

VASCULAR PLANT SURVEY  
OF  
ADKINS ARBORETUM  
CAROLINE COUNTY, MARYLAND

1998, 1999

JANET EBERT AND JACK HOLT

394 SMITH BRIDGE ROAD  
CHADDS FORD, PA 19317

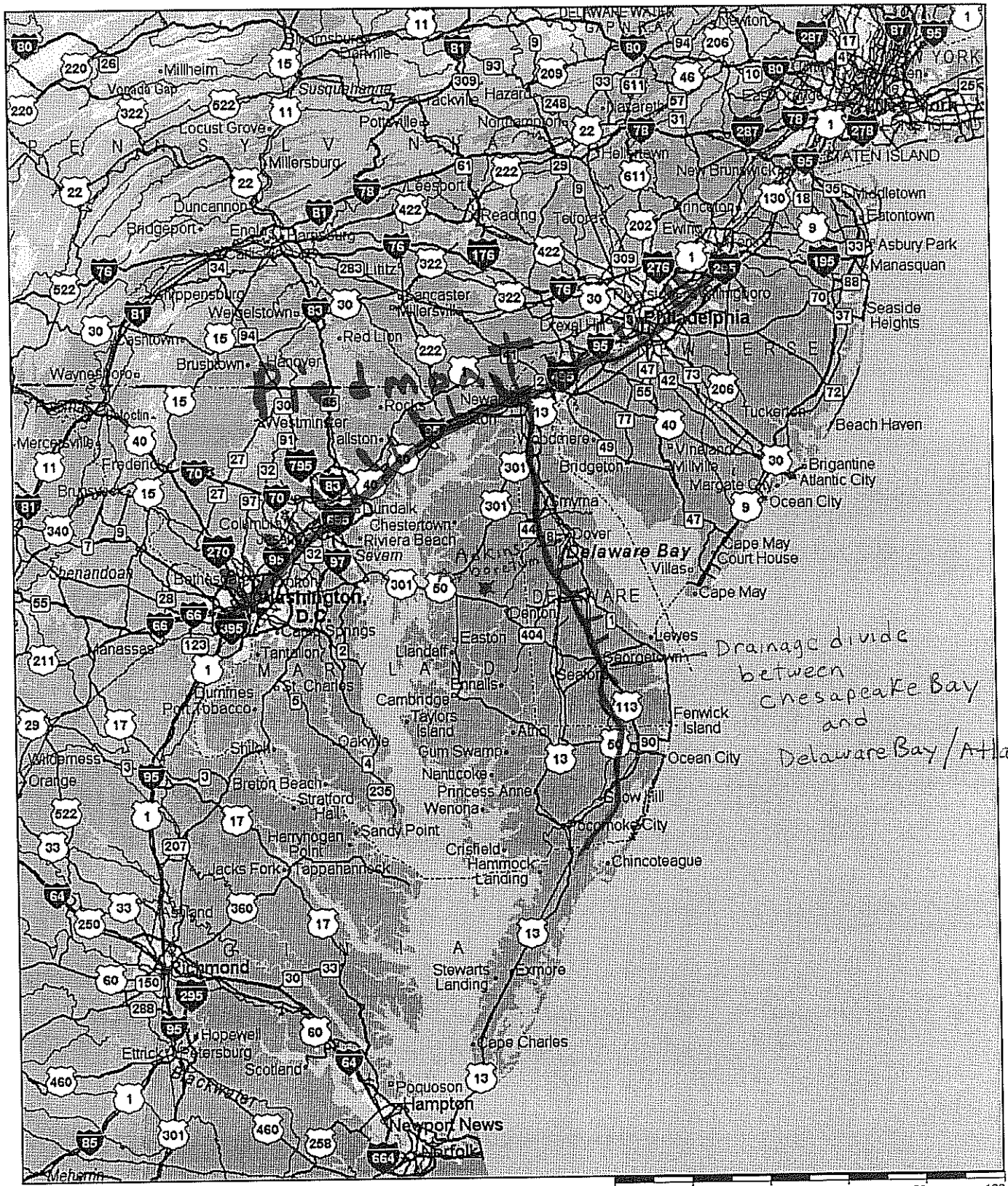
### The Setting

Adkins Arboretum, consisting of approximately 400 acres, is located along the eastern edge of the Tuckahoe River, on the western border of Caroline County, west of the center of the Delmarva Peninsula. It has a moderate climate, with about 45 inches of rain per year. The average temperature in July is in the mid 70's, in January about 35 degrees, and it has a 210 day growing season.

Several first order streams along with the larger Piney Branch drain or cross the Arboretum and flow into the Tuckahoe. The Tuckahoe because tidal near Hillsboro, less than 1.5 miles from the southern end of the Arboretum, then enters the Choptank River a further 9 miles south, which eventually drains into the Chesapeake Bay.

The Arboretum is surrounded on three sides by Tuckahoe State Park. To the east, across Eveland Road, the land is privately owned and under cultivation or light residential use. Built-up areas on the site include a paved driveway and parking lot, a nature center next to an artificial pond, all in the center of the Arboretum, and a nursery/propagation area, towards the southern end of the property, and a network of trails which are connected to the Tuckahoe State park trail system.

Floristically, the Tuckahoe drainage is part of the mid-Atlantic coastal plain, but it has a number of distinctive features. Some species reach the northern edge of their range in the mid-Delmarva, and are almost never seen farther north. A few species are in the Chesapeake Bay or Delaware Bay drainage, but not in both. Woodland species more typical of the Piedmont are occasionally and unpredictably found in rich woods pockets. Even the nearby Choptank drainage, with a slightly different pattern of geology and soils, does not share the same exact same species mix as the Tuckahoe.

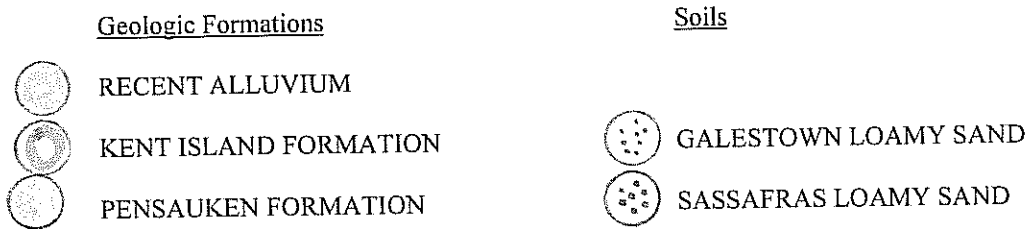
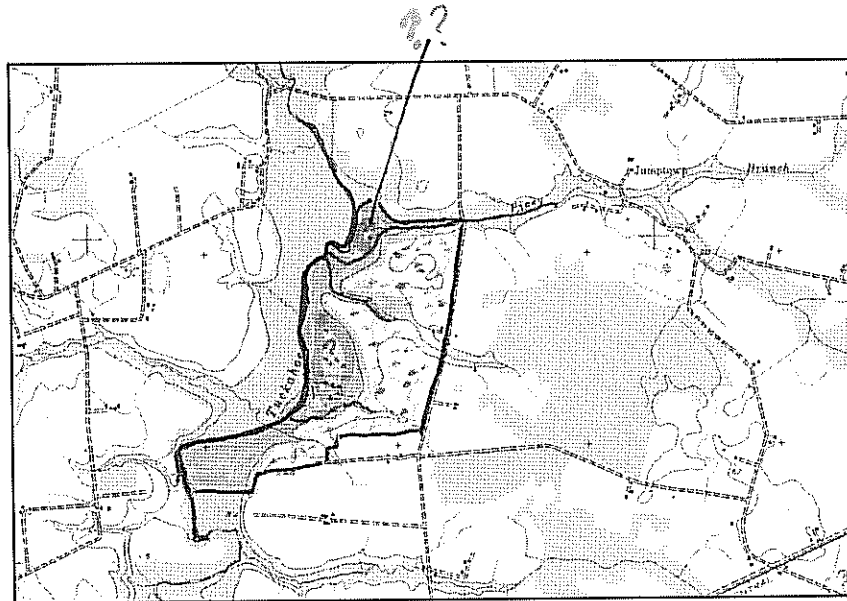


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Geology

The upland portion of Adkins Arboretum, and all of Caroline County between the Tuckahoe and Choptank Rivers, consists of the Pennsauken Formation, which is of late Miocene age. It consists of sands and gravels deposited by rivers. Within the corridor of the Tuckahoe are several deposits of the younger Kent Island Formation, which was formed by rivers reworking the Pennsauken Formation during the Pleistocene Age, only about 30,000 years ago. The soils follow the geologic formations, with Sassafras loamy sand on the uplands and Galestown loamy sands on the Kent Island formation. The Sassafras soils are usually dry and well-drained, as are the Galestown soils, but the latter are coarser and even faster-draining than the former, with sometimes a moisture-retaining subsoil. The Kent Island/Galestown geologic/soil 'islands' within the floodplain significantly increase the diversity of habitats on the Arboretum grounds.



### History – Changes in Land Usage

Since 1937, which is the date of the earliest available aerial photograph, and probably long before, the level uplands between Eveland Road and the Tuckahoe River were under cultivation. The 1958 soil maps base photos showed three houses on what is now the Arboretum. In the 1960's the state purchased land along both sides of the Tuckahoe River in order to create Tuckahoe State Park, including the ground where the Arboretum now is. The houses were demolished during the 1970's, but most of the land was not taken out of cultivation until the late 1970's. The Welcome Center, pond, and trail network were constructed and developed in the early 1980's. Probably in the late 1960's or early 1970's, a loblolly pine plantation was planted at the south end. Soon afterwards a plan to make Adkins a true arboretum with native trees from all of Maryland was begun, but soon abandoned. Afterwards some management of the old cropland was attempted, including planting perennial grasses, and more recently burning, the last in 1996 and 1997. During the summer of 1999, some of the loblolly pine plantation was logged.

All of these activities and changes have left obvious marks on the land, and can be fairly well documented. Older, earlier traces are harder to decipher. Faint traces of old roads lead onto the active floodplain, and stop. Old trash piles here and there on the property are now covered with humus. Earlier uses of the mature forest, including logging or grazing, are unknown.

### Methods

Field work for the vascular plant survey was performed between April 1998 and August 1999. During the 1998 growing season a general survey of the entire property was performed, during which a plant list was developed and general plant communities were decided upon. Most of the 1999 field work was spent on performing releves, or sample plots, in different plant communities and habitats to gain a more exact idea of the important species, and how they were distributed across different communities.








### Description of Releves

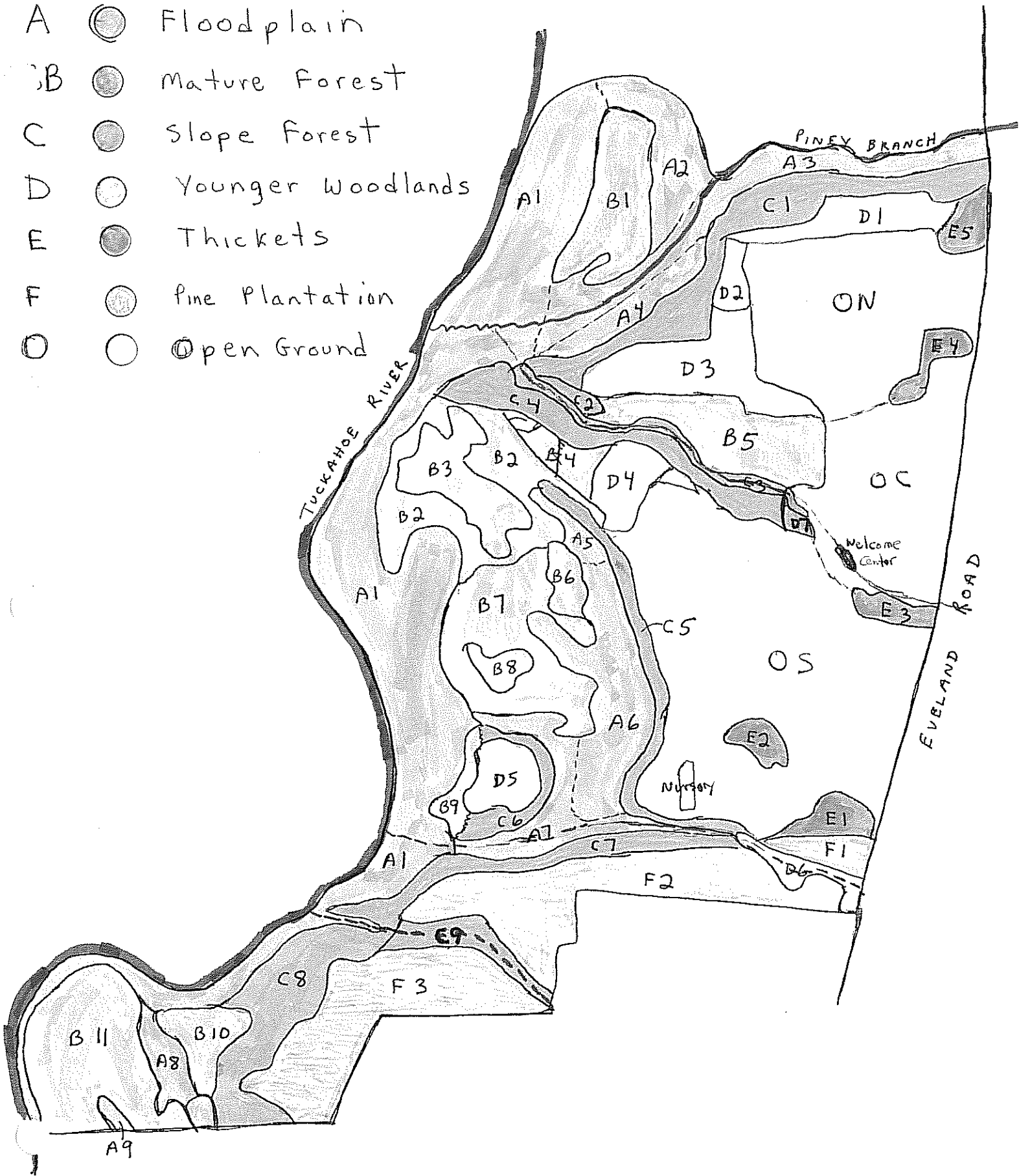
Releves were conducted by marking of a set area and then estimating percent cover of each species in a certain level or stratum. The area marked was 25x 25 meters for wooded plots, 10x10 for scrub-shrub plots, and 5x5 for herbaceous or low vine-dominated plots. The dimensions of some plots had to be adjusted to keep within a certain habitat, but the area enclosed was kept close to a standard square plot. The strata used were: Emergent-above the main canopy, canopy, sub-canopy-5 meters to canopy, tall shrub-1 to 5 m., short shrub-less than one m., vine, herb, and non-vascular plant. The cover categories were: R=1 or 2 plants (herbs, very small shrubs), +=Occasional, 1=Less than 5% cover, 2-=5 to 12% cover, 2+=13 to 25% cover, 3=26 to 50% cover, 4=51 to 75% cover, and 5=Over 75% cover.

For Reference: OLD Forest Stand Designations



# MAJOR HABITATS

- A  Floodplain
- B  Mature Forest
- C  Slope Forest
- D  Younger Woodlands
- E  Thickets
- F  Pine Plantation
- O  Open Ground



## PLANT COMMUNITIES AND HABITATS

An excellent job of mapping forest stands and types was done by the Arboretum staff prior to the plant survey, and that mapping and labeling system has been used as a guide and a base for the botanical survey itself. However, the classification system on which the labels were based in some instances attempted to force some stands into forest alliances that did not fit very well to local conditions. The revised classification system listed here is based on a combination of age, dominant species, and slope. The habitats have been divided into six broad categories: Swamp and floodplain forest, mature level to gently sloping well-drained forest, slope forest, younger woodlands, thickets, pine plantation, and open ground. Descriptions of these types and their subcategories follow.

The outstanding feature of the plant habitats at Adkins Arboretum is the area along the Tuckahoe that is large enough and relatively undisturbed enough to show the ongoing interplay between the underlying geology and the river, and how the plants react to and reflect this interaction.

### **FLOODPLAIN FOREST (A series communities)**

These habitats include the active floodplains of the Tuckahoe and the Piney Branch, as well as the older, less disturbed areas of the back floodplain.

#### **Active Floodplain, including Piney Branch (A1 and A3 Habitats)**

Canopy Trees: Green Ash (*Fraxinus pensylvanica*), Red Maple (*Acer rubrum*). Locally Oaks – Overcup Oak (*Quercus lyrata*), Basket Oak (*Q. michauxii*), and Pin Oak (*Q. palustris*).

Understory: Red Maple, Slippery Elm (*Ulmus rubra*). Locally on drier edges Ironwood (*Carpinus caroliniana*).

Vines & Lianas: Poison Ivy (*Toxicodendron radicans*), Round-leaved Greenbrier (*Smilax rotundifolia*).

Shrubs, Saplings: Green Ash, Red Maple, Winterberry (*Ilex verticillata*). Locally Black-haw (*Viburnum prunifolium*), Privet holly (*Ilex decidua*), Virginia-willow (*Itea virginica*).

Herbs: Lizard's-tail (*Saururus cernuus*), False nettle (*Boehmeria cylindrica*), Clearweed (*Pilea pumila*), Virginia Dayflower (*Commelina virginica*), Water-horehound (*Lycopus rubellus*), Calico Aster (*Aster lateriflorus*), various grasses including Wood Reed-grass (*Cinna arundinacea*), Fowl Manna-grass (*Glyceria striata*), White Grass (*Leersia virginica*), and Rough-stemmed Bluegrass (*Poa trivialis*); Orange Jewelweed (*Impatiens capensis*), and Knotweeds (*Polygonum* spp.). Locally Lowland Loosestrife (*Lysimachia hybrida*), Late bluegrass (*Poa autumnalis*).

**A1 – Active Tuckahoe Floodplain Forest.** Releve A1.2 has species typical of large areas of the interior of the A1 community, with Green Ash, Red Maple, and Overcup Oak forming the canopy and most of the understory, growing over a blanket of Lizard's-tail with some Poison ivy, Clearweed, and Virginia Dayflower. Standing water may persist into the summer, and the substrate is mostly fairly firm. Differences in light and hydrology produce a number of different micro-habitats. By late summer the bank of the Tuckahoe is covered with Early water-starwort, Water Purslane, Mud Plantain, with some Navelwort. More showy flowering plants such as Cardinal-flower, Swamp Mallow, and Climbing Boneset stand out over the knotweeds, Bur-reed, and Arrow Arum that are common there on the water's edge. Occasionally the banks of the Tuckahoe have a drier berm with River Birch and Canby's Cockspur Hawthorn as common trees, with grapes scrambling over the woody vegetation. The inner edge of the floodplain is also different from the interior with better-drained scour zones, especially where it is narrow (See Releve A1.1), where asters are often common. There are also permanently wet seepy zones where Golden Saxifrage, Water Hemlock, Small Green Orchis, Skunk Cabbage, and Elderberry are common.

**A3 – Active Piney Branch Floodplain.** This smaller floodplain forest has younger trees growing in it than the Tuckahoe floodplain, mostly ash and maple, at least in the upper portions. It has a relatively larger sandy scour zone within it, where more grasses, especially Rough-Stemmed Bluegrass, Wood Reed-grass, and Fowl Manna-grass the dominants.

### Back Floodplain Mixed and skunk-cabbage-dominated (A2, A3, A4, A6, A7 Habitats)

- Canopy Trees: Green Ash, Red Maple, Sweet-gum (*Liquidambar styraciflua*). Locally Tulip-tree (*Liriodendron tulipifera*), Black Gum (*Nyssa sylvatica*).
- Understory: Red Maple, Ironwood, Sweet-gum, Green Ash, American Holly (*Ilex opaca*).
- Vines: Poison Ivy, Round-leaved Greenbrier, Virginia Creeper (*Parthenocissus quinquefolia*), Trumpet Creeper (*Campsis radicans*). Locally Dodder (*Cuscuta gronovii*), and Japanese Honeysuckle (*Lonicera japonica*), the latter in disturbed areas.
- Shrubs: Green Ash, Spicebush (*Lindera benzoin*), Black-haw, Pawpaw (*Asimina triloba*), (Incl. sapling & Flowering Dogwood, Slippery Elm, Red Maple, Southern Arrowwood *Viburnum* (seedling trees) (*Viburnum dentatum*), Winterberry. Locally Northern Arrowwood *Viburnum* (*Viburnum recognitum*), Common Alder (*Alnus serrulata*), Sweet-bay Magnolia (*Magnolia virginica*), Fetterbush (*Leucothoe racemosa*), High-bush Blueberry (*Vaccinium corymbosum*), Sweet Pepperbush (*Clethra alnifolia*), Elderberry (*Sambucus canadensis*), in seeps; Stiff Dogwood (*Cornus stricta*) (A2, A7), Buttonbush (*Cephalanthus occidentalis*) (A2).
- Herbs: Skunk Cabbage (*Symplocarpus foetidus*), (mostly A7 & side seeps), Lizard's-tail, Orange Jewelweed, Clearweed, Jack-in-the-Pulpit (*Arisaema triphyllum*), Spring Beauty (*Claytonia virginica*), Common Blue Violet (*Viola sororia*), Honewort (*Cryptotaenia canadensis*), Enchanter's-nightshade (*Circaea lutetiana*), various sedges (*Carex* spp.), various ferns, including Sensitive (*Onoclea sensibilis*), Lady- (*Athyrium felix-femina*), Wood- (*Dryopteris* spp.), and Rattlesnake fern (*Botrychium virginianum*). Locally Mayapple (*Podophyllum peltatum*), Wood Anemone (*Anemone quinquefolia*), Reed-Canary Grass (*Phalaris arundinacea*); Cinnamon Fern (*Osmunda cinnamomea*), Water Hemlock (*Cicuta maculata*), Golden Saxifrage (*Chrysosplenium americanum*), Small Green Orchis (*Habenaria clavellata*), and Spring Cress (*Cardamine bulbosa*), in seeps; Log Fern (*Dryopteris celsa*), mostly A7, some A2); Reed-Canary Grass (*Phalaris arundinacea*) (A2), Netted chain fern (*Woodwardia areolata*).

**A2 and A7 – Back Floodplain Forest.** Both of these communities are dominated by Skunk Cabbage, especially visible in the spring, but parts of A2 have little vegetation below the Green Ash and Red Maple except Skunk Cabbage, Spicebush, Spring Beauty, and Spring Cress. Along the edge of A2 is a small patch of open and diverse marsh near the north end, and a larger area of dead trees, grasses, and sedges, possibly an old beaver pond (See Releve A2.1) southward. In contrast, relevés in A7 (A7.1, A7.2) by far have the highest species-strata counts of any relevés in the floodplain or swamp forest communities.

**A4 and A6 – Back Mixed Floodplain Forest.** These communities have drier areas within them where more typical rich or mesic forest species such as Tulip-tree, Mayapple, and Wood Anemone grow, mixed with wetter spots where Lizard's-tail, sedges, and some grasses are dominant.

