Capital St overpass. It will be a full-shade woodland mix that will provide season-long visual interest, predominantly via a rich herbaceous stratum (a significant number of plugs and quarts) and several larger containerized flowering shrubs for immediate visual impact.

Canopy & Understory Trees: None	Shrubs/Small Trees - 6 ft-on-center in front row	Shrubs/Small Trees - 6-ft-on-center in back row
N/A	<i>Viburnum dentatum</i> – 30% <i>Viburnum acerifolium</i> – 20% <i>Euonymus americana</i> – 20% <i>Corylus americana</i> – 30%	<i>Chionanthus virginicus</i> – 15% <i>Hamamelis virginiana</i> – 15% <i>Viburnum dentatum</i> – 30% <i>Corylus americana</i> – 10% <i>Cercis canadensis</i> – 15% <i>Cornus florida</i> – 15%
Quarts (5-ft-on-center along trail edges):	Plugs (clusters of 3 every 4- ft-on-center):	
<i>Geranium maculatum</i> – 30% <i>Dryopteris marginalis</i> – 40% <i>Polystichum acrostichoides</i> – 30%	<i>Phlox divaricata</i> – 10% <i>Tiarella cordifolia</i> – 10% <i>Solidago caesia</i> – 10% <i>Solidago flexicaulis</i> – 10% <i>Eurybia divaricata</i> – 10% <i>Packera aurea</i> – 10% <i>Zizia aurea</i> – 5% <i>Carex pensylvanica</i> – 10% <i>Anemone virginiana</i> – 5% <i>Elymus hystrix</i> – 5% <i>Aquilegia canadensis</i> – 5% <i>Tradescantia ohiensis</i> – 10%	

Seed:

Elymus hystrix

Zizia aurea

Anemone virginiana

Silver Maple First Bottom Floodplain Forest – Map Code: SVMFPF

The first bottom floodplain forests of both Kingman and Heritage Islands are very similar to the [Piedmont-Central Appalachian Silver Maple Floodplain Forest \(CEGL006217\)](#)



Canopy Trees (134 stems/acre):	Understory Trees (134 stems/acre):	Shrubs (generally 435 stems/acre, one area with only 222 stems/acre):
<i>Acer saccharinum</i> – 10% <i>Populus deltoides</i> – 5% <i>Platanus occidentalis</i> – 5%	<i>Acer negundo</i> – 20%	<i>Lindera benzoin</i> – 15% <i>Asimina triloba</i> – 25% <i>Viburnum dentatum</i> – 10% <i>Viburnum prunifolium</i> – 5% <i>Corylus americana</i> – 5%
Quarts (10-ft-on-center):	Plugs (most areas: clusters of 4 every 15 ft-on-center)	
<i>Mertensia virginica</i> – 70% <i>Onoclea sensibilis</i> – 30%	<i>Solidago gigantea</i> – 25% <i>Rudbeckia laciniata</i> – 35% <i>Bidens frondosa</i> – 5% <i>Verbesina alternifolia</i> – 20% <i>Symphotrichum cordifolius</i> – 15%	Still trying to source <i>Asarum canadense</i>

Seed:

Geum canadense, *Elymus virginicus*, *Elymus riparius*, *Cinna arundinacea*, *Dichanthelium clandestinum*, *Verbesina alternifolia*, *Symphotrichum lateriflorum*, *Parthenocissus quinquefolia*

UPLAND OPEN AREAS

Upland Meadow

The existing planted meadows on Kingman have some native plant diversity, including *Verbena urticifolia*, *Bidens bipinnata*, *Asclepias syriaca* and *tuberosa*, *Erigeron annuus* and *strigosus*, *Eupatorium serotinum*, with planted species including: *Rudbeckia hirta* and *Sorghastrum nutans*.

The planting strategy here involves utilizing a mix of common regional meadow species combined with a few added species characteristic of midwestern calcareous grasslands, which are found as disjunct habitats in the mid-Atlantic (side-oats grama, stiff goldenrod, hoary mt. mint, and hairy beard-tongue) (McPherson, 2013). These calcareous grassland species should thrive in the high Calcium setting and will complement the other more widespread taxa and provide additional diversity.



