

# Selection and Planting Guide for Aquatic and Wetland Plants in the Piedmont Region of North Carolina

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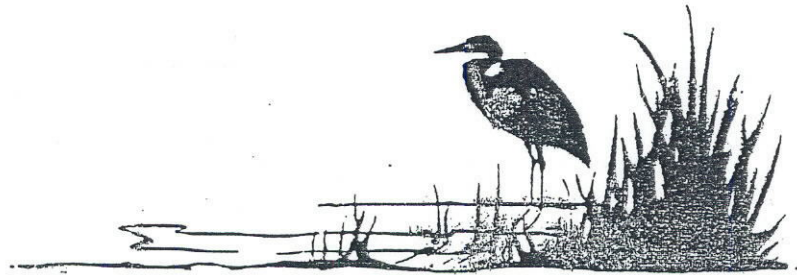
*Mecklenburg County  
Engineering & Building Standards Department  
Land Development Services*

by

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Habitat Assessment and Restoration Program  
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## INTRODUCTION

This booklet was produced at the request of the Mecklenburg County Engineering & Building Standards Department. Land Development Services, in response to an increasing need for specific information about wetland and aquatic plants that may be used in water quality best management practices (BMPs) that are required as part of some land development plans. The information can also be used for stream and pond restoration, stream enhancement, erosion control of stream banks, and wetland mitigation.

Our list is selected to represent some of the best suited species for the Piedmont region of North Carolina. In addition, almost all are readily available and easy to work with.

The booklet is intended to be a guide for engineers, designers and landscapers who need specific information on characteristics of plants and how to space them in a particular landscape setting. Various information about the form, character, growth rate, and uses of each species is included. It may also be useful for botanists, horticulturists and ecologists. The information presented is based on first-hand observation supplemented by data from other published books.

Additional species of plants may be well suited to our region, and may provide landscape uses in significant demand by our audience. Nevertheless, this selection is a first approximation, and will likely be supplemented and enlarged as more experience is gained. There is little published information on actual performance of aquatic and wetland plants in the South, and for this reason we offer this compilation as an experiment and a beginning, with necessary refinement and correction coming after practical experience with the plants in various situations. We would be pleased to learn of successes and failures regarding these or other species of plants in the South, and would gladly receive comments on our recommendations.

Some of the species in this booklet (e.g., *Eleocharis quadrangulata*) are currently available in very limited quantities from commercial sources. By pointing out the potential usefulness of these species, we hope to encourage nurseries to begin to propagate them and make them available.

We recommend that project planners obtain plants from nurseries as close to their project site as possible, ensuring that the plants are adapted to the regional climatic conditions. It is also advisable that large numbers of individual plants be ordered from wholesale nurseries well in advance to ensure availability. One year's notice is not too long if certain species must be custom propagated. A few species are available only as liners or plugs; these would have to be grown for a season before they could be installed in a landscape setting. Knowledge of sizes and numbers needed is critical to a successful



landscape installation. Consideration for timing of plant arrival and condition of plants (whether bare root or container-grown) is critical in project planning.

Plants have seasonal needs and cannot be effectively utilized during all months of the year. Engineers and planners often have other parameters that limit or determine the sequence and timing of their projects. Early consultation and consideration of as many factors as possible will result in the most efficient and effective project completion.

Nursery sources known by us as of 5-1-96 are listed on page 26 and the table on page 27 indicates the available forms of species described in this booklet.

## **PLANTING AND HANDLING NEWLY ACQUIRED AQUATIC PLANTS**

### **Plants received as Liners or Plugs**

Some comments and suggestions on handling aquatic plants may be useful here. Plants received as liners or plugs are actually small seedlings or cuttings, and would normally need to be held and grown for at least a year before use in a landscape situation. One would need tanks or plastic-lined beds in which a suitable level of water could be maintained, generally enough to at least cover the roots of the aquatic plants. Water-lilies, on the other hand, would need several inches of deep water. The tank or bed should be such that they are situated in full sun, where fertilizer could be applied, and where weeding and other maintenance could be performed. We have used inexpensive 2' X 2' by 6" deep plastic cement-mixing trays for holding and growing-on various size nursery stocks. A liner purchased for \$.60 could be a quart plant worth \$1.50 after one summer of optimum growth, and could be installed in late summer.

NOTE: Plants received in dormancy are easier to hold and maintain than those received in active growth. Dormant plants should be kept as cool as possible. Active plants should be treated especially carefully as a few hours of drying out could permanently injure them.

Upon arrival of sizable new plants from a supplier, the specimens would need to be properly maintained until they could be installed in their permanent positions in the landscape. If they are going into beds for growing on to even larger sizes, this should be done immediately. If plants are to be held a while before landscape installation, hopefully a matter of only hours or days, they should be removed from their packing and the roots placed in a suitable situation so as to keep them wet or moist. Truly aquatic plants should have their roots submersed in water, and spread out so they are not crowded. Broken parts should be carefully cut off and discarded. Plants suitable for moist soils, or even normal soils, should have their roots covered entirely by a moist medium: soil, sawdust, mulch or the like. Here again, the plants should be separated, cleaned of broken parts, and spread out as much as possible before "healing in" by



covering with moist medium in a container or bed, or by being placed into excavations in a pile of suitable medium. Even under these circumstances, the plants may need to be watered regularly so as not to dry out. It is especially important not to assume the roots are moist just because they are covered with moist medium. Exposed leaves can still lose water during hot spells, and the roots may not have enough free water around them to remain uninjured. Check your plants frequently to avoid disappointment: it is not good enough to say "I *thought* they would be moist enough in the sawdust." Likewise, aquatic plants placed into water tanks should be checked, because the water could dry up in hot weather, especially with numerous temporarily inserted plants sucking up the water.

### **Container and Bare Root Plants**

Plants received as container plants in quarts or gallons are usually larger than plugs and liners. They would be more costly to acquire because of their larger size and much heavier root mass for shipping. Container-grown plants would not normally be shipped; but could be appropriate and cost-effective if they could be picked up from a nursery. Bare-root plants may be large, but they will have no soil around the roots. Bare root plants are intended for immediate placement in the landscape, or suitably healed in for planting a few days hence. If bare-root specimens are not to be used within 4 days, they should be planted in suitable beds with the assumption that it will be a while before they can be used, and they should be provided with conditions making it possible for them to survive and grow as optimally as possible. Container plants will need to be watered regularly, perhaps several times a day if the weather is hot. They may be kept in shady conditions for a day or two. Otherwise, it would be wise to set the pots into tanks or tubs with several inches of water so there is not chance of the root ball drying out. Aquatic plants do not always recover readily from drying out, and great care should be given to keep them wet at all times. Weakened plants are more susceptible to herbivore damage and may take longer to become established in the landscape.

### **Transplanting from the Wild**

It is quite possible to transplant aquatic plants locally from the wild for use in a specific landscape installation. As long as they are common plants, aquatics usually grow rapidly and recover from transplanting in one season. Likewise, the wild population from which the material was obtained should recover as long as not more than one half of the volume of plants are removed, and this should be done in an alternating manner so that clumps of plants remain scattered throughout the habitat to replenish the stock. Some useful aquatics may be available only as locally transplanted specimens (e.g., *Eleocharis quadrangularis*). At least they will be better suited to the climate than stock from some far off nursery. Transplanted specimens should be installed immediately, if possible, moving directly from the wild site to the installation site, so as to do the least damage to the natural root-soil associations. The aforementioned large plastic 2' X 2' cement-mixing trays has been useful to us in transporting wild-dug specimens. We have also



utilized heavy-duty sharp-edged soil knives (available from Ben Meadows Company, Atlanta, GA: 1-800-241-6401) as digging implements for removing and installing root masses.

### General Planting Guidelines

In all cases, newly planted plants may need to be fastened to the substrate to allow them to establish new roots without danger of floating to the surface or washing away as water levels fluctuate. There is no way, for example, to plant a water-lily rhizome in two feet of water without something to weigh it down in the soil until it roots -- it will just come lose and float to the surface. Pinning the pieces down with bent wire pins (12") (available from Smith & Richardson Mfg. Co., Inc., Geneva, IL; 1-800-426-0876) have worked well, after digging a hole, inserting the plant root, and then covering the hole. Covering a root with a brick, or fastening heavy lead weights to the plants may be suggested, but these techniques may be awkward to manage in deep water or in a large installation. Cutting slits through netting and meshes covering a bank or soil shelf may allow plant roots to be inserted and pinned and help to stabilize the entire setting.

Cutting back tall and easily broken leaves and stems at the time of transplanting is a good practice, as broken or bruised parts will allow decay to spread into the plant more readily. Healthy plants will grow back quickly in warm weather from their underground creeping stems or crowns. Broken parts could cause the unestablished plant mass to be picked up by water currents and lead to disturbance. Cut back parts to undamaged tissue, leaving as much green basal tissue as possible above the roots.

While aquatic and wetland plants are generally sun-loving, newly received nursery stock and disturbed transplants should not be exposed to hot direct sun any more than necessary until they are placed in their permanent positions. If they are to be kept for a few hours or a day, full shade is adequate; if they must be kept for more than 4 days, they should be treated as if they are being permanently planted in a temporary bed, and placed in good soil, in full sun and watered well. It is surprising how many new roots can form during warm weather on a set of transplants.

Aquatic and wetland plants respond well to fertilizer, and applying it may significantly increase the rate of growth and establishment. Obviously, liquid fertilizer is not suitable in an open wetland, but dry fertilizer tablets or spikes may be inserted near the plants at the time of transplanting.

While landscape designers and engineers can work on plans and land can be reshaped at almost any time of year, there are optimal seasons for plant installation. Aquatic plants are slow to start growing in the spring because it takes longer for water to heat up than for soil. Thus, it is not desirable to transplant in winter or early spring. March-April are good times to transplant such that the plants are ready to start growing



and will not sit dormant for any length of time. Likewise, plants can be transplanted all summer until September since most aquatics grow continuously. As temperatures start to fall in autumn, water stays warmer longer than soil and so growth of roots can continue into October. However, it is less desirable to transplant as plants are going into dormancy, especially if one desirable factor is that the plants will be expected to grow into the substrate and help prevent erosion. This type of actively growing plant should be transplanted only during active growing season. On the other hand, dormant twigs and stems as fascines and live stakes can be inserted while dormant in late spring. This is a much better time than doing it in fall or winter. Much experimental work needs to be done utilizing fascines and live stakes in the South as far as suitable plants and time of year of installation.

### **Predators**

Aquatic plants are favorite foods of several destructive aquatic animals. Muskrats and Canada Geese are especially troublesome as they will eat roots stems, and leaves of most aquatic plants. They are somewhat less likely to eat established plants, and are more likely to devour newly disturbed plants with succulent roots. Care should be taken to rid the area of such animals, or try and fence off the newly planted aquatics for a growing season. Plastic landscape fencing may make a suitable barrier to keep out animals if staked to posts surrounding the planting area; the fencing may even be placed under water to foil muskrat activity. There are poison baits and chemical repellents, but these should be used with caution and discretion depending on local laws and use of the area by people and desirable animals. NOTE: It is usually unreasonable to expect establishment of most aquatic plants if muskrats are in the area.

## **FORMAT**

This booklet is organized with a single-page entry for each plant species. This page begins with a general description for each species. The page also includes relevant information that is organized into the following categories: characteristics (including growth, planting, and habitat), wildlife benefits (including food and cover) and aesthetic benefits (including flowers, foliage, form, and maintenance concerns).

### **Description**

The descriptions provide general information for each species including whether typical habitat is moist soil (e.g., a wetland) or an actual aquatic environment with standing water (e.g., emergent). If the plant grows in standing water, it may be emergent meaning rooted in the soil below water and rising some distance above the water surface; or floating, with leaves actually resting on the water surface. No free floating or submerged species are listed in this compilation.



All species presented in this booklet are herbaceous, that is none have woody stems or twigs that are persistent, and thus they will die down to the ground, more or less, in winter. All species are also perennial, meaning they live, grow, and bloom for potentially many seasons after establishment; none are annual, living only one year, or biennial, living only two years. Since all these species are perennial, their underground roots and stems (rhizomes or crowns) would remain alive to sprout back the following season. All of these species are known to be quite hardy and should tolerate air temperature to zero degrees Fahrenheit or below. In some cases, hard, or especially prolonged, freezing of the roots or underground stems could be fatal.

Each species may be evergreen, with leaves remaining distinctly green and noticeable throughout a normal winter, or not evergreen, meaning the above ground parts normally turn brown and are essentially dead after the first hard freeze.

### **Growth, Planting, and Habitat**

Growth information presented for each species includes the plant form or appearance (clump or scattered), height at maturation, rate of spread, and method of spreading. Planting and habitat information includes a guide for how close to place the plants for cover of planting space. Commercial availability of plant forms and various plant sizes is indicated by the number that corresponds to the commercial nursery list on page 22 of this booklet. Environmental needs such as water depth and desired or tolerated, sun or shade requirements are also provided. In addition, the general community or habitat types as well as the geographical range are provided for each species. Wide-ranging species may vary in their cold hardiness or heat tolerance, depending on where the plants originated.

### **Wildlife and Aesthetic Benefits**

Notes on use by wildlife give an indication of the value of each species in the natural environment and what animals might be attracted or enhanced. Aesthetic Qualities such as showy flowers, color of foliage and general form or appearance are provided. Maintenance concerns are presented last on the plant information page and provide information on what you may do, or should not do, to the plants. This section should be revised and enlarged as data is known. Future notes may give valuable information on plant performance and handling.

## **ILLUSTRATIONS**

A line drawing is provided for each species. These were made by Sheva Myers who looked at dried herbarium specimens, illustrations in other books, and 2"X2" slides. In a few cases, living material was observed. An indication of scale size is given on each illustration. General form and appearance are emphasized, not details of technical

botanical characters. See the books listed in the references section for other sources of illustrations and botanical descriptions.

### PLANT CHARACTERISTICS REFERENCE CHART

A Plant Characteristics Reference Chart has been provided on Page 21 of this booklet. For each species presented in this booklet, this chart provides the following plant characteristics information: light requirements; height at maturation; spreading rate; optimal water depth; and flowering characteristics.