### Back Floodplain Sloughs and Depressions (A5, A8, A9 Habitats)

- Canopy Trees: Green Ash, Sweet-gum various Oaks - Overcup, Basket, Willow (*Quercus phellos*), and Pin (*Q. palustris*).
- Understory: Red Maple, Sweet-gum, Green Ash, Oak species listed above.
- Vines: Round-leaved Greenbrier.
- Shrubs: Green Ash, Red Maple, Southern Arrowwood *Viburnum* (*Viburnum dentatum*), (Incl. sapling & Winterberry, Northern Arrowwood *Viburnum* (*Viburnum recognitum*), Fetterbush (seedling trees) (*Leucothoe racemosa*), High-bush blueberry (*Vaccinium corymbosum*), Sweet Pepperbush (*Clethra alnifolia*), Buttonbush (*Cephalanthus occidentalis*), Virginia-willow. Locally Swamp White Azalea (*Rhododendron viscosum*).
- Herbs: Mostly absent. Commoner species include Sedges (*Carex* spp.), Lizard's-tail, Beggar's-ticks (*Bidens frondosa*), Netted chain fern (*Woodwardia areolata*), Knotweeds (*Polygonum* spp.).

**A5, A8, A9 – Back Floodplain Sloughs.** These communities have fairly well-defined vernal ponds, more interesting shrubs within them, such as High-bush Blueberry, Buttonbush, Fetterbush, and more oaks such as Overcup Oak and Willow Oak in the canopy (see Releve A8.1).

#### **Mature Forest Habitats (B Series communities)**

- Canopy Trees: Oaks – White (*Quercus alba*), Southern Red (*Q. falcata*), black (*Q. velutina*); Mockernut Hickory (*Carya tomentosa*), Virginia Pine (*Pinus virginiana*). Locally, American Beech (*Fagus grandifolia*), Tulip-tree, Loblolly Pine (*Pinus taeda*).
- Understory: Mockernut hickory, American Beech, Sassafras (*Sassafras albidum*), Oaks (White and Southern Red), Sweet-gum. Locally, Flowering Dogwood (*Cornus florida*), American Holly.
- Common Vines: Greenbriers – Round-leaved greenbrier, Glaucous Greenbrier (*Smilax glauca*), Virginia Creeper, Summer Grape (*Vitis aestivalis*). Locally, Japanese Honeysuckle in disturbed areas.
- Shrub Layer: (Incl. sapling & seedling trees) Lowbush blueberry (*Vaccinium pallidum*), American Beech, Pawpaw, Sassafras, Sweet-gum), Persimmon, Running Strawberry bush (*Euonymus americanus*), Red Maple, Oak seedlings, Black Cherry (*Prunus serotina*), Deerberry (*Vaccinium stamineum*), Ironwood, Mockernut Hickory, Flowering Dogwood, Black Gum, American Holly, Tree Shadbush (*Amelanchier arborea*). Locally, Black Huckleberry (*Gaylussacia baccata*), Mountain Laurel (*Kalmia latifolia*), Pinxter Flower (*Rhododendron periclymenoides*), and Downy Arrowwood (*Viburnum rafinesquianum*).
- Herb Layer: Usually sparse, especially in xeric habitats under pines and pine-oak mixtures. Where present, commoner species include False Solomon's-seal (*Smilacina racemosa*), Partridgeberry (*Mitchella repens*), Solomon's-Seal (*Polygonatum biflorum*), and Spotted Wintergreen (*Chimaphila maculata*), along with various Sedges (*Carex* spp.), and Grasses (chiefly Panic-grasses (*Panicum* spp.) and Wild oat-grass (*Danthonia spicata*)).

In general, these habitats occur on relatively level, well-drained ground above the floodplain and slope forests along the Tuckahoe. The main canopy species in these communities are various Oaks, American Beech, Virginia Pine with some Loblolly Pine and Hickories. The central core of the mature forest is split into different units, but there is a broader pattern, reflecting the interaction of the Tuckahoe and Kent Island geologic formations. The general pattern west-to-east is of a bluff at the edge of the active floodplain, a slight rise to a drier spine, usually covered with pines (**habitats B3, B8**), then a gentle grade to the inner floodplain (old stream channel?). The Galestown 'rise' (**D5, C6**), originally included in the B-series communities but also discussed later, have younger trees in them. Because of the greater elevation (less erosion?), dry soils and possibly human intervention succession has been slower, allowing it to stay open longer than the northern and central part. The lobes of floodplain into B2 and B7 are probably the remnants of old stream channels. Relevés performed included the often richer area near the Tuckahoe bluff (B2.1), the pine-ericaceous shrub community (B3.1), a beech-dominated transition area (B2.2), and a conspicuous but species-poor mountain-laurel dominated thicket and open woods (B7.1).

Below are some general notes on particular B-series forest communities not discussed above.

**B1 Community.** The B1 forest community gradually slopes in all directions to merge imperceptibly with the floodplain forest. It has some pine in it, and a richer herb flora, especially near the northern end, than the other mature forest habitats.

**B10 and B11 Communities** are not separated from the upland by any wide wetland. They are mostly dry beech (Releve B11.1), and beech-oak-pine (B11.2) dominated woodlands, often with a sparse shrub layer and scattered pines. The main trail along the floodplain has some weedy areas, but a number of rare and unusual species grow here including Anglepod, Carolina Petunia, Elephant's-Foot, and a huge population of Downy Arrowwood.

**B5.** The only upland mature forest not surrounded by wetland habitats, it has more oaks, with little beech or pine, than the wetland-surrounded mature forest (See Relevés B5.1, B5.2), but shares many of the same shrubs and herbs (Ironwood, Low-bush Blueberry, False-Solomon's-Seal) with them. Of especial interest is the presence of Maple-leaved Viburnum (*Viburnum acerifolium*) which is frequent here and is completely absent in the rest of Adkins Arboretum. The floristic differences between this forest community and the others may be because the underlying soil is be Sassafras loamy sand rather than Galestown loamy sand that the other upland forests appear to be growing on.

#### Slope Forest Community (C-series habitats)

Canopy: Tulip-tree, Oaks, especially White, American Beech, Black Gum, Mockernut Hickory.  
 Understory: American Beech, Flowering Dogwood, Ironwood, Tulip-tree, Sassafras, American Holly, various Oaks.  
 Vines: Round-leaved greenbrier, Poison Ivy, Virginia Creeper, Japanese Honeysuckle, Glaucous Greenbrier.  
 Shrubs: Pawpaw, American Holly, Pinxter-Flower, Running Strawberry Bush, American Beech, (Incl. sapling & seedling trees) Ironwood, Spicebush, Flowering Dogwood, Sassafras, Sweet Pepperbush (lower edges), various Oaks, Hercules'-Club (*Aralia spinosa*).  
 Herbs: Mayapple, Spring Beauty, False Solomon's-Seal, Enchanter's-nightshade, Jack-in-the-Pulpit, Christmas Fern (*Polystichum acrostichoides*), Partridgeberry, Solomon's-seal, Indian Cucumber (*Medeola virginica*), White wild licorice (*Galium circaezans*), Wood Anemone, various sedges (*Carex* spp.), various ferns, including Lady-, Wood (*Dryopteris intermedia*), and Rattlesnake-fern. Locally Wild Sarsaparilla (*Aralia nudicaulis*), Canada Mayflower (*Maianthemum canadense*), Shining Clubmoss (*Lycopodium lucidulum*), Bloodroot (*Sanguinaria canadensis*).

The slope forest is on the edge of the Pennsauken formation, where it has been cut into by the Tuckahoe. Tulip-tree is the distinctive signature tree of this community, but American Beech and oaks are also common. Ironwood and Flowering Dogwood are common understory trees along with saplings of the canopy trees. Pawpaw and American holly are frequent shrubs, both of which often form dense stands that discourage herbaceous vegetation. Japanese Honeysuckle is often conspicuous, more often on upper slopes. The slope forest often has a dense herbaceous layer, including Bloodroot, False-Solomon's-Seal, Mayapple, Spring Beauty, Jack-in-the-Pulpit, and various ferns. The best rich woods pocket is in C6 on the Galestown 'island'. This community is somewhat different than the other C-series sections, with a gentler slope over the underlying Kent Island Formation, but is much more similar to the slope forest than the mature forest.

(C1.1 only releve performed in this series.)

#### Younger Woodlands (D-series habitats)

Canopy: Virginia Pine, Loblolly Pine, Sweet-gum, Oaks (chiefly Southern Red)  
 Understory: Virginia Pine, Sweet-gum, Red Maple, occasionally Red Cedar and various Oaks. Locally River Birch (*Betula nigra*).  
 Vines: Trumpet-creeper (*Campsis radicans*), especially, Virginia creeper, Japanese Honeysuckle.  
 Shrubs: Sweet-gum, Oaks, chiefly Southern Red, Sassafras, Ironwood, Mockernut hickory, Black Cherry, numerous species of lesser importance.  
 Herbs: Sparsely represented. Commonest species include Spotted Wintergreen, sedges, chiefly *Carex swanii*, Grasses, chiefly Panic-grasses (*Panicum* spp.), the fern Ebony Spleenwort (*Asplenium platyneuron*), Cleavers (*Galium aparine*).

These are successional stands of trees and thickets, mostly dating from the end of farming in the late 1970's. These are dominated by Sweet-gum (D1, D2, D4, D7), or Virginia Pine (D3, D5). Again the Galestown D5 island is slightly different from the other younger woodland habitats as a more gradual encroachment of woody species is apparently occurring here than in the other younger woodlands; it is definitely not an even-aged stand of trees as than those woodlands. Colonization by pines rather than

Sweet-gum probably indicates sandier, poorer soil, so despite the more open canopy in the pine stands they have fewer species and fewer individuals in them than the deciduous stands (See releves D2.1, D3.1, D5.1)

#### **Thickets (E-series habitats)**

##### Canopy and

- Understory: Virginia Pine, Sweet-gum, Tulip-tree, Black Cherry, Sassafras, Red Maple, various Oak (*Quercus* spp.), River Birch.
- Vines: Poison Ivy, Trumpet Creeper, Virginia Creeper, Japanese Honeysuckle, Grapes (*Vitis* spp.).
- Shrubs: Pine seedlings, Sweet-gum, Black Cherry, Slippery Elm, Red Maple, various Oaks, various brambles (*Rubus* spp.), Shining Sumac (*Rhus copallina*).
- Herbs: Goldenrods (*Solidago* spp.), Sedges (*Carex* spp.), various grasses, Cleavers, Common Chickweed (*Stellaria media*), Hairy Bittercress (*Cardamine hirsuta*), White Avens (*Geum canadense*).

These are often isolated patches of young trees and shrubs in an earlier state of succession than the younger woodlands. E4 and E5 are old house sites, and the other units were all cropland or open ground until farming ceased. They are dominated by bird-spread tree, shrub, and vine species such as Sassafras, Black Cherry, Shining Sumac, Poison Ivy, grapes, and Japanese Honeysuckle, with a number of weedy herb and grass species similar to that found in the open grounds. (See releve E5.1)

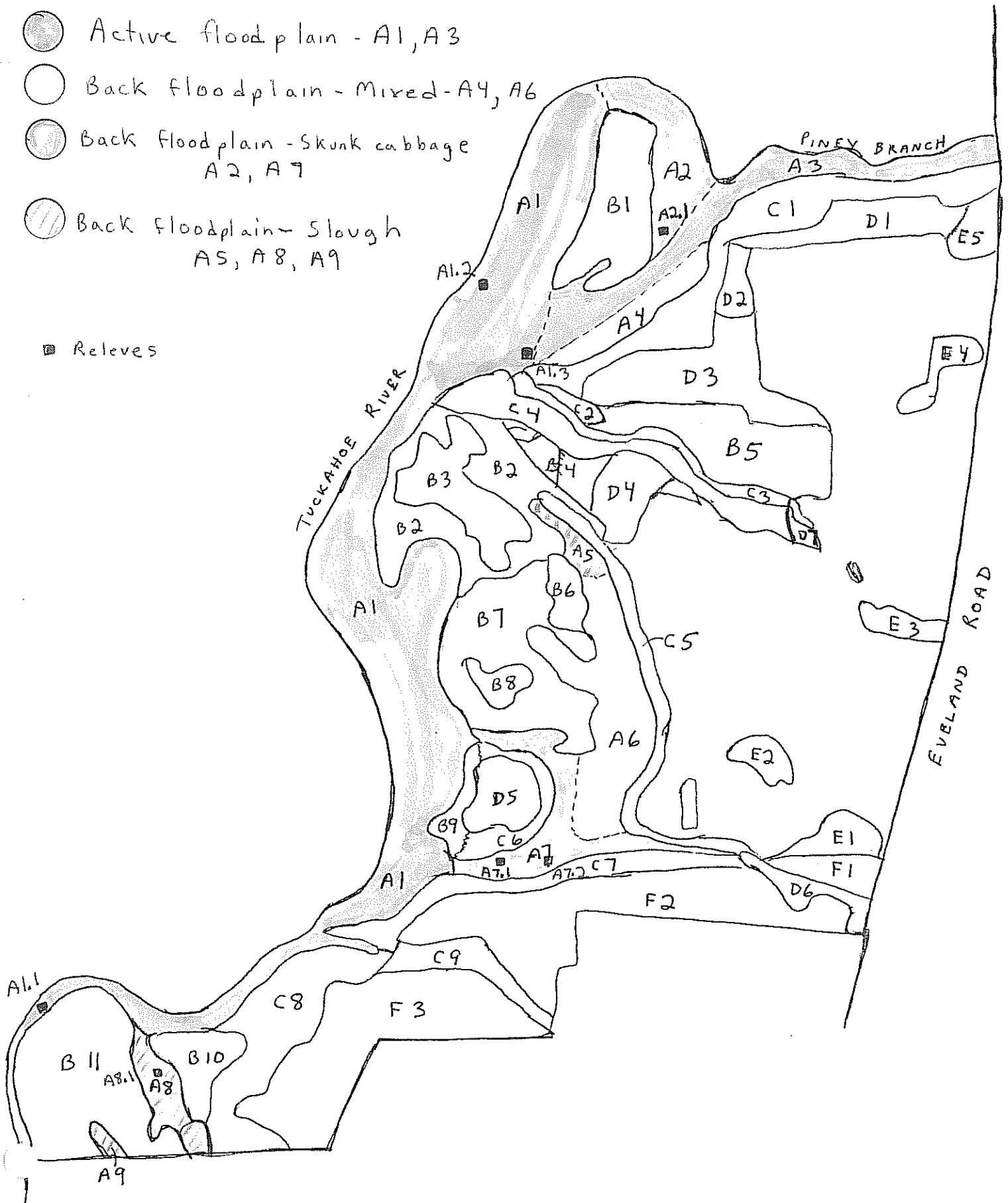
#### **Pine Plantations (F-series habitats)**

These woodlands are dominated by planted loblolly pines, but with some seedlings of Sweet-gum, Red Maple, and Red Cedar. Vines, especially Trumpet-creeper and Poison Ivy, are common in the more level areas. Some of the more exposed and open slopes have more interesting herbs growing on them such as Flowering Spurge (*Euphorbia corollata*), Wild Ipecac (*Euphorbia ipecachuanae*), and Blunt-leaved milkweed (*Asclepias amplexicaule*). Much of the pine plantation was logged in 1999, and the only releve (F2.1) was performed after logging. This logged area presents a good opportunity to monitor the regeneration of an artificial woodland.

# A Floodplain Habitats

- Active flood plain - A1, A3
- Back floodplain - Mixed - A4, A6
- Back floodplain - Skunk cabbage A2, A7
- ▨ Back floodplain - Slough A5, A8, A9

■ Releves

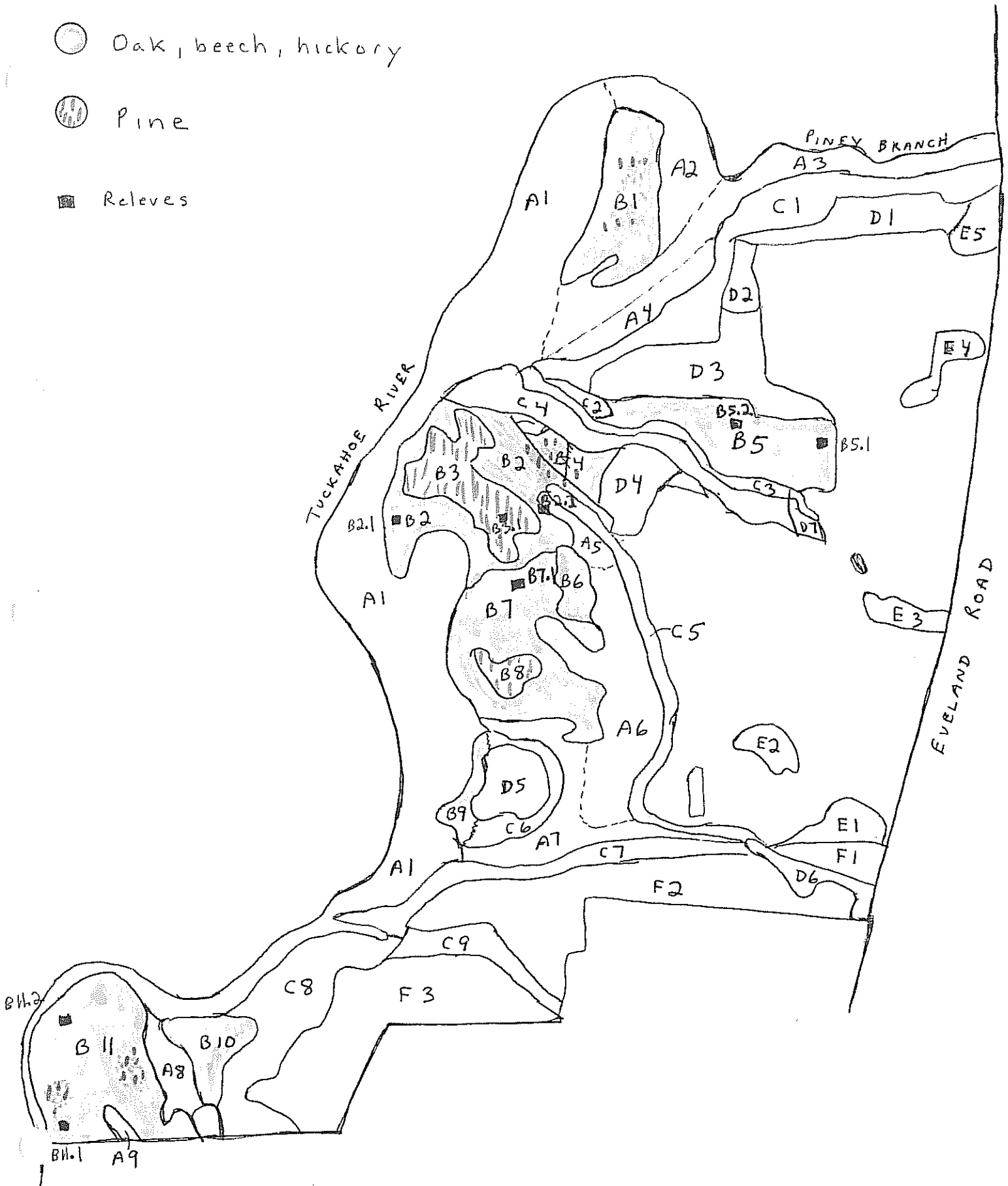


# B Mature Forest Habitats






○ Oak, beech, hickory



▨ Pine

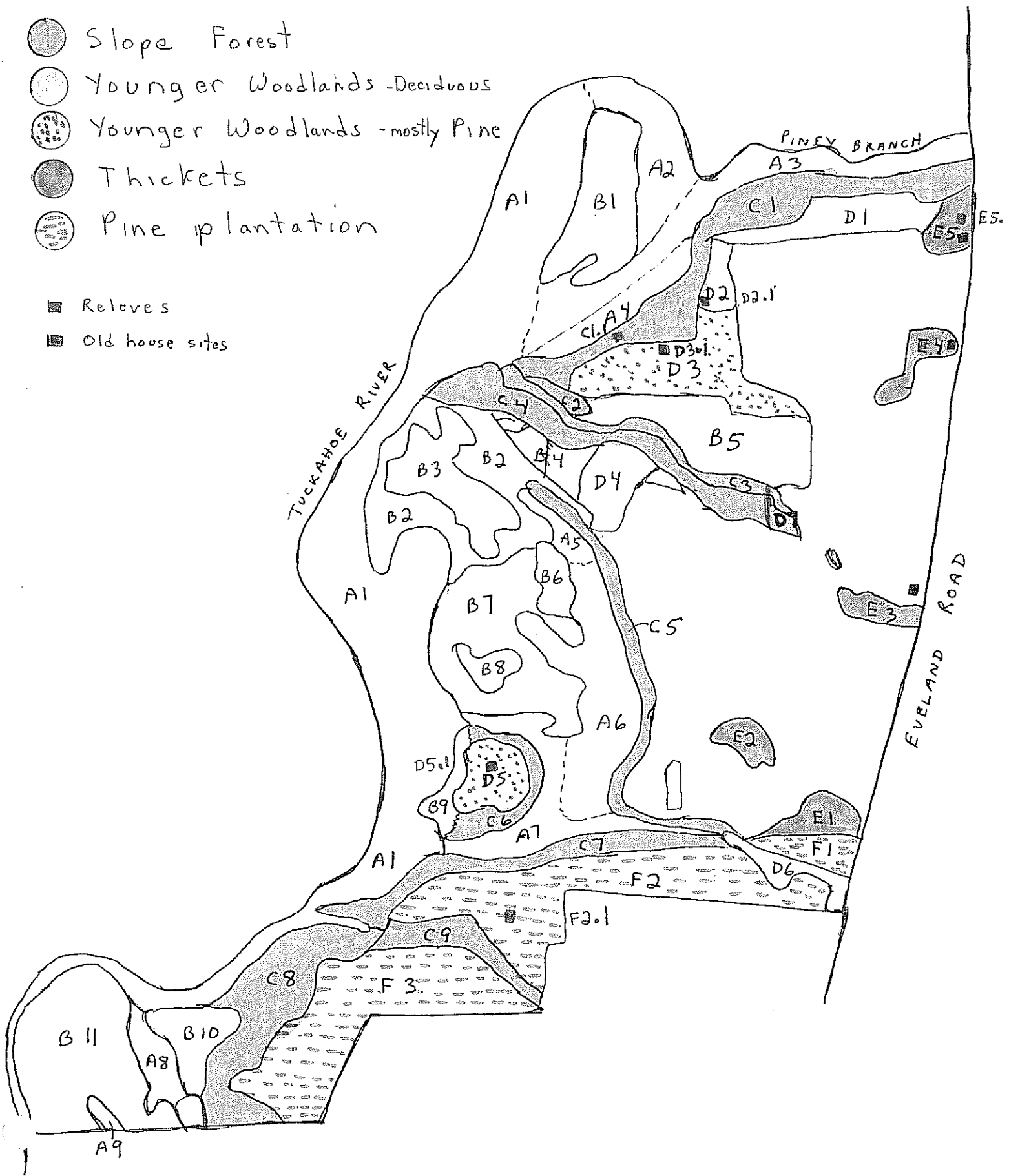
■ Relevés



# Slope and Upland Habitats - C, D, E, F

-  Slope Forest
-  Younger Woodlands - Deciduous
-  Younger Woodlands - mostly Pine
-  Thickets
-  Pine plantation

-  Relics
-  Old house sites



## OPEN GROUND (FIELDS, MEADOWS, FORMER AGRICULTURAL AND WASTE GROUND)

The areas originally mapped as the north, central, and south meadows have very little actual 'meadow' species in them, if meadow is defined as an assemblage of largely native herbs and grasses. The 'meadows' in Adkins Arboretum are far from homogenous, with large-scale differences between them and even within them. The large-scale differences are mostly due to past management, including former agricultural practices, burning and seeding. Smaller-scale differences are often due to human disturbances (dumps, lawns, areas around the nursery) and also to natural differences in soil and drainage that are not as obvious.