Trees:	Understory Trees:	Shrubs:
N/A	N/A	N/A
Quarts - None	Plugs (mixed spacing & density, to cover approximately 20% of the meadow area) – ratios of various species will vary based location:	
N/A	<i>Asclepias syriaca</i> <i>Asclepias tuberosa</i> <i>Echinacea purpurea</i> <i>Baptisia australis</i> <i>Tradescantia ohiensis</i> <i>Rudbeckia fulgida</i> <i>Bouteloua curtipendula</i> <i>Andropogon virginicus</i>	<i>Cirsium discolor</i> <i>Solidago rigida</i> var. <i>rigida</i> <i>Solidago gigantea</i> <i>Solidago juncea</i> <i>Solidago speciosa</i> <i>Pycnanthemum incanum</i> <i>Pycnanthemum muticum</i> <i>Sorghastrum nutans</i> <i>Eupatorium hyssopifolium</i>

Seed: *Agrostis hyemalis*, *Agrostis perennans*, *Oenothera biennis*, *Andropogon virginicus*, *Schizachyrium scoparium*, *Tridens flavus*, *Bouteloua curtipendula*, *Symphyotrichum lateriflorum*, *Monarda fistulosa*, *Penstemon hirsutus*, *Pycnanthemum tenuifolium*, *Euthamia graminifolia*, *Verbena hastata*, *Conoclinium coelestinum*, *Chamaecrista fasciculata*, *Chamaecrista nictitans*, *Rudbeckia hirta*, *Rudbeckia fulgida*, *Vernonia noveboracensis*, *Desmodium paniculatum*, *Tradescantia ohiensis*, *Avena sativa* (nurse crop), *Solidago rigida* var. *rigida*, *Solidago juncea*, *Solidago speciosa*

Open Woodland / Savanna – Map Code: SVNNA

The upland terrace area south of the Capitol St. Bridge was opened considerably by forestry mowing to remove invasive bush honeysuckle and vines and is now dominated primarily by young elm saplings. Due to its already open nature and relative lack of mature canopy trees, it seems appropriate to manage it as an open woodland / savanna extending northward from the South Meadow. Inspired by floodplain meadows of the local area and open canopy, forb-rich woodlands of the upper Midwest, this planting leans into tall native grasses and tall, late summer composites.

Trees – None	Understory Trees – None	Shrubs (larger containerized material, clusters of 7 shrubs every 120 feet in larger areas, 6 ft spacing in linear features):
N/A	N/A	<i>Rosa carolina</i> – 15% <i>Sambucus canadensis</i> – 15% <i>Corylus americana</i> – 15% <i>Viburnum prunifolium</i> – 15% <i>Viburnum dentatum</i> – 15% <i>Rhus glabra</i> – 10% <i>Franklinia alahmata</i> – 15%
Quarts – None	Plugs (clusters of 9 every 12 ft-on-center)	Approximately 5% per species
N/A	<i>Sorghastrum nutans</i> , <i>Andropogon gerardii</i> , <i>Tridens flavus</i> <i>Helenium autumnale</i> <i>Symphyotrichum pilosum</i> <i>Solidago juncea</i> <i>Solidago speciosa</i> <i>Eupatorium serotinum</i> <i>Verbena urticifolia</i> <i>Pycnanthemum incanum</i> <i>Pycnanthemum muticum</i> <i>Euthamia graminifolia</i> <i>Solidago caesia</i> <i>Tradescantia ohiensis</i> <i>Eryngium yuccifolium</i>	

Solidago juncea, *Solidago speciosa*, *Sorghastrum nutans*, *Andropogon gerardii*, *Agrostis hyemalis*, *Agrostis perennans*, *Tridens flavus*, *Helenium autumnale*, *Symphyotrichum lanceolatum*, *Symphyotrichum pilosum*, *Eupatorium serotinum*, *Verbena urticifolia*, *Euthamia graminifolia*, *Eryngium yuccifolium*

Riverside Wet Meadow – Map Code: RVWTMD

This small patch habitat, roughly similar the [Piedmont-Central Appalachian Riverbar Tall Wet Meadow](#), is found naturally at the southern tip of Heritage island (Polygon 63) where hydraulic disturbance and sandy deposition occur, and could be promoted elsewhere in small patches of well-drained soils. Without flood scour disturbance, regular removal of woody species may be required to maintain this habitat as meadow.