### PLANTING ZONE GUIDES AND SAMPLE PLANTING PLAN

Planting Zone Guides presented by species and by zone are provided on pages 22 and 23 of this booklet. The Sample Planting Plan has been provided on page 24 of this booklet and shows how a typical wet pond could be designed to meet the requirement that watershed protection wet ponds' littoral shelves be planted with aquatic vegetation (see Charlotte-Mecklenburg Storm Water Design Manual, Chapter 9). The list of plants for the pond's various moisture regimes is a suggestion only.



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3. Bushy Beardgrass (*Andropogon glomeratus*)
4. Tussock Sedge (*Carex stricta*)
5. Dwarf-bamboo, Three-way Sedge (*Dulichium arundinaceum*)
6. Spikerush (*Eleocharis quadrangulata*, or perennial *Eleocharis* spp.)
7. Yellow Iris, Yellow-flag (*Iris pseudacorus*)
8. Blue-flag Iris, Southern Blue Flag (*Iris virginica*)
9. Soft Rush (*Juncus effusus*)
10. Rice Cutgrass (*Leersia oryzoides*)
11. White Water-lily (*Nymphaea odorata*)
12. Switchgrass (*Panicum virgatum*)
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17. Wool-grass (*Scirpus cyperinus*)
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19. Cattail (*Typha* spp.)
20. Ironweed (*Vernonia noveboracensis*)

PLANT CHARACTERISTICS REFERENCE CHART (page 21)

PLANTING ZONE GUIDES AND SAMPLE PLANTING PLAN (pages 22-24)

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# 1. *Acorus calamus*

Sweetflag

## CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - Perennial - not-evergreen

## GROWTH

Form: spreading colony of erect, narrow leaves  
Mature Size: 1 to 3 ft. tall  
Rate of spread: moderate colony forming.  
Method of spreading: underground stem

## PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	2 ft. OC
in 2 years	3 ft. OC
in 3 years	4 ft. OC

Forms available: bare root plant (1, 2, 4, 6)  
& Sources container plant (1, 2, 4, 5)

Sizes Available: large (1, 4,)   
med (2, 5)   
liner (1)

Water depth tolerated: wet soil;  
up to ½ ft. permanent inundated

## HABITAT

Community: fresh water marshes  
shallow water in ponds and lakes

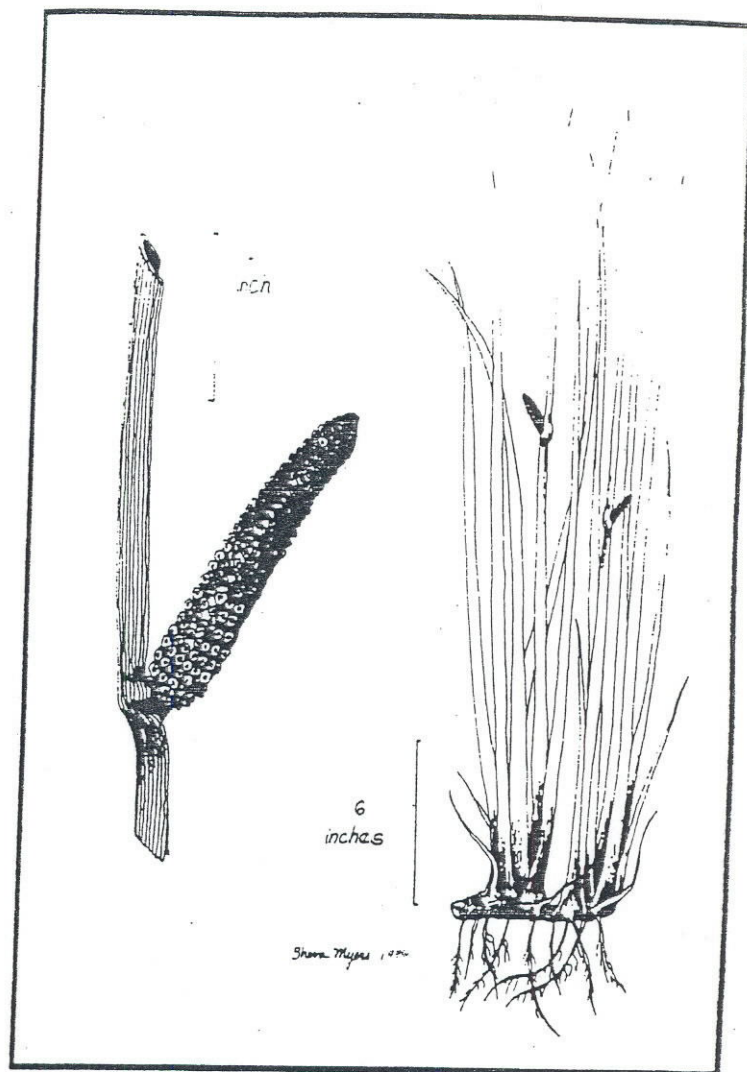
Distribution: throughout eastern North America

Shade: tolerates very light shade, ½ day sun

## WILDLIFE BENEFITS:

Food: Leaves and root may be eaten by  
waterfowl and muskrat.

Cover: Makes small colonies with minimal cover.



*Acorus calamus*

## AESTHETIC BENEFITS:

Flowers: Flowers not showy, on dense 1-2" spike surrounded by green, leaf-like spathe, remains hidden within leafy mass.

Foliage: stiffly erect iris-like leaves, to 3 feet tall; conspicuous all growing season.

Form: Large clumps of medium to light green, of medium texture.

Maintenance concerns: Normally, a tough, adaptable plant that may do well in light shade.



## 2. *Alisma subcordatum*

Water-plantain (also *Alisma plantago-aquatica*)

### CHARACTERISTICS:

Emergent from standing water  
Herbaceous - Perennial - not-evergreen

### GROWTH

Form: clump-forming, with erect spreading leaves  
Mature Size: 1 to 2 ft. tall, 2 ft. wide  
Rate of spread: slow from orig. clump  
                  enlargement fast from seedlings  
Method of spreading: seedlings, may be sparse to  
                                  numerous

### PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	1 ft. OC
in 2 years	2 ft. OC
in 3 years	3 ft. OC

Forms available: bare root plant (4,6)  
& sources container plant (4)

Sizes Available: gallon pot (4)

Water depth tolerated: wet soil;  
up to 1 ft. permanent inundation

### HABITAT

Community: fresh water marshes  
shallow water in ponds and lakes  
may be quite common in ditches

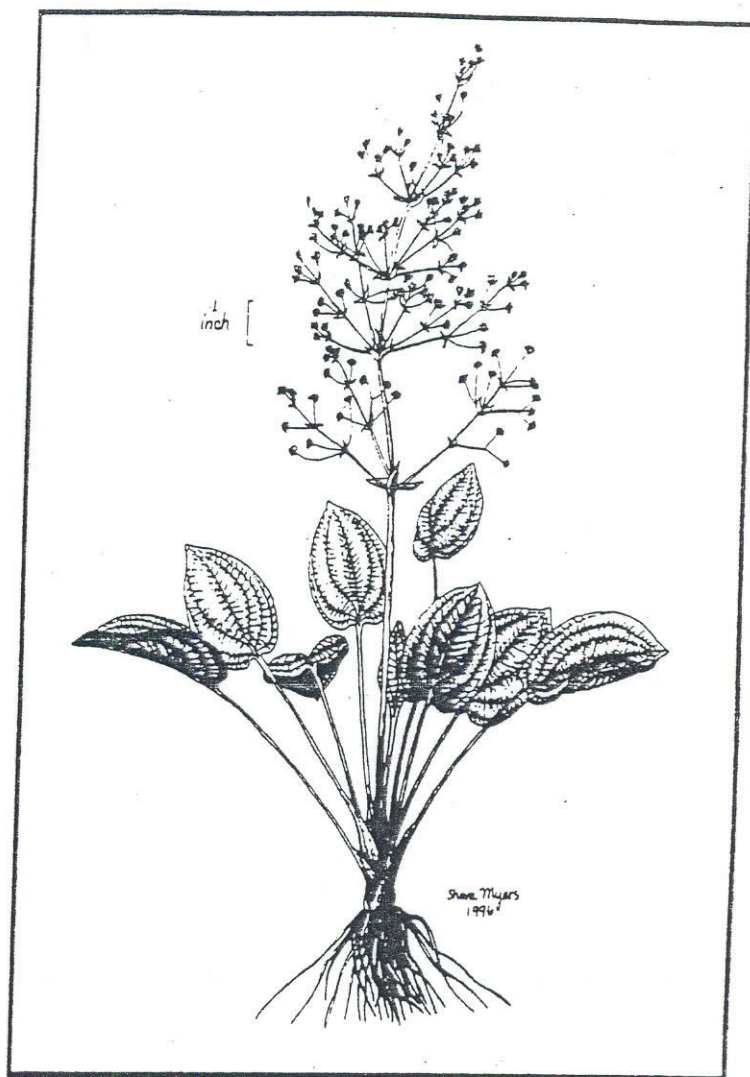
Distribution: throughout eastern North America

Shade: Full sun to very light shade, ½ day sun.

### WILDLIFE BENEFITS:

Food: Seeds may be eaten by waterfowl &  
pheasants.

Cover: Makes dense cover in moist to wet areas.



*Alisma subcordatum*

### AESTHETIC BENEFITS:

Flowers: Flowers are tiny, about ¼" wide, white to pink, in profusely branched terminal clusters. They give rise to tiny seed heads.

Foliage: broad leaves to 8" wide on long stalks, appearing light to dark green all season.

Form: Large clumps of coarse texture.

Maintenance concerns: Normally, a tough, adaptable plant that prefers full sun but may do well in very light shade. Do not mow or disturb.

### 3. *Andropogon glomeratus*

Bushy Beardgrass

#### **CHARACTERISTICS:**

Moist soil

Herbaceous - perennial - not-evergreen

#### **GROWTH**

Form: clump, tuft

Mature Size: 1 to 6 ft. tall, clump to 1 ft. wide

Rate of spread: slow from original clump;  
fast from seedlings

Method of spreading: seedlings, may be sparse to  
numerous

#### **PLANTING**

Suggested spacing:

for uniform ground cover

plant at

in 1 year

1 ft. OC

in 2 years

1½ ft. OC

in 3 years

1½ ft. OC

Forms available: container plant (2)  
& sources

Sizes Available: quart (2)  
liner (2)

Water depth tolerated: average soil;  
moist with periodic flooding & drying

#### **HABITAT**

Community: fresh water marshes  
moist banks of ponds and lakes  
may be quite common in ditches

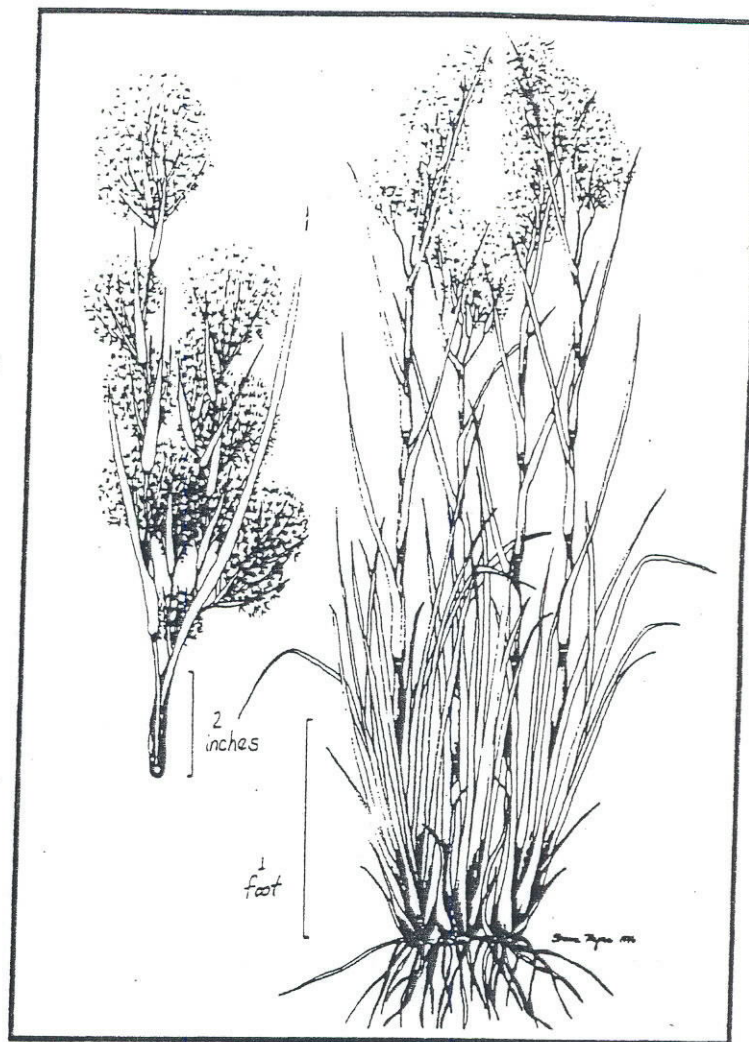
Distribution: throughout eastern United States

Shade: Full sun.

#### **WILDLIFE BENEFITS:**

Food: Seeds may be eaten by gamebirds &  
songbirds; leaves by deer.

Cover: May quickly invade a disturbed moist site  
and form a mass of striking tall plants.



*Andropogon glomeratus*

#### **AESTHETIC BENEFITS:**

**Flowers:** Flowers are not showy, as with most grasses; but in fall the seed heads ripen into striking fluffy white plumes on tall tan sprays.

**Foliage:** narrow grass-like leaves in clumps to 4 feet high, light green until fall, then tan.

**Form:** Medium clumps of fine texture. Remains well into winter as handsome tall fluffy plumes.

**Maintenance concerns:** Normally, a tough, adaptable plant that does best in full sun. May become invasive by seed. Mowing not advisable.