Twenty-one 5x5 meter sample plots were surveyed on the open ground, along with one 10x10 meter plot, all in late summer. The plots are concentrated in a few areas, in the North and South meadows mostly on old cropland away from wooded edges, so many more plots should be surveyed in order to better understand the dynamics of the open areas. However, the plots do give a glimpse of the succession process the open areas are undergoing.

In the twenty-two plots, a total of 117 species of plants are recorded. However, only 12 species are seen in 10 or more plots, and eight of these have at least 25% cover in at least one plot. Of the twelve, five are annual herbs, five perennial herbs, one is an annual grass and one a perennial grass. The only shrubs and woody vines seen in the sample plots are blackberry, dewberry, shining sumac, and trumpet-creeper, and they either tended to be completely absent from or were a dominant species a plot, especially trumpet creeper in the north meadow. With one exception, tree seedlings are very scarce, with only the occasional sassafras and black cherry poking through the herbs and vines. The exception is in the 10x10 meter plot, which is a grove of shining sumac over two meters tall, where seedlings of a number of trees, including four different oaks, were observed.

The average number of species per plot (including the 10x10 plot) is nineteen, with a high of 31 species and a low of twelve species. The plots with the greatest number of native and interesting species are those on drier mounds, possibly old spoil banks from when the pond was being dug.

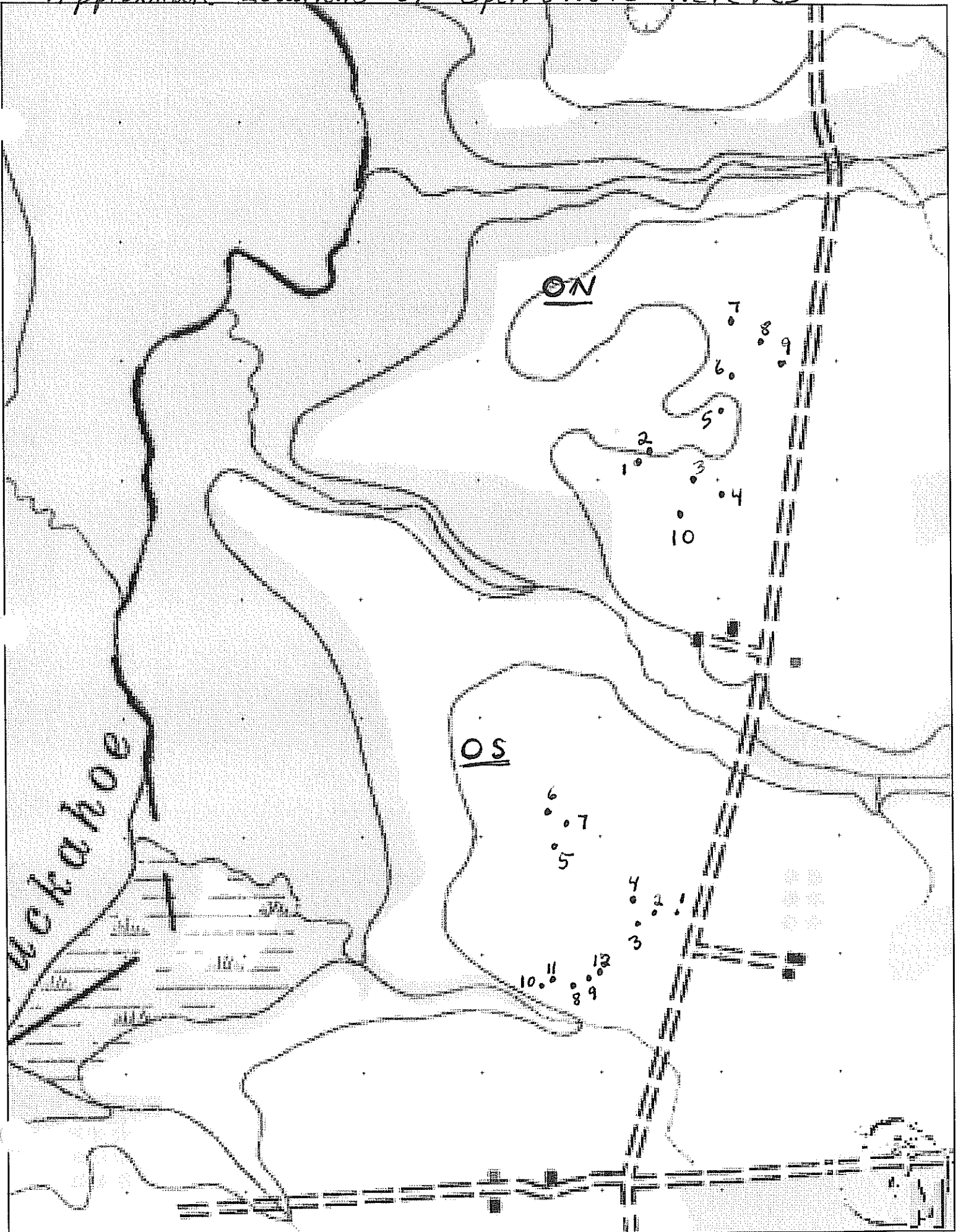
The overall impression of the old cropland is that the same species of plants are always present in them, but in varying proportions. Trees have not yet begun to colonize the middle parts of the meadows, except where groves or clumps of shining sumac are present.

Most of the area we call Open Ground North (the North Meadow) is old cropland that looks relatively homogenous from the air, but is very patchy in dominant plant species on the ground (See Releve #'s ON05 through ON09). No relevés were performed near the woodland edges, where more woody vegetation is starting to move in. The southern end is a gentle rise which has scattered trees and is drier with more grassy patches (See Releve #'s ON01 through ON04 and ON10).

The area we call Open Ground Central (the Central Meadow) consists of lawn, disturbed areas still dominated by annual plants, patches of goldenrod growing in the low areas above the pond, grassy areas dominated by fescue, and a dry meadow edge below the pond. No relevés were performed in this area.

The area we call Open Ground South (the South Meadow) has a large fescue-dominated area southeast of the Welcome Center; a more recently disturbed area around the nursery (Releve #'s #OS08, OS10, OS11). The rest of Open Ground South is a patchy complex habitat dominated by goldenrods, various brambles, grasses, shining sumac, and young trees. Some of the denser groves of trees have been separated out as thickets (E1, E2), but these divisions are somewhat arbitrary, and there is still open ground within these thickets. The drier rise along Eveland Road (see Releve OS01), has some native 'dry meadow' species including the interesting grass Fall witchgrass (*Leptoloma cognatum*) and the sedge *Carex alata*. Two relevés were performed in shining sumac thickets; OS05 in a burned-over short shrub thicket, and OS09 in a taller sapling and shrub thicket. Both of these plots have a relatively large number of species of plants, and the sapling thicket is a nursery for woodland trees including four oak species. An old dump of vegetative debris stands out as a mass of pokeweed (Releve plot #OS11).

Approximate Locations of Open Ground Relevés



**GPS LOCATIONS OF OPEN GROUND RELEVÉ PLOTS (+ or - 20 Meters)**

<b>PLOT #</b>	<b>LATITUDE</b>		<b>LONGITUDE</b>	
<b>NORTH MEADOW</b>				
ON01	38 Degrees	57.334 Minutes	75 Degrees	56.034 Minutes
ON02	38 Degrees	57.341 Minutes	75 Degrees	56.029 Minutes
ON03	38 Degrees	57.327 Minutes	75 Degrees	56.019 Minutes
ON04	38 Degrees	57.314 Minutes	75 Degrees	55.994 Minutes
ON05	38 Degrees	57.354 Minutes	75 Degrees	55.989 Minutes
ON06	38 Degrees	57.382 Minutes	75 Degrees	55.963 Minutes
ON07	38 Degrees	57.421 Minutes	75 Degrees	55.957 Minutes
ON08	38 Degrees	57.415 Minutes	75 Degrees	55.940 Minutes
ON09	38 Degrees	57.406 Minutes	75 Degrees	55.916 Minutes
<b>SOUTH MEADOW</b>				
OS01	38 Degrees	56.970 Minutes	75 Degrees	55.974 Minutes
OS02	38 Degrees	56.970 Minutes	75 Degrees	56.007 Minutes
OS03	38 Degrees	56.960 Minutes	75 Degrees	56.011 Minutes
OS04	38 Degrees	56.978 Minutes	75 Degrees	56.027 Minutes
OS05	38 Degrees	57.031 Minutes	75 Degrees	56.132 Minutes
OS06	38 Degrees	57.061 Minutes	75 Degrees	56.148 Minutes
OS07	38 Degrees	57.055 Minutes	75 Degrees	56.133 Minutes
OS08	38 Degrees	56.930 Minutes	75 Degrees	56.119 Minutes
OS09	38 Degrees	56.934 Minutes	75 Degrees	56.108 Minutes
OS10	38 Degrees	56.919 Minutes	75 Degrees	56.133 Minutes
OS11	38 Degrees	56.924 Minutes	75 Degrees	56.135 Minutes
OS12	38 Degrees	56.937 Minutes	75 Degrees	56.102 Minutes

## HABITATS FOUND IN CAROLINE COUNTY NOT CURRENTLY PRESENT IN ADKINS ARBORETUM

Despite the relatively small size of the property, most of the major or significant plant habitats found in Caroline County are found at Adkins Arboretum, including some less common plant communities. The major habitat types not present on arboretum property are mostly wetlands. Some of these 'missing' habitats could possibly be 'created' artificially if so desired. These are as follows:

**Acidic swamp community.** Typically dominated by hardwood canopy species such as Black Gum, Sweet-gum, or oaks. Greenbrier is a common vine, the shrub layer consists almost entirely of ericaceous shrubs, and the herbaceous layer is sparse or almost entirely absent, usually consisting of various ferns, sedges, and grasses rather than forbs, and sphagnum is common. Areas that approach this type of habitat are the upper part of the 'slough' demarcated as A5 in the central portion of the property and the A8 'slough' along the southern border.

**Acidic bog and meadow community.** Underlain by mats of sphagnum and peat and more or less open to the sky, this community is dominated usually by various ericaceous (heath-family) shrubs, grasses, and sedges, often including a number of showy and unusual wildflowers. No trace of this habitat occurs on Adkins Arboretum property, although some plants often found in these communities such as Downy Lobelia (*Lobelia puberula*) grow in the ditch on the far side of Eveland Road southeast of the Welcome Center.

**Coastal Plain Pond.** There are frequent examples of the Delmarva version of the coastal vernal pond present in Caroline County, but most tend to be east of Adkins Arboretum. Typical coastal plain ponds are dominated by shrubs, herbs, and graminoids that tolerate large changes in water level over the course of a season. The habitat most closely approximating a Delmarva 'bay' are the floodplain slough habitats designated as A8 and A9.

**Mature dry tallgrass meadow.** Open ground dominated by medium to tall-grass native grasses and herbs such as Indian Grass, broom-sedges, little Bluestem grass, Goldenrods, and Thoroughworts. Some of the soil mounds along Eveland Road and the entrance road have a few dry meadow species of this habitat growing on them such as Broom-sedge (*Andropogon virginicus*) and Fall Witchgrass (*Leptoloma*), but other than a small colony of the state rarity Rough Dropseed (*Sporobolus clandestinus*) no dry-habitat tall grass species grow at Adkins, including surprisingly the usually relatively common and showy Indian Grass (*Sorghastrum nutans*).

## RARE, ENDANGERED, AND UNUSUAL PLANTS OF ADKINS ARBORETUM (SEE ATTACHED TABLES)

A total of nineteen current Maryland state rarities have been observed in 1998 and 1999 in Adkins Arboretum. Of these, fourteen are found in wetland communities, three in woodland habitats, and only two in the Open Ground habitats. There is one tree (Black Ash (*Fraxinus nigra*)), one shrub (Privet Holly (*Ilex decidua*)), five graminoid species (grasses or sedges), three herbaceous vines, two pteridophytes, and seven herbs.

Delaware rankings of unusual species are included here. Since Delaware is mostly on the Delmarva, its list more accurately reflects the status of a species on the Delmarva than the Maryland list, which also includes other physiographic provinces. 22 species of plants found at Adkins are on the Delaware list but not the Maryland list, including Downy Arrowwood (*Viburnum rafinesquianum*), which is a Historical species (SH) in Delaware. Privet holly (*Ilex decidua*) and Branched Bur-reed (*Sparganium androcladum*) have never been reported from Delaware. Virginia Dayflower (*Commelina virginica*) is common along the Choptank and Tuckahoe, but does not occur as far upstream as Delaware in that drainage.

A special community of the Delmarva that is well represented at Adkins Arboretum is the rich woods pocket, best represented on the property in the C6 habitat. Found here are a number of herbaceous species of plants that are generally common on the piedmont, but occur on the coastal plain only in special circumstances of soil and geology. Rich woods species at Adkins include Showy Orchis (*Galearis spectabilis*), Pointed-leaved Tick-trefoil (*Desmodium glutinosum*), Horse-balm (*Collinsonia canadensis*), and Interrupted fern (*Osmunda claytoniana*).

### STATE RANK

S1 = Extremely rare, 5 or fewer known sites in state

S2 = Very rare, 6 to 20 known sites in state

S3 = Rare to uncommon, 21 to 50 (or 100 in MD) known sites in state

SH = Historically known from state but not seen in last (15) years

## RARE AND UNUSUAL SPECIES OF ADKINS ARBORETUM, CAROLINE COUNTY, MD

SCIENTIFIC NAME	COMMON NAME	HABIT	MD RANK	DE RANK	ABUNDANCE	MAJOR HABITAT
<i>Aquilegia canadensis</i>	American columbine	Herbs		S2	2	B
<i>Arabis canadensis</i>	Sicklepod	Herbs		S1	1	B
<i>Arabis lyrata</i>	Lyre-leaved rock cress	Herbs		S1	1	B
<i>Asclepias variegata</i>	White milkweed	Herbs		S1	1	B
<i>Baccharis halimifolia</i>	Groundsel-tree	Shrubs			1	A
<i>Carex leavenworthii</i>	Leavenworth's sedge	Graminoid	SU		1	Open
<i>Carex striatula</i>	Lined sedge	Graminoid		S1	1	B
<i>Carex styloflexa</i>	Bent sedge	Graminoid	S3		3	A
<i>Carex typhina</i>	Cattail sedge	Graminoid	S3	S2	1	A (Riparian)
<i>Chimaphila umbellata</i>	Common wintergreen	Herbs		S2	1	B
<i>Clitoria mariana</i>	Butterfly-pea	Herbs		S2	2	C & D
<i>Commelina virginica</i>	Virginia dayflower	Herbs		S1	4	A (Riparian)
<i>Cornus stricta</i>	Stiff dogwood	Shrubs		S2	3	A
<i>Crataegus crus-galli</i> v <i>canbyi</i>	Canby's cockspur hawthorn	Trees			2	A (Riparian)
<i>Cyperus hystricinus</i>	An umbrella-sedge	Graminoid		S2	1	D
<i>Desmodium glutinosum</i>	Pointed-leaved tick-trefoil	Herbs		S2	1	C
<i>Desmodium laevigatum</i>	Smooth tick-trefoil	Herbs	S3S4		1	D
<i>Dryopteris celsa</i>	Log fern	Ferns	S3.1	S2	3	A
<i>Dryopteris cristata</i>	Crested fern	Ferns			1	A
<i>Elephantopus carolinianus</i>	Elephant's-foot	Herbs			1	B
<i>Eupatorium album</i>	White thoroughwort	Herbs		S2	1	B
<i>Fraxinus nigra</i>	Black ash	Trees	S2?	S2	2	A
<i>Galearis spectabilis</i>	Showy orchis	Herbs			1	C
<i>Geum virginianum</i>	Pale avens	Herbs		S1	1	B
<i>Habenaria flava</i> v. <i>herbiola</i>	Pale green orchid	Herbs	S1	S1	1	A (Riparian)
<i>Houstonia purpurea</i>	Purple bluets	Herbs		S1	2	B
<i>Ilex decidua</i>	Privet holly	Shrubs	S1	X	4	A (Riparian)
<i>Isoetes engelmannii</i>	Engelmann's quillwort	Ferns	S3	S3	2	A (Riparian)
<i>Lespedeza stuevei</i>	Downy bush-clover	Herbs	S3	S1	1	D
<i>Lysimachia hybrida</i>	Lowland loosestrife	Herbs	S1	S2	3	A (Riparian)
<i>Matalea caroliniensis</i>	Anglepod	Vines, herb.	S1	S2	1	B
<i>Ophioglossum vulgatum</i> v. <i>pyc</i>	Southeastern adder's-tongue	Ferns		S2	1	A & C
<i>Osmorhiza claytonii</i>	Sweet cicely	Herbs		S2	1	C
<i>Osmunda claytoniana</i>	Interrupted fern	Ferns			1	C
<i>Parietaria pensylvanica</i>	Pellitory	Herbs		?	1	D

SCIENTIFIC NAME	COMMON NAME	HABIT	MD RANK	DE RANK	ABUNDANCE	MAJOR HABITAT
<i>Passiflora lutea</i>	Yellow passion-flower	Vines, herb.		S2	2	B & C
<i>Pilea fontana</i>	Coolweed	Herbs	S3		1	A
<i>Piptochaetium avenaceum</i>	Black-seeded needlegrass	Graminoid		S1	1	B
<i>Poa cuspidata</i>	Short-leaved bluegrass	Graminoid		S2	1	B
<i>Pycnanthemum incanum</i>	Downy mountain-mint	Herbs		S1	1	B
<i>Quercus lyrata</i>	Overcup oak	Trees			5	A (Riparian)
<i>Ranunculus pusillus</i>	Low spearwort	Herbs	SU		2	A (Riparian)
<i>Ruellia caroliniensis</i>	Carolina petunia	Herbs		S1	1	B
<i>Smilax pseudochina</i>	False china-root	Vines, herb.	S1	S2	1	A
<i>Sparganium androcladum</i>	Branched bur-reed	Herbs	S3	SU	3	A (Riparian)
<i>Sphenopholis pensylvanica</i>	Swamp oats	Graminoid	S1S2	S1.1	1	A
<i>Sporobolus clandestinus</i>	Rough dropseed	Graminoid	S1	S1	1	Open
<i>Trachelospermum difforme</i>	Climbing dogbane	Vines, herb.	S1	S1.1	1	A
<i>Viburnum rafinesquianum</i>	Downy arrow-wood	Shrubs		SH	3	B
<i>Viola pedata</i>	Birds-foot violet	Herbs		S1	1	B

**SOME BRIEF DESCRIPTIVE NOTES ABOUT AND LOCATIONS FOR THE RARE AND UNUSUAL  
PLANTS OF ADKINS ARBORETUM**

*Aquilegia canadensis* (American columbine) [Delaware Rank – S2] **MAP #'s #1, #2, #3**

This beautiful spring-blooming wildflower was found in three places; first, growing with the first Lyre-leaved rock-cress colony east of the main trail at B7; as a few plants growing above the B9 Galestown 'rich woods pocket' where Showy orchis grows; and as a dense showy colony along the banks of an erosion gully below an old dump east of the main trail where it passes along the edge of the F2 Loblolly pine plantation.

*Arabis canadensis* (Sicklepod) [Delaware Rank – S1] **MAP #4**

The first known coastal Delmarva peninsula population for this mustard, usually considered to be a Piedmont 'obligate' species, was found early in 1998 growing along the edge of the main trail in 'pit-and-mound' wooded terrain in the southwest portion of the B2 block not far from a side ravine. Several plants were seen at this same site in 1999.

*Arabis lyrata* (Lyre-leaved rock cress) [Delaware Rank – S1] **MAP #'s #1, #4**

Two populations of this diminutive but showy mustard, very uncommon on the Delmarva, occur on Arboretum property. The first occurs along and east of the main trail extending into the woods on a faint woodland track south of its junction with the Broken Beech trail in the B7 block; the other grows with the Sicklepod population mentioned above.

*Asclepias variegata* (White Milkweed) [Delaware Rank – S1] **MAP #4**

A blooming plant as well as a few sterile stems of this showy but uncommon wildflower were seen in 1999 along the Broken Beech Trail in the B2 block as well as farther back in the woods of B2.

*Baccharis halimifolia* (Groundsel-tree)

A common plant of salt marshes and tidal areas, but only spottily found elsewhere, a few shrubs of this plant are growing in the 'Beaver Meadow' in open marshland on the sound edge of the B1 'island'. This was the only salt-tolerant species found in the Arboretum.

*Carex leavenworthii* (Leavenworth's Sedge) – Maryland (S1) Status (Endangered) **MAP #5**

This sedge grows in grassy lawn edges and fields near the welcome center. It is probably much more common in the state than its current state status indicates.

*Carex striatula* (Lined Sedge) [Delaware Rank – S1] **MAP #6**

A few plants of this sedge were discovered in 1999 during a releve survey in the B5 woodland block. Somewhat difficult to identify, it probably grows elsewhere in Adkins Arboretum as well.

*Carex styloflexa* (Bent Sedge) – Maryland (S3) Status (Rare)

This sedge is frequent in the A6 swampy woods west of the Nursery.

*Carex typhina* (Cattail Sedge) – Maryland (S3) Status (Rare) [Delaware Rank – S2]

A few immature plants of this noticeable sedge were seen in 1998 on the edge of the floodplain forest at the base of the southern slope of the inside of the 'hook' in the B7 forest community. Mature plants were seen the next year elsewhere in the floodplain swamp.

*Chimaphila umbellata* (Common Wintergreen) [Delaware Rank – S2] **MAP #7**

Several colonies of this attractive evergreen shiny-leaved relative of the blueberries grow in the oak-pine woods along and east of the main trail in the center of the woodland portion of the Arboretum in both the B2 and B3 blocks. A few plants grew right along the main trail as well.

*Clitoria mariana* (Butterfly-pea) [Delaware Rank – S2] **MAP #8, #9**

This sprawling large-flowered very attractive legume grows on a small sandy dry open slope and wooded edge just west of the pond near the visitor's center and on the upland edges of the northern section of the C6 portion of the 'Galestown' island.

*Commelina virginica* (Virginia day-flower) [Delaware Rank – S1]

This species is locally common on the outer floodplain of the Tuckahoe

*Cornus stricta* (Stiff Dogwood) [Delaware Rank – S2]

A large healthy population of this wetland-obligate shrub was found growing in the emergent marsh and swamp in A2 surrounding the 'B1' 'island' forest community in the northwest corner of the property, and grows occasionally elsewhere as well in swampy woods.

*Crataegus crus-galli* v. *canbyi* (Canby's Cockspur Hawthorn)

This hawthorn, often lumped into the megaspecies *C. crus-galli*, was usually found growing on the outer floodplain. This variety (or species?) may be endemic to the Chesapeake Bay drainage.

*Cyperus hystricinus* (an Umbrella-sedge) [Delaware Rank – S2] **MAP #10**

Scattered plants of this tall unusual-looking sedge were seen growing in or near the edge of the B5 section of dry woods near the visitor's center and on the edges of the driest sections of the D5 'Galestown' scrub pine community.

*Desmodium glutinosum* (Pointed-leaved Tick-trefoil) [Delaware Rank – S2] **MAP #2**

A relatively small but quite vigorous colony of this large showy member of the bean family is growing in the rich woods pocket of C6 on the south side of the Galestown 'Island'. Nearby associates included Showy Orchis, American Columbine, and Southern Adder's-tongue fern.

