

WORK ORDER NUMBER 2
**SHALLOW MARSH #2 LANDSCAPING SERVICES AT OSPREY
ACRES FLOWAY AND NATURE PRESERVE**

This Work Order Number 2 is entered into as of this ____ day of _____, 2018, pursuant to that certain Continuing Contract Agreement for Environmental and Biological Support Services entered into as of October 10, 2017 ("Agreement"), by and between Indian River County, a political subdivision of the State of Florida ("COUNTY") and G.K. Environmental, Inc. ("CONSULTANT").

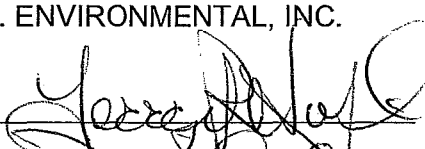
The COUNTY has selected the CONSULTANT to perform the professional services set forth on Attachment 1, attached to this Work Order and made part hereof by this reference. The CONSULTANT will perform the professional services for the fee schedule set forth in Attachment 2, attached to this Work Order and made a part hereof by this reference. The CONSULTANT will perform the professional services within the timeframe set forth in Attachment 3, attached to this Work Order and made a part hereof by this reference, all in accordance with the terms and provisions set forth in the Agreement. Pursuant to paragraph 1.4 of the Agreement, nothing contained in any Work Order shall conflict with the terms of the Agreement and the terms of the Agreement are incorporated in each individual Work Order as if fully set forth herein.

IN WITNESS WHEREOF, the parties hereto have executed this Work Order as of the date first written above.

CONSULTANT
G.K. ENVIRONMENTAL, INC.

By: _____

Title: _____


President

BOARD OF COUNTY COMMISSIONERS
OF INDIAN RIVER COUNTY

By _____

Peter D. O'Bryan, Chairman

Attest: Jeffrey R. Smith, Clerk of Court and
Comptroller

By _____

Deputy Clerk

Approved:

Jason E. Brown, County Administrator

Approved as to form and legal sufficiency:

William K. Debraal, Deputy County Attorney

ATTACHMENT 1 to WORK ORDER NUMBER 2
**SHALLOW MARSH #2 LANDSCAPING SERVICES AT OSPREY ACRES
FLOWAY AND NATURE PRESERVE**

SCOPE OF WORK

The COUNTY has requested that the CONSULTANT provide landscaping and exotic elimination services in Shallow Marsh #2 at the COUNTY's Osprey Acres Floway and Nature Preserve (hereinafter "Osprey Acres"). The Work is generally described below.

Landscaping Services: Furnish and install landscaping materials, plants, etc. and maintain plantings and eliminate exotics as more specifically specified or implied in Exhibit A (Section 02235 – Specifications), Exhibit B (Drawings SML-1 and SML-2), and Exhibit C (Scope of Work), included herein.

END OF ATTACHMENT 1

ATTACHMENT 2 to WORK ORDER NUMBER 2
**SHALLOW MARSH #2 LANDSCAPING SERVICES AT OSPREY ACRES
FLOWAY AND NATURE PRESERVE**

1. COMPENSATION

The COUNTY agrees to pay and the CONSULTANT agrees to accept, a not-to-exceed fee of **\$125,119.12** for services rendered according to Attachment 1 of this Work Order and as summarized on Exhibit C, included herein. Additional services shall be performed at the hourly rates as set forth in the Agreement.

2. PARTIAL PAYMENTS

The COUNTY shall make monthly partial payments to the CONSULTANT for all authorized work pertaining directly to this project performed during the previous calendar month. The CONSULTANT shall submit invoices monthly for services performed and expenses incurred pursuant to this Agreement during the prior month.

The CONSULTANT shall submit duly certified invoices in duplicate to the Director of the Public Works Department. For lump sum line items, the amount submitted shall be the prorated amount due for all work performed to date under this phase, determined by applying the percentage of the work completed as certified by the CONSULTANT, to the total due for this phase of the work. For time and material line items, the amount submitted shall be based on the actual hours worked and expenses incurred for the billing period.

The amount of the partial payment due the CONSULTANT for the work performed to date under these phases shall be an amount calculated in accordance with the previous paragraph and less previous payments. Per F.S. 218.74(2), the COUNTY will pay approved invoices on or before the forty-fifth day after the COUNTY receives the CONSULTANT's invoice.