## 4. *Carex stricta*

Tussock Sedge

### **CHARACTERISTICS:**

Emergent from shallow water  
Herbaceous - Perennial - not-evergreen

### **GROWTH**

Form: Tuft, with erect narrow spreading leaves  
Mature Size: 1-2 ft. tall, 1-3 ft. wide  
Rate of spread: slow from original clump;  
fast from seedlings  
Method of spreading: seedlings, may be sparse to numerous

### **PLANTING**

Suggested spacing:

for uniform ground cover	plant at
in 1 year	1 ft. OC
in 2 years	1½ ft. OC
in 3 years	1½ ft. OC

Forms available: container (2)  
& sources plug (2, 8)

Sizes Available: quart (2)  
2" plug (2, 8)

Water depth tolerated: wet soil;  
up to ½ ft. permanent inundation

### **HABITAT**

Community: fresh water marshes & swamps  
forested & shrubby wetlands, bogs

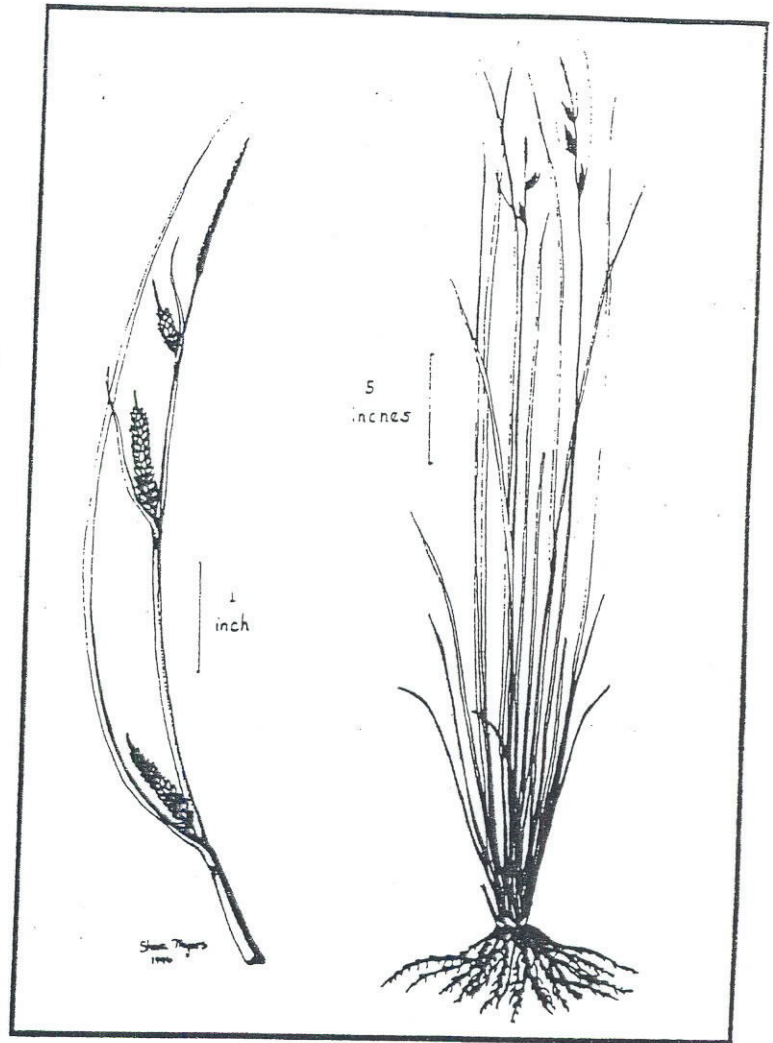
Distribution: northeastern United States, to NC

Shade: Full sun to light shade.

### **WILDLIFE BENEFITS:**

Food: Seeds eaten by waterfowl, gamebirds,  
upland birds, & small mammals;  
leaves by small mammals & deer.

Cover: Makes dense cover in moist to wet areas  
for ducks and small mammals.



*Carex stricta*

### **AESTHETIC BENEFITS:**

Flowers: Flowers are in tiny clusters on stems,  
not showy. Seeds "heads" are more conspicuous.

Foliage: Narrow light to dark green leaves to 3 ft.  
long, in dense clumps. Turn tan in winter.

Form: Large clumps may appear as graceful  
arching-mounding forms of fine texture.

Maintenance concerns: Normally, a tough,  
adaptable plant that prefers full sun but may do  
well in very light shade. May mow after frost.

## 5. *Dulichium arundinaceum*

Dwarf-Bamboo, Three-way Sedge

### CHARACTERISTICS:

Emergent from shallow water

Herbaceous - Perennial - somewhat-evergreen

### GROWTH

Form: slowly spreading mass

Mature Size: 1-3 ft. tall

Rate of spread: moderate to slow from clump

Method of spreading: creeping underground stems

### PLANTING

Suggested spacing:

for uniform ground cover

in 1 year

in 2 years

in 3 years

plant at

1 ft. OC

1½ ft. OC

2 ft. OC

Forms available: container (1,3,5)  
& sources liner (1)  
bare root (6)

Sizes Available: quart (5)  
liner (1)

Water depth tolerated: wet soil;  
up to 1 ft. permanent inundation

### HABITAT

Community: fresh water marshes and  
edges of streams and swamps,  
mixed with other plant species

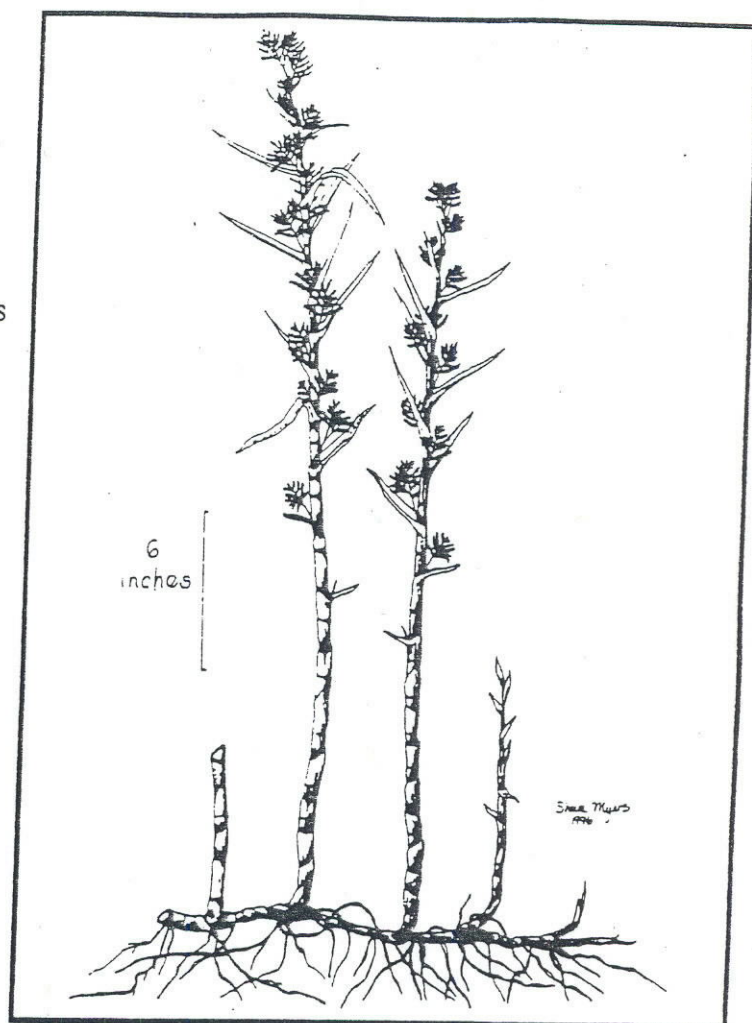
Distribution: throughout eastern North America

Shade: Full sun to very light shade.

### WILDLIFE BENEFITS:

Food: seeds - waterfowl, gamebirds, upland  
birds, small mammals,  
leaves - small mammals, deer

Cover: Makes dense cover in moist to wet areas  
for ducks and small mammals.



*Dulichium arundinaceum*

### AESTHETIC BENEFITS:

Flowers: Flowers in tiny clusters on stems,  
among leaves. Seeds may be reddish.

Foliage: 2-4" dark green leaves appear to arise  
from triangular stem in three equal directions.

Form: Handsome dark green masses of medium  
upright texture; turn tan in fall.

Maintenance concerns: Somewhat difficult to  
transplant from the wild and does not compete  
well; but persistent once established. Easily  
bruised and toppled. May mow after frost.



## 6. *Eleocharis quadrangulata* Square-stem Spikerush

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - Perennial - not-evergreen

### GROWTH

Form: slowly spreading tufted mass  
Mature Size: 1-3 ft. tall  
Rate of spread: moderate from orig. clump  
Method of spreading: creeping underground stem

### PLANTING

Suggested spacing:

for uniform ground cover	plant at
in 1 year	1 ft. OC
in 2 years	1½ ft. OC
in 3 years	2 ft. OC

Forms available: not available commercially  
& sources others spikerushes are  
available as container (7)  
or bare root (6, 7, 9)

Note: this species needs to be propagated and  
made available

Sizes Available: gallon (7)  
bare root liner (6, 9)

Water depth tolerated:  
shallow, up to 1 ft. permanent inundation

### HABITAT

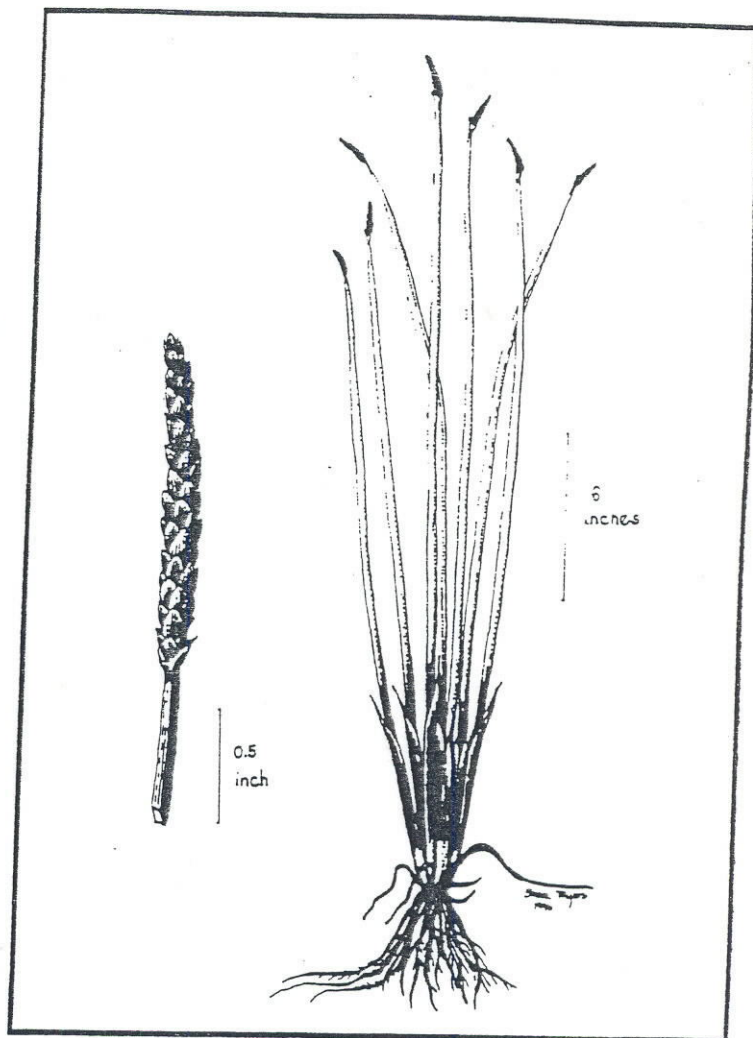
Community: fresh water marshes  
edges of ponds in distinct zone,

Distribution: throughout eastern United States

Shade: Full sun.

### WILDLIFE BENEFITS:

Food: seeds - waterfowl, gamebirds, upland  
birds, small mammals,  
leaves - small mammals, deer  
Cover: Makes cover in moist to wet areas for  
ducks and small mammals.



*Eleocharis quadrangulata*

### AESTHETIC BENEFITS:

Flowers: Flowers in tiny clusters on stem tips,  
not showy; may turn whitish upon aging.

Foliage: 1-2 foot very thin green leaves stand  
stiffly erect in masses or zones in shallow water.

Form: Unusual rigid texture; no evident leaves  
amid the spaghetti-thin "square sticks".

Maintenance concerns: Easy to transplant in  
"sods" from the wild, establishes well. Should be  
commercially propagated. Easily bruised and  
toppled. May mow after frost.