*Desmodium laevigatum* (Smooth tick-trefoil) – Maryland (S3S4) Status (Rare) **MAP #11**

A few plants of this large showy legume grow along dry trailsides in the B4 woodland block in successional woodland habitat.

*Dryopteris celsa* (Log Fern) – Maryland (S3.1) Status (Endangered) [Delaware Rank – S2]

An enormous population (numbering in the thousands) of this large and attractive fern exists in the A1 swamp forest community surrounding the Galestown B9 and C6 forest communities. It was also found growing in lesser numbers on the seepy edges of both the C5 slope forest community west of the Nursery, the C7 slope forest immediately south of the Galestown formation and in and near the emergent marsh community surrounding the B1 forest community at the north end of the Arboretum.

*Dryopteris cristata* (Crested Fern)

A few relatively small plants of this striking swamp forest and seep-loving fern grew at the base of the C1 slope opposite the B1 'island' community and along the southern edge of the C6 section of the 'Galestown' island community.

*Elephantopus carolinianus* (Elephant's foot) **MAP #12**

This member of the Aster Family, with distinctive clusters of pale blue flowers, grew several places in the Arboretum, most noticeably along the trail at the south end of the property in the B10 section.

*Eupatorium album* (White Thoroughwort) [Delaware Rank – S2] **MAP #13**

A few feeble plants of this member of the Aster family were seen in both 1998 and 1999 along the main trail near the southern end of the Arboretum in thin open flat woods, near Downy Arrowwood and Anglepod.

- Fraxinus nigra* (Black ash) – Maryland (S2?) Status (Threatened) [Delaware Rank – S2]  
A fair number of healthy individuals of this uncommon understory tree, including some quite large specimens, grew in the A1 swamp forest surrounding the B1 ‘Island’ at the north end of the property, especially near or in the emergent marsh community in the extreme northeast.
- Galearis spectabilis* (Showy orchis) **MAP #2**  
A small colony of this attractive orchid grows in a ‘Rich Woods pocket’ in C6 south of the D5 scrub pine, with Adder’s-tongue fern, Pointed-leaved tick-trefoil, and other rich woods species of plants.
- Geum virginianum* (Pale Avens) [Delaware Rank – S1] **MAP #9**  
Several plants of this elusive species grow on the edge of the dry woods north of the welcome center’s pond in B5.
- Habenaria flava* v. *herbiola* (Pale Green Orchid) – Maryland (S1) Status (Endangered) [DE Rank – S1] **MAP #23**  
A small but densely-growing and flowering population of this unusual orchid was found in 1998 on a slightly-drier ‘hummock’ in the south-central portion of the floodplain forest, near a colony of Golden club. A couple of flowering plants were also observed north of this stand on the southwest edge of the B9 forest community, and possibly one plant in the A1 swamp forest community south of the D5 and C6 Galestown soil plant communities. These plants were not relocated in 1999.
- Houstonia purpurea* (Purple bluets) [Delaware Rank—S1] **MAP #'s #4, #14**  
Several populations of this small but showy herb were found growing in and along dry rich woods in the B5 block along the main trail.
- Ilex decidua* (Privet Holly) – Maryland (S1) Status (Endangered)  
This shrub, first found in Maryland here at Adkins Arboretum by Wilbur Rittenhouse, the first director of the Arboretum, is common in the floodplain forest of the Tuckahoe River, and is also occasionally found even on the upland forest slopes and in the Loblolly pine plantations.
- Isoetes engelmannii* (Engelmann’s Quillwort) – Maryland (S3) Status (Rare)  
Scattered plants of this semi-aquatic fern ally were observed growing in small sloughs near the Tuckahoe River and on the banks of the Tuckahoe River itself.
- Lespedeza stuevei* (Hoary Bush-clover) – Maryland (S3) Status (Rare) [Delaware Rank – S1] **MAP #15**  
Several plants of this wand-like legume grew along and near the main trail in the D3 section of dry thickets and woods west of the North Meadow.
- Lysimachia hybrida* (Lowland Loosestrife) – Maryland (S1) Status (Endangered) [Delaware Rank – S2]  
This relative of the more common fringed loosestrife was a frequent species in the floodplain forest along the Tuckahoe, often forming ribbon populations in slightly more well-drained soil above where Lizard’s-tail (*Saururus cernuus*) was growing in swampier ground.
- Matalea caroliniensis* (Anglepod) – Maryland (S1) Status (Endangered) [Delaware Rank – S2] **MAP #13**  
A dozen or so plants of this twining deciduous vine grew along or near the main trail in the southwestern part of the property in the B11 forest community. Associates included Carolina petunia (*Ruellia caroliniensis*) and Downy Arrowwood (*Viburnum rafinesquianum*).
- Ophioglossum vulgatum* v. *pycnostichum* (Southeastern Adder’s-tongue Fern) [Delaware Rank – S2] **MAP #2**  
This small but interesting fleshy-leaved fern-ally is growing in the rich woodland community on the northern portion of the C6 Galestown community. One or two other scattered plants were found elsewhere on the property.
- Osmorhiza claytonii* (Sweet Cicely) [Delaware Rank S2]  
This rich woods species was seen in the slope forests of the C8 block near the southern end of the Arboretum.

*Osmunda claytoniana* (Interrupted Fern) **MAP #2**

This large fern, uncommon this far south in the Delmarva, grew near the Adder's-tongue fern and the Showy orchis on the northern edge of the 'Galestown' island community.

*Parietaria pensylvanica* (Pellitory) **MAP #16**

This diminutive relative of the nettles was seen in 1998 in the D5 block of the Galestown 'Island' growing in extremely dry sandy soil under and near scrub pines. It was not relocated in 1999 at this site, but as an annual species probably seedbanks. Extremely unusual in the coastal plain, but does like disturbed sites.

*Passiflora lutea* (Yellow Passion-flower) [Delaware Rank S2] **MAP #'s #3, #17**

This herbaceous twining vine, which seems to prefer edges and partial shade, grew on the gentle slope along the mail trail in the B9 block and also along the trail in the C7 block. It appears to be on the increase in the Arboretum.

*Pilea fontana* (Coolweed) – Maryland (S3) Status (Rare)

This elusive and undercollected relative of common Clearweed was found in seeps on the inner edge of the floodplain forest of the Tuckahoe River.

*Piptochaetium avenaceum* (Black-seeded needlegrass) [Delaware Rank – S1] **MAP #18**

A small colony of this uncommon grass, notable for its extremely long and graceful fruiting awns, occurred along the Broken beech Trail just north of the broken beech in B2.

*Poa cuspidata* (Short-leaved Bluegrass) [Delaware Rank – S2] **MAP #18**

This woodland bluegrass, more normally associated with Piedmont forests, grows along the Broken Beech trail north of the broken beech in B2, under a dense colony of Running strawberry-bush.

*Pycnanthemum incanum* (Downy Mountain-mint) [Delaware Rank – S1] **MAP #4**

This more northerly-occurring mint grows near and with the colony of Sicklepod in the B2 block.

*Ranunculus pusillus* (Low Spearwort) – Maryland (SU) Status (Undetermined)

This low spring-flowering weedy-looking buttercup was occasional in wet miry soil in the floodplain of the Tuckahoe River, especially in the 'braided stream' channels where the Piney Branch drains into the Tuckahoe. It is unknown what the effect of Hurricane Floyd had on this population.

*Ruellia caroliniensis* (Carolina Petunia) [Delaware Rank – S1] **MAP #13**

A small colony of this delicate southern wildflower was found in 1998 growing along the trail at the south end of the Arboretum along the trail in the B11 section. They were not seen in 1999.

*Smilax pseudochina* (False China-root) – Maryland (S1) Status (Endangered) [Delaware Rank – S2] **MAP #19**

A few plants of this herbaceous vine, one of which had fruited and was collected as a voucher specimen, were seen in the swampy woods east of the Galestown 'Island' in A6.

*Sparganium androcladum* (Branched Bur-reed) – Maryland (3) Status (Rare) [Delaware Rank – SU]

This difficult-to-identify aquatic herb occurred along the banks of the Tuckahoe River.

*Sphenopholis pensylvanica* (Swamp Oats) Maryland (S1S2) Status (Endangered) [Delaware Rank–S1] **MAP #20**

Several small colonies of this delicate graceful grass were found growing on gravelly or mucky streambanks of and seeps feeding the unnamed brook that flows through the A7 swamp forest.

*Sporobolus clandestinus* (Rough Dropseed) Maryland (S1) Status (Endangered) [Delaware Rank – S1] **MAP #21**

A small but dense colony of this large late-summer grass grew on dry sandy soil at the southern edge of the Open Ground North (North Meadow). The population was unequally bisected by a mown jeep trail.

*Trachelospermum difforme* (Climbing Dogbane) Maryland (S1) Status (Endangered) [Del. Rank S1] **MAP #22**

A number of scattered small non-flowering plants of this semi-woody vine formed a colony growing at the extreme south end of the Arboretum in the A8 slough between the B10 and B11 forest communities. To the east in Tuckahoe State Park a more extensive and flowering population grew along the wet edge of a soybean field.

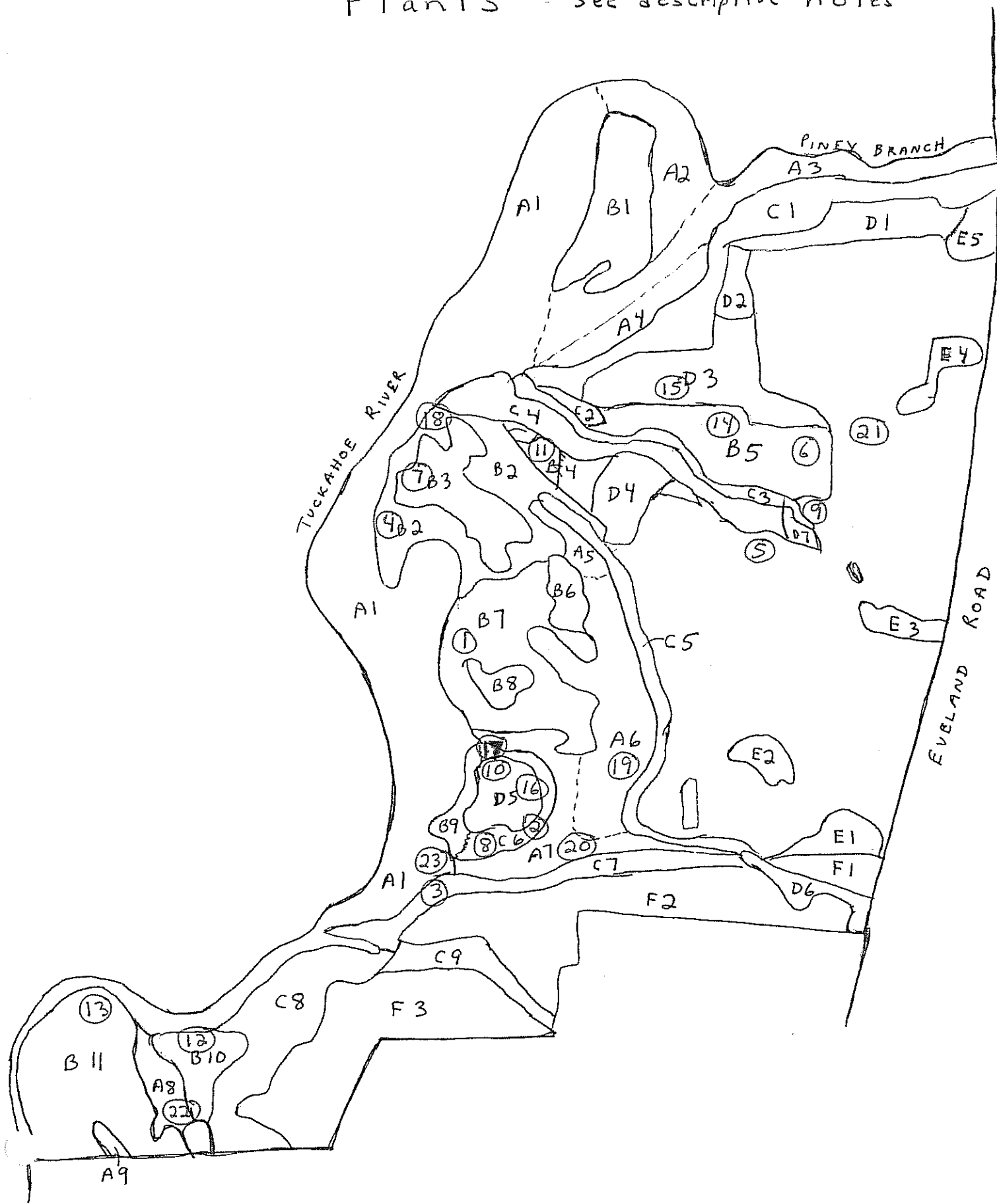
*Viburnum rafinesquianum* (Downy Arrowwood) [Delaware Rank – SH]

A flourishing and extensive colony of this low attractive shrub, not recently reported from the Delmarva, was found growing at the southeastern end of the Arboretum in the B10 and B11 sections on both sides of the main trail and considerably to the east of the trail as well. The colony continues southward into Tuckahoe State Park.

*Viola pedata* (Birds-foot Violet) [Delaware Rank – S1] **MAP #14**

This attractive cut-leaved violet was found growing along the trail near the bridge over the creek draining the nature's center pond – however these plants might have been introduced.

# Locations of Some Rare and Unusual Plants - see descriptive notes



## ALIEN SPECIES

125, or 21.7% of the 577 of the species observed on Adkins Arboretum property are considered alien or non-native to the Delmarva peninsula. This is low considering the diversity of habitats on the property and the relatively high amount of disturbed and recently disturbed land on the property. For comparison, alien species average about 30% of the total species found on properties surveyed in the Piedmont of southeastern Pennsylvania and Delaware. Nearly half of the aliens are ruderal species, concentrated in disturbed areas such as road edges, lawns, and the nursery, and most of these probably will not persist if disturbance ceases. Even in the old crop fields, aliens species are not always dominant, and should decrease in number and frequency as succession takes place.

In wooded areas, alien species are most numerous and common in the young upland woods and upper slopes of the Slope Forest habitat (C-Series). Patches of honeysuckle mark old openings or disturbed areas on the floodplain, but many areas of mature forest are almost entirely free of exotic plants (see Releve Data Explanation). Japanese honeysuckle is probably the most common woody invasive on the property. Multiflora rose and Asiatic bittersweet, both noxious woody aliens far too common elsewhere, are present in Adkins Arboretum but not abundant, while privet and barberry are scarce.

Notable are some species that were NOT observed at the Arboretum. These include Japanese stilt-grass (*Microstegium vimineum*), Garlic Mustard (*Alliaria petiolata*), Autumn Olive (*Elaeagnus umbellata*), Mile-a-Minute (*Polygonum perfoliatum*), Lesser Celadine Buttercup (*Ranunculus ficaria*), Amur and Morrow's honeysuckles (*Lonicera maackii* and *L. morrowii*), Porcelain-berry (*Ampelopsis brevipedunculata*), and Norway Maple (*Acer platanoides*). Some of these invasives, all of which grow so lushly on the Piedmont, seem to be discouraged by the sandy, more acidic soils of the Coastal Plain.

Several alien species that are now only found in small populations, but could become troublesome, probably could still be eliminated without too much effort. These include two colonies of Japanese Knotweed along Eveland Road, which if brush-hogged for the next several years before they set seed will probably succumb. Old-house site and garden-escape species such as English Ivy and Day-lily should be removed, or at least monitored to make certain they don't expand beyond their current stations on the Arboretum.

## ALIEN THREAT AND ABUNDANCE CLASSIFICATION KEY

### THREAT RANKING DESCRIPTION

#### RANK # DESCRIPTION

- 1      **Low threat species.** Plants usually found as a persisting horticultural planting or a rare escape, spreading vegetatively or very slowly from seed.  
  
    **Examples:** Daffodil, cypress spurge
- 2      **Ruderal species.** Plants that may be very common, but almost always in heavily or persistently disturbed sites such as actively cultivated cropland, lawns, roadsides, and similar habitats. These plants usually do not replace existing natives in native habitats.  
  
    **Examples:** Crabgrass, chicory, henbit
- 3      **Moderate threat species.** Plants that are fairly common in less disturbed habitats such as woodlands, thickets, and old fields, but are only occasionally dominant in such habitats.  
  
    **Examples:** Canada bluegrass, Indian strawberry, horse nettle
- 4      **High potential threat species.** These are plants in the process of invading this area, that have demonstrated elsewhere the ability to overwhelm one or several habitats, and probably will become a high impact alien species.  
  
    **Examples:** Ground ivy, Japanese barberry
- 5      **High impact alien species.** These are plants that have successfully invaded all their 'natural' habitats in an area. They are often the dominant or codominant species in these habitats.  
  
    **Examples:** Oriental bittersweet, Japanese honeysuckle, Multiflora rose.

### ABUNDANCE RANKING DESCRIPTION

#### RANK # DESCRIPTION

- 1      Rare. Known from two or less populations.
- 2      Scarce. Several populations (at least (3)) known, but never common even at those sites.
- 3      Infrequent. Plant occasionally encountered.
- 4      Frequent. Plant generally encountered in its preferred habitat.
- 5      Common. Almost always in preferred habitat(s), often dominant.

Combining these two rankings gives a status report for an alien species at Adkins Arboretum. For example, a 2, 5 (Threat=2 and Abundance=5) means that this species is probably a common roadside or cropland weed, while a 5, 3 is a species that is generally a frequent pest, but at this time is not a serious presence.

## ADKINS ARBORETUM ALIEN SPECIES

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>THREAT</u>	<u>ABUNDANCE</u>
<b>Graminoid</b>			
<i>Digitaria ciliaris</i>	Southern crabgrass	2	2
<i>Eleusine indica</i>	Goose-grass	2	2
<i>Eragrostis cilianensis</i>	Stink grass	2	2
<i>Setaria faberi</i>	Giant foxtail grass	2	2
<i>Setaria glauca</i>	Yellow foxtail	2	2
<i>Cynodon dactylon</i>	Bermuda grass	2	3
<i>Digitaria ischaemum</i>	Crabgrass	2	3
<i>Digitaria sanguinalis</i>	Crabgrass	2	3
<i>Poa annua</i>	Annual bluegrass	2	3
<i>Vulpia myuros</i>	Foxtail fescue	2	3
<i>Bromus commutatus/japoni</i>	Hairy chess	2	4
<i>Bromus sterilis</i>	Barren brome	2	4
<i>Bromus tectorum</i>	Hairy chess	2	5
<i>Echinochloa crus-galli</i>	Barnyard grass	3	2
<i>Elytrigia repens</i>	Witch grass	3	2
<i>Phleum pratense</i>	Timothy	3	2
<i>Bromus inermis</i>	Awnless brome-grass	3	3
<i>Poa compressa</i>	Canada bluegrass	3	3
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	3	4
<i>Phragmites australis</i>	Giant reed	5	2
<i>Dactylis glomerata</i>	Orchard grass	5	4
<i>Poa pratensis</i>	Kentucky bluegrass	5	4
<i>Poa trivialis</i>	Rough-stemmed bluegrass	5	4
<i>Festuca pratensis</i>	Meadow fescue	5	5
<b>Herbs</b>			
<i>Euphorbia cyparissias</i>	Cypress spurge	1	1
<i>Lathyrus sylvestris</i>	Perennial pea	1	1
<i>Narcissus pseudonarcissus</i>	Daffodil	1	1
<i>Agrostemma githago</i>	Corn cockle	2	1
<i>Bidens polylepis</i>	Tickseed sunflower	2	1
<i>Cirsium vulgare</i>	Bull thistle	2	1
<i>Lespedeza stipulacea</i>	Korean clover	2	1
<i>Lithospermum arvense</i>	Corn gromwell	2	1
<i>Petrorhagia prolifera</i>	Tunica	2	1
<i>Senecio vulgaris</i>	Common groundsel	2	1
<i>Veronica persica</i>	Bird's-eye speedwell	2	1
<i>Vicia angustifolia</i>	Common vetch	2	1

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>THREAT</u>	<u>ABUNDANCE</u>
Xanthium strumarium	Cocklebur	2	1
Amaranthus hybridus	Green amaranth	2	2
Arabidopsis thaliana	Mouse-ear cress	2	2
Barbarea verna	Spring cress	2	2
Barbarea vulgaris	Wintercress	2	2
Brassica rapa	Mustard	2	2
Cichorium intybus	Chicory	2	2
Dianthus armeria	Deptford pink	2	2
Draba verna	Whitlow-wort	2	2
Holosteum umbellatum	Jagged chickweed	2	2
Hypericum perforatum	Common st. john's-wort	2	2
Hypochaeris radicata	Cat's-ear	2	2
Lactuca serriola	Prickly lettuce	2	2
Lespedeza striata	Japanese clover	2	2
Melilotus alba	White sweet clover	2	2
Mollugo verticillata	Carpetweed	2	2
Polygonum aviculare	Knotweed	2	2
Saponaria officinalis	Soapwort	2	2
Scleranthus annuus	Knawel	2	2
Silene alba	White campion	2	2
Solanum nigrum	Black nightshade	2	2
Verbascum blattaria	Moth-mullein	2	2
Verbascum thapsus	Common mullein	2	2
Veronica arvensis	Corn speedwell	2	2
Viola arvensis	Wild pansy	2	2
Chenopodium album	Lamb's-quarters	2	3
Chondrilla juncea	Skeleton-weed	2	3
Daucus carota	Wild carrot	2	3
Geranium molle	Doves-foot cranesbill	2	3
Lamium amplexicaule	Henbit	2	3
Lamium purpureum	Purple dead-nettle	2	3
Lepidium campestre	Cow-cress	2	3
Plantago lanceolata	English plantain	2	3
Rumex crispus	Curly dock	2	3
Stellaria media	Common chickweed	2	3
Trifolium repens	White clover	2	3
Plantago aristata	Bristly plantain	2	4
Trifolium arvense	Rabbit's-foot clover	2	5
Ornithogalum umbellatum	Star-of-bethlehem	3	1
Rudbeckia hirta	Brown-eyed susan	3	1

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>THREAT</u>	<u>ABUNDANCE</u>
Duchesnea indica	Indian strawberry	3	2
Lespedeza cuneata	Sericea	3	2
Potamogeton crispus	Crimped pondweed	3	2
Potentilla norvegica	Rough cinquefoil	3	2
Potentilla recta	Rough-fruited cinquefoil	3	2
Prunella vulgaris	Heal-all	3	2
Rumex obtusifolius	Broad dock	3	2
Tragopogon dubius	Larger goat's-beard	3	2
Vicia cracca	Cow vetch	3	2
Vicia hirsuta	A vetch	3	2
Achillea millefolium	Yarrow	3	3
Allium vineale	Field garlic	3	3
Cerastium vulgatum	Mouse-eared chickweed	3	3
Chrysanthemum leucanthemum	Ox-eye daisy	3	3
Commelina communis	Asiatic dayflower	3	3
Solanum carolinense	Horse-nettle	3	3
Trifolium campestre	Low hop clover	3	3
Trifolium pratense	Red clover	3	3
Vicia grandiflora	Large-flowered vetch	3	3
Taraxacum officinale	Dandelion	3	4
Vicia lathyrioides	A vetch	3	4
Hemerocallis fulva	Orange daylily	4	1
Glechoma hederacea	Ground ivy	4	2
Myriophyllum aquaticum (br	Parrot's-feather	4	2
Polygonum cuspidatum	Japanese knotweed	4	2
Cirsium arvense	Canada thistle	4	3
Veronica hederifolia	Ivy-leaved speedwell	4	3
Centaurea maculosa	Spotted knapweed	5	3
Cardamine hirsuta	Hairy bittercress	5	4
Polygonum caespitosum	Long-bristled smartweed	5	4
Rumex acetosella	Sheep sorrel	5	5
<b>Shrubs</b>			
Prunus munsoniana	Wild-goose plum	1	1
Berberis thunbergii	Japanese barberry	4	2
Ligustrum vulgare	Common privet	4	2
Rosa multiflora	Multiflora rose	5	3
<b>Trees</b>			
Broussonetia papyrifera	Paper mulberry	1	1
Populus alba	White poplar	1	1

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>THREAT</u>	<u>ABUNDANCE</u>
Prunus persica	Peach	1	1
Malus coronaria cultivars	Crabapple	3	2
Morus alba	White mulberry	3	2
Prunus avium	Sweet cherry	3	3
Ailanthus altissima	Tree-of-heaven	4	2
<b>Vine, herbaceous</b>			
Ipomoea purpurea	Common morning-glory	2	1
Ipomoea hederacea	Ivy-leaved morning-glory	2	5
Polygonum convolvulus	Black bindweed	3	2
<b>Vine, woody</b>			
Hedera helix	English ivy	1	1
Celastrus orbiculatus	Oriental bittersweet	5	4
Lonicera japonica	Japanese honeysuckle	5	5

## RELEVE DATA EXPLANATION

The following data on the releve surveys completed in 1999 are presented in tabular form rather than separately by individual plots. Individual plots can still be 'pulled out' separately, though not easily, but the tabular format makes it easy to see how frequent a species is both within a major habitat and across habitats. It also shows that some habitats are not represented or were very poorly covered by the existing releve plots, so any trends or insights taken from the following data should be considered as preliminary.