END OF ATTACHMENT 2

ATTACHMENT 3 to WORK ORDER NUMBER GKE 2
SHALLOW MARSH #2 LANDSCAPING SERVICES AT OSPREY ACRES
FLOWAY AND NATURE PRESERVE

1. TIME FOR COMPLETION

Complete all planting Work within two months of receiving a Notice-to-Proceed from the COUNTY. Plant maintenance and exotic species control will begin immediately after the planting phase is approved by the COUNTY.

END OF ATTACHMENT 3

EXHIBIT A - LANDSCAPING

SECTION 02235

LANDSCAPING SHALLOW MARSH #2 AREA

PART 1 - GENERAL

1.1 SCOPE

- A. This Work consists of furnishing all labor, supervision, material, equipment, transportation, etc., to complete all landscaping work for the areas shown or implied on the Drawings, and as specified herein. Work shall also include the removal of all invasive exotic species from within the work area, and continual removal of exotics for the times specified herein.
- B. The CONTRACTOR is solely responsible for watering and otherwise maintaining the landscaping until the end of the landscape maintenance and warranty period specified herein. Furnish and install a temporary irrigation system if necessary, through the end of the landscape maintenance and warranty period at no additional cost to the OWNER.

1.2 SUBMITTALS

- A. Before planting, submit two samples of each specified plant to the OWNER for approval and identify the name, address, and telephone number of the nursery supplier.

1.3 PROTECTION OF GOPHER TORTOISES

- A. Gopher tortoises inhabit the site. Their burrows have been identified to the best extent possible. Take extreme care to prevent disturbing or harming the site's gopher tortoises. Maintain a minimum 25-foot radius from all gopher tortoise burrows. If a planting location appears that it will interfere with a tortoise burrow, modify the planting layout as necessary so the burrow is not disturbed.

1.4 EXOTIC AND INVASIVE VEGETATION ELIMINATION

- A. Keep the work area free of exotics and invasive vegetation until the specified time period.
- B. All herbicide must be applied by an individual possessing a State (FDACS) Certified herbicide application license of the appropriate class. Provide the OWNER with a copy of the individual's license before herbicide application. Do not impact native plants with herbicide.

- C. Vines growing in trees within the work area that are to remain do not need to be pulled out of the tree canopy. Cut the vines and carefully treat each vine and stump at the base with approved herbicide, leaving the remaining severed vines in the tree canopy.

PART 2 – PRODUCTS

2.1 FERTILIZER

- A. Provide a complete analysis slow-release fertilizer that is uniform in composition, dry, and free flowing. Deliver to the site in the original unopened containers, each bearing the manufacturer's statement of analysis. Fertilizer shall meet the following requirements:
 1. 12 percent Nitrogen (Minimum 70% Slow Release N Source)
 2. 8 percent Phosphorus
 3. 8 percent Potassium.The fertilizer shall also contain trace elements. Do not place any fertilizer in locations where it may flow into the water in Shallow Marsh #2.

2.2 PLANT MATERIAL

- A. All nursery stock shall conform with Grades and Standards for Nursery Plants Parts I and II, latest edition, published by the Florida Department of Agriculture and Consumer Services. All plantings shall be Florida #1 specimens or better as determined by the Florida Division of Plant Industry. Supply native vegetation in proper containers and at the size indicated on the Drawings. Under no circumstances shall plant material containing fire ants be brought onto the Project Site.
- B. All vegetation shall be sound, healthy, well-branched, and free of disease, insect eggs, larvae, nematodes, weeds, and exotic or invasive vegetation. All plants shall have adequate root systems and shall not be root-bound. All plants not meeting this requirement will be immediately rejected and shall be immediately removed from the project site.
- C. Plants larger in size than specified may be used if approved by the OWNER. If the use of larger plants is approved, the required ball of earth or spread of roots shall be increased in proportion to the size of the plant.
- D. Inspection: At any time, the OWNER may inspect plants at the place of planting for quality, size, and variety. Prior approval shall not impair the right of re-inspection and rejection at the site during progress of the Work or after completion, for size and

conditions of balls or roots, latent defects, disease, infestations, injuries, etc. Remove rejected plants immediately from the project site and replace with new material within two days. Plant material rejected shall be replaced at no additional charge.