## 7. *Iris pseudacorus* Yellow Iris, Yellow-flag

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - Perennial - mostly-evergreen

### GROWTH

Form: fast growing mass  
Mature Size: 2-4 ft. tall  
Rate of spread: fast from orig. clump, 1-3 ft./year  
Method of spreading: creeping, thick, underground stem

### PLANTING

Suggested spacing:

for uniform ground cover	plant at
in 1 year	2 ft. OC
in 2 years	4 ft. OC
in 3 years	6 ft. OC

Forms available: container (2,4)  
& sources liner (1, 8)  
bare root (2,4,6)

Sizes Available: gallon (4)  
bare root (1, 2, 6)  
bare root larger (4)  
liner (1, 8)

Water depth tolerated: moist to saturated soil;  
shallow, or up to 1 ft. permanent inundation

### HABITAT

Community: fresh water marshes  
edges of ponds and lakes

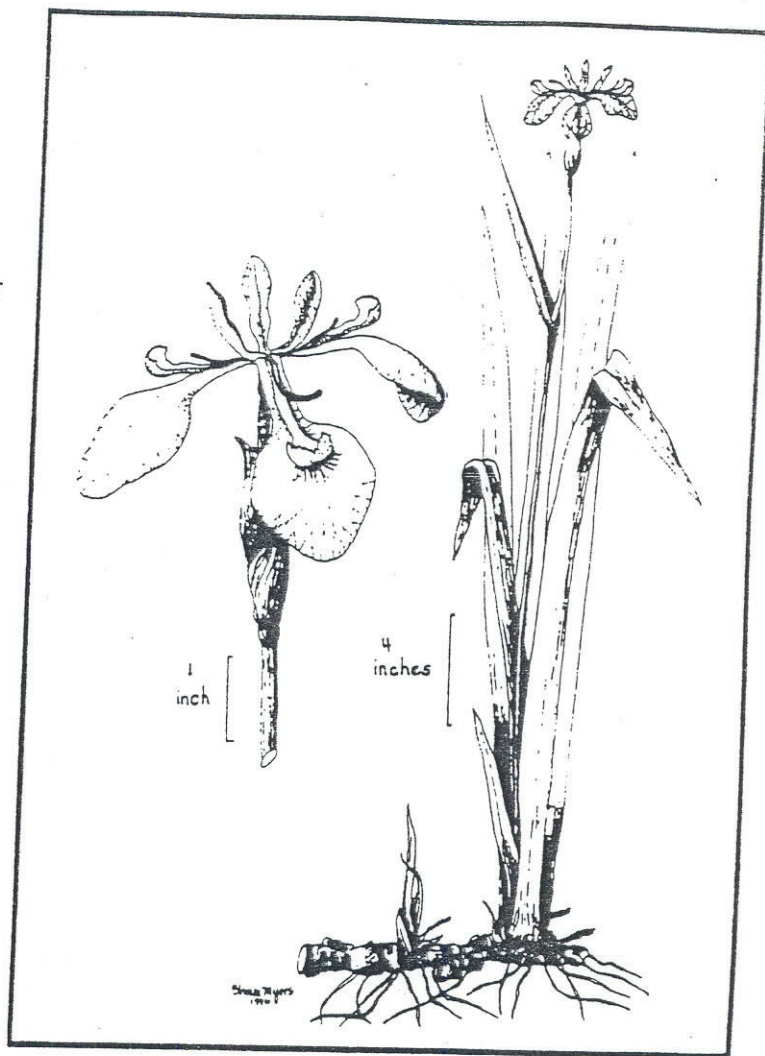
Distribution: introduced from Eurasia, widely  
naturalized in northeastern United States;  
rare in the Southeast outside cultivation

Shade: Full sun to light shade.

### WILDLIFE BENEFITS:

Food: Insects may visit flowers. Muskrats may  
eat underground stems.

Cover: Adds to general marsh cover.



*Iris pseudacorus*

### AESTHETIC BENEFITS:

Flowers: Large, showy yellow flowers are  
produced in May-June; not always conspicuous.

Foliage: 2-4 foot 1" wide dark green sword-like  
leaves in clumps. Remains green in mild winters.

Form: Dull, dark green leaves stand erect in  
masses and make an impressive sight along pond  
margins. More robust than other wild irises.

Maintenance concerns: Easy to transplant and  
establish. May be eaten by muskrats. May be  
aggressive and overgrow smaller forms nearby.



## 8. *Iris virginica*

Blue-flag Iris (Southern Blue Flag)

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - Perennial - not-evergreen

### GROWTH

Form: mass of narrow erect leaves  
Mature Size: 2-3 ft. tall  
Rate of spread: moderate from orig. clump  
Method of spreading: creeping underground stem

### PLANTING

#### Suggested spacing:

for uniform ground cover	plant at
in 1 year	1 ft. OC
in 2 years	2 ft. OC
in 3 years	3 ft. OC

Forms available: container (2,4,7)  
& sources liner (1, 8)  
bare root (2,4,6,7)

Sizes Available: gallon (4, 7) quart (2)  
bare root (2, 6, 7)  
bare root larger (4)  
liner (1, 8)

Water depth tolerated: moist to saturated soil;  
shallow, up to ½ ft. permanent inundation

### HABITAT

Community: fresh water marshes  
edges of ponds and lakes  
coastal savannahs and wet ditches

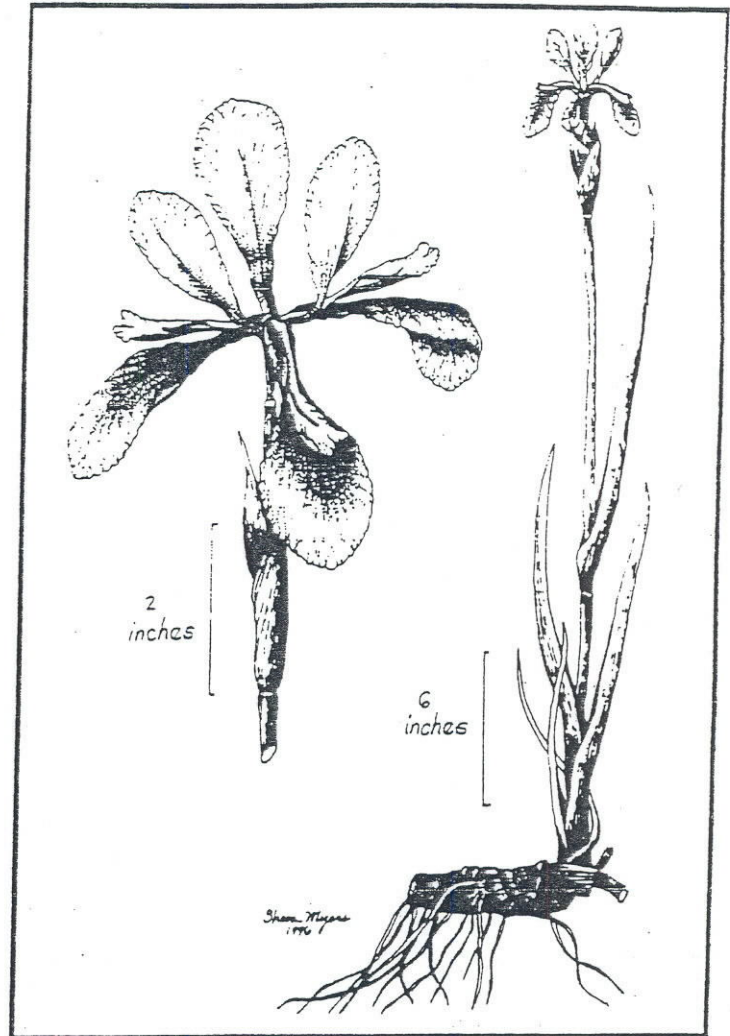
Distribution: throughout Southeastern U.S.

Shade: Full sun to light shade.

### WILDLIFE BENEFITS:

Food: Insects may visit flowers. Muskrats may  
eat thick underground stems.

Cover: Adds to general marsh cover.



*Iris virginica*

### AESTHETIC BENEFITS:

**Flowers:** Large, showy blue flowers are produced in May-June, and unlike yellow iris, these are held above leaves and are more conspicuous. Very attractive in bloom.

**Foliage:** 2-4 ft. tall, 1" wide dark green sword-like leaves in discrete clumps; die down in winter.

**Form:** Shiny green leaves stand erect in masses and make an impressive sight along pond margins.

**Maintenance concerns:** Easy to transplant and establish. May be eaten by muskrats.

## 9. *Juncus effusus*

Soft Rush

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - Perennial - evergreen

### GROWTH

Form: large clump of needle-like leaves  
Mature Size: 2-3 ft. tall  
Rate of spread: slow from orig. clump;  
fast from seeds in disturbed areas  
Method of spreading: enlarging of clump; seeds

### PLANTING

Suggested spacing:

for uniform ground cover	plant at
in 1 year	1 ft. OC
in 2 years	1½ ft. OC
in 3 years	2 ft. OC

Forms available: container (2, 3, 4, 5, 7)  
& sources liner-plug (1, 7, 8,)  
bare root (1, 2, 4, 6, 7, 9)

Sizes Available: gallon (4, 7) quart (2, 5)  
bare root liner (2, 6, 7, 9)  
bare root larger (1, 4)  
liner-plug (1, 7, 8)

Water depth tolerated: moist to saturated soil;  
periodically inundated and drying

### HABITAT

Community: acidic streams, marshes, and pond  
edges, especially newly disturbed  
sites; wet ditches and meadows;  
virtually any permanently wet site.

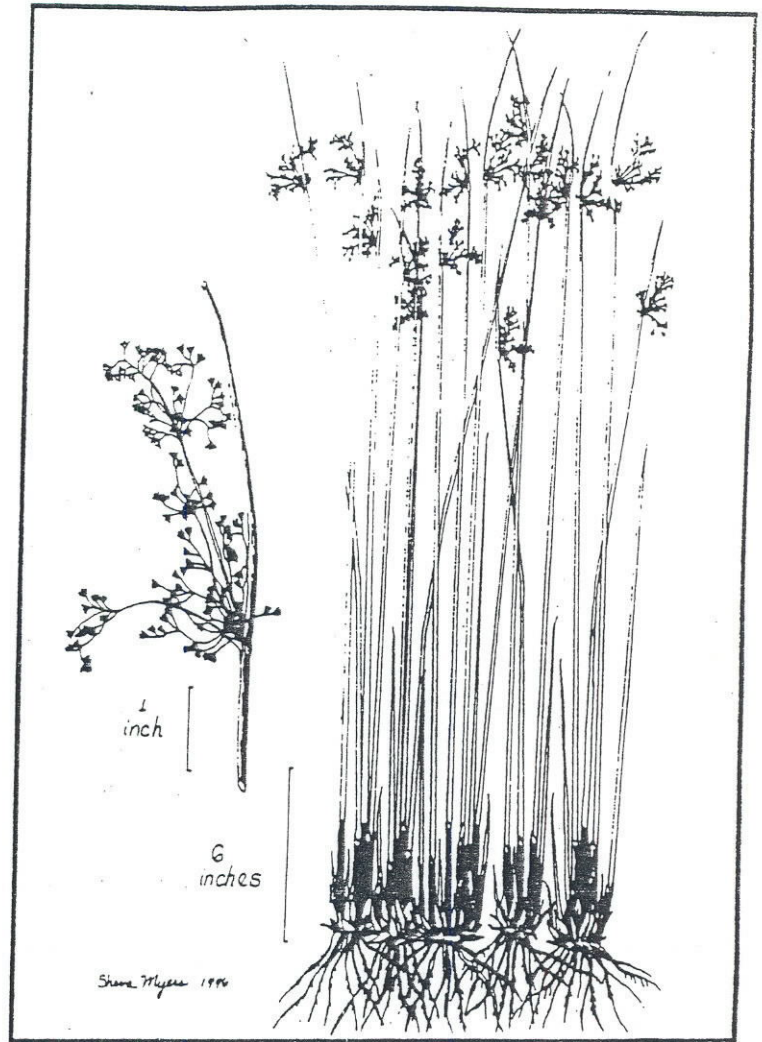
Distribution: throughout eastern North America

Shade: Full sun.

### WILDLIFE BENEFITS:

Food: Seeds may be eaten by small birds.

Cover: Adds to general marsh cover.



*Juncus effusus*

### AESTHETIC BENEFITS:

Flowers: Inconspicuous clusters near stem tips.

Foliage: 2-3 ft. tall, dark green, stiffly erect,  
needle-like stems appear as leaves.

Form: Very stiff clumps of needle-like stems.  
Very characteristic of permanently wet situations.

Maintenance concerns: Easy to transplant and  
establish. May become invasive by virtue of high  
seed output and preference for disturbance.



# 10. *Leersia oryzoides*

## Rice Cutgrass

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - Perennial - not-evergreen

### GROWTH

Form: large loose mass of stems  
Mature Size: 2-3 ft. tall  
Rate of spread: moderate  
Method of spreading: slender, creeping  
underground stems

### PLANTING

Suggested spacing:

for uniform ground cover	plant at
in 1 year	1 ft. OC
in 2 years	2 ft. OC
in 3 years	3 ft. OC

Forms available: liner-plug (2, 8)  
& sources clump (5)

Sizes Available: liner-plug (2, 8)

Water depth tolerated: moist to saturated soil;  
periodically inundated and drying

### HABITAT

Community: near and along creeks and streams,  
in marshes, swamps and muddy  
borders of ponds, and ditches,  
often forming dense zones

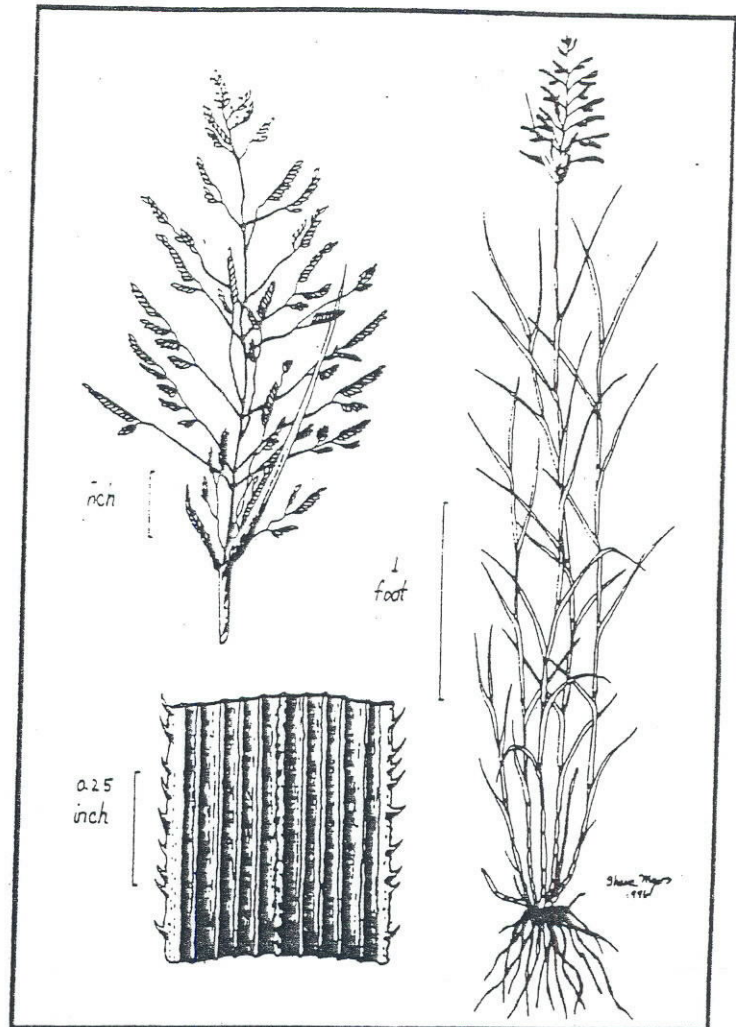
Distribution: throughout eastern North America

Shade: Full sun to light shade.