21 woody releve plots and 22 open ground releve plots were surveyed in 1999 for a total of 33. 322 vascular taxa, along with several non-vascular plants and fungi, were seen and identified at least to family level during the course of these surveys. Of the plants observed, 76 were woody trees and shrubs, 9 were woody vines, 10 were herbaceous vines, and the rest were herbaceous or graminoid species. 57, or 17.70% of the species observed in the releves, were not native to the Delmarva, including four trees or shrubs, two woody vines, and two herbaceous vines; the rest were herbs. Of especial interest is the fact that of 249 species of vascular plants observed in the 21 woody releve plots, only 23, 9.2%, were non-native taxa, and of them only Japanese Honeysuckle (*Lonicera japonica*) is of any significance. This is noteworthy considering the past land usage of the property.

### STRATA

T1 = Emergent canopy  
T2 = Canopy  
T3 = Subcanopy, 5 m. to canopy

S1 = Tall shrubs, 1 to 5 m.  
S2 = Short shrub, less than 1 m.

V = Vines, woody or herbaceous

H = Herbaceous species

NV = Non-vascular species

### Cover Categories

R = Rare, 1 or 2 plants  
+ = Occasional  
1 = Less than 5% cover  
2- = 5 to 12% cover  
2+ = 13 to 25% cover  
3 = 26 to 50% cover  
4 = 51 to 75% cover  
5 = Over 75% cover

## ADKINS ARBORETUM - LIST OF RELEVES

NUMBER	AREA	DATE	# OF SPECIES	DESCRIPTION (TOP), DOMINANT SPECIES, IF ANY (BOTTOM)
A01.1	25X25	6/12/99	36	INNER (NARROW) FLOODPLAIN SCOUR ZONE NEAR B11 <i>ACER RUBRUM</i> =4, <i>FRAXINUS PENNSYLVANICA</i> =3
A01.2	25X25	7/18/99	34	OUTER FLOODPLAIN WITHIN 100(?)YDS OF TUCKAHOE <i>FRAXINUS PENNSYLVANICA</i> =4, <i>QUERCUS LYRATA</i> =3
A01.3	25X25	7/18/99	37	CHANNELED FLOODPLAIN NEAR A2/A4 <i>FRAXINUS PENNSYLVANICA</i> =4, <i>CINNA ARUNDINACEA</i> =4, <i>TOXICODENDRON RADICANS</i> =4
A02.1	10X10	7/18/99	29	BEAVER MEADOW <i>GLYCERA STRIATA</i> =4, <i>PILEA PUMILA</i> =4, <i>NYSSA SYLVATICA</i> =3
A07.1	30X20	6/19/99	76	NEAR C6 <i>FRAXINUS PENNSYLVANICA</i> =4, <i>SYMPLOCARPUS FOETIDUS</i> =5
A07.2	25X25	6/19/99	60	NEAR C7 <i>FRAXINUS PENNSYLVANICA</i> =4, <i>LINDERA BENZOIN</i> =4, <i>SYMPLOCARPUS FOETIDUS</i> =4
A08.1	25X25	6/12/99	34	SLOUGH <i>LEUCOTHOE RACEMOSA</i> =3, <i>CEPHALANTHUS OCCIDENTALIS</i> =3
B02.1	25X25	7/4/99	67	NEAR BROKEN BEECH TRAIL <i>CARYA TOMENTOSA</i> =4, <i>CARPINUS CAROLINIANA</i> =4, <i>SMILACINA RACEMOSA</i> =4
B02.2	25X25	7/4/99	41	CLOSE TO EDGE OF A5, WETTER AND DRIER CORNERS <i>FAGUS GRANDIFOLIA</i> =3, <i>SMILAX ROTUNDIFOLIA</i> =3
B03.1	25X25	7/4/99	43	PINE <i>PINUS VIRGINIANA</i> =4, <i>CARYA TOMENTOSA</i> =4, <i>VACCINIUM PALLIDUM</i> =4
B05.1	25X25	5/29/99	58	NE CORNER <i>QUERCUS ALBA</i> =4

NUMBER	AREA	DATE	# OF SPECIES	DESCRIPTION (TOP), DOMINANT SPECIES, IF ANY (BOTTOM)
B05.2	25X25	5/29/99	45	NEARER MIDDLE <i>QUERCUS SPP (Collectively 4), VACCINIUM SPP. (Collectively 4)</i>
B07.1	25X25	7/4/99	30	KALMIA THICKET <i>KALMIA LATIFOLIA=5, QUERCUS ALBA=4</i>
B11.1	25X25	6/12/99	38	NEAR SOUTH END OF ARBORETUM <i>FAGUS GRANDIFOLIA=5</i>
B11.2	25X25	6/12/99	44	NEAR UPPER END OF B11 <i>QUERCUS FALCATA=3, FAGUS GRANDIFOLIA=3, VACCINIUM PALLIDUM=3</i>
C01.1	40X16	5/29/99	43	ON SLOPE NEAR DUMP <i>LIRIODENDRON=3, FAGUS =3, ILEX OPACA=3, EUONYMUS AMERICANUS=3</i>
D02.1	25X25	5/29/99	66	MIDDLE? <i>LIQUIDAMBAR STYRACIFLUA=5, CAMPSIS RADICANS=5, LONICERA JAPONICA=4</i>
D03.1	30X15	7/18/99	37	NORTH SIDE, SOLID PINE, NEAR TRAIL <i>PINUS TAEDA=4, PINUS VIRGINIANA=4, CAMPSIS RADICANS=3</i>
D05.1	25X25	6/19/99	37	GALESTOWN PINE <i>PINUS VIRGINIANA=4</i>
E05.1	25X25	6/5/99	36	NEAR EVELAND ROAD <i>LIQUIDAMBAR STYRACIFLUA=5, TOXICODENDRON RADICANS=5, GALIUM APARINE=5</i>
F02.1	25X25	6/19/99	49	LOGGED PINE PLANTATION <i>PINUS TAEDA=3, LIQUIDAMBAR STYRACIFLUA=3, CAMPSIS RADICANS=3</i>
ON01	5X5	8/8/99	21	<i>RUMEX ACETOSELLA=5, BROMUS JAPONICUS=3</i>



SPECIES NAME	Habit	A1/	A1/	A1/	A2/	A7/	A7/	A8/	B2/	B2/	B3/	B5/	B5/	B7/	B11/	B11/	C1/1	D2/	D3/	D5/	E5/	F2/
		1	2	3	1	1	2	1	1	2	1	1	2	1	1	2		1	1	1	1	1
Carex nigromarginata (?)	H											1										
Carex seorsa	H							1														
Carex sparganioides	H											+										
Carex spp.	H								+					R	1	+	+					
Carex stipata	H		+	+	R			+														
Carex striatula	H											+										
Carex styloflexa	H							1														
Carex swanii	H									+	+	1			R		+	+	+	R		
Carex tribuloides	H	R						R														
Carex typhina	H	R																				
Chasmanthium laxum	H								+													
Chelone glabra	H						+	+														
Chimaphila maculata	H					R			+				+	R	1	1		R	2-	1		
Chrysosplenium americanum	H							1														
Cicuta maculata	H	+		R				2+														
Cinna arundinacea	H	+	1	4		R	1	R														
Circaea lutetiana	H					2-	1															
Commelina communis	H																	+				
Commelina virginica	H	1	3																			
Cryptotaenia canadensis	H			+		1	2-															
Cypripedium acaule	H										+				R							
Danthonia spicata	H								R		+	+	+				R	R				
Daucus carota	H																					R
Desmodium paniculatum	H																	R				R
Desmodium sp.	H																	R				
Desmodium viridiflorum	H																	R				
Dryopteris carthusiana	H			R				+														
Dryopteris celsa	H					2-	2-															
Epifagus virginiana	H									R					+	+						
Eupatorium rugosum	H					+																
Euphorbia corollata	H																					2
Euthamia graminifolia	H																	R				
Fragaria virginiana	H																	+				
Galim triflorum	H							1														
Galium aparine	H		+	+				+				+						2-			5	
Galium circaeazans	H					R			1			2-	+				+					
Galium obtusum	H	R						R														
Galium triflorum	H				+	1																
Geranium carolinianum	H																	R			R	R

SPECIES NAME	Habit	AV/	AV/	AV/	A2/	A7/	A7/	AB/	B2/	B2/	B3/	B5/	B5/	B7/	B11/	B11/	CI/1	D2/	D3/	D5/	E5/	F2/
		1	2	3	1	1	2	1	1	2	1	1	2	1	1	2		1	1	1	1	1
Geranium maculatum	H					+			R													
Geum canadense	H			+		R	1															+
Geum sp.	H								R			R							2-			
Glyceria striata	H			3	4	R																
Goodyera pubescens	H								R		R								+			
Grass spp.	H							R							R							
Habenaria clavellata	H							R														
Hieracium sp.	H															R						
Hydrocotyle ranunculoides	H					R																
Impatiens capensis	H		+	2-	2+	R	1															
Isoetes engelmannii	H	R																				
Krigia virginica	H																					R
Lamium purpureum	H			2+																		R
Laportea canadensis	H		1																			
Leersia oryzoides	H		+																			
Leersia virginica	H	2+	+			1	+															
Lemna minor	H					+																
Leucobryum sp.	NV										+			+					+	+		
Linaria canadensis	H																					2+
Lobelia cardinalis	H	1	+			R																
Luzula bulbosa	H															R			R			
Lycopus rubellus	H		2-					1														
Lycopus virginicus	H					1		R														
Lysimachia ciliata	H					+																
Lysimachia hybrida	H	2-																				
Lysimachia quadrifolia	H								R													
Medeola virginiana	H									2-								1				
Melampyrum lineare	H										+											
Mimulus alatus	H		1																			
Mitchella repens	H							+		2-	1		R	+	1	2+	2+	R	R			
Monotropa uniflora	H								R										R			
Oenothera biennis	H					R																
Oncoclea sensibilis	H						R	+														
Ophioglossum vulgatum v. pycn	H							R														
Osmunda cinnamomea	H						1	+		2-								+				
Osmunda regalis	H					+	R			+												
Oxalis dillenii	H																		R			R
Panicum acuminatum	H																					+
Panicum boscii	H								+		R	+				R			2-			

SPECIES NAME	Habit	AV/	AV/	AV/	A2/	A7/	A7/	AB/	B2/	B2/	B3/	B5/	B5/	B7/	BH/	BH/	C1/1	D2/	D3/	D5/	E5/	F2/
		1	2	3	1	1	2	1	1	2	1	1	2	1	1	2	1	1	1	1	1	1
Panicum clandestinum	H																					+
Panicum dichotomum	H								+		R	R	R			R						
Panicum sp.	H																			R		
Paronychia canadensis	H											+										
Peltandra virginica	H		+	1																		
Phalaris arundinacea	H					3																
Phryma leptostachya	H						R															
Phytolacca americana	H											+									R	+
Pilea pumila	H		3	3	4		2-	+														
Poa autumnalis	H	3		R			1		R													
Poa trivialis	H			R																		
Podophyllum peltatum	H						+	1		R		R					1	+				
Polygonatum biflorum	H						+		1		+	1	1		+	+	1			R		
Polygonum arifolium	H			+	3		1															
Polygonum caespitosum	H		+	+	1+																	
Polygonum scandens v. cristatu	H											+										
Polygonum sp.	H						+															
Polygonum virginianum	H						+	1														
Polystichum acrostichoides	H																					R
Polytrichum sp.	NV									1										2-		
Prenanthes serpentaria	H											+	R				+					
Ranunculus abortivus	H	R		R			+		R									+			+	+
Ranunculus recurvatus	H					R	2-															R
Rumex crispus	H																	R				
Sanicula canadensis	H					R	R		+									+			+	
Saururus cernuus	H		4	3	3	2-	2-	+														
Scutellaria elliptica	H								+			+										
Scutellaria lateriflora	H			R	+			R														
Sium suave	H	+																				
Smilacina racemosa	H						+	R	4+		+	2-	1	R	R		2-					
Solanum carolinense	H																		R			R
Solidago caesia	H					R			1													
Solidago rugosa	H					R	+														+	
Solidago sp.	H														R				R			
Sphagnum sp.	NV							+														
Stellaria media	H																				2-	
Symplocarpus foetidus	H			1		5	4															
Taraxacum officinale	H																	R				R
Thalictrum pubescens	H						+															

SPECIES NAME	Habit	A1/	A1/	A1/	A2/	A7/	A7/	AB/	B2/	B2/	B3/	B5/	B5/	B7/	B11/	B11/	C1/1	D2/	D3/	D5/	E5/	F2/
		1	2	3	1	1	2	1	1	2	1	1	2	1	1	2	1	1	1	1	1	1
Tipularia discolor	H																+					
Triodanis perfoliata	H																	R			R	+
Uvularia perfoliata	H																R					
Uvularia sessilifolia	H	+							1													
Veronica arvensis	H																	+				
Vicia angustifolia	H																				1	
Vicia hirsuta	H																					R
Vicia lathyrioides	H																	+				
Viola cucullata	H			+		2-	2-															
Viola palmata v. triloba	H								+			+										
Viola rafinesquii	H																	R	R			
Viola sororia	H	3										+						+				
Woodwardia areolata	H								1								+					

PLANT LIST – 1998 AND 1999

	Families	Total species	Aliens
Pteridophytes	9	24	0
Gymnosperms	2	3	0
Dicots	82	393	95
<u>Monocots</u>	<u>16</u>	<u>157</u>	<u>30</u>
Total	109	577	125

Aliens = 21.7 % of species

**Status:** A= Alien, species not native to central Delmarva peninsula, but naturalized

R= Rare, MD Natural Heritage species of concern

U= Unusual species (not on MD's species of concern list, but on DE's list or uncommon in the Coastal Plain of the Delmarva)

I= Introduced species

**Abundance:** 1 = Rare. Known from 1 or 2 populations

2 = Scarce. Several populations (at least 3) known, but never common at these sites.

3 = Infrequent. Plant occasionally encountered

4 = Frequent. Plant generally encountered in its preferred habitat.

5 = Common. Almost always in preferred habitat, often dominant.

Nomenclature follows Gleason and Cronquist (1992).

Adkins

**Adkins Arboretum Plant List - PTERIDOPHYTES**

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<b>ASPENIACEAE</b>		<b>SPLEENWORT FERN FAMILY</b>		
<i>Asplenium platyneuron</i>		Ebony spleenwort	3	Younger woods
<i>Asplenium platyneuron</i> f. <i>incis</i>		Cut-leaved ebony spleen	1	Dry opening in thicket
<b>BLECHNACEAE</b>		<b>NETTED CHAIN FERN FAMILY</b>		
<i>Woodwardia areolata</i>		Netted chain fern	4	Swamps, floodplain swamp edges
<b>DENNSTAEDTIACEAE</b>		<b>HAY-SCENTED FERN FAMILY</b>		
<i>Dennstaedtia punctilobula</i>		Hay-scented fern	4	Woods, dry to moist
<i>Pteridium aquilinum</i>		Bracken	1	Wooded slope forest edges
<b>DRYOPTERIDACEAE</b>		<b>WOOD FERN FAMILY</b>		
<i>Athyrium filix-femina</i> v. <i>angust</i>		Northern lady fern	3	Woods, moist to dryish
<i>Dryopteris carthusiana</i>		Spinulose woodfern	2	Slope woods, swamps
<i>Dryopteris celsa</i>	R	Log fern	3	Floodplain, lower slopes
<i>Dryopteris cristata</i>	U	Crested fern	1	Swamps, inner edge floodplain
<i>Dryopteris intermedia</i>		Intermediate woodfern	3	Slope woods
<i>Oncoclea sensibilis</i>		Sensitive fern	3	Floodplain, wetlands
<i>Polystichum acrostichoides</i>		Christmas fern	4	Slopes, banks
<b>ISOETACEAE</b>		<b>QUILLWORT FAMILY</b>		
<i>Isoetes engelmannii</i>	R	Engelmann's quillwort	2	Floodplain streams and gullies
<b>LYCOPODIACEAE</b>		<b>CLUBMOSS FAMILY</b>		
<i>Lycopodium digitatum</i>		Ground pine	3	Dry open woods, thickets
<i>Lycopodium lucidulum</i>		Shining clubmoss	2	Low woods on inner edge floodplain
<i>Lycopodium obscurum</i>		Tree clubmoss	3	Dry to rich mature woods
<b>OPHIOGLOSSACEAE</b>		<b>ADDER'S-TONGUE FAMILY</b>		
<i>Botrychium dissectum</i>		Cut-leaved grapefern	3	Woods, swampy to upland, thickets
<i>Botrychium virginianum</i>		Rattlesnake fern	3	Rich woods
<i>Ophioglossum vulgatum</i> v. <i>py</i>	U	Southeastern adder's-ton	1	Low woods, rich woods pocket
<b>OSMUNDACEAE</b>		<b>ROYAL-FERN FAMILY</b>		
<i>Osmunda cinnamomea</i>		Cinnamon fern	5	Swamps, floodplain swamps
<i>Osmunda claytoniana</i>	U	Interrupted fern	1	Rich woods
<i>Osmunda regalis</i>		Royal fern	3	Floodplain swamps, swamps
<b>THELYPTERIDACEAE</b>		<b>BEECH FERN FAMILY</b>		
<i>Thelypteris noveboracensis</i>		New york fern	4	Woods, rich to low
<i>Thelypteris palustris</i>		Marsh fern	2	Swampy woods, floodplain swamps

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**Adkins Arboretum Plant List -GYMNOSPERMS**

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<b>SCIENTIFIC NAME</b>	<b>ALIEN</b>	<b>COMMON NAME</b>	<b>ABUNDANCE</b>	<b>HABITAT</b>
<b>CUPRESSACEAE</b>		<b>CYPRESS FAMILY</b>		
Juniperus virginiana		Red cedar	4	Thickets, young woods, pine plantation
<b>PINACEAE</b>		<b>PINE FAMILY</b>		
Pinus taeda		Loblolly pine	3	Woods, also planted
Pinus virginiana		Scrub pine	5	Dry woods

## Adkins Arboretum Plant List - ANGIOSPERMS - DICOTS

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<b>ACANTHACEAE</b>		<b>ACANTHUS FAMILY</b>		
<i>Ruellia caroliniensis</i>	U	Carolina petunia	1	Dry rich woods along trail B11
<b>ACERACEAE</b>		<b>MAPLE FAMILY</b>		
<i>Acer rubrum</i>		Red maple	5	Woods, swamps, thickets
<b>AIZOACEAE</b>		<b>CARPETWEED FAMILY</b>		
<i>Mollugo verticillata</i>	A	Carpetweed	2	Fields, waste ground
<b>AMARANTHACEAE</b>		<b>AMARANTH FAMILY</b>		
<i>Amaranthus albus</i>		Tumbleweed	1	Fields, waste areas
<i>Amaranthus hybridus</i>	A	Green amaranth	2	Waste ground
<b>ANACARDIACEAE</b>		<b>CASHEW FAMILY</b>		
<i>Rhus copallina</i>		Shining sumac	4	Dry fields, thickets, edges
<i>Toxicodendron radicans</i>		Poison ivy	5	Woods, edges, thickets, fields
<i>Toxicodendron vernix</i>	U	Poison sumac	1	Floodplain swamp off Piney Branch
<b>ANNONACEAE</b>		<b>CUSTARD-APPLE FAMILY</b>		
<i>Asimina triloba</i>		Pawpaw	5	Woods, wet to dry
<b>APIACEAE</b>		<b>PARSLEY FAMILY</b>		
<i>Cicuta maculata</i>		Water hemlock	3	Floodplain swamp, wooded seeps
<i>Cryptotaenia canadensis</i>		Honewort	3	Floodplain, moist woods
<i>Daucus carota</i>	A	Wild carrot	3	Fields, lawns, waste ground
<i>Hydrocotyle ranunculoides</i>		Buttercup-leaved pennyw	2	Open marsh (Beaver Meadow)
<i>Hydrocotyle umbellata</i>		Navelwort	1	Floodplain edge along Tuckahoe
<i>Osmorhiza claytonii</i>	U	Sweet cicely	1	Rich woods
<i>Osmorhiza longistylis</i>		Anise-root	3	Rich woods, swamp forest
<i>Oxypolis rigidior</i>		Cowbane	3	Floodplain swamps, swamps
<i>Sanicula canadensis</i>		Black snakeroot	3	Woods
<i>Sanicula gregaria</i>		Black snakeroot	2	Rich woods
<i>Sium suave</i>		Water-parsnip	3	Floodplain swamp sloughs
<b>APOCYNACEAE</b>		<b>DOGBANE FAMILY</b>		
<i>Apocynum cannabinum</i>		Indian hemp, dogbane	3	Old fields, edges, trailsides
<i>Trachelospermum difforme</i>	R	Climbing dogbane	1	Wooded vernal slough
<b>AQUIFOLIACEAE</b>		<b>HOLLY FAMILY</b>		
<i>Ilex decidua</i>	R	Privet holly	4	Floodplain woods
<i>Ilex laevigata</i>		Smooth winterberry	1	Floodplain wet woods
<i>Ilex opaca</i>		American holly	5	Woods
<i>Ilex verticillata</i>		Winterberry	4	Floodplain swamp, wet woods