Canopy Trees:	Understory Trees:	Shrubs:
N/A	N/A	N/A
Plugs (4 ft-on-center):	Seed:	
<i>Eutrochium fistulosum</i> – 10% <i>Rudbeckia laciniata</i> – 20% <i>Lobelia siphilitica</i> – 10% <i>Verbena urticifolia</i> – 10% <i>Chasmanthium latifolium</i> – 10% <i>Packera aurea</i> – 10% <i>Solidago gigantea</i> – 30%	<i>Verbesina alternifolia</i> <i>Dichanthelium clandestinum</i> <i>Eutrochium fistulosum</i> <i>Elymus riparius</i> <i>Helenium autumnale</i> <i>Lobelia siphilitica</i> <i>Chasmanthium latifolium</i>	

TIDAL OPEN WETLANDS

Freshwater Tidal Mixed High Marsh – Map Code: HIMRSH

This habitat is primarily found on the east side of Heritage Island where two breaches in the outer island dike have occurred, allowing limited tidal flushing of the adjacent interior wetlands at high tides. This limited tidal amplitude mimics a head of tide situation. These wetlands include a number of native species not found elsewhere at the site, such as *Commelina virginica*, but are threatened by invasives such as reed canary grass and purple loosestrife. Plantings here will be focused on supplementing existing plant diversity as needed while minimizing disturbance to existing native species. Small patches of tidal mixed high marsh are also present at the north end of heritage island near the bridge to the RFK fields.



Canopy Trees - None	Understory Trees - None	Shrubs (109 stems/acre):
N/A	N/A	<i>Cephalanthus occidentalis</i> – 75% <i>Rosa palustris</i> – 25%
Plugs (5 ft-on-center):	Seed:	
<i>Hibiscus moscheutos</i> – 15% <i>Peltandra virginica</i> – 10% <i>Sagittaria latifolia</i> – 10% <i>Bidens laevis</i> – 10% <i>Sparganium americanum</i> – 10% <i>Pontederia cordata</i> – 5% <i>Iris versicolor</i> – 20% <i>Symphyotrichum puniceum</i> – 20%	<i>Leersia oryzoides</i> <i>Bidens laevis</i> <i>Persicaria sagittata</i> <i>Hibiscus moscheutos</i> <i>Carex crinita</i> <i>Peltandra virginica</i> <i>Cinna arundinacea</i>	<i>Sagittaria latifolia</i> <i>Eleocharis palustris</i> <i>Carex lurida</i> <i>Lycopus americanus</i> <i>Sparganium eurycarpum</i> <i>Carex comosa</i> <i>Pontederia cordata</i>

NONTIDAL PALUSTRINE WETLANDS

Oak Depression Wetland – Map Code: OAKWET

The shallow, seasonally inundated depressions at the north end of Kingman Island indicate a perched water table atop an impermeable layer, which in our soil samples appeared to be a layer of sandy clay starting at 3 inches deep and extending to a depth of at least 10 inches. Existing colonization by pin oak, willow oak, and red cedar hints at a possible restoration target inspired by [Pin Oak - Swamp White Oak Seasonal Ponds \(CEGL004643\)](#), rare oak depression wetlands featuring pin oak and swamp white oak perched atop calcareous hardpans.



Proposed area of oak depression wetland showing shallow seasonal perched water table in winter.