### WILDLIFE BENEFITS:

Food: Seeds and rootstocks are widely eaten by  
ducks, marsh and shore birds; seeds may  
be eaten by small birds; rootsocks eaten by  
muskrats. An important wildlife food.

Cover: Adds to general marsh cover.



*Leersia oryzoides*

### AESTHETIC BENEFITS:

Flowers: Interesting, but not showy.

Foliage: 2-3 ft. tall, light green, leaves have  
sharp teeth on edges, hence the name cutgrass.

Caution.

Form: Large colonies of loose stems, may be  
bent by high water and current. Adds a more  
delicate texture to the aquatic landscape.

Maintenance concerns: May be eaten by wildlife.  
May be harmful to small children and adults who  
may grab and pull the delicate-looking leaves.

Full sun will keep stems as strong as possible.

## 11. *Nymphaea odorata*

White Water-lily, Pond-lily

### CHARACTERISTICS:

Floating - herbaceous - perennial  
Floating leaves - not-evergreen

### GROWTH

Form: clump-forming  
Mature Size: floating leaves to 1 ft. diameter;  
3-6 ft. spread  
Rate of spread: moderate  
Method of spreading: large, creeping  
underground stems

### PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	3 ft. OC
in 2 years	6 ft. OC
in 3 years	8 ft. OC

Forms available: bare-root liner (6, 9)  
& sources clump (1)

Sizes Available: large bare-root (1)  
liner (6, 9)

Water depth tolerated: constantly submerged  
in at least 1 ft. of water, up to 3 ft. deep.

### HABITAT

Community: In standing water of pond margins,  
lakes, slow streams and ditches

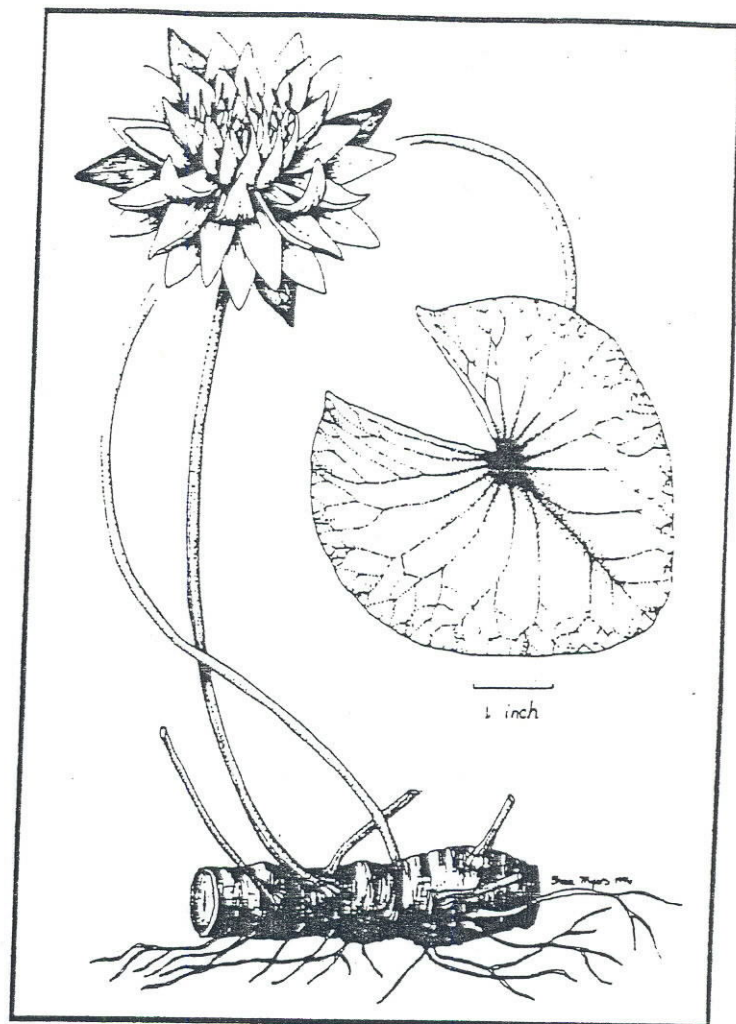
Distribution: throughout eastern North America

Shade: Full sun.

### WILDLIFE BENEFITS:

Food: Seeds and rootstocks are widely eaten by  
ducks, marsh and shore birds; rootstocks  
may be eaten by muskrats.

Cover: Adds to general pond surface cover and  
may provide shelter for young fish and  
other aquatic life (frogs, snakes, turtles).



*Nymphaea odorata*

### AESTHETIC BENEFITS:

Flowers: Showy, white, fragrant flowers (to 6" wide) are produced at the surface among the leaves all season long. Each flower lasts two days.

Foliage: Shiny, round leaves are produced all season in an every widening floating array.

Form: Large colonies of leaves appear as lush green mats on the water surface. The flowers add an interesting highlight.

Maintenance concerns: May be eaten by wildlife. May become crowded if confined; easy to divide.



## 12. *Panicum virgatum*

Switchgrass

### CHARACTERISTICS:

Moist to dry soil - herbaceous - perennial  
not-evergreen

### GROWTH

Form: clump-forming  
Mature Size: 2-5 ft. tall and wide  
Rate of spread: moderate, from original clump  
Method of spreading: stout underground stems;  
seedlings may appear in disturbed areas

### PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	2 ft. OC
in 2 years	3 ft. OC
in 3 years	4 ft. OC

Forms available: liner (1, 2, 4, 8)  
& sources container (2, 4, 5)

Sizes Available: liner (1, 2, 4, 8)  
gallon (4)  
quart (2, 5)

Water depth tolerated: dry, moist to wet soil  
with periodic inundation and drying

### HABITAT

Community: Moist, or seasonally moist, open  
places, marshes, seepage areas,  
pond margins, pools and ditches

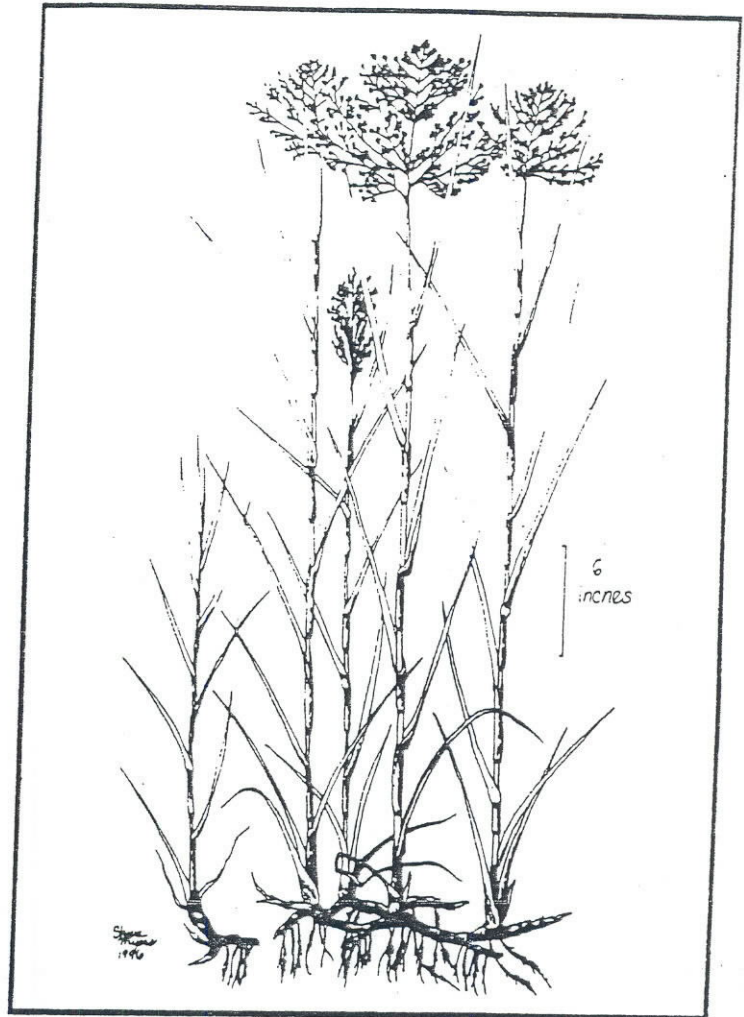
Distribution: throughout eastern North America

Shade: Full sun.

### WILDLIFE BENEFITS:

Food: Seeds are widely eaten by ducks, marsh  
and shore birds, songbirds, upland  
gamebirds; foliage may be eaten by rabbit,  
muskrat and deer.

Cover: Important cover plant in meadows and  
marshes, especially newly disturbed places.



*Panicum virgatum*

### AESTHETIC BENEFITS:

Flowers: Not showy, in large, open, diffuse  
sprays rising above the foliage.

Foliage: Typical narrow grass foliage may be  
light or dark green, or whitish-green or gray.  
Often used in ornamental grass planting.

Form: Broad clumps of widely branched and  
diffuse foliage and flowering sprays provide a  
large mass of medium to delicate texture.

Maintenance concerns: May be mowed.  
May remain attractive into winter, but eventually  
appears untidy and broken. A common weed.

## 13. *Peltandra virginica*

Arrow Arum

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - perennial - not-evergreen

### GROWTH

Form: clump-forming  
Mature Size: 1-2 ft. tall and wide  
Rate of spread: slowly enlarging clump  
Method of spreading: seedlings may appear

### PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	1 ft. OC
in 2 years	2 ft. OC
in 3 years	2½ ft. OC

Forms available: container (2, 4)  
& sources liner (1, 8)

Sizes Available: gallon (4)  
quart (2)  
liner (1, 2, 6, 8, 9)  
larger bare-root (4)

Water depth tolerated: wet soil;  
to 1½ feet permanently inundated

### HABITAT

Community: Swamps, moist woodlands, bogs,  
marshes, pond edges

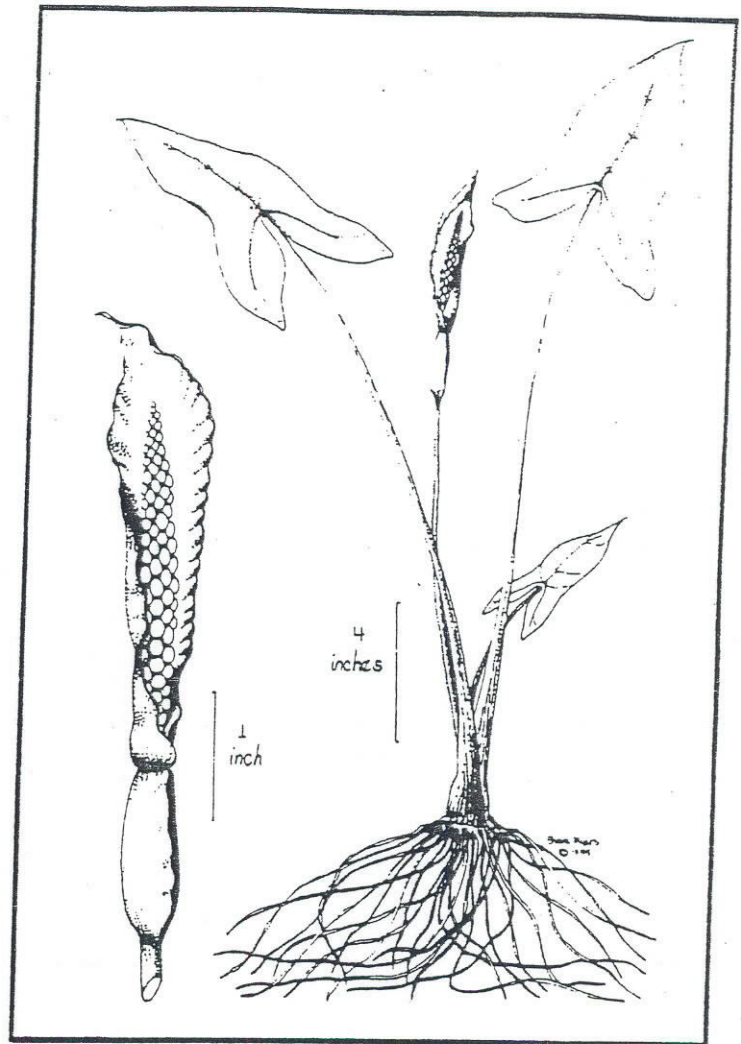
Distribution: throughout eastern North America

Shade: Full sun to moderate shade.

### WILDLIFE BENEFITS:

Food: seeds are widely eaten by ducks, marsh  
and shore birds; seeds and roots may be  
eaten by muskrat.

Cover: May occur as scattered plants or colonies  
in various wetland situations.



*Peltandra virginica*

### AESTHETIC BENEFITS:

Flowers: Flowers are tiny, not showy, arranged  
on a dense spike surrounded by green, leaf-like  
structure (spathe), remaining hidden under leaves.

Foliage: Conspicuous arrow-head or oval-shaped  
leaf blades are large and dark green, mostly erect.

Form: Large clumps of erect to spreading coarse-  
textured leaves provide an distinct focal point in  
the vegetation.

Maintenance concerns: Easy to establish.