- E. Condition of Plant Material at Final Completion: At Final Completion, all plant material shall be sound, healthy, well-branched, and free of disease, weeds, and exotic or invasive vegetation. Plant material rejected shall be replaced at no additional charge at the end of Final Completion and during the maintenance / acceptance timeframe.

2.3 COLLECTED STOCK

- A. No collected stock is permitted from private / public property.

2.4 NATIVE STOCK

- A. Plants collected from wild or native stands shall be considered nursery grown when they have been reestablished in the nursery row and grown under regular nursery cultivation practices for a minimum of one growing season (12 months) and have attained adequate root and top growth to indicate full recovery from transplanting into the nursery row.

2.5 CONTAINER GROWN STOCK

- A. All container grown stock shall be healthy, vigorous, well-rooted plants and established in the container within which they are sold or grown. The tops shall be in good quality and in a healthy growing condition.
- B. An established container grown plant shall be transplanted into a container and grown in that container sufficiently long for new fibrous roots to have developed so that the root mass will retain its shape and hold together when removed from the container.
- C. Root-bound plants will be rejected and shall be immediately removed from the project site.

PART 3 - EXECUTION

3.1 DIGGING AND HANDING

- A. Do not hold for planting more than the time recommended by the supplier and protect from excessive exposure and dehydration. Pack plant material during

transport to prevent breakage and drying during transport.

- B. Dig balled and burlapped (B&B) plants with firm, natural balls of soil of sufficient size to encompass the plant's fibrous and feeding roots. Do not plant said plants if the ball is cracked or broken.
- C. Do not handle plants by their stems.
- D. If plants are marked "BR" on the Drawings they shall be dug with bare roots. Do not cut roots within the minimum spread listed on the Drawings. Ensure roots do not dry out during moving or before planting.
- E. Excavate for plantings using extreme care to avoid damage to subsurface utilities, Gopher Tortoise burrows, adjacent improvements, etc.
- F. Prior to ordering plants, test the soil pH and other pertinent soil parameters to verify the specified plants will grow well in the existing soil. If the soil conditions are such that the specified plants will not grow well, notify the ENGINEER in writing and provide a recommended substitute list of plants that will grow well in the existing soil, for the ENGINEER's review. The warranties set forth elsewhere in this Specification shall apply to all substitute plantings recommended by the CONTRACTOR.

3.2 PLANTING PROCEDURES

- A. Cleanup the site after the work is completed. Remove all objectionable matter, rubbish, etc. from the site before planting. Do not mix these materials with the soil.
- B. The planting areas are expected to be free of ruts and graded in accordance with the Drawings by others prior to planting. Kill or remove any miscellaneous stray weeds or exotics that may remain either by cultivation or spraying of approved herbicides.
- C. Protect Geosynthetic Clay Liner: A geosynthetic clay liner is installed a minimum of twelve inches below the bottom and sides of Shallow Marsh #2 and its berms as indicated on the Drawings. Take extreme care when planting to not puncture or otherwise disturb this liner. Liner details and locations are shown on the Drawings. Repair all liner damaged as recommended by the liner manufacture at no cost to the OWNER.
- D. Install and maintain all plants as recommended by the supplier nursery. Perform all planting procedures with qualified personnel. Insure no air pockets are around the roots.

- E. The diameter of all plant holes (trees and shrubs) shall be two times the diameter of the root ball or plant container (for container grown plants). Fill the void in the planting hole with top quality topsoil.
- F. Set plants straight and level such that after settlement, the plant crown will stand one to two inches above grade. Set each plant in the center of the pit.
- G. Evenly space ground cover plants in accordance with the Drawings.
- H. Fertilize all upland plants at least once to ensure proper growth until the maintenance period begins. Notify the ENGINEER prior to applying the fertilizer. Immediately after fertilizer application, provide a written certification to the ENGINEER that the fertilizer was applied per the Specifications – payment for this fertilization will not be issued without this certification. Fertilize so that runoff of fertilizer-laden water into water bodies does not occur.

3.3 PLANTING AREAS

- A. Planting areas in general, are shown on the Drawings.