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<b>ARALIACEAE</b>		<b>GINSENG FAMILY</b>		
<i>Aralia nudicaulis</i>		Wild sarsaparilla	2	Wooded slopes, dry woods
<i>Aralia spinosa</i>		Hercules'-club	4	Woods
<i>Hedera helix</i>	A	English ivy	1	Dry thicket g on old foundation
<b>ARISTOLOCHIACEAE</b>		<b>WILD-GINGER FAMILY</b>		
<i>Aristolochia serpentaria</i>		Virginia snakeroot	2	Rich woods and thickets
<b>ASCLEPIADACEAE</b>		<b>MILKWEED FAMILY</b>		
<i>Asclepias amplexicaule</i>		Blunt-leaved milkweed	1	Dry open woods, pine plantation
<i>Asclepias syriaca</i>		Common milkweed	3	Pond banks, fields, edges
<i>Asclepias tuberosa</i>		Butterfly weed	1	Old fields, meadows
<i>Asclepias variegata</i>	U	White milkweed	1	Dry open woods
<i>Asclepias viridiflora</i>		Green milkweed		Dry fields
<i>Matalea caroliniensis</i>	R	Anglepod	1	Dry rich woodes, trail in B10
<b>ASTERACEAE</b>		<b>ASTER FAMILY</b>		
<i>Achillea millefolium</i>	A	Yarrow	3	Thickets, woods edges, fields
<i>Ambrosia artemisiifolia</i>		Common ragweed	5	Fields, edges
<i>Antennaria plantaginifolia</i>		Plantain-leaved pussytoes	2	Shaded trailsides, open woods & banks
<i>Antennaria plantaginifolia v. p</i>		Plantain-leaved pussytoes	1	Shaded trailside bank
<i>Aster lanceolatus (simplex)</i>		Panicled aster	5	Floodplain woods, thickets
<i>Aster lateriflorus</i>		Calico aster	2	Floodplain, seepy woods
<i>Aster patens v. patens</i>		Late purple aster	1	Dry thicket, trail in B11 rich floodplain
<i>Aster pilosus</i>		Heath aster	3	Fields, roadsides
<i>Aster undulatus</i>		Wavy-leaved aster	1	Dry woods, trailsides
<i>Baccharis halimifolia</i>	U	Groundsel-tree	1	Marshes, Beaver Pond
<i>Bidens bipinnata</i>		Spanish needles	2	Dry woods edges, trailsides, fields
<i>Bidens frondosa</i>		Beggar's-ticks	2	Floodplain swamp, back slough S end
<i>Bidens polylepis</i>	A	Tickseed sunflower	1	Roadside along Eveland Road
<i>Centaurea maculosa</i>	A	Spotted knapweed	3	Dry fields, heavily disturbed ground
<i>Chondrilla juncea</i>	A	Skeleton-weed	3	Dry sandy fields
<i>Chrysanthemum leucanthem</i>	A	Ox-eye daisy	3	Dry fields, roadsides, lawn edges
<i>Chrysopsis mariana</i>		Maryland golden-aster	2	Dry field and thicket edges, trailsides
<i>Cichorium intybus</i>	A	Chicory	2	Roadsides
<i>Cirsium arvense</i>	A	Canada thistle	3	Fields, disturbed wetlands
<i>Cirsium discolor</i>		Field thistle	2	Roadside ditch and bank
<i>Cirsium vulgare</i>	A	Bull thistle	1	Field/meadow south of pond
<i>Conzya canadensis</i>		Horseweed	4	Dry fields, waste ground
<i>Elephantopus carolinianus</i>	U	Elephant's-foot	1	Open wooded trailsides, banks
<i>Erechtites hieracifolia</i>		Pilewort	2	Fields
<i>Erigeron annuus</i>		Daisy fleabane	2	Fields, thicket edges, trailsides

DICOTS

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Erigeron strigosus</i>		Fleabane	3	Dry fields, waste ground
<i>Eupatorium album</i>		White thoroughwort	1	Low rich wooded trailsides, S. End
<i>Eupatorium dubium</i>		Marsh joe-pye weed	1	Floodplain swamp openings
<i>Eupatorium hyssopifolium</i>		Hyssop-leaved thoroughw	2	Dry fields, thicket edges
<i>Eupatorium perfoliatum</i>		Boneset	2	Floodplain swamp openings, roadsides
<i>Eupatorium rugosum</i>		White snakeroot		
<i>Euthamia graminifolia</i>		Grass-leaved goldenrod	3	Fields, thicket edges, streamsides
<i>Gnaphalium obtusifolium</i>		Sweet everlasting	3	Fields, cut-over pine woods
<i>Gnaphalium purpureum</i>		Purple cudweed	2	Low sandy fields
<i>Heterotheca subaxillaris</i>		Tarweed	5	Dry sandy fields, locally abundant
<i>Hieracium gronovii</i>		Hairy hawkweed	1	Open dry sandy woods and thickets
<i>Hieracium scabrum</i>		Rough hawkweed		
<i>Hieracium venosum</i>		Rattlesnake-weed	2	Dry woods, trailsides
<i>Hypochaeris radicata</i>	A	Cat's-ear	2	Dry thicket trailsides lawns
<i>Krigia virginica</i>		Dwarf dandelion	2	Dry sandy fields, pine plantation
<i>Lactuca canadensis</i>		Yellow smooth wild lettuce	3	Fields, thickets
<i>Lactuca serriola</i>	A	Prickly lettuce	2	Fields, edges
<i>Mikania scandens</i>		Climbing boneset	3	Floodplain, edge Tuckahoe
<i>Prenanthes serpentina</i>	U	Lion's-foot	3	Dry rich woods
<i>Rudbeckia hirta</i>	A	Brown-eyed susan	1	Dry fields
<i>Rudbeckia laciniata</i>		Green-headed coneflower	1	Floodplain woods, wet edges
<i>Senecio aureus</i>	I	Golden ragwort	1	Low woods, planted
<i>Senecio vulgaris</i>	A	Common groundsel	1	Logged pine plantation
<i>Solidago caesia</i>		Blue-stemmed goldenrod	3	Wooded slopes & banks
<i>Solidago canadensis</i>		Canada goldenrod	5	Dry fields, edges, thickets
<i>Solidago juncea</i>		Early goldenrod	4	Dry fields, thickets
<i>Solidago nemoralis</i>		Gray goldenrod	2	Dry fields, trailsides, thicket edges
<i>Solidago odora</i>		Sweet goldenrod	1	Dry open woods along trails
<i>Solidago rugosa</i>		Rough-stemmed goldenro	3	Thickets, low open woods, swamps
<i>Taraxacum officinale</i>	A	Dandelion	4	Lawns, waste ground
<i>Tragopogon dubius</i>	A	Larger goat's-beard	2	Dry fields
<i>Vernonia noveboracensis</i>		Ironweed	1	Roadside, S end
<i>Xanthium strumarium</i>	A	Cocklebur	1	Waste ground, floodplain edge
<b>BALSAMINACEAE</b>		<b>JEWEL-WEED FAMILY</b>		
<i>Impatiens capensis</i>		Orange jewelweed	5	Floodplain, wetlands
<b>BERBERIDACEAE</b>		<b>BARBERRY FAMILY</b>		
<i>Berberis thunbergii</i>	A	Japanese barberry	2	Woods, edges
<i>Podophyllum peltatum</i>		Mayapple	5	Rich woods, wooded slopes
<b>BETULACEAE</b>		<b>BIRCH FAMILY</b>		

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Alnus serrulata</i>		Common alder		
<i>Betula nigra</i>		River birch	3	Floodplain levee along Tuckahoe, pine
<i>Carpinus caroliniana</i> v. <i>virgini</i>		Ironwood	5	Floodplain, woods
<i>Corylus americana</i>		American hazelnut	3	Wet woods, wooded slopes
<b>BIGNONIACEAE</b>		<b>BIGNONIA FAMILY</b>		
<i>Campsis radicans</i>		Trumpet-creeper	4	Old fields, edges, young woods
<b>BORAGINACEAE</b>		<b>BORAGE FAMILY</b>		
<i>Hackelia virginiana</i>		Beggar's-lice	2	Rich woods edges and thickets
<i>Lithospermum arvense</i>	A	Corn gromwell	1	Dry fields
<b>BRASSICACEAE</b>		<b>CRESS FAMILY</b>		
<i>Arabidopsis thaliana</i>	A	Mouse-ear cress	2	Waste ground, bare soil
<i>Arabis canadensis</i>	U	Sicklepod	1	Rich dry open woods, trailsides
<i>Arabis lyrata</i>	U	Lyre-leaved rock cress	1	Rich dry woods
<i>Barbarea verna</i>	A	Spring cress	2	Fields, edges, trailsides
<i>Barbarea vulgaris</i>	A	Wintercress	2	Roadsides, waste ground
<i>Brassica rapa</i>	A	Mustard	2	Waste ground
<i>Cardamine bulbosa</i>		Spring cress	2	Floodplain swamp, seeps
<i>Cardamine hirsuta</i>	A	Hairy bittercress	4	Dry fields, edges, disturbed ground
<i>Cardamine pensylvanica</i>		Pennsylvania bittercress	3	Floodplain swamp, sloughs
<i>Draba verna</i>	A	Whitlow-wort	2	Waste ground, lawns
<i>Lepidium campestre</i>	A	Cow-cress	3	Waste ground, old fields
<i>Lepidium virginicum</i>		Poor man's pepper		
<b>CACTACEAE</b>		<b>CACTUS FAMILY</b>		
<i>Opuntia humifusa</i>		Eastern prickly-pear	1	Dry open sandy pine thickets D5
<b>CAESALPINIACEAE</b>		<b>POINCIANA FAMILY</b>		
<i>Chamaecrista fasciculata</i>		Partridge-pea	1	Dry sandy fields, roadside
<i>Chamaecrista nictitans</i>		Wild sensitive plant	2	Dry sandy fields, thickets, edges
<b>CALLITRICHACEAE</b>		<b>WATER-STAR FAMILY</b>		
<i>Callitriche palustris</i> (verna)		Early water-starwort	3	Floodplain swamp along Tuckahoe
<b>CAMPANULACEAE</b>		<b>BELLFLOWER FAMILY</b>		
<i>Lobelia cardinalis</i>		Cardinal-flower	3	Floodplain swamp
<i>Triodanis perfoliata</i>		Venus' looking-glass	3	Dry thickets, openings, logged pines
<b>CAPRIFOLIACEAE</b>		<b>HONEYSUCKLE FAMILY</b>		
<i>Lonicera japonica</i>	A	Japanese honeysuckle	5	Edges, open woods
<i>Sambucus canadensis</i>		Elderberry	4	Floodplain, seeps, swamps
<i>Viburnum acerifolium</i>		Maple-leaved viburnum		
<i>Viburnum dentatum</i>		Southern arrowwood vibur	5	Woods, thickets, swamps

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Viburnum nudum</i>		Swamp-haw	3	Wooded seeps, swamps, floodplain ed
<i>Viburnum prunifolium</i>		Black-haw	3	Woods, thickets
<i>Viburnum rafinesquianum</i>	U	Downy arrow-wood	3	Rich well-drained wooded floodplain S
<i>Viburnum recognitum</i>		Northern arrowwood vibur	2	Floodplain swamp
<b>CARYOPHYLLACEAE</b>		<b>PINK FAMILY</b>		
<i>Agrostemma githago</i>	A	Corn cockle	1	Field along road
<i>Cerastium vulgatum</i>	A	Mouse-eared chickweed	3	Fields, waste ground, edges
<i>Dianthus armeria</i>	A	Deptford pink	2	Dry fields, thicket edges
<i>Holosteum umbellatum</i>	A	Jagged chickweed	2	Dry sandy fields, waste ground
<i>Paronychia canadensis</i>	U	Forked chickweed	2	Rich dry woods
<i>Petrorhagia prolifera</i>	A	Tunica	1	Dry sandy fields
<i>Saponaria officinalis</i>	A	Soapwort	2	Fields, roadsides
<i>Scleranthus annuus</i>	A	Knawel	2	Dry fields
<i>Silene alba</i>	A	White campion	2	Fields, edges, trailsides, roadsides
<i>Silene antirrhina</i>		Sleepy catchfly	2	Dry sandy fields, thicket openings
<i>Silene stellata</i>		Starry campion	3	Dry woods
<i>Stellaria media</i>	A	Common chickweed	3	Thickets, young woods, waste ground
<b>CELASTRACEAE</b>		<b>BITTERSWEET FAMILY</b>		
<i>Celastrus orbiculatus</i>	A	Oriental bittersweet	4	Edges, woods, old fields
<i>Euonymus americanus</i>		Running strawberry bush	4	Woods, low to rich
<b>CHENOPODIACEAE</b>		<b>GOOSEFOOT FAMILY</b>		
<i>Chenopodium album</i>	A	Lamb's-quarters	3	Fields, thickets, dry openings
<b>CISTACEAE</b>		<b>ROCKROSE FAMILY</b>		
<i>Helianthemum canadense</i>		Frostweed	1	Dry open thickety woods
<i>Helianthemum propinquum</i>		Colonial frostweed	2	Dry sandy thickets
<i>Lechea minor</i>		Thyme-leaved pinweed	3	Dry thicket openings, edges
<b>CLETHRACEAE</b>		<b>SUMMER-SWEET FAMILY</b>		
<i>Clethra alnifolia</i>		Sweet pepperbush	5	Floodplain swamp, sloughs, wet woods
<b>CLUSIACEAE</b>		<b>ST. JOHN'S-WORT FAMILY</b>		
<i>Hypericum mutilum</i>		Dwarf st. john's-wort	1	Pond banks
<i>Hypericum perforatum</i>	A	Common st. john's-wort	2	Dry fields
<i>Hypericum punctatum</i>		Spotted st. john's-wort	1	Fields, thicket edges
<i>Hypericum stragulum</i>		St. andrew's-cross	2	Dry woods, openings, trailsides
<i>Triadenum virginianum</i>		Marsh st. john's-wort	3	Swamps, floodplain swamps
<i>Triadenum walteri</i>		Marsh st. john's-wort	3	Floodplain swamps near Tuckahoe
<b>CONVOLVULACEAE</b>		<b>MORNING-GLORY FAMILY</b>		
<i>Calystegia sepium</i>		Hedge bindweed	2	Dry fields, edges, thickets
<i>Ipomoea hederacea</i>	A	Ivy-leaved morning-glory	5	Dry fields, waste ground

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SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Ipomoea lacunosa</i>		Small white morning-glory	2	Roadsides, fields, edges
<i>Ipomoea pandurata</i>		Wild potato-vine	2	Dry young woods, thickets
<i>Ipomoea purpurea</i>	A	Common morning-glory	1	Dry fields
<b>CORNACEAE</b>		<b>DOGWOOD FAMILY</b>		
<i>Cornus amomum</i>		Swamp dogwood	5	Floodplain swamp, wet woods
<i>Cornus florida</i>		Flowering dogwood	4	Woods, dry to rich
<i>Cornus stricta</i>	U	Stiff dogwood	3	Floodplain swamp, swampy woods
<b>CUSCUTACEAE</b>		<b>DODDER FAMILY</b>		
<i>Cuscuta gronovii</i>		Dodder	2	Floodplain swamp openings
<b>EBENACEAE</b>		<b>EBONY FAMILY</b>		
<i>Diospyros virginiana</i>		Persimmon	3	Woods, wet to dry
<b>ERICACEAE</b>		<b>HEATH FAMILY</b>		
<i>Gaylussacia baccata</i>		Black huckleberry	3	Dry woods
<i>Gaylussacia frondosa</i>		Dangleberry	2	Dry acidic woods
<i>Kalmia latifolia</i>		Mountain laurel	4	Dry woods
<i>Leucothoe racemosa</i>		Fetter-bush	4	Swamps, floodplain wooded edges
<i>Lyonia ligustrina</i>		Maleberry	1	Wet wooded streamsides
<i>Rhododendron periclymenoid</i>		Pinxter flower	4	Woods
<i>Rhododendron viscosum</i>		Swamp white azalea	1	Swamps
<i>Vaccinium corymbosum</i>		High-bush blueberry	4	Swamps, low woods
<i>Vaccinium pallidum</i>		Lowbush blueberry	5	Woods
<i>Vaccinium stamineum</i>		Deerberry	4	Dry woods
<b>EUPHORBIACEAE</b>		<b>SPURGE FAMILY</b>		
<i>Acalypha gracilens</i>		Slender 3-seeded mercur	2	Dry fields, thickets
<i>Acalypha rhomboidea</i>		Three-seeded mercury	3	Roadsides, waste ground
<i>Acalypha virginica</i>		Three-seeded mercury		
<i>Croton glandulosus v. septent</i>		Croton	5	Dry sandy fields, waste ground
<i>Euphorbia corollata</i>		Flowering spurge	2	Loblolly pine woods, thicket edges
<i>Euphorbia cyparissias</i>	A	Cypress spurge	1	Dry Roadside bank
<i>Euphorbia ipecacuanhae</i>		Wild ipecac	3	Dry woods, esp. pine plantation
<i>Euphorbia maculata</i>		Milk purslane	2	Lawns and lawn edges
<i>Euphorbia nutans</i>		Eyebane	2	Field and meadow south of pond
<b>FABACEAE</b>		<b>LEGUME FAMILY</b>		
<i>Amphicarpa bracteata</i>		Hog peanut	3	Moist to wet woods
<i>Apios americana</i>		Groundnuts	2	Swamps, marshes
<i>Clitoria mariana</i>	U	Butterfly-pea	2	Dry openings, young woods
<i>Desmodium ciliare</i>		Small-leaved tick-trefoil	2	Dry thicket edges and fields
<i>Desmodium glutinosum</i>	U	Pointed-leaved tick-trefoil	1	Rich woods

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Desmodium laevigatum</i>	R	Smooth tick-trefoil	1	Wooded trailsides, thickets
<i>Desmodium nudiflorum</i>		Naked-flowered tick-trefoil	2	Rich dry woods
<i>Desmodium paniculatum</i>		Panicled tick-trefoil	2	Thickets, woods edges, pine plantation
<i>Desmodium perplexum</i>		Tick-trefoil	1	Fields, thicket edges
<i>Desmodium viridiflorum</i>		Velvety tick-trefoil	1	Dry field edges, thickets - S END OPP
<i>Lathyrus sylvestris</i>	A	Perennial pea	1	Roadside
<i>Lespedeza cuneata</i>	A	Sericea	2	Pine plantation, cutover
<i>Lespedeza procumbens</i>		Trailing hairy bush-clover	2	Dry sandy fields, pine plantation
<i>Lespedeza stipulacea</i>	A	Korean clover	1	Roadsides, waste ground
<i>Lespedeza striata</i>	A	Japanese clover	2	Roadsides, waste ground
<i>Lespedeza stuevei</i>	R	Downy bush-clover	1	Dry thicket opening B2
<i>Lespedeza virginica</i>		Narrow-leaved bush-clove	2	Dry thicket openings & sandy edges
<i>Melilotus alba</i>	A	White sweet clover	2	Fields, roadsides, waste ground
<i>Strophostyles helvola</i>		Trailing wild bean	1	Dry fields
<i>Strophostyles umbellata</i>		Pink wild bean	1	Dry field, lawn, lawn edges, Nature Cen
<i>Trifolium arvense</i>	A	Rabbit's-foot clover	5	Dry fields, roadsides, waste ground
<i>Trifolium campestre</i>	A	Low hop clover	3	Dry fields, roadsides
<i>Trifolium pratense</i>	A	Red clover	3	Fields, lawns, waste ground
<i>Trifolium repens</i>	A	White clover	3	Lawns, waste ground
<i>Vicia angustifolia</i>	A	Common vetch	1	Edges, fields
<i>Vicia cracca</i>	A	Cow vetch	2	Dry fields, thicket openings
<i>Vicia grandiflora</i>	A	Large-flowered vetch	3	Dry disturbed fields
<i>Vicia hirsuta</i>	A	A vetch	2	Dry disturbed fields
<i>Vicia lathyrioides</i>	A	A vetch	4	Dry disturbed fields, thicket edges
<b>FAGACEAE</b>		<b>BEECH FAMILY</b>		
<i>Castanea dentata</i>		American chestnut	2	Dry woods
<i>Castanea pumila</i>		Chinquapin	3	Dry open woods
<i>Fagus grandifolia</i>		American beech	5	Woods
<i>Quercus alba</i>		White oak	5	Woods
<i>Quercus bicolor</i>		Swamp white oak	2	Low swampy woods
<i>Quercus falcata</i>		Southern red oak	4	Dry woods
<i>Quercus lyrata</i>	U	Overcup oak	5	Floodplain swamp
<i>Quercus marilandica</i>		Blackjack oak	2	Dry sandy woods
<i>Quercus michauxii</i>		Basket oak	4	Low woods, floodplain forest
<i>Quercus palustris</i>		Pin oak	3	Floodplain swamp & woods
<i>Quercus phellos</i>		Willow oak	3	Low woods and swamps
<i>Quercus rubra</i>		Red oak	4	Woods
<i>Quercus stellata</i>		Post oak	2	Dry woods and thickets
<i>Quercus velutina</i>		Black oak	3	Dry woods

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<b>GERANIACEAE</b>		<b>GERANIUM FAMILY</b>		
<i>Geranium carolinianum</i>		Carolina cranesbill	2	Dry fields, edges, waste ground
<i>Geranium maculatum</i>		Wild geranium	2	Rich woods
<i>Geranium molle</i>	A	Doves-foot cranesbill	3	Lawns around nature center
<b>GROSSULARIACEAE</b>		<b>GOOSEBERRY FAMILY</b>		
<i>Itea virginica</i>		Virginia-willow	3	Floodplain woods and swamps
<b>HALORAGACEAE</b>		<b>WATER-MILFOIL FAMILY</b>		
<i>Myriophyllum aquaticum</i> (bra	A	Parrot's-feather	2	Floodplain sloughs along Tuckahoe
<i>Proserpinaca palustris</i>		Mermaid-weed	1	Floodplain swamp, Back Slough End A1
<b>HAMAMELIDACEAE</b>		<b>WITCH-HAZEL FAMILY</b>		
<i>Liquidambar styraciflua</i>		Sweet-gum	5	Woods, moist to dry
<b>JUGLANDACEAE</b>		<b>WALNUT FAMILY</b>		
<i>Carya cordiformis</i>		Bitternut hickory	4	Rich to low woods
<i>Carya pallida</i>		Pale hickory	3	Dry sandy woods
<i>Carya tomentosa</i>		Mockernut hickory	5	Dry to rich woods
<i>Juglans nigra</i>		Black walnut	3	Floodplain and slope woods, thickets
<b>LAMIACEAE</b>		<b>MINT FAMILY</b>		
<i>Collinsonia canadensis</i>		Horse-balm	1	Rich woods
<i>Glechoma hederacea</i>	A	Ground ivy	2	Fields, lawns, wood edges
<i>Lamium amplexicaule</i>	A	Henbit	3	Waste ground, lawns
<i>Lamium purpureum</i>	A	Purple dead-nettle	3	Waste ground, cropland
<i>Lycopus rubellus</i>		Water-horehound	4	Floodplain swamps
<i>Lycopus virginicus</i>		Bugleweed	3	Floodplain, wetlands
<i>Monarda punctata</i>		Horsemint	1	Dry sandy open pine woods D5
<i>Prunella vulgaris</i>	A	Heal-all	2	Old fields, edges
<i>Pycnanthemum incanum</i>	U	Downy mountain-mint	1	Dry open woods w/ <i>Arabis canadensis</i>
<i>Salvia lyrata</i>		Lyre-leaved sage	1	Dry woods
<i>Scutellaria elliptica</i>		Hairy skullcap	2	Dry rich woods
<i>Scutellaria integrifolia</i>		Hyssop skullcap	2	Dry fields, edges
<i>Scutellaria lateriflora</i>		Mad-dog skullcap	2	Floodplain swamp, streambanks
<i>Trichostema dichotomum</i>		Bluecurls	2	Dry meadows, old fields
<b>LAURACEAE</b>		<b>LAUREL FAMILY</b>		
<i>Lindera benzoin</i>		Spicebush	5	Woods, swamps, thickets
<i>Sassafras albidum</i>		Sassafras	3	Thickets, woods, pine plantation
<b>MAGNOLIACEAE</b>		<b>MAGNOLIA FAMILY</b>		
<i>Liriodendron tulipifera</i>		Tulip-tree	5	Woods, moist to dry
<i>Magnolia virginica</i>		Sweet-bay magnolia	3	Floodplain and swampy woods