# 14. *Pontederia cordata*

Pickerelweed, Pickerel-rush

## CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - perennial - not-evergreen

## GROWTH

Form: clump-forming but spreading  
Mature Size: 1-3 ft. tall  
Rate of spread: moderate  
Method of spreading: enlargement of clump

## PLANTING

Suggested spacing:

for uniform ground cover

in 1 year

in 2 years

in 3 years

plant at

1½ ft. OC

2½ ft. OC

3½ ft. OC

Forms available:  
& sources

container (2, 3, 4, 5, 7)

liner (1, 2, 8, 9)

bare root (1, 3, 4, 6, 7)

Sizes Available:

gallon (3, 4, 7)

quart (2, 5)

liner (1, 2, 8, 9)

larger bare-root (1, 4)

Water depth tolerated: wet soil to 2 feet  
permanently inundated

## HABITAT

Community: marshes, sluggish streams, ditches

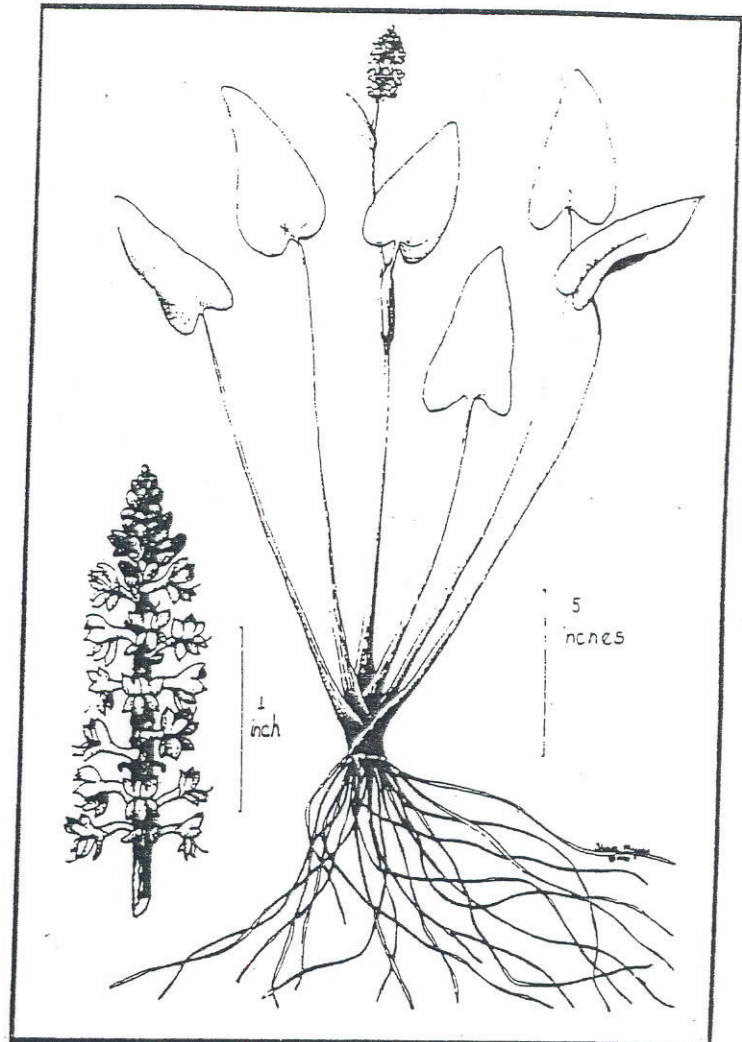
Distribution: throughout eastern North America

Shade: Full sun to very light shade.

## WILDLIFE BENEFITS:

Food: Seeds are eaten by ducks and muskrat.  
Rootstocks may be eaten by muskrat

Cover: May form dense colonies that would  
afford some cover.



*Pontederia cordata*

## AESTHETIC BENEFITS:

**Flowers:** Showy blue flowers are born all season on tall spikes that show well above the leaves.

**Foliage:** Conspicuous rounded arrow-head leaf blades are large and dark green, mostly erect.

**Form:** Large clumps of erect to spreading coarse-textured leaves provide an distinct focal point in the landscape. Foliage is distinctive and attractive.

**Maintenance concerns:** Easy to transplant and establish. May be eaten by muskrats. Easily broken down, but regrows quickly.

# 15. *Sagittaria latifolia* Arrowhead, Duck-potato

## CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - perennial - not-evergreen

## GROWTH

Form: clump-forming and spreading  
Mature Size: 1-1½ ft. tall  
Rate of spread: moderate to fast  
Method of spreading: long underground stems that form enlarged tubers

## PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	1 ft. OC
in 2 years	2 ft. OC
in 3 years	3 ft. OC

Forms available: container (2, 3, 4, 5, 7)  
& sources liner (1, 8, 9)  
bare root (1, 2, 3, 4, 6, 7)

Sizes Available: gallon (3, 4, 7)  
quart (2, 5)  
liner (1, 8, 9)  
larger bare-root (1, 4)

Water depth tolerated: wet soil, up to 2 feet permanently inundated

## HABITAT

Community: in water and wet places

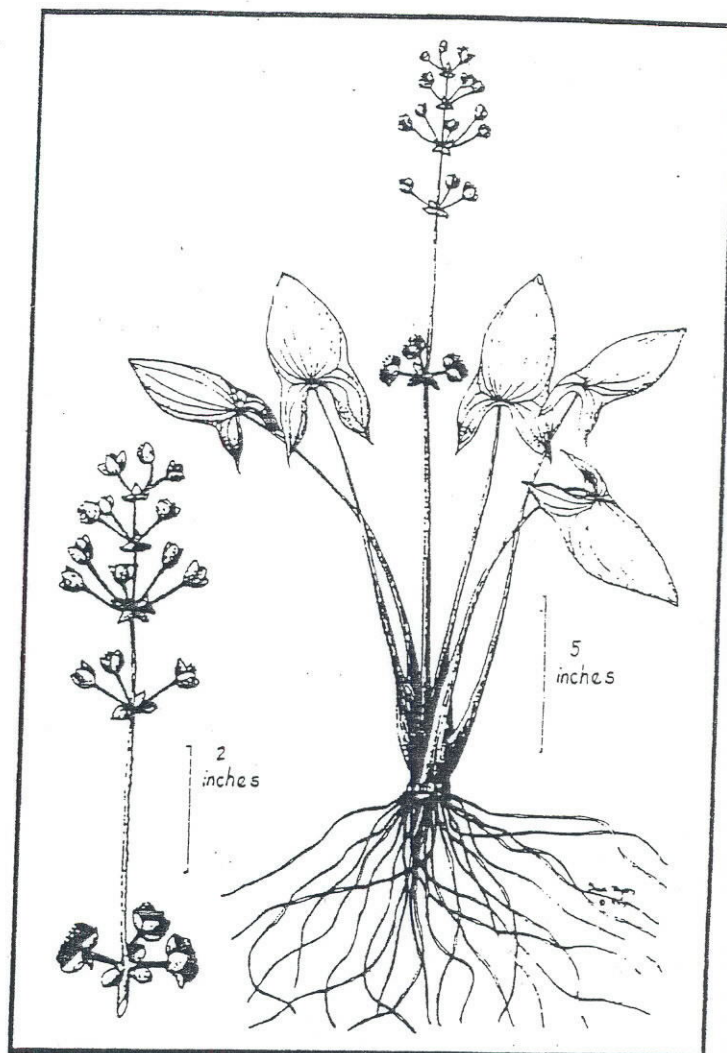
Distribution: throughout eastern North America

Shade: Full sun.

## WILDLIFE BENEFITS:

Food: Seeds and tubers are eaten by ducks and waterfowl; tubers are eaten by muskrats

Cover: May form dense colonies that would afford some cover.



*Sagittaria latifolia*

## AESTHETIC BENEFITS:

**Flowers:** Showy white flowers are born all season on tall spikes that show well above leaves.

**Foliage:** Conspicuous arrow-head leaf blades are large and light to dark green, mostly erect. Blades may be narrow or broad; broader are better seen.

**Form:** Large clumps of erect to spreading coarse-textured leaves provide an distinct focal point in the landscape. Foliage is distinctive and attractive.

**Maintenance concerns:** Not the easiest to establish, but once there, will persist and spread by underground runners. May become invasive.



## 16. *Saururus cernuus*

Lizard-tail

### CHARACTERISTICS:

Emergent from shallow water  
Herbaceous - perennial - not-evergreen

### GROWTH

Form: Loose, spreading colony  
Mature Size: 2-4 ft. tall  
Rate of spread: fast  
Method of spreading: long underground stems

### PLANTING

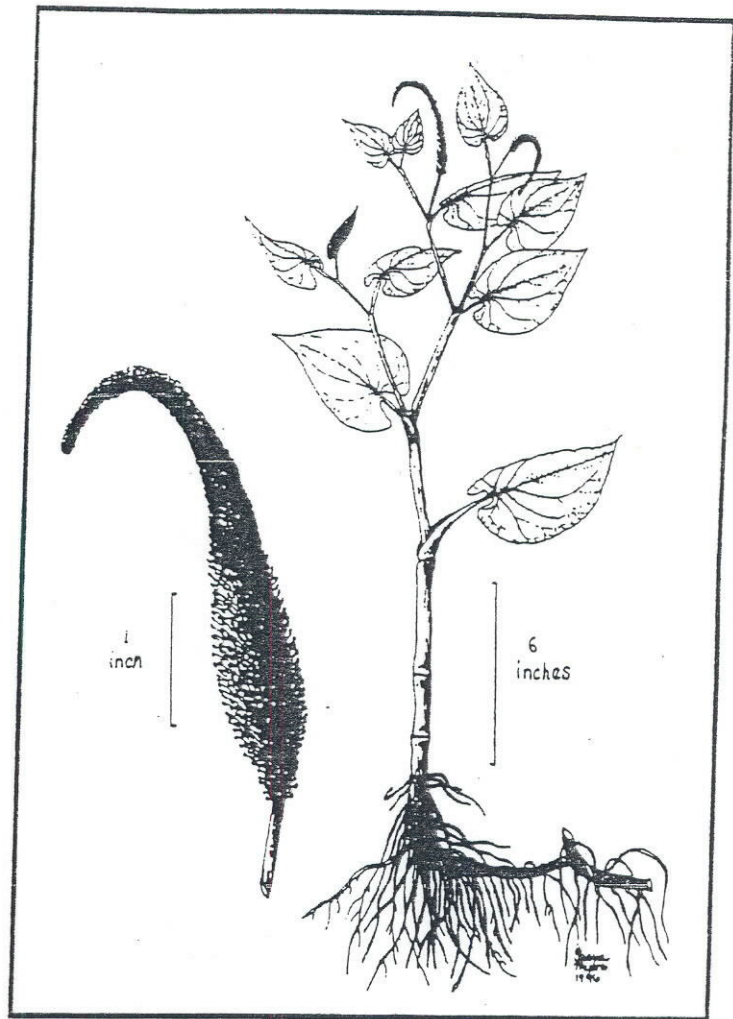
Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	1 ft. OC
in 2 years	2 ft. OC
in 3 years	3 ft. OC

Forms available: container (2, 4)  
& sources liner (1, 8, 9)  
bare root (1, 2, 4, 6,)

sizes Available: gallon (4)  
quart (2)  
liner-bare-root  
(1, 2, 6, 8, 9)  
larger bare-root (1, 4)

Water depth tolerated: wet soil to 1 ft.  
permanently inundated



*Saururus cernuus*

### HABITAT

Community: wet ditches, marshes, open  
wetlands, swamps, pond margins

Distribution: throughout southeastern U. S.

Shade: Full sun to light shade.

### WILDLIFE BENEFITS:

Food: Seeds may be eaten by wooducks

Cover: May form dense colonies that would  
afford some cover.

### AESTHETIC BENEFITS:

**Flowers:** Showy white flowers are born mid-summer on conspicuous long spikes with drooping tips held above foliage.

**Foliage:** Conspicuous oval heart-shaped green leaves scattered on tall slender stems.

**Form:** Large loose colonies may form, ceaselessly spreading

**Maintenance concerns:** A tough plant, easy to transplant and establish. Will definitely become invasive. Will return after mowing.

# 17. *Scirpus cyperinus*

Wool-grass

## CHARACTERISTICS:

Wetlands -Herbaceous - perennial - not-evergreen

## GROWTH

Form: dense clumps

Mature Size: 2-6 ft. tall

Rate of spread: slow from original clump;  
fast from seeds

Method of spreading: enlarging orig. clump;  
seeds

## PLANTING

Suggested spacing:

for uniform ground cover	plant at
in 1 year	1 ft. OC
in 2 years	1½ ft. OC
in 3 years	2 ft. OC

Forms available: container (2)  
& sources liner (8)  
bare root (2)

Sizes Available: quart (2)  
liner (8)  
bare-root (2)

Water depth tolerated: wet soil to  
periodically inundated or drying.

## HABITAT

Community: wet ditches, marshes, open  
wetlands, swamps, pond margins

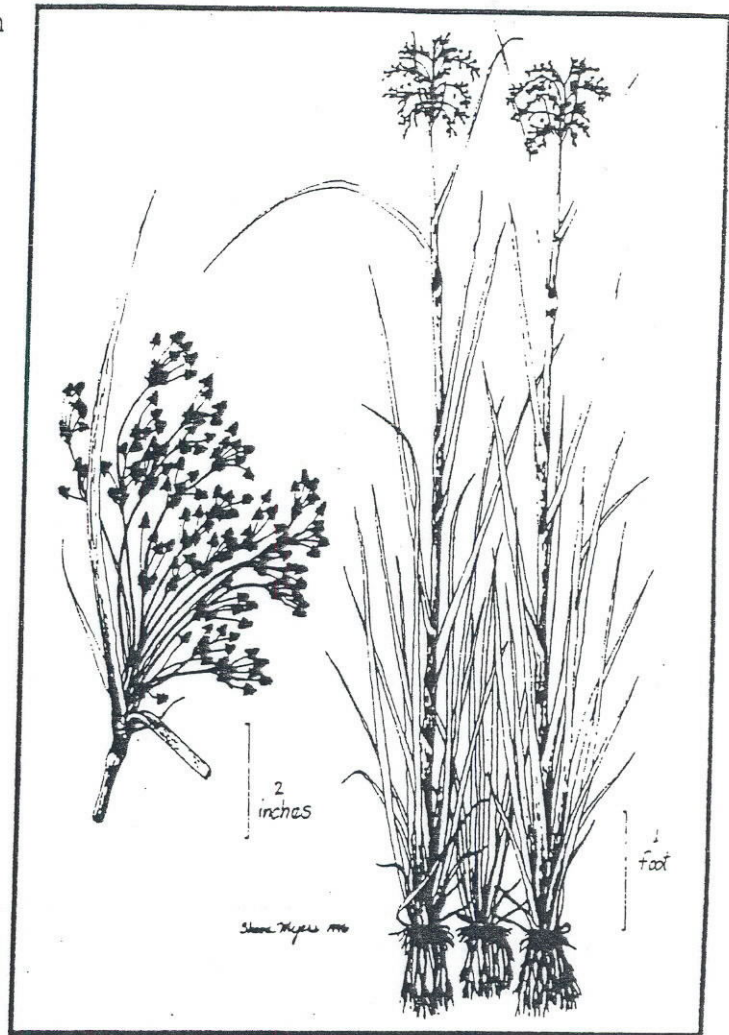
Distribution: throughout eastern North America

Shade: Full sun.