3.4 TEMPORARY IRRIGATION SYSTEM

- A. If deemed necessary by the Landscaper, design, furnish, install, and maintain a temporary irrigation system or provide other means to water and maintain all landscape items/planting areas during the maintenance and warranty period. CONTRACTOR may use water from Shallow Marsh #2. The OWNER will not provide electricity. Temporary facilities shall not conflict with the site's operation and maintenance. There is no set number of irrigation events in this Contract. Irrigate as many times as necessary to keep all landscape items/planting areas alive and healthy for the entire landscape maintenance and warranty period. Increase irrigation events as required during all drought periods and at no additional cost to the OWNER.

3.5 THE LANDSCAPE MAINTENANCE AND WARRANTY PERIOD

- A. Maintenance and Warranty Period: The maintenance and warranty period for all landscaping shall run consecutive and the duration is nine months, beginning on the date of Final Acceptance of the planting portion by County staff. During the nine-month maintenance and warranty period, operate and maintain the temporary irrigation facilities, maintain the plantings, and guarantee that:
 1. Eighty-five (85) percent of the planted individuals become established and show signs of normal growth, based upon standard growth parameters such as height, base diameter, or canopy circumference; and

2. At least ninety (90) percent cover by appropriate wetland herbaceous species has been obtained.
- B. Replacement Plantings: Replace all plantings not meeting the above warranty period. All replacement plantings shall be Florida #1 specimens and they shall be installed and maintained as recommended by the supplier nursery and specified herein. Coordinate planting with County personnel. Replacements shall be at no cost to the OWNER.
 - C. Perform maintenance as necessary to insure plant survivability. Take special care to not disturb birds, nests, or other wildlife.
 - D. Fertilize plantings as necessary to ensure proper growth throughout the maintenance and warranty period and provide all other care necessary for their survival at no additional cost.

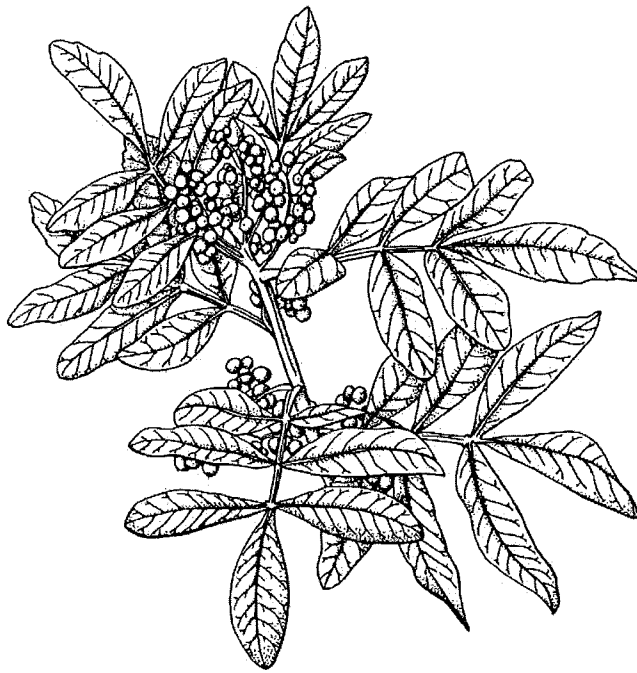
3.5 EXOTIC AND INVASIVE VEGETATION ELIMINATION PERIOD

- A. Beginning on the same date as the landscape maintenance and warranty period, destroy and continually destroy, all exotic and invasive vegetation within the Shallow Marsh #2 work area for nine months. Kill all exotic and invasive vegetation using methods approved by both the OWNER and St. Johns River Water Management District (SJRWMD) (i.e. hand remove or lightly spray with SJRWMD approved herbicides) and keep all areas free of exotics. Take special care to not disturb birds, nests, or other wildlife. Do not use any chemicals, etc. harmful to wildlife or native ants. All herbicides must be approved by the OWNER prior to their use. For Brazilian pepper tree eradication, use a herbicide proven to kill Brazilian pepper trees. All herbicides shall be color-marked so it leaves a colored imprint where sprayed, to easily identify where it is applied. Replace all landscaping material damaged by overspray at no cost to the OWNER.
- B. In addition to cattails and other plants normally considered to be exotic or invasive species by the industry, eliminate and remove from the Project Site all of the plants in the following attachment "Upland and Wetland Invasive Exotics" (11 pages).