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<b>MALVACEAE</b>		<b>MALLOW FAMILY</b>		
Hibiscus moscheutos		Swamp mallow	2	Floodplain levee of Tuckahoe
<b>MELASTOMATACEAE</b>		<b>MEADOW-BEAUTY FAMILY</b>		
Rhexia mariana		Maryland meadow-beauty	1	Dry sandy bank by pond
<b>MENISPERMACEAE</b>		<b>MOONSEED FAMILY</b>		
Menispermum canadense		Canada moonseed	3	Rich woods edges, trailsides
<b>MONOTROPACEAE</b>		<b>PINESAP FAMILY</b>		
Monotropa uniflora		Indian pipe	1	Dry woods
<b>MORACEAE</b>		<b>MULBERRY FAMILY</b>		
Morus alba	A	White mulberry	2	Thickets, woods edges
<b>NYSSACEAE</b>		<b>SOUR-GUM FAMILY</b>		
Nyssa sylvatica		Black gum	4	Woods
<b>OLEACEAE</b>		<b>OLIVE FAMILY</b>		
Chionanthus virginicus		Fringe-tree	3	Low dry to rich woods
Fraxinus nigra	R	Black ash	2	Floodplain swamp, wet woods
Fraxinus pennsylvanica		Green ash	5	Floodplain swamp, woods
Ligustrum vulgare	A	Common privet	2	Moist thickets, young woods
<b>ONAGRACEAE</b>		<b>EVENING-PRIMROSE FAMILY</b>		
Circaea lutetiana		Enchanter's-nightshade	3	Woods
Epilobium coloratum		Willow herb	2	Floodplain openings, wet fields
Ludwigia alternifolia		Seedbox	2	Wet streamsides, thickets, floodplain
Ludwigia palustris		Water purslane	3	Floodplain swamp
Oenothera biennis		Evening primrose	3	Fields, roadsides, waste ground
Oenothera laciniata		Cut-leaved evening-primr	2	Dry sandy fields, waste ground
<b>OROBANCHACEAE</b>		<b>BROOM-RAPE FAMILY</b>		
Epifagus virginiana		Beechdrops	3	Beech woods
<b>OXALIDACEAE</b>		<b>WOOD-SORREL FAMILY</b>		
Oxalis dillenii		Yellow wood-sorrel	4	Dry sandy fields, edges, thickets
<b>PAPAVERACEAE</b>		<b>POPPY FAMILY</b>		
Sanguinaria canadensis		Bloodroot	3	Rich woods
<b>PASSIFLORACEAE</b>		<b>PASSION-FLOWER FAMILY</b>		
Passiflora lutea	U	Yellow passion-flower	2	Rich open wooded slopes along trails
<b>PHYTOLACCACEAE</b>		<b>POKEWEED FAMILY</b>		
Phytolacca americana		Pokeweed	3	Woods edges, fields, waste ground
<b>PLANTAGINACEAE</b>		<b>PLANTAIN FAMILY</b>		
Plantago aristata	A	Bristly plantain	4	Dry sandy fields

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SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Plantago lanceolata</i>	A	English plantain	3	Lawns, waste ground
<i>Plantago virginica</i>		Hoary plantain	3	Dry sandy fields, open thickets
<b>PLATANACEAE</b>		<b>PLANE-TREE FAMILY</b>		
<i>Platanus occidentalis</i>		Sycamore	3	Floodplain woods, wooded slopes
<b>POLYGONACEAE</b>		<b>BUCKWHEAT FAMILY</b>		
<i>Polygonum arifolium</i>		Halberd-leaved tearthumb	3	Swamps, seeps
<i>Polygonum aviculare</i>	A	Knotweed	2	Lawns, edges, roadsides
<i>Polygonum caespitosum</i>	A	Long-bristled smartweed	4	Woods, edges
<i>Polygonum convolvulus</i>	A	Black bindweed	2	Fields, disturbed ground
<i>Polygonum cuspidatum</i>	A	Japanese knotweed	2	Roadsides, fields
<i>Polygonum hydropiperoides</i>		Mild water-pepper	2	Swamp forest opening, field below pon
<i>Polygonum punctatum</i>		Slender water smartweed	5	Floodplain, wetlands
<i>Polygonum sagittatum</i>		Arrow-leaved tearthumb	5	Floodplain, wetlands
<i>Polygonum scandens v. crista</i>		Climbing buckwheat	1	Dry open woods
<i>Polygonum virginianum</i>		Virginia knotweed	3	Rich woods
<i>Rumex acetosella</i>	A	Sheep sorrel	5	Dry fields, banks, thickets, edges
<i>Rumex crispus</i>	A	Curly dock	3	Fields, waste ground
<i>Rumex obtusifolius</i>	A	Broad dock	2	Fields
<b>PORTULACACEAE</b>		<b>PURSLANE FAMILY</b>		
<i>Claytonia virginica</i>		Spring beauty	5	Woods, wet, rich, dry
<b>PRIMULACEAE</b>		<b>PRIMROSE FAMILY</b>		
<i>Lysimachia ciliata</i>		Fringed loosestrife	2	Swamps, moist woods
<i>Lysimachia hybrida</i>	R	Lowland loosestrife	3	Floodplain swamp and in scour zone
<i>Lysimachia quadrifolia</i>		Whorled loosestrife	2	Dry fields, thicket edges
<i>Lysimachia terrestris</i>		Swamp candles	2	Floodplain woods, swamps, wet woods
<i>Samolus parviflorus</i>		Water pimpernel	1	Floodplain
<b>PYROLACEAE</b>		<b>WINTERGREEN FAMILY</b>		
<i>Chimaphila maculata</i>		Spotted wintergreen	3	Dry to moist woods
<i>Chimaphila umbellata</i>	U	Common wintergreen	1	Dry sandy woods
<b>RANUNCULACEAE</b>		<b>BUTTERCUP FAMILY</b>		
<i>Anemone quinquefolia</i>		Wood anemone	3	Low moist woods
<i>Aquilegia canadensis</i>	U	American columbine	2	Rich dry woods
<i>Clematis virginiana</i>		Virgin's-bower	4	Woods and floodplain swamp
<i>Ranunculus abortivus</i>		Kidneyleaf buttercup	3	Woods, thickets
<i>Ranunculus pusillus</i>	R	Low spearwort	2	Floodplain swamp sloughs
<i>Ranunculus recurvatus</i>		Hooked buttercup	3	Seeps, swamp edges
<i>Ranunculus sceleratus</i>		Cursed buttercup	1	Floodplain seep base slope forest
<i>Thalictrum pubescens</i>		Tall meadow rue	3	Floodplain, wetlands

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<b>ROSACEAE</b>		<b>ROSE FAMILY</b>		
<i>Amelanchier arborea</i>		Tree shadbush	3	Woods
<i>Amelanchier species</i>		Shadbush	2	Dry woods, swampy woods
<i>Aronia arbutifolia</i>		Red chokeberry	2	Swamps, slough edges
<i>Crataegus crus-galli</i> v <i>canbyi</i>	U	Canby's cockspur hawthorn	2	Floodplain swamp
<i>Crataegus intricata</i>		Hawthorn	2	Woods
<i>Duchesnea indica</i>	A	Indian strawberry	2	Thicket edges
<i>Fragaria virginiana</i>		Wild strawberry	3	Dry thickets, fields, woods edges
<i>Geum canadense</i>		White avens	4	Floodplain, woods
<i>Geum virginianum</i>	U	Pale avens	1	Dry open woods, dry openings
<i>Malus coronaria</i> cultivars	A	Crabapple	2	Edges, thickets
<i>Potentilla canadensis</i>		Dwarf cinquefoil	4	Dry field edges, thickets, woods edges
<i>Potentilla norvegica</i>	A	Rough cinquefoil	2	Fields, moist edges
<i>Potentilla recta</i>	A	Rough-fruited cinquefoil	2	Dry field
<i>Potentilla simplex</i>		Common cinquefoil	1	Pine plantation
<i>Prunus avium</i>	A	Sweet cherry	3	Woods, thickets
<i>Prunus munsoniana</i>	A	Wild-goose plum	1	Dry field edge towards S End
<i>Prunus persica</i>	A	Peach	1	Old house site
<i>Prunus serotina</i>		Black cherry	5	Woods, edges
<i>Rosa carolina</i>		Pasture rose	1	Pine Plantation
<i>Rosa multiflora</i>	A	Multiflora rose	3	Woods, edges, old fields
<i>Rosa palustris</i>		Swamp rose	1	Swamp A7 South End
<i>Rubus allegheniensis</i>		Blackberry	4	Dry fields, edges, woods
<i>Rubus cuneifolius</i>		Sand blackberry	4	Dry sandy fields, thicket edges, opening
<i>Rubus enslenii</i>		Southern dewberry	3	Woods, field edges, thickets
<i>Rubus flagellaris</i>		Dewberry	4	Dry fields, edges
<i>Rubus hispidus</i>		Swamp dewberry	3	Swamps, wet woods, seeps
<i>Rubus occidentalis</i>		Thimbleberry	3	Thickets, field edges, trailsides
<b>RUBIACEAE</b>		<b>MADDER FAMILY</b>		
<i>Cephalanthus occidentalis</i>		Buttonbush	3	Floodplain swamp, sloughs
<i>Diodia teres</i>		Buttonwood	2	Dry sandy barren fields, waste ground
<i>Galium aparine</i>		Cleavers	4	Open woods, thickets, edges
<i>Galium circaezans</i>		Wild white licorice	3	Rich woods
<i>Galium obtusum</i>		Swamp bedstraw	3	Floodplain woods and swamp
<i>Galium pilosum</i>		Hairy bedstraw	2	Dry open woods and edges
<i>Galium triflorum</i>		Sweet bedstraw	3	Rich woods
<i>Houstonia caerulea</i>		Bluets	2	Trailsides, wooded banks
<i>Houstonia purpurea</i>	U	Large bluets	2	Rich woods, rich wooded trailsides
<i>Mitchella repens</i>		Partridgeberry	4	Woods, low to dry

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<b>SALICACEAE</b>		<b>WILLOW FAMILY</b>		
<i>Populus alba</i>	A	White poplar	1	Dry field edge, suckering
<i>Salix nigra</i>		Black willow	2	Streamsides, banks of Tuckahoe, belo
<b>SANTALACEAE</b>		<b>SANDALWOOD FAMILY</b>		
<i>Comandra umbellata</i>		Bastard toad-flax	1	Dry woods
<b>SAURURACEAE</b>		<b>BLACK PEPPER FAMILY</b>		
<i>Saururus cernuus</i>		Lizard's-tail	5	Floodplain swamp, wet woods
<b>SAXIFRAGACEAE</b>		<b>SAXIFRAGE FAMILY</b>		
<i>Chrysosplenium americanum</i>		Golden saxifrage	3	Floodplain swamp edges, wooded seep
<b>SCROPHULARIACEAE</b>		<b>FIGWORT FAMILY</b>		
<i>Aureolaria virginica</i>		Downy yellow false-foxglo	2	Dry rich woods
<i>Chelone glabra</i>		Turtlehead	3	Floodplain swamp, wooded seeps
<i>Gratiola neglecta</i>		Clammy hedge-hyssop	3	Floodplain, edge Tuckahoe
<i>Linaria canadensis</i>		Old-field toadflax	3	Old fields, dry thicket edges
<i>Lindernia dubia</i>		False pimpernel	2	Floodplain, edge of Tuckahoe
<i>Melampyrum lineare v. ameri</i>		Cow-wheat	2	Dry woods, under oak
<i>Mimulus alatus</i>	U	Wingstem monkey-flower	3	Floodplain, edge Tuckahoe, swamp for
<i>Scrophularia marilandica</i>		Carpenter's-square	1	Rich thin open woods C6
<i>Verbascum blattaria</i>	A	Moth-mullein	2	Fields, roadsides
<i>Verbascum thapsus</i>	A	Common mullein	2	Fields, roadsides, sandy pine woods
<i>Veronica arvensis</i>	A	Corn speedwell	2	Fields, waste ground
<i>Veronica hederaefolia</i>	A	Ivy-leaved speedwell	3	Rich woods, slope woods, thickets
<i>Veronica persica</i>	A	Bird's-eye speedwell	1	Fields, waste ground
<b>SIMAROUBACEAE</b>		<b>QUASSIA FAMILY</b>		
<i>Ailanthus altissima</i>	A	Tree-of-heaven	2	Edges, thickets
<b>SOLANACEAE</b>		<b>NIGHTSHADE FAMILY</b>		
<i>Physalis heterophylla</i>		Clammy ground-cherry	1	Dry fields, edges, roadsides
<i>Solanum carolinense</i>	A	Horse-nettle	3	Dry fields, thickets
<i>Solanum nigrum</i>	A	Black nightshade	2	Edges, disturbed areas
<b>TILIACEAE</b>		<b>LINDEN FAMILY</b>		
<i>Tilia americana</i>		Basswood	2	Floodplain swampy woods
<b>ULMACEAE</b>		<b>MULBERRY FAMILY</b>		
<i>Broussonetia papyrifera</i>	A	Paper mulberry	1	Field edge along thicket
<i>Celtis occidentalis</i>		Hackberry	2	Woods, pine plantation
<i>Ulmus rubra</i>		Slippery elm	4	Floodplain woods, low woods
<b>URTICACEAE</b>		<b>NETTLE FAMILY</b>		
<i>Boehmeria cylindrica</i>		False nettle	3	Floodplain, wetlands, slope forest

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Laportea canadensis</i>		Wood nettle	3	Rich and low woods
<i>Parietaria pensylvanica</i>	U	Pellitory	1	Dry sandy pine thicket D5
<i>Pilea fontana</i>	R	Coolweed	1	Wooded seeps, edges floodplain swam
<i>Pilea pumila</i>		Clearweed	4	Floodplain, wetlands
<b>VERBENACEAE</b>		<b>VERVAIN FAMILY</b>		
<i>Phryma leptostachya</i>		Lopseed	2	Rich woods
<i>Verbena urticifolia</i>		White vervain	1	Thickets, edges, young woods
<b>VIOLACEAE</b>		<b>VIOLET FAMILY</b>		
<i>Viola arvensis</i>	A	Wild pansy	2	Dry fields, waste ground
<i>Viola cucullata</i>		Marsh blue violet	3	Swampy woods, floodplain woods & se
<i>Viola hirsutula</i>		Southern wood violet	2	Rich dry woods
<i>Viola palmata</i> v. <i>triloba</i>		Three-lobed violet	2	Dry woods
<i>Viola pedata</i>	U	Birds-foot violet	1	Dry semi-open path edge
<i>Viola primulifolia</i>		Primrose-leaved violet	3	Wet woods, swamps
<i>Viola rafinesquii</i>		Field pansy	2	Dry fields, thickets, waste ground
<i>Viola sororia</i>		Common blue violet	4	Woods, thickets, edges, fields
<b>VISCACEAE</b>		<b>MISTLETOE FAMILY</b>		
<i>Phoradendron leucarpum</i>	U	Mistletoe	1	Wet woods N End on Red Maple
<b>VITACEAE</b>		<b>GRAPE FAMILY</b>		
<i>Parthenocissus quinquefolia</i>		Virginia creeper	5	Woods, edges, floodplain
<i>Vitis aestivalis</i>		Summer grape	3	Dry woods, thickets, floodplain woods e
<i>Vitis labrusca</i>		Fox grape	1	Low thickets and woods
<i>Vitis vulpina</i>		Frost grape	3	Woods, thickets, edges

## Adkins Arboretum Plant List -ANGIOSPERMS - MONOCOTS

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<b>ALISMATACEAE</b>		<b>WATER-PLANTAIN FAMILY</b>		
<i>Alisma subcordatum</i>		Water plantain	3	Floodplain swamp, emergent swamp
<i>Sagittaria latifolia</i>		Broad-leaved arrowhead	2	Floodplain woods, swamps
<b>ARACEAE</b>		<b>ARUM FAMILY</b>		
<i>Arisaema triphyllum</i>		Jack-in-the-pulpit	4	Woods
<i>Arisaema triphyllum</i> v. <i>pusillum</i>		Swamp jack-in-the-pulpit	2	Swamp forest
<i>Orontium aquaticum</i>	U	Golden club	1	Floodplain streams
<i>Peltandra virginica</i>		Arrow arum	3	Floodplain swamp
<i>Symplocarpus foetidus</i>		Skunk cabbage	5	Swamps, seeps, inner floodplain woods
<b>COMMELINACEAE</b>		<b>SPIDERWORT FAMILY</b>		
<i>Commelina communis</i>	A	Asiatic dayflower	3	Edges, woods
<i>Commelina virginica</i>	U	Virginia dayflower	4	Floodplain swamp
<b>CYPERACEAE</b>		<b>SEDGE FAMILY</b>		
<i>Carex abscondita</i>		Hidden-fruit sedge	4	Woods, slope forest
<i>Carex alata</i>		A sedge	3	Dry fields, thickets
<i>Carex albicans</i>		A sedge	4	Dry woods
<i>Carex albicans</i> v. <i>emmonsii</i>		A sedge	2	Dry sandy to rich woods
<i>Carex albolutescens</i>		A sedge	1	Swamps
<i>Carex amphibola</i> (v. <i>turgida</i> )		A sedge	3	Woods, rich to dry, slope forest
<i>Carex blanda</i>		A sedge	3	Woods, edges
<i>Carex bromoides</i>		A sedge	2	Swamps, floodplain swamps
<i>Carex cephalophora</i>		A sedge	3	Woods, dry to rich
<i>Carex crinita</i>		A sedge	4	Swamps, floodplain woods
<i>Carex debilis</i> v. <i>debilis</i>		A sedge	3	Low woods, swamps
<i>Carex festucacea</i>		A sedge	1	Fields
<i>Carex intumescens</i>		Swollen sedge	3	Floodplain swamps and sloughs
<i>Carex laevivaginata</i>		A sedge	4	Floodplain openings, seeps
<i>Carex laxiculmis</i>		A sedge	2	Rich woods, esp. S. end
<i>Carex laxiflora</i>		A sedge		
<i>Carex leavenworthii</i>	R	Leavenworth's sedge	1	Fields, disturbed grassy ground
<i>Carex leptalea</i>		A sedge	2	Floodplain swamp, slough
<i>Carex lupulina</i>		Hop sedge	2	Floodplain swamp
<i>Carex lurida</i>		Sallow sedge	3	Swamps, pond edge
<i>Carex muhlenbergii</i> v. <i>australi</i>		A sedge	2	Dry sandy fields, woods edges
<i>Carex nigromarginata</i>		A sedge	3	Dry woods
<i>Carex pensylvanica</i>		A sedge	3	Dry to rich woods

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Carex radiata</i> (old rosea)		A sedge	3	Swampy to rich woods
<i>Carex rosea</i> (old convuluta)		A sedge	3	Swampy woods
<i>Carex seorsa</i>		A sedge	4	Floodplain swamps, wooded seeps
<i>Carex sparganioides</i>		A sedge	1	Thickets, trailsides, dry edges
<i>Carex sparganioides</i> v. aggre		A sedge	1	Dry fields
<i>Carex stipata</i>		A sedge	2	Floodplain swamp, slough
<i>Carex striatula</i>		Lined sedge	1	Dry rich woods
<i>Carex stricta</i>		Tussock sedge	2	Swampy woods, A3 inner edge
<i>Carex styloflexa</i>	R	Bent sedge	3	Low wet woods and swamps
<i>Carex swanii</i>		A sedge	3	Woods, dry to rich
<i>Carex tribuloides</i>		A sedge		
<i>Carex typhina</i>	R	Cattail sedge	1	Floodplain swamp edges
<i>Carex umbellata</i>		A sedge	4	Dry woods and thickets
<i>Carex umbellata</i> v. tonsa		A sedge	1	Dry sandy pine woods
<i>Carex vulpinoidea</i>		A sedge	1	Low fields, marsh edges
<i>Carex vulpinoidea</i> v. annecte		A sedge	1	Wooded seeps
<i>Cyperus hystricinus</i>	U	An umbrella-sedge	1	Dry open sandy woods
<i>Cyperus lupulinus</i>		A flatsedge	2	Dry sandy fields and woods
<i>Cyperus retrorsus</i>		A sedge	2	Dry sandy barren fields
<i>Cyperus strigosus</i>		A flatsedge	2	Fields, open floodplain
<i>Eleocharis ovata</i>		Blunt spike-rush	1	Pond banks
<i>Scirpus cyperinus</i>		Woolgrass	1	Marshes, wet openings, below pond
<i>Scirpus polyphyllus</i>		Leafy bulrush	2	Floodplain woods stream edges
<b>DIOSCOREACEAE</b>		<b>YAM FAMILY</b>		
<i>Dioscorea villosa</i>		Wild yam	3	Swamps, rich wods
<b>IRIDACEAE</b>		<b>IRIS FAMILY</b>		
<i>Iris versicolor</i>		Northern blue flag	2	Floodplain swamp, wet woods
<i>Sisyrinchium angustifolium</i>		Blue-eyed grass	2	Open woods, thickets
<b>JUNCACEAE</b>		<b>RUSH FAMILY</b>		
<i>Juncus effusus</i>		Soft rush	1	Wet thickets and woods edges
<i>Juncus tenuis</i>		Path rush	3	Paths, edges, fields
<i>Luzula bulbosa</i>		Bulbous wood-rush	3	Dry woods and thicket edges
<i>Luzula multiflora</i>		Wood rush	2	Wooded banks
<b>LEMNACEAE</b>		<b>DUCKWEED FAMILY</b>		
<i>Lemna minor</i>		Duckweed	1	Pond
<i>Spirodela polyrhiza</i>		Greater duckweed	2	Pond
<i>Wolffia brasiliensis</i>		Pointed water-meal	1	Pond
<b>LILIACEAE</b>		<b>LILY FAMILY</b>		