## WILDLIFE BENEFITS:

Food: Seeds may be eaten by ducks, marsh &  
shorebirds, songbirds and mice.

Cover: May form dense colonies that would  
afford some cover in marshes and meadows.



*Scirpus cyperinus*

## AESTHETIC BENEFITS:

**Flowers:** Flowers are inconspicuous, but ripening  
seed heads are fluffy, showy & persistent.

**Foliage:** Stiffly erect, grass-like green leaves  
form clump of fine texture.

**Form:** Showy tall, tight, dense clumps are  
characteristic of wet ditches and marsh edges.  
Handsome plant into the winter months.

**Maintenance concerns:** A tough plant, easy to  
transplant and establish. May seed into disturbed  
areas. May take annual mowing.



# 18. *Scirpus validus* Soft Stem Bulrush

## CHARACTERISTICS:

Emergent from shallow water -Herbaceous -  
Perennial - not-evergreen

## GROWTH

Form: dense clumps  
Mature Size: 2-8 ft. tall  
Rate of spread: fast from original clump  
Method of spreading: creeping underground stems

## PLANTING

Suggested spacing:

<u>for uniform ground cover</u>	<u>plant at</u>
in 1 year	2 ft. OC
in 2 years	3 ft. OC
in 3 years	4 ft. OC

Forms available: container (2, 5, 7)  
& sources liner (8, 9)  
bare root (2, 3, 6, 7)

Sizes Available: gallon (7)  
quart (2, 5)  
liner (8, 9)  
bare-root (2, 3, 6, 7)

Water depth tolerated: shallow water to 2 ft.  
permanently inundated

## HABITAT

Community: marshes, open wetlands, pond  
margins

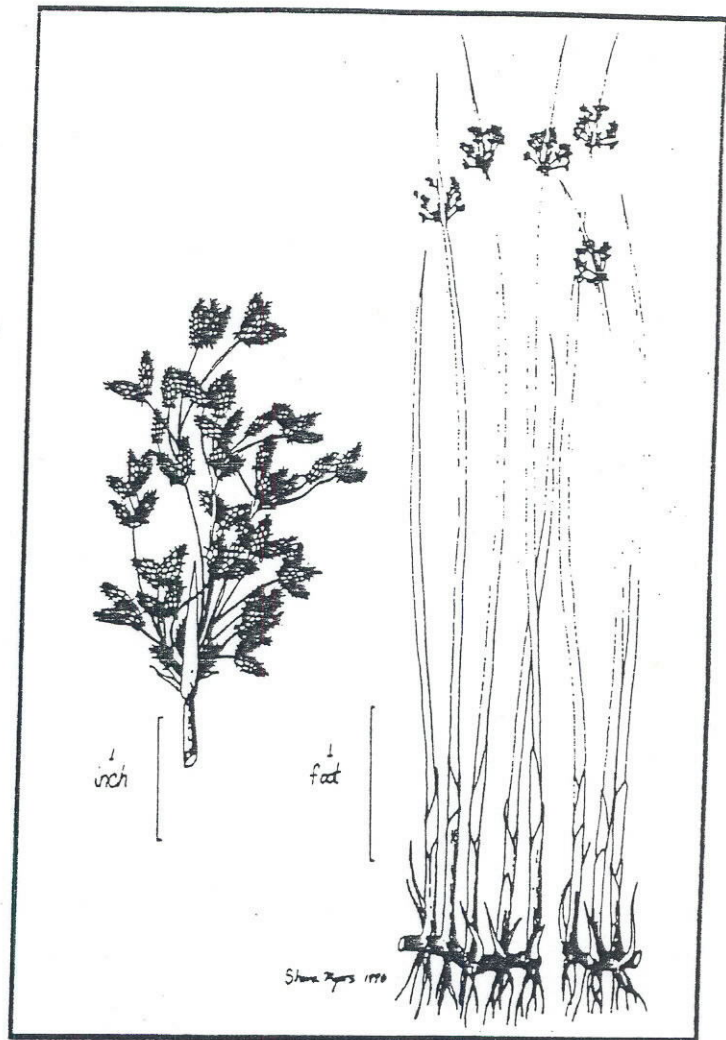
Distribution: throughout eastern North America

Shade: Full sun.

## WILDLIFE BENEFITS:

Food: Seeds may be eaten by ducks, marsh &  
shorebirds, songbirds and mice.

Cover: May form dense colonies that would  
afford some cover in marshes.



*Scirpus validus*

## AESTHETIC BENEFITS:

**Flowers:** Flowers are inconspicuous, born at the tips of the tall stems. Never significant.

**Foliage:** True leaves are absent. The tall, flexible, round stems may be called leaves by some.

**Form:** Tall, stiff, dark green pencil-thick stems form very dense colonies. They are easily broken. Provide distinctive form in the landscape and one of the best aquatic plants to utilize.

**Maintenance concerns:** A tough plant, easy to transplant and establish. Easily broken during growing season, but new growth forms quickly. May be mowed annually in winter.

# 19. *Typha latifolia*; *Typha angustifolia*

Cattail

## CHARACTERISTICS:

Emergent from shallow water -Herbaceous -  
Perennial - not-evergreen

## GROWTH

Form: dense clumps  
Mature Size: 2-8 ft. tall  
Rate of spread: fast from original clump  
Method of spreading: creeping underground stem

## PLANTING

### Suggested spacing:

for uniform ground cover	plant at
in 1 year	2 ft. OC
in 2 years	3 ft. OC
in 3 years	4 ft. OC

Forms available: container (2, 4, 5)  
& sources liner (8)  
bare root (2, 4, 5)

Sizes Available: gallon (4, 5)  
quart (2)  
liner (8)  
bare-root (2, 4, 5)

Water depth tolerated: shallow water to 1 ft.  
permanently inundated

## HABITAT

Community: marshes, open wetlands, pond  
margins, wet ditches, canals

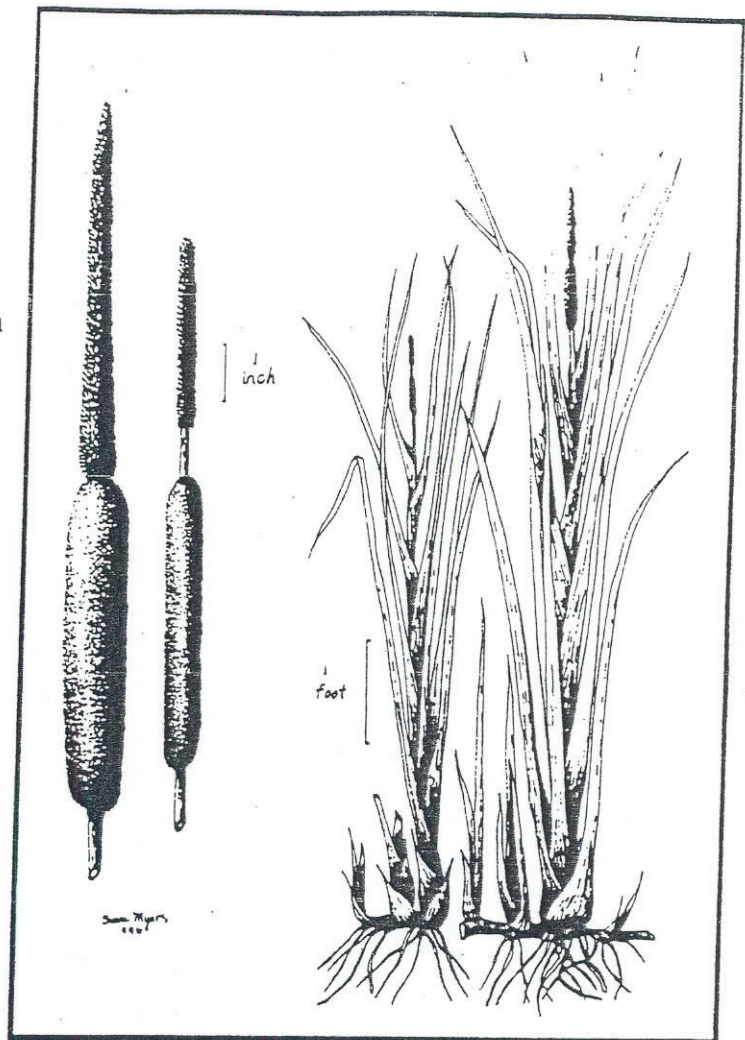
Distribution: throughout eastern North America

Shade: Full sun.

## WILDLIFE BENEFITS:

Food: Starchy rootstocks may be eaten by geese  
and muskrats

Cover: May form dense colonies that would  
afford excellent cover in marshes..



*Typha latifolia* (large); *Typha angustifolia* (smaller)

## AESTHETIC BENEFITS:

**Flowers:** Individual flowers are inconspicuous, but they are borne in the familiar cattail seed heads that are conspicuous, handsome and persistent. They become white-fluffy in winter in dispersal.

**Foliage:** Tall, strap-like dark green leaves are borne stiffly erect. Turn brown in winter.

**Form:** Tall, stiff, dark green strap-like leaves form familiar stands in all shallow wetlands.

**Maintenance concerns:** A tough plant, easy to transplant and establish. Grows rapidly and would become invasive. Seedlings colonize even the smallest permanent wet spot.



## 20. *Vernonia noveboracensis*

Ironweed

### CHARACTERISTICS:

Wetland plant of moist soil  
Herbaceous - Perennial - not-evergreen

### GROWTH

Form: multi-stemmed sub-shrub  
Mature Size: 3-8 ft. tall  
Rate of spread: slow from clump or from seeds  
Method of spreading: enlarging clump, or seedlings

### PLANTING

Suggested spacing:

for uniform ground cover	plant at
in 1 year	2 ft. OC
in 2 years	2½ ft. OC
in 3 years	3 ft. OC

Forms available: container (2, 4)  
& sources liner (8)

Sizes Available: quart (2, 4)  
liner (8)

Water depth tolerated: moist soil to periodically inundated

### HABITAT

Community: open wetlands, pond margins,  
wet ditches

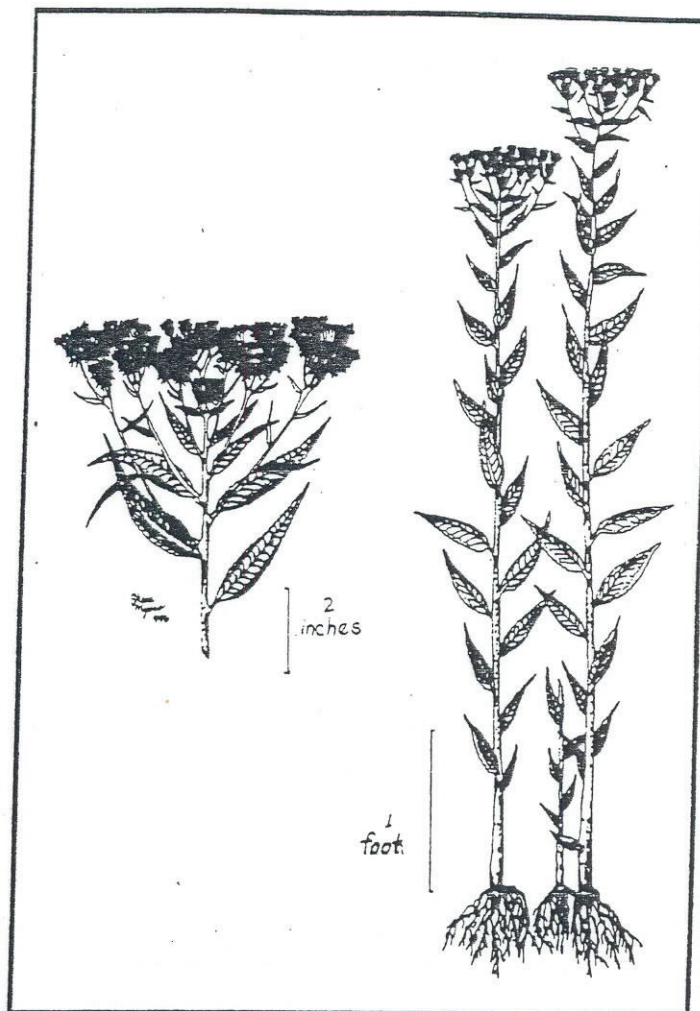
Distribution: throughout eastern North America.

Shade: Full sun.

### WILDLIFE BENEFITS:

Food: Seeds may be used by songbirds.

Cover: May form scattered clumps that would add to the cover in marshes.



*Vernonia noveboracensis*

### AESTHETIC BENEFITS:

Flowers: Showy dark purple flowers in late summer atop tall leafy stems.

Foliage: Narrow, dark green leaves cloth tall stout stems. Medium to Coarse texture.

Form: Tall, stiff, dark green leafy stemmed plants occur in clumps. May be too tall for blending with other plants. Adds a different color & texture.

Maintenance concerns: A tough plant, easy to transplant and establish. Grows rapidly and is long-lived. May be too tall for some situations.