+ + END OF SECTION + +

PLANT IDENTIFICATION TIPS:

**UPLAND and WETLAND
INVASIVE EXOTICS**



K. C. Burks, Botanist
Bureau of Invasive Plant Management
Florida Department of Environmental Protection
Tallahassee, Florida 32399 850-245-2809
August 2003



www.dep.state.fl.us/lands/invaspec/index.htm

Illustrations courtesy of the Center for Aquatic and Invasive Plants, IFAS, University of Florida
(<http://plants.ifas.ufl.edu/>)

Except:

Abrus precatorius, courtesy of Jackie Smith, FDEP.

Albizia julibrissin, from Kurz, H., and R.K. Godfrey. 1962. *Trees of Northern Florida*. Univ. Press of Florida, Gainesville.

Albizia lebbek, *Cupaniopsis anacardioides*, *Ficus microcarpa*, *Jasminum dichotomum*, *Leucaena leucocephala*, courtesy of Miami-Dade County Dept of Environmental Resources Management, illustrations by Elizabeth Smith.

Imperata cylindrica, courtesy of LeRoy G. Holm (used in *World's Worst Weeds*, 1979).

Lonicera japonica, from Godfrey, R.K., and J. Wooten. 1981. *Aquatic and Wetland Plants of Southeastern United States: Dicotyledons*. Univ. of Georgia Press, Athens.

Neyraudia reynaudiana, from Hitchcock, A.S., and A. Chase. 1950. 2nd edition. *Manual of the Grasses of the United States*. USDA Ag. Research, Washington, DC.

Pueraria montana, courtesy of Suzanne Kennedy, Brevard County Natural Resources Dept.

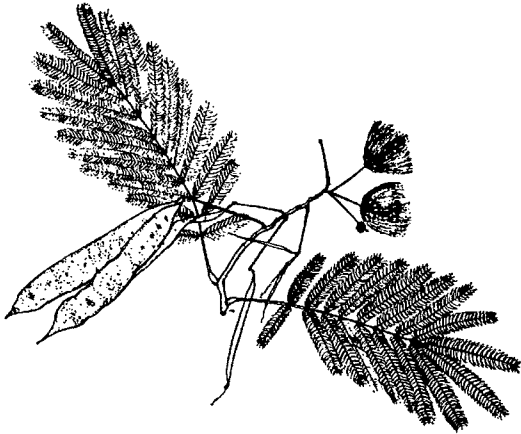
Scaevola sericea, courtesy of K.C. Burks, FDEP.

Solanum viarum, courtesy of Jeff Mullahey, Agronomy Dept., Univ. of Fla. IFAS (used in # SS-AGR-58. 1996).

Trees

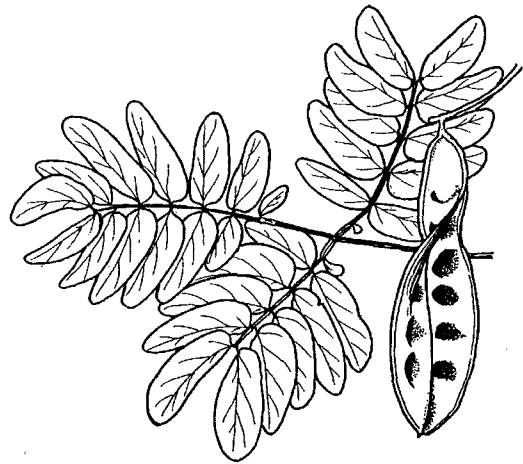
Albizia julibrissin – mimosa tree

- Trees to ___ ft, with spreading crown
- Unarmed, i.e., no thorns or prickles
- Leaves twice compound, leaflets tiny, many
- Flowers in pink “powder-puff” clusters
- Fruit a long, flat pod