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Allium vineale</i>	A	Field garlic	3	Woods, edges, old fields
<i>Erythronium americanum</i>		Trout lily	4	Woods, low, slope forest, seep edges
<i>Hemerocallis fulva</i>	A	Orange daylily	1	Field in Central Meadow
<i>Lilium superbum</i>		Turk's-cap lily	3	Swamps, low woods
<i>Maianthemum canadense</i>		Canada mayflower	2	Low woods and wooded seep edges
<i>Medeola virginica</i>		Indian cucumber-root	3	Low to rich woods
<i>Narcissus pseudonarcissus</i>	A	Daffodil	1	Thickets near old house sites
<i>Ornithogalum umbellatum</i>	A	Star-of-bethlehem	1	Thickety woods
<i>Polygonatum biflorum</i>		Solomon's-seal	4	Rich woods, wooded slopes
<i>Smilacina racemosa</i>		False solomon's-seal	4	Woods, rich woods & slopes
<i>Uvularia perfoliata</i>		Perfoliate bellwort	2	Rich woods
<i>Uvularia sessilifolia</i>		Sessile bellwort	3	Low woods
<b>ORCHIDACEAE</b>		<b>ORCHID FAMILY</b>		
<i>Cypripedium acaule</i>	U	Pink lady's-slipper	3	Dry woods
<i>Galearis spectabilis</i>	U	Showy orchis	1	Rich woods pocket
<i>Goodyera pubescens</i>	U	Downy rattlesnake-plantain	3	Dry to rich woods
<i>Habenaria clavellata</i>	U	Small green orchis	3	Wooded seeps
<i>Habenaria flava</i> v. <i>herbiola</i>	R	Tuberculed rein-orchid	1	Floodplain woods on 'hammock'
<i>Tipularia discolor</i>	U	Cranefly orchid	4	Woods, young woods
<b>POACEAE</b>		<b>GRASS FAMILY</b>		
<i>Agrostis gigantea</i>		Redtop	1	Dry fields
<i>Agrostis perennans</i>		Upland bent-grass	1	Dry open woods
<i>Andropogon ternarius</i>		Silver broom-sedge	3	Dry meadows
<i>Andropogon virginicus</i>		Broomsedge	4	Old fields, meadows
<i>Anthoxanthum odoratum</i>	A	Sweet vernal grass	4	Old fields, meadows
<i>Bromus inermis</i>	A	Awnless brome-grass	3	Dry fields, edges, waste ground
<i>Bromus japonicus/commutatu</i>	A	Hairy chess	4	Dry fields, edges, waste ground
<i>Bromus sterilis</i>	A	Barren brome	4	Dry fields, edges, waste ground
<i>Bromus tectorum</i>	A	Hairy chess	5	Dry fields, edges, waste ground
<i>Chasmanthium laxum</i>		Slender sea-oats	2	Low moist to dry woods
<i>Cinna arundinacea</i>		Wood reed-grass	4	Floodplain swamp, slope forest, levee
<i>Cynodon dactylon</i>	A	Bermuda grass	3	Lawns
<i>Dactylis glomerata</i>	A	Orchard grass	4	Old fields, edges
<i>Danthonia spicata</i>		Wild oat-grass	3	Dry open woods
<i>Deschampsia flexuosa</i>	U	Common hairgrass	1	Dry woded banks
<i>Digitaria ciliaris</i>	A	Southern crabgrass	2	Waste ground, roadsides
<i>Digitaria ischaemum</i>	A	Crabgrass	3	Waste ground, roadsides
<i>Digitaria sanguinalis</i>	A	Crabgrass	3	Waste ground, roadsides
<i>Echinochloa crus-galli</i>	A	Barnyard grass	2	Waste ground, roadsides

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Eleusine indica</i>	A	Goose-grass	2	Fields, roadsides, waste ground
<i>Elytrigia repens</i>	A	Witch grass	2	Fields, roadsides
<i>Eragrostis ciliaris</i>	A	Stink grass	2	Dry fields, waste ground
<i>Eragrostis spectabilis</i>		Tumble grass	3	Dry fields
<i>Festuca obtusa</i>		Woodland fescue	3	Rich woods, occ. Swamps
<i>Festuca pratensis</i>	A	Meadow fescue	5	Dry fields, planted and naturalized
<i>Glyceria septentrionalis</i>		Eastern manna-grass	1	Wet thicketed stream near Eveland Ro
<i>Glyceria striata</i>		Fowl manna-grass	5	Floodplain openings, wetlands
<i>Leersia oryzoides</i>		Rice cut-grass	4	Pond edge, open floodplain, ditches
<i>Leersia virginica</i>		White grass	4	Floodplain swamp and woods
<i>Leptoloma cognatum</i>		Fall witchgrass	2	Dry sandy fields
<i>Muhlenbergia schreberi</i>		Nimblewill	2	Lawns, edges, waste ground
<i>Panicum acuminatum</i>		A panic-grass	1	Pine plantation in logged area
<i>Panicum anceps</i>		A panic-grass	1	Dry fields, edges
<i>Panicum boscii</i>		A panic-grass	2	Dry to rich open woods
<i>Panicum clandestinum</i>		Deer-tongue grass	2	Old fields, edges, trailsides
<i>Panicum commonsianum</i>		Common's panic-grass	1	Dry woods edges
<i>Panicum commutatum</i>		A panic-grass	3	Dry fields, wooded banks
<i>Panicum dichotomum</i>		A panic-grass	4	Dry to rich woods
<i>Panicum latifolium</i>		Broad-leaved panic-grass	2	Dry to rich open woods & thickets
<i>Panicum polyanthes</i>		A panic-grass	1	Thickets, young woods
<i>Panicum scoparium</i>		Velvety panic-grass	2	Dry fields, roadsides
<i>Panicum sphaerocarpon</i>		A panic-grass	1	Dry open thickets
<i>Panicum virgatum</i>		Switch-grass	1	Dry fields, roadsides
<i>Paspalum laeve</i>		Bead-grass	1	Dry fields
<i>Paspalum setaceum</i>		Bead-grass	3	Dry fields and trailsides
<i>Phalaris arundinacea</i>		Reed-canary grass	2	Floodplain openings, wet fields
<i>Phleum pratense</i>	A	Timothy	2	Fields
<i>Phragmites australis</i>	A	Giant reed	2	Floodplain openings
<i>Piptochaetium avenaceum</i>	U	Black-seeded needlegrass	1	Wooded bank above floodplain B4/5
<i>Poa annua</i>	A	Annual bluegrass	3	Fields, lawns, trailsides, woods edges
<i>Poa autumnalis</i>		Late bluegrass	4	Floodplain woods, slope forest
<i>Poa compressa</i>	A	Canada bluegrass	3	Woods, edges, trailsides
<i>Poa cuspidata</i>	U	Short-leaved bluegrass	1	Wooded bluff above floodplain B4/5
<i>Poa pratensis</i>	A	Kentucky bluegrass	4	Fields, lawns, roadsides, trailsides
<i>Poa trivialis</i>	A	Rough-stemmed bluegrass	4	Floodplain woods, Piney Branch
<i>Setaria faberi</i>	A	Giant foxtail grass	2	Fields, waste ground
<i>Setaria glauca</i>	A	Yellow foxtail	2	Fields, waste ground
<i>Sphenopholis nitida</i>		Wedge-grass	3	Dry open woods
<i>Sphenopholis pensylvanica</i>	R	Swamp oats	1	Wooded seepage streams & streambank

SCIENTIFIC NAME	STATUS	COMMON NAME	ABUNDANCE	HABITAT
<i>Sporobolus clandestinus</i>	R	Rough dropseed	1	Dry sandy meadow, one colony
<i>Tridens flavus</i>		Purpletop	5	Dry fields, edges, trailsides
<i>Tripsacum dactyloides</i>		Gamma grass	1	Moist roadsides N end
<i>Vulpia myuros</i>	A	Foxtail fescue	3	Dry fields, thicket openings
<b>PONTEDERIACEAE</b>		<b>PICKERELWEED FAMILY</b>		
<i>Heteranthera reniformis</i>		Mud plantain	4	Floodplain swamp, bank of Tuckahoe
<i>Pontederia cordata</i>		Pickerelweed	2	Floodplain swamp and sloughs
<b>POTAMOGETONACEAE</b>		<b>PONDWEED FAMILY</b>		
<i>Potamogeton crispus</i>	A	Crimped pondweed	2	Flowing water, Tuckahoe
<b>SMILACACEAE</b>		<b>GREENBRIER FAMILY</b>		
<i>Smilax glauca</i>		Glaucous greenbrier	5	Woods, edges
<i>Smilax herbacea</i>		Carrion-flower	3	Rich woods
<i>Smilax pseudochina</i>	R	False china-root	1	Swampy woods
<i>Smilax pulverulenta</i>		Hairy carrion-flower	3	Rich to dry woods
<i>Smilax rotundifolia</i>		Round-leaved greenbrier	5	Woods, edges
<i>Smilax walteri</i>		Red-berried greenbrier	1	Floodplain edge of Tuckahoe, S end
<b>SPARGANIACEAE</b>		<b>BUR-REED FAMILY</b>		
<i>Sparganium angrocladum</i>	R	Branched bur-reed	3	Floodplain swamps & sloughs, banks of
<b>TYPHACEAE</b>		<b>CAT-TAIL FAMILY</b>		
<i>Typha latifolia</i>		Cattail	2	Floodplain swamp, pond edge

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**SPECIES**

	Habit	ON 01	ON 02	ON 03	ON 04	ON 05	ON 06	ON 07	ON 08	ON 09	ON 10	OS 01	OS 02	OS 03	OS 04	OS 05	OS 06	OS 07	OS 08	OS 09	OS 10	OS 11	OS 12		
Geum canadense	H												+										R		
Gnaphalium obtusifolium	H	+		R	R				R		2-			2-	2-										
Grass spp.	H												1												
Heterotheca subaxillaris	H	1		2-	+	2+	5	2-			2-	R											2+		
Hieracium scabrum	H			R	+																				
Hypericum perforatum	H		1																				R		
Juncus tenuis	H													+		R									
Lactuca canadensis	H				+						+	R		+									R		
Lepidium virginicum	H					+	+																+		
Leptoloma cognatum	H											2-													
Lespedeza cuneata	H										3					R									
Mollugo verticillata	H			1	R																	1	2		
Moss sp.	NV				3						3			2-	2-							1	+	+	
Mustard sp. (dead)	H														R										
Oenothera biennis	H																					R	R		
Oenothera laciniata	H			R																					
Oxalis dillenii	H		+	+								R	+			1	1	R	1	+	R		R		
Panicum clandestinum	H													R								R			
Panicum dichotomum	H													2-	1							R	+		
Panicum scoparium	H																					R			
Paspalum setaceum	H														R	1	1					1			
Phytolacca americana	H										+											1	5	R	
Plantago lanceolata	H															+						R			
Polygonum aviculare	H																					R			
Polytrichum sp.	NV											2+													
Potentilla canadensis	H																							+	
Rumex acetosella	H	5		4	4	2+	2+		+		3	2-	+	2+		3	4	1	2-		2-	2-	2-		
Rumex crispus	H						R																		
Rumex obtusifolius	H																						R		
Sagina sp.	H					R																			
Scleranthus annuus	H							2-																	
Setaria faberii	H														+							R		+	
Setaria glauca	H																						+		
Solanum carolinense	H	1	+	+	+	+			R	+			R	R								+	R	+	1
Solanum nigrum	H																							1	
Solidago canadensis	H		5								2+		5	1	5		5	2+	2-	R	2-				
Solidago juncea	H		2+	+								2-		2-	3										
Spergularia marina (?)	H											4													
Sporobolus clandestinus	H											1													
Stellaria media	H											R													
Tragopogon sp.	H																						+		
Tridens flavus	H	2-		2-	4							2-	+	+			2-	2-	+	2-			+		

SPECIES	Habit	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OS	OS	OS	OS	OS	OS	OS	OS	OS	OS	OS	OS
		01	02	03	04	05	06	07	08	09	10	01	02	03	04	05	06	07	08	09	10	11	12
Trifolium arvense	H		+	R		1	2+	R	2-			2+				R		R					R
Trifolium campestre	H							1															
Trifolium pratense	H																			+			
Trispacum dactyloides	H							R															
Veronica sp.	H		+																				
Vicia sp.	H		R										+	+		R			1	1	+	+	
Vulpia spp.	H						+	3	3			2+											

## RELEVE DATA FROM WOODY PLOTS (A to F) -WOODY AND VINE SPECIES

SPECIES NAME	Habit	A1/	A1/	A1/	A2/	A7/	A7/	A8/	B2/	B2/	B3/	B5/	B5/	B7/	B11/	B11/	C1/1	D2/	D3/	D5/	E5/	F2/	
		1	2	3	1	1	2	1	1	2	1	1	2	1	1	2		1	1	1	1	1	
Acer rubrum	S1	+		1	+			2-		+				1								1	+
Acer rubrum	S2	3	2+		2-			2+	R		+	R	R	R	R	+	+	+				R	1
Acer rubrum	T2	4		1		2+	2-	2+	2-														
Acer rubrum	T3		3	3	2+	2-	3	2+							1							2-	+
Alnus serrulata	S1					2-																	
Amelanchier arborea	S1												+				+						
Amelanchier arborea	S2										R	1	+		R	1		R					
Aralia spinosa	S1								+		R												
Aralia spinosa	S2								R		+	+											
Aronia arbutifolia	S2								1														
Asimina triloba	S1					3	2+		2-		+						2+						
Asimina triloba	S2	+				1			2-	1	2+	+	2-	1	R		3						+
Betula nigra	S2																						R
Betula nigra	T3		+																				
Campsis radicans	V		1		+	R	+		R									5	3	2+	2-	3	
Carpinus caroliniana	S1							1	4			R	+		+	3	2-	1	+				
Carpinus caroliniana	S2	R				R			1			R			1		1	2-	1	+			R
Carpinus caroliniana	T3	2+		2-		3									1								
Carya cordiformis	S2	R				+			R										R	R			+
Carya pallida	S1												+		1								
Carya pallida	S2													R	1								
Carya pallida	T3													2-									
Carya sp.	T2														2+								
Carya sp.	T3														1								
Carya tomentosa	S1										2-								R	1			
Carya tomentosa	S2								1	+	2-	1		1				1	1	1			
Carya tomentosa	T2	1							3+	1	2+			2+			2-						
Carya tomentosa	T3	+							4	4	2+	2+		1									
Castanea pumila	S2								1	+		R											
Celastrus orbiculatus	V											R	R								R		R
Cephalanthus occidentalis	S1				2-			3															
Cephalanthus occidentalis	S2		+					2-															
Clethra alnifolia	S1					+			4								1						
Clethra alnifolia	S2					R	R		4				+				1						
Cornus florida	S1					2-	1		+	2-		+	1	1									
Cornus florida	S2									R		+					+			R			
Cornus florida	T3											2-	2+				2+						
Cornus stricta	S1					2-	2-																

NUMBER	AREA	DATE	# OF SPECIES	DESCRIPTION (TOP), DOMINANT SPECIES, IF ANY (BOTTOM)
ON02	5X5	8/8/99	18	<i>SOLIDAGO CANADENSIS</i> =5
ON03	5X5	8/8/99	23	<i>CYNODON DACTYLOIDES</i> , <i>RUMEX ACETOSELLA</i> =4
ON04	5X5	8/8/99	22	<i>RUMEX ACETOSELLA</i> , <i>TRIDENS FLAVUS</i> =4
ON05	5X5	8/8/99	18	<i>RHUS COPALLINA</i> =5
ON06	5X5	8/8/99	14	<i>HETEROTHECA SUBAXILLARIS</i> =5
ON07	5X5	8/8/99	14	<i>CAMPSIS RADICANS</i> =5, <i>ASTER PILOSUS</i> =4
ON08	5X5	8/8/99	12	<i>CAMPSIS RADICANS</i> =5, <i>BROMUS JAPONICUS</i> =4
ON09	5X5	8/8/99	12	<i>RUBUS ALLEGHENIENSIS</i> =5, <i>VULPIA SP.</i> , <i>BROMUS SPP.</i> =4
ON10	5X5	11/28/98	23	RISE AT SOUTH END <i>SPERGULARIA MARINA</i> =4, <i>SPOROBOLUS CLANDESTINUS</i>
OS01	5X5	8/7/99	22	WEST FACE OF RISE SOUTH OF SERVICE ENTRANCE <i>AMBROSIA ARTEMISIIFOLIA</i> =3
OS02	5X5	8/29/99	16	<i>SOLIDAGO CANADENSIS</i> =5, <i>LONICERA JAPONICA</i> =4

NUMBER	AREA	DATE	# OF SPECIES	DESCRIPTION (TOP), DOMINANT SPECIES, IF ANY (BOTTOM)
OS03	5X5	8/29/99	24	<i>FESTUCA ELATIOR</i> =5
OS04	5X5	8/29/99	12	<i>SOLIDAGO CANADENSIS</i> =4
OS05	5X5	8/29/99	31	BURNED SHORT SHINING SUMAC THICKET <i>RHUS COPALLINA</i> =5
OS06	5X5	8/29/99	17	<i>SOLIDAGO CANADENSIS</i> =5
OS07	5X5	8/29/99	24	<i>RUBUS FLAGELLARIS</i> =5
OS08	5X5	8/29/99	28	<i>AMBROSIA ARTEMISIIFOLIA</i> , <i>ASTER PILOSUS</i> =4
OS09	10X10	8/29/99	32	TALL SHINING SUMAC THICKET, TREE SEEDLINGS UNDERNEATH <i>RHUS COPALLINA</i> =5
OS10	5X5	8/29/99	17	<i>BROMUS JAPONICUS</i> =5
OS11	5X5	8/29/99	14	OLD DUMP <i>PHYTOLACCA AMERICANS</i> =5
OS12	5X5	8/29/99	17	<i>IPOMOEA HEDERACEA</i> =5

## AA OPEN GROUND REVELES - WOODY AND VINE SPECIES

SPECIES	Habit	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OS	OS	OS	OS	OS	OS	OS	OS	OS	OS	OS		
		01	02	03	04	05	06	07	08	09	10	01	02	03	04	05	06	07	08	09	10	11	12	
Acer rubrum	S2													+										
Ailanthus altissima	S1																				+			
Campsis radicans	V		2-			2-	2+	5	5	+		R				+								
Celtis occidentalis	S2																				R			
Crataegus sp.	S2																				R			
Diospyros virginiana	S2														R						R			
Fagus grandifolia	S2																				R			
Fraxinus pensylvanica	S2																				+			
Ipomoea hederacea	V	2-	+	+	+	+	2-	1	2+	2-		+	1							1	2	4	4	5
Ipomoea panduratus	V						2-																	
Lonicera japonica	V													4							R			
Morus alba	S2												R								R			
Nyssa sylvatica	S2													R										
Parthenocissus quinquefolia	V	R												R	1						+		2+	
Pinus taeda	S2													+										
Polygonum convolvulus	V																							+
Prunus serotina	S2	1		R											R	1					+			
Prunus serotina	S1														2									
Quercus falcata	S2																					1		
Quercus michauxii	S2																					R		
Quercus phellos	S2																					1		
Quercus rubra	S2																					R		
Rhus copallina	S1						3									2						5		
Rhus copallina	S2						5			R						5						1	+	
Rosa multiflora	S2																					+		
Rubus allegheniensis	S2		2-							5		R												
Rubus flagellaris	S2				2+		1								1	+	5	2-						
Rubus occidentalis	S2																					R		
Sassafras albidum	S1														1									
Sassafras albidum	S2														1									
Strophostyles helvola	V								1															
Toxicodendron radicans	V	R												2-	3	1					2+	2-	1	
Vitis aestivalis	V																			R		4		

SPECIES NAME	Habit	A1/ 1	A1/ 2	A1/ 3	A2/ 1	A7/ 1	A7/ 2	AD/ 1	B2/ 1	B2/ 2	B3/ 1	B5/ 1	B5/ 2	B7/ 1	B11/ 1	B11/ 2	C1/ 1	D2/ 1	B3/ 1	D5/ 1	E5/ 1	F2/ 1
Cornus stricta	S2					1																
Crataegus crus-galli v canbyi	S1	+																				
Crataegus intricata	S1											R	R									
Cuscuta gronovii	V		1		4																	
Cuscuta sp.	V									R												
Dioscorea villosa	V					+	R		+													
Diospyros virginiana	S1					+																
Diospyros virginiana	S2	+								R	R	1	1	R	+	+	+	R	R	+		R
Diospyros virginiana	T2					2-																
Euonymus americanus	S1					R	R		+													
Euonymus americanus	S2	1				1			3-	1	+			R	1	1	3	R	+			
Fagus grandifolia	S1					1			1	2-	2-	+	1	1	+	3	2+	+	+			+
Fagus grandifolia	S2		2+	3	1				+	+	R		+	+	+	1	1	+	1	R		R
Fagus grandifolia	T2									3						5	2-	2+				
Fagus grandifolia	T3								1	1	1			1	2-	+	3					
Fraxinus pennsylvanica	S1		2+	+	1	+	2-	1	R									R			+	
Fraxinus pennsylvanica	S2	2-						+	R										1	+		R
Fraxinus pennsylvanica	T2	3	4	4		4	4															
Fraxinus pennsylvanica	T3		+		2-			2-														
Gaylussacia baccata	S2								2-		2+				+	2+						
Gaylussacia frondosa	S2																2-					
Ilex decidua	S1		1														R					
Ilex decidua	S2	2-																				
Ilex opaca	S1	+				1						1		2-	2-	3		R				
Ilex opaca	S2							R	R	R	R	1	1	+			+	R	R	R		
Ilex opaca	T3								2+					2-			1					
Ilex verticillata	S1	1					1	1	R													
Ilex verticillata	S2					R				1										R		
Ipomoea pandurata	V													R		R				R		
Itea virginica	S1							2-														
Itea virginica	S2	2-				R																
Juniperus virginiana	S1								+		R								1			
Juniperus virginiana	S2								R				R						+	R		
Kalmia latifolia	S1									+					5							
Kalmia latifolia	S2									R					1							
Leucothoe racemosa	S1				1			3														
Leucothoe racemosa	S2									1						+						
Lindera benzoin	S1			2-		3	4															
Lindera benzoin	S2			1		2-												+				

## RELEVE DATA FROM WOODY PLOTS (A to F) - HERBACEOUS SPECIES

SPECIES NAME	Habit	A1/	A1/	A1/	A2/	A7/	A7/	A8/	B2/	B2/	B3/	B5/	B5/	B7/	B11/	B11/	C1/1	D2/	D3/	D5/	E5/	F2/
		1	2	3	1	1	2	1	1	2	1	1	2	1	1	2	1	1	1	1	1	1
<i>Achillea millefolium</i>	H																	+				
<i>Alisma subcordatum</i>	H				R																	
<i>Allium vineale</i>	H																	+			R	+
<i>Ambrosia artemisiifolia</i>	H																	R			+	+
<i>Amphicarpa bracteata</i>	H					+																
<i>Anemone quinquefolia</i>	H					+																
<i>Anthoxanthum odoratum</i>	H																	+				
<i>Arabis canadensis</i>	H								+													
<i>Arabis lyrata</i>	H								+													
<i>Aralia nudicaulis</i>	H																3					
<i>Arisaema triphyllum</i>	H			+	2-	2-			R		R						+	R			+	
<i>Arisaema triphyllum v. pusillum</i>	H						1															
<i>Aristolochia serpentaria</i>	H								+			R							R			
<i>Asclepias amplexicaule</i>	H																					+
<i>Asclepias variegata</i>	H								R													
<i>Asplenium platyneuron</i>	H					R			R									R	2-		1	+
<i>Aster lateriflorus</i>	H	4-	2+	3																		
<i>Aster sp.</i>	H					R	+															
<i>Athyrium filix-femina</i>	H					R	+															
<i>Bidens frondosa</i>	H							2-														
<i>Boehmeria cylindrica</i>	H	2-	2-	2-	2+	+	+	1														
<i>Botrychium dissectum</i>	H																				R	
<i>Botrychium virginianum</i>	H					R	+															
<i>Callitriche palustris</i>	H	+																				
<i>Cardamine hirsuta</i>	H										R							+			+	+
<i>Carex abscondita</i>	H								+	+							R					
<i>Carex alata</i>	H										+											+
<i>Carex amphibola</i>	H	1																				
<i>Carex bromoides</i>	H					1																
<i>Carex cephalophora</i>	H								+												R	
<i>Carex crinita</i>	H			R	+		R	+														
<i>Carex intumescens</i>	H			R																		
<i>Carex laevivaginata</i>	H						R															
<i>Carex laxiflora</i>	H								R													
<i>Carex lupulina</i>	H	1	1	R			1															
<i>Carex lurida</i>	H				+																	
<i>Carex montanae group</i>	H												+								1	
<i>Carex muhlenbergii</i>	H																				+	