Canopy Trees (222 stems/acre):	Understory Trees (109 stems/acre):	Shrubs (134 stems/acre, planted in hummocks):
<i>Quercus bicolor</i> – 18% <i>Quercus palustris</i> – 16% <i>Quercus phellos</i> – 6% <i>Nyssa sylvatica</i> – 6%	<i>Acer rubrum</i> – 12% <i>Diospyros virginiana</i> – 12%	<i>Viburnum prunifolium</i> – 10% <i>Juniperus virginiana</i> – 10% <i>Ilex verticillata</i> – 10%
Plugs (8 ft-on-center):	Seed:	
<i>Carex radiata</i> – 30% <i>Symphyotrichum puniceum</i> – 50% <i>Glyceria striata</i> – 10% <i>Cinna arundinacea</i> – 10%	<i>Cinna arundinacea</i> <i>Lycopus virginicus</i> <i>Juncus tenuis</i> <i>Glyceria striata</i> <i>Parthenocissus quinquefolia</i>	

Maple – Ash Swamp Forest – Map Code: MAPASH

The interior areas of most of heritage island are similar in composition to the Northern [Piedmont-Central Appalachian Maple - Ash Swamp Forest \(CEGL006548\)](#) which is normally found in oxbows and backswamps. These areas will be enhanced with the appropriate species reflecting this community.

Canopy Trees (109 stems/acre):	Understory Trees (109 stems/acre):	Shrubs (222 stems/acre):
<i>Acer saccharinum</i> – 10% <i>Platanus occidentalis</i> – 4% <i>Quercus bicolor</i> – 6% <i>Quercus palustris</i> – 6%	<i>Acer negundo</i> – 6% <i>Betula nigra</i> – 8% <i>Carpinus caroliniana</i> – 6% <i>Diospyros virginiana</i> – 6%	<i>Cephalanthus occidentalis</i> – 8% <i>Cornus amomum</i> – 14% <i>Viburnum prunifolium</i> – 6% <i>Viburnum dentatum</i> – 10% <i>Ilex verticillata</i> – 10%
Plugs (cluster of 4 every 15 ft-on-center)	Seed:	
<i>Lobelia cardinalis</i> – 15% <i>Carex stipata</i> – 10% <i>Carex grayi</i> – 10% <i>Carex lupulina</i> – 10% <i>Carex crinata</i> – 20% <i>Saururus cernuus</i> – 25% <i>Bidens frondose</i> – 10%	<i>Symphotrichum lateriflorum</i> <i>Cinna arundinacea</i> <i>Glyceria striata</i> <i>Lobelia cardinalis</i> <i>Carex stipata</i>	<i>Carex grayi</i> <i>Carex crinita</i> <i>Carex lupulina</i> <i>Carex stricta</i> <i>Lycopus virginicus</i> <i>Bidens frondose</i> <i>Saururus cernuus</i>

Nontidal Seasonal Depression Wetland – Map Code: VRNL

This plant palette reflects proposed enhancements using containerized shrubs and plugs to the main seasonal depression wetland complex (aka the “vernal pool”) on the north end of Kingman Island. This seasonal wetland complex is currently a somewhat open canopy system, with abundant herbaceous vegetation throughout much of the wetland, but lacking an herbaceous stratum in the deepest pools due to extended inundation. Current canopy dominants are *Salix nigra*, *Ulmus americana* and *U. rubra*, and *Populus deltoides*. Herbaceous species include *Ludwigia palustris*, *Leersia oryzoides*, *Typha angustifolia*, *Juncus effusus*, *Lycopus americanus*, several *Carex* species, *Persicaria* sp., etc. The only invasive of major concern is *Lythrum salicaria*, which will be carefully spot-treated. This species specification and low density addition of shrub species is intended to add floristic and structural diversity to the wetland without compromising the current ability of *Ambystoma* salamanders and other amphibians to migrate in and out of the wetland.