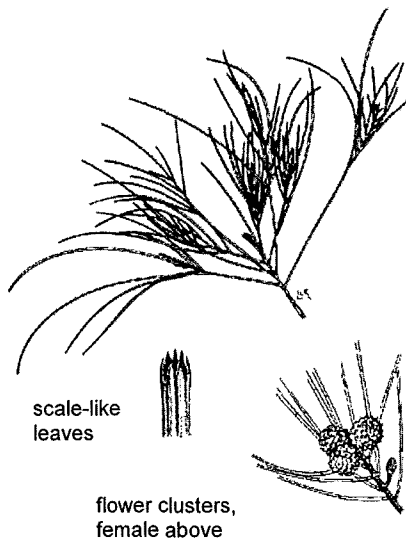
Albizia lebeck – woman's tongue

- Trees to 65 ft, with spreading crown
- Unarmed, i.e., no thorns or prickles
- Leaves twice compound, leaflets 1-2 in. long
- Flowers in yellowish “powder-puff” clusters
- Fruit a flat long pod, persisting & “rattling” in wind



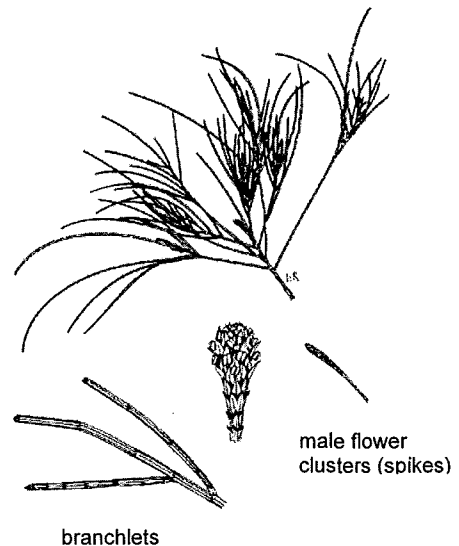
Casuarina equisetifolia – Australian-pine

- Trees to 150 ft, with open crown
- Branchlets thin, grayish green
- Leaves tiny, scalelike, in whorls of 6-8
- Flowers tiny, unisexual, on same tree
- Fruits in woody, conelike clusters



Casuarina glauca – thicket Australian-pine

- Trees to 65 ft, with dense crown
- Spreads by root suckers
- Branchlets thin, green, often waxy
- Leaves tiny, scalelike, in whorls of 12-17
- Flowers tiny, mostly male trees in Florida



Trees

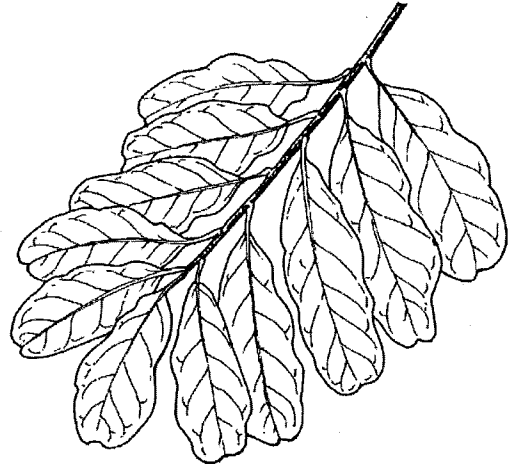
***Cinnamomum camphora* – camphor tree**

- Evergreen tree to 60 ft tall, glabrous
- Cut stems/leaves highly aromatic
- Leaves simple, alternate, with short petioles
- Leaf blades lustrous, entire
- Glands on lower leaf surfaces



***Cupaniopsis anacardioides* – carrotwood**

- Slender evergreen tree to 10 m
- Inner bark often orange (carrot color)
- Leaves large, compound, with 4-12 leaflets
- Leaflets leathery, dark green, oblong
- Flowers tiny, green-yellow, in long racemes



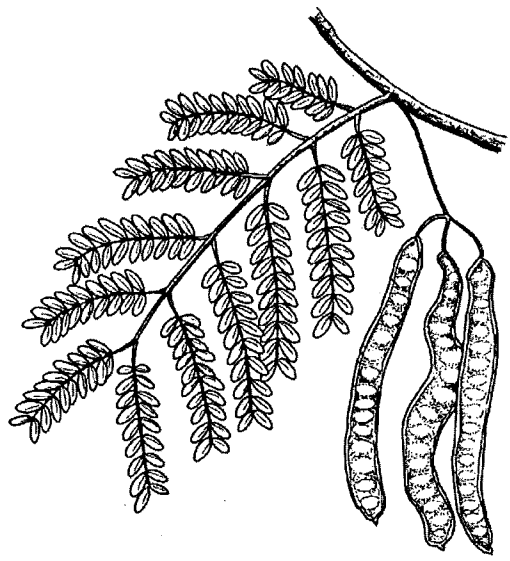
***Ficus microcarpa* – laurel fig**

- Tree with short trunk, rounded crown
- Often growing on other trees when young
- Milky sap from stems or leaves
- Leaves alternate, small, dark shiny green
- Figs yellow or dark red when ripe