## Plant Characteristics Reference Chart

Plants	Shade/Sun	Height	Spreading Rate	Water Depth	Flowers
Number and Species Name	S = Full Sun required LS = Light Shade tolerated	Height in Feet	M = Medium F = Fast C = Clump forming spreads by seed only	Depth in Feet SI = Seasonal Inundation, not permanently flooded	Y = Showy flowers NS = Not Showy flowers D = Showy seed heads
1. Sweet-flag <i>Acorus calamus</i>	LS	2-3	M	0.5	NS
2. Water-plantain <i>Alisma subcordatum</i>	LS	1-2	C	1.0	NS
3. Bushy Beardgrass <i>Andropogon glomeratus</i>	S	2-5	C	SI	D
4. Tussock Sedge <i>Carex stricta</i>	S	1-2	C	0.5	NS
5. Three-way Sedge, Dwarf-bamboo <i>Dulichium arundinaceum</i>	S	1-2	M	1.0	NS
6. Spike-rush <i>Eleocharis quadrangulata</i>	S	1-2	M	1.0	NS
7. Yellow Iris <i>Iris pseudacorus</i>	LS	1-4	M	1.0	Y
8. Blue-flag Iris <i>Iris virginica</i>	LS	1-3	M	0.5	Y
9. Soft Rush <i>Juncus effusus</i>	S	2-3	C	0.25	NS
10. Rice Cutgrass <i>Leersia oryzoides</i>	LS	1-3	M	0.25	NS
11. Water-lily <i>Nymphaea odorata</i>	S	Floater	M	3.0	Y
12. Switch Grass <i>Panicum virgatum</i>	S	2-4	C	SI	NS
13. Arrow Arum <i>Peltandra virginica</i>	LS	2-3	C	1.5	NS
14. Pickerelweed <i>Pontederia cordata</i>	LS	1-3	M	1-2	Y
15. Arrowhead <i>Sagittaria spp.</i>	LS	1-2	F	1.5	Y
16. Lizard-tail <i>Saururus cernuus</i>	LS	2-3	F	1.0	Y
17. Wool-grass <i>Scirpus cyperinus</i>	S	4-5	C	SI	D
18. Soft Stem Bulrush <i>Scirpus validus</i>	S	2-5	F	1.0	NS
19. Broad-leaved Cattail <i>Typha latifolia</i>	S	3-6	F	1.0	D
20. Ironweed <i>Vernonia noveboracensis</i>	S	3-7	C	SI	Y



## Planting Zone Guide (by species)

The Standard Specifications For Watershed Protection Basins under the "Standard Specifications for BMP's," Section of the Charlotte - Mecklenburg Storm Water Services Credit Application Instruction Manual, requires that aquatic vegetation be planted on a littoral shelf. The following guides include a planting zone guide that lists, first by species and then by zone, the recommended planting zones for each of the species presented in this booklet and a sample planting plan. The six zones present in this planting zone guide are:

Zone 1--Dry Soil

Zone 2--Shoreline-Moist Edge (required\*\*)

Zone 3--0.5' to 1' Sloping Shelf (required\*\*)

Zone 4--2' Sloping Shelf (required\*\*)

Zone 5--Area of Sediment Deposition

Zone 6--Deep Water

### Recommended Planting Zones for the Aquatic and Wetland Species Featured in This Booklet

Species Number and Name	Recommended Planting Zone(s)
1. Sweetflag ( <i>Acorus calamus</i> )	Zone 3*
2. Water-plantain ( <i>Alisma subcordatum</i> )	Zone 3*
3. Bushy Beardgrass ( <i>Andropogon glomeratus</i> )	Zone 2*
4. Tussock Sedge ( <i>Carex stricta</i> )	Zones 2* & 3
5. Dwarf-bamboo, Three-way Sedge ( <i>Dulichium arundinaceum</i> )	Zones 3* & 4
6. Spikerush ( <i>Eleocharis quadrangulata</i> , or perennial <i>Eleocharis</i> spp.)	Zone 3*
7. Yellow Iris, Yellow-flag ( <i>Iris pseudacorus</i> )	Zones 3*, 4, & 5
8. Blue-flag Iris, Southern Blue Flag ( <i>Iris virginica</i> )	Zones 2* & 3*
9. Soft Rush ( <i>Juncus effusus</i> )	Zones 2* & 3
10. Rice Cutgrass ( <i>Leersia oryzoides</i> )	Zone 3*
11. White Water-lily ( <i>Nymphaea odorata</i> )	Zone 6*
12. Switchgrass ( <i>Panicum virgatum</i> )	Zones 1 & 2*
13. Arrow Arum ( <i>Peltandra virginica</i> )	Zones 3*, 4, & 5
14. Pickerelweed ( <i>Pontederia cordata</i> )	Zones 3* & 4*
15. Arrowhead ( <i>Sagittaria</i> spp.)	Zones 3* & 4*
16. Lizard-tail ( <i>Saururus cernuus</i> )	Zone 3
17. Wool-grass ( <i>Scirpus cyperinus</i> )	Zone 2*
18. Soft Stem Bulrush ( <i>Scirpus validus</i> )	Zones 3, 4*, & 5*
19. Cattail ( <i>Typha</i> spp.)	Zone 5*
20. Ironweed ( <i>Vernonia noveboracensis</i> )	Zone 2*

\* = Especially recommended

\*\* = Required for Watershed Protection Basins

## Planting Zone Guide (by zone)

### Zone 1—Dry Soil

12. Switchgrass (*Panicum virgatum*)

### Zone 2—Shoreline-Moist Edge (required for Watershed Protection Basins)

3. Bushy Beardgrass (*Andropogon glomeratus*)\*
4. Tussock Sedge (*Carex stricta*)\*
8. Blue-flag Iris, Southern Blue Flag (*Iris virginica*)\*
9. Soft Rush (*Juncus effusus*)\*
12. Switchgrass (*Panicum virgatum*)\*
17. Wool-grass (*Scirpus cyperinus*)\*
20. Ironweed (*Vernonia noveboracensis*)\*

### Zone 3—0.5' to 1' Sloping Shelf (required for Watershed Protection Basins)

1. Sweetflag (*Acorus calamus*)\*
2. Water-plantain (*Alisma subcordatum*)\*
4. Tussock Sedge (*Carex stricta*)
5. Dwarf-bamboo, Three-way Sedge (*Dulichium arundinaceum*)\*
6. Spikerush (*Eleocharis quadrangulata*, or perennial *Eleocharis* spp.)\*
7. Yellow Iris, Yellow-flag (*Iris pseudacorus*)\*
8. Blue-flag Iris, Southern Blue Flag (*Iris virginica*)\*
9. Soft Rush (*Juncus effusus*)
10. Rice Cutgrass (*Leersia oryzoides*)\*
13. Arrow Arum (*Peltandra virginica*)\*
14. Pickerelweed (*Pontederia cordata*)\*
15. Arrowhead (*Sagittaria* spp.)\*
16. Lizard-tail (*Saururus cernuus*)
18. Soft Stem Bulrush (*Scirpus validus*)

### Zone 4—2' Sloping Shelf (required for Watershed Protection Basins)

5. Dwarf-bamboo, Three-way Sedge (*Dulichium arundinaceum*)
7. Yellow Iris, Yellow-flag (*Iris pseudacorus*)
13. Arrow Arum (*Peltandra virginica*)
14. Pickerelweed (*Pontederia cordata*)\*
15. Arrowhead (*Sagittaria* spp.)\*
18. Soft Stem Bulrush (*Scirpus validus*)\*

### Zone 5—Area of Sediment Deposition

7. Yellow Iris, Yellow-flag (*Iris pseudacorus*)
13. Arrow Arum (*Peltandra virginica*)
18. Soft Stem Bulrush (*Scirpus validus*)\*
19. Cattail (*Typha* spp.)\*

### Zone 6—Deep Water

11. White Water-lily (*Nymphaea odorata*)\*

\* = Especially recommended



## LIST OF NURSERY SOURCES

Nurseries supplying Aquatic and Wetland Plants for the Southeast

List compiled by HARP for 1996

1. Emerald Coast Growers  
7400 Klondike Rd.  
Pensacola, FL 32526  
(904) 944-0808 FAX (904) 944-1006
2. Environmental Concern  
210 West Chew Ave.  
P.O. Box P  
St. Michaels, MD 21663  
(410) 745-9620 FAX (410) 745-3517
3. Flowerwood Liners  
P.O. Box 369  
Loxly, AL 36551  
(334) 964-5122 FAX (334) 964-5471
4. Hoffman Nursery  
5520 Bahama Rd.  
Rougemont, NC 27572  
1-800-203-8590  
919-479-6620 FAX (919) 471-3100
5. Kurt Bluemel, Inc.  
2740 Greene Lane  
Baldwin, MD 21013-9523  
301) 557-7229 FAX (301) 557-9785
6. Maryland Aquatic Nurseries  
3427 N. Furnace Rd.  
Jarrettsville, MD 21084  
(301) 557-7615 FAX (301) 557-7615  
Also check (same family owns):  
Charleston Aquatic Nurseries  
3095 Canal Bridge Road  
John's Island, SC 29455  
(803) 559-31517.
7. Okefenokee Growers  
P.O. Box 4488  
Jacksonville, FL 32201  
(904) 356-4881 FAX (904) 356-4884
8. Pinelands Nursery  
323 Island Rd.  
Columbus, NJ 08022  
(609) 291-9486 FAX (609) 298-8939
9. Plants for Tomorrow  
16361 Norris Rd.  
Loxahatchee, FL 33470-9430  
1-800-448-2525  
(407) 790-1422 FAX (407) 790-1916

Source Plant	Emerald Coast Growers	Environmental Concern	Flowerwood Liner	Hoffman Nursery	Kurt Blumel, Inc	Maryland Aquatic Nurseries	Okefenokee Growers	Pinelands Nursery	Plants for Tomorrow
1. Sweet-flag <i>Acrostichum</i>	lg br \$3.25 lin \$1.95	qt \$1.60 br \$6.00		gal \$3.50 br \$2.50	qt	br			Plants for Tomorrow 16401 Norris Rd Lakeland, FL 33506 (813) 796-1422 FAX 796-1416
2. Water-plantain <i>Alisma subcordatum</i>				gal \$3.50 br \$2.50		br			
3. Bushy Beadgrass <i>Andropogon glomeratus</i>		qt \$1.55 lin \$6.00							
4. Tussock Sedge <i>Carex stricta</i>									
5. Three-way Sedge, Dwarf Banana <i>Polypodium trinerveum</i>	lin \$1.60		gal \$3.00		qt	br		2" \$6.5	
6. Spike-rush <i>Eleocharis quadrangulata</i>									
7. Yellow Iris <i>Iris pseudacorus</i>	N/A lin \$1.25	qt \$1.60 br \$8.5		gal \$4.00 br \$3.00			Eleocharis sp gal \$1.56 br		Eleocharis sp br liner \$4.7
8. Blue-flag Iris <i>Iris virginica</i>	N/A lin \$1.25	qt \$1.60 br \$8.5		gal \$4.00 br \$3.00		br	gal \$2.00 br	2" \$6.5	
9. Soft Rush <i>Juncus effusus</i>	lg br \$2.75 lin \$1.60	qt \$1.55 br \$5.0	4" \$5.0	gal \$3.50 br \$2.40	qt	br	gal plug br	2" \$6.5	br liner \$5.0
10. Rice Cutgrass <i>Leersia oryzoides</i>		lin \$8.5			clump			2" \$6.5	
11. Water-lily <i>Nymphaea odorata</i>	\$10.25					br			br liner \$1.50
12. Switch Grass <i>Panicum virgatum</i>	N/A lin \$8.9	qt \$1.50 lin \$8.5		gal \$3.00 3.5" \$1.30	qt			2" \$6.5	
13. Arrow Arum <i>Peltandra virginica</i>	lin \$1.25	qt \$1.75 br \$1.10		gal \$4.00 br \$3.00		br		2" \$7.5	br liner \$4.5
14. Pickerelweed <i>Pontederia cordata</i>	lg br \$2.25 lin \$1.25	qt \$1.75 lin \$1.10	gal \$2.00 br \$5.0	gal \$3.50 br \$2.50	qt	br	gal \$1.56 br	2" \$7.5	br liner \$4.7
15. Arrowhead <i>Sagittaria</i> spp.	lg br \$2.25 lin \$1.25	qt \$1.60 br \$6.5	gal \$2.00 br \$5.0	gal \$3.50 br \$2.50	qt	br	gal \$1.56 br	2" \$6.5	br liner \$6.5
16. Lizard-tail <i>Saururus cernuus</i>	lg br \$2.25 lin \$1.50	qt \$1.55 br \$7.5		gal \$3.50 br \$2.50		br		2" \$7.0	liner \$5.0
17. Wool-grass <i>Scirpus cyperinus</i>		qt \$1.60 br \$6.0						2" \$6.5	
18. Soft Stem Bulrush <i>Scirpus validus</i>		qt \$1.55 br \$8.5	br \$5.0		qt	br	gal \$2.60 br	2" \$6.5	liner \$6.0
19. Broad-leaved Cattail <i>Typha latifolia</i>		qt \$1.55 br \$7.0		gal \$3.50 br \$2.50	gal	clump		2" \$6.5	
20. Ironweed <i>Veronica maculosa</i>		qt \$1.60		2 qt \$2.60				2" \$6.5	

ABREVIATIONS used in this chart:

lg br = large, bare-root

lin = liner, plug or seedling

qt = quart pot

gal = gallon pot



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- Godfrey, R.K. and J.W. Wooten. 1981. Aquatic and Wetland Plants of the Southeastern United States: Dicotyledons. The University of Georgia Press, Athens. 933 pages.
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- Kartesz, John T. 1994. A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland. Second Edition. Timber Press, Portland, Oregon.
- Martin, Alexander C., Herbert S. Zim & Arnold L. Nelson. 1951. American Wildlife and Plants. McGraw Hill, New York. ix + 500 pages.
- Thunhorst, Gwendolyn A. 1993. Wetland Planting Guide for the Northeastern United States. Environmental Concern, Inc. 179 pages. (P.O. Box P, 210 West Chew Avenue, St. Michaels, MD 21663.)
- Tiner, Ralph W. 1993. Field Guide to Coastal Wetland Plants of the Southeastern United States. The University of Massachusetts Press, Amherst. xii + 328 pages.