Canopy Trees - None	Understory Trees (48 stems/acre):	Shrubs (109 stems/acre):
N/A	<i>Salix nigra</i> – 30%	<i>Cephalanthus occidentalis</i> – 5% <i>Cornus amomum</i> – 20% <i>Ilex verticillata</i> – 10% <i>Rosa palustris</i> – 20% <i>Sambucus canadensis</i> – 15%
Plugs (clusters of 4 every 12 feet):	Seed:	
<i>Carex crinita</i> – 10% <i>Carex intumescens</i> – 10% <i>Carex stricta</i> – 10% <i>Chelone glabra</i> – 20% <i>Iris versicolor</i> – 20% <i>Asclepias incarnata</i> – 20% <i>Sparganium americanum</i> – 10%	<i>Mimulus ringens</i> <i>Leersia orzoides</i> <i>Vernonia noveboracensis</i> <i>Carex lurida</i>	

Open Wetland Complex – Map Code: OPENWT

This community represents a generalized herbaceous wetland / wet meadow habitat dominated by Facultative (FAC) and Facultative Wetland (FACW) herbaceous species with a few wetland and wetland edge shrubs included in appropriate locations. It is intended as enhancement to existing wet areas that fall between upland meadow and wetland, and that may be seasonally saturated or very shallowly inundated. These areas are intended to stay relatively open. The old road trace (Polygon 4) on the north end of Kingman is a good example.

Canopy Trees:	Understory Trees:	Shrubs (222 stems/acre):
N/A	N/A	<i>Viburnum dentatum</i> – 45% <i>Cornus amomum</i> – 20% <i>Ilex verticillata</i> – 35%
Plugs (clusters of 4 every 15 ft-on-center):	Seed:	
<i>Rudbeckia laciniata</i> – 25% <i>Sisyrinchium angustifolium</i> – 25% <i>Helianthus giganteus</i> – 30% <i>Vernonia noveboracensis</i> – 10% <i>Mimulus ringens</i> – 10%	<i>Carex vulpinoidea</i> <i>Carex scoparia</i> <i>Carex frankii</i> <i>Carex lurida</i> <i>Juncus effusus</i> <i>Juncus tenuis</i> <i>Ludwigia alternifolia</i> <i>Mimulus ringens</i> <i>Symphyotrichum lateriflorum</i> <i>Helenium autumnale</i>	<i>Eupatorium perfoliatum</i> <i>Vernonia noveboracensis</i> <i>Verbena hastata</i> <i>Pycnanthemum tenuifolium</i> <i>Scirpus atrovirens</i> <i>Symphyotrichum lateriflorum</i>

Tidal Scrub-Shrub Swamp – Map Code: OBLPSS

On the Anacostia River side of Kingman Island, especially in the vicinity of the large, constructed fringe marsh, this shrub swamp community occupies a narrow zone of hydric soils on the landward side of the sea wall. The similar natural community is [Alder – Black Willow Tidal Shrub Swamp \(CEGL006843\)](#). Plots of this reference association type generally feature about 25-30% cover of the dominant woody black willow (*Salix nigra*) and around 15% cover of smooth alder (*Alnus serrulata*) (Peet et al., 2013). Our restoration approach will include establishing pockets of this community in the appropriate hydric soils along the east shores of Kingman and enhancing existing patches on the east side of Heritage.

Canopy Trees - None	Understory Trees (222 stems/acre):	Shrubs (888 stems/acre):
N/A	<i>Salix nigra</i> – 20%	<i>Alnus serrulata</i> – 20% <i>Cornus amomum</i> – 10% <i>Cephalanthus occidentalis</i> – 10% <i>Rosa palustris</i> – 10% <i>Sambucus canadensis</i> – 10% <i>Aronia arbutifolia</i> – 10% <i>Amorpha fruticose</i> – 10%
Plugs:	Seed:	
N/A	<i>Cornus amomum</i> <i>Rosa palustris</i> <i>Cephalanthus occidentalis</i> <i>Hibiscus moscheutos</i> <i>Leersia oryzoides</i> <i>Persicaria sagittata</i>	<i>Carex crinita</i> <i>Peltandra virginica</i> <i>Lycopus virginicus</i> <i>Juncus effusus</i> <i>Carex lurida</i> <i>Asclepias incarnata</i> <i>Lobelia cardinalis</i> <i>Symphyotrichum novi-belgii</i>

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