***Leucaena leucocephala* – lead tree**

- Small tree, to 30 ft tall, often in thickets
- Stems unarmed, i.e., no thorns or prickles
- Leaves twice compound, leaflets oblong
- Flowers white to yellowish in round clusters
- Pods long flat, red-brown, hanging clusters



Trees

Melaleuca quinquenervia – melaleuca

- Evergreen tree to 100 ft, with slender crown
- Whitish, thick, spongy bark sheds easily
- Leaves alternate, evergreen, gray-green
- Flowers white, in "bottle-brush" spikes
- Fruits small, brown woody capsules



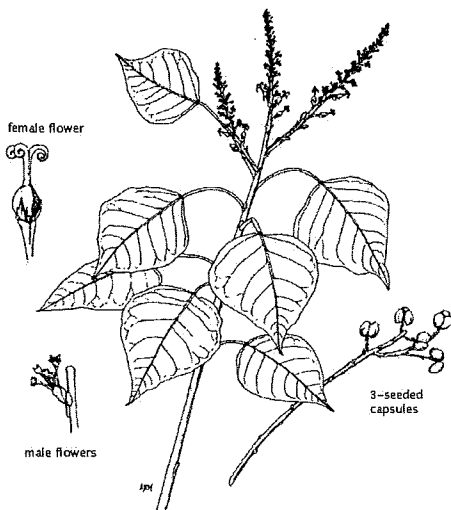
Melia azederach – Chinaberry

- Deciduous tree to 50 ft tall, often in thickets
- Twigs stout, with purplish bark
- Leaves large, twice or thrice compound
- Flowers lilac in large panicles
- Fruit a thin fleshy drupe, yellow



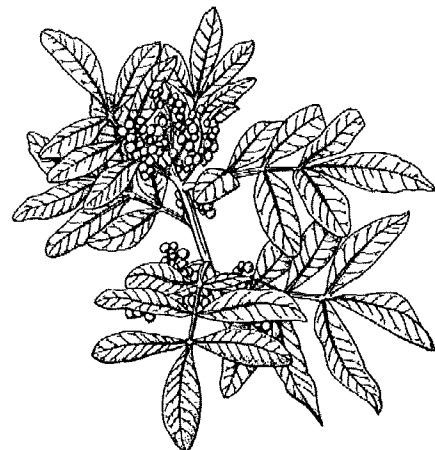
Sapium sebiferum – Chinese tallow tree

- Deciduous tree to 50 ft tall
- Sap milky, poisonous
- Leaves ovate with narrowed tips, aspen-like
- Pair of glands at petiole tops
- Fruit a hard capsule with 3 white, waxy seeds



Schinus terebinthifolius – Brazilian pepper

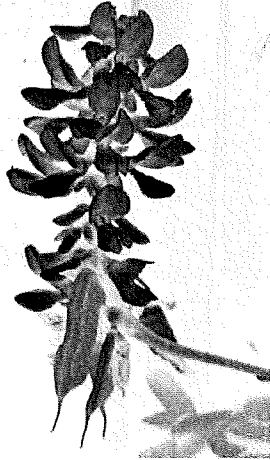
- Shrubby evergreen tree to 13 m tall
- Leaves alternate, once compound
- Leaflets usually 7-9, often toothed
- Flowers unisexual, small, white
- Fruits bright red small drupes in clusters



Vines

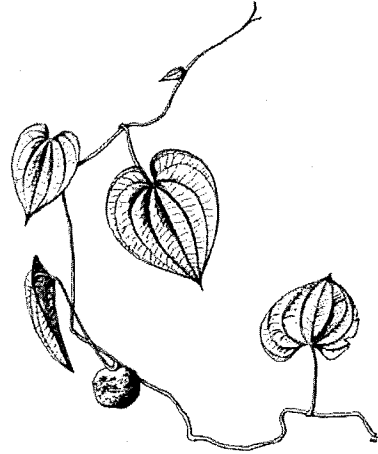
***Abrus precatorius* – rosary pea**

- Stems branching, twining, woody below
- Leaves alternate, even-pinnate compound
- Leaflets oval-oblong, in 5-15 pairs
- Flowers pea-like, white-pink to reddish
- Seeds scarlet and black, **very poisonous**



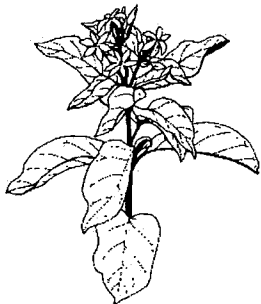
***Dioscorea bulbifera* – air potato**

- Stems herbaceous, twining to 60+ ft
- Leaves alternate, heart shaped
- Forms many aerial tubers
- Rarely flowering in Florida
- Leaf-blade veins in parallel curves



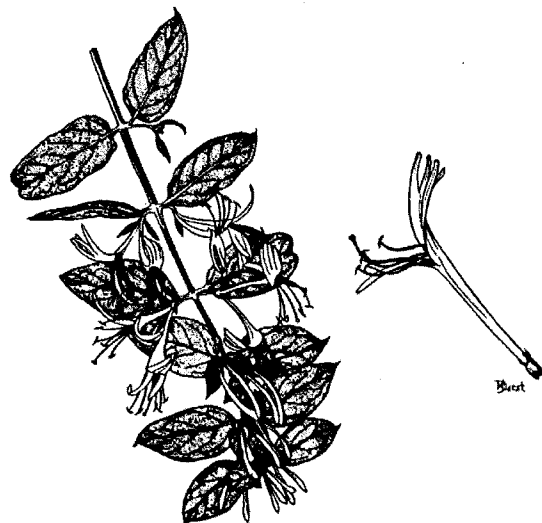
***Jasminum dichotomum* – Gold Coast jasmine**

- Evergreen woody climber, often shrubby
- Leaves opposite, glossy green, roundish oval
- Flowers fragrant, white (pink in bud)
- Flowers opening at night
- Fruit a two-lobed fleshy black berry



***Lonicera japonica* – Japanese honeysuckle**

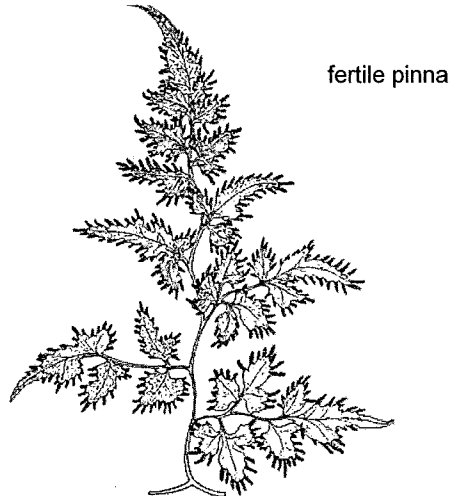
- Stems woody, trailing or climbing
- Leaves opposite, evergreen, oval
- Young stems and leaves hairy
- Flowers white, yellowing with age
- Leaves on new shoots often toothed



Vines

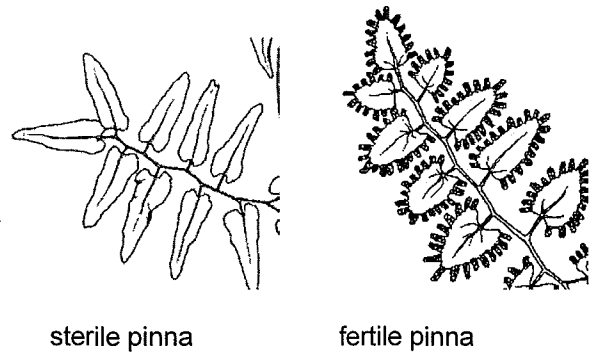
***Lygodium japonicum* – Japanese climbing fern**

- Fronds delicate, twining, to 90 ft long
- Pinnae spread out along stemlike rachis
- Pinnae triangular shaped, pinnately divided
- Sterile leaflets incised on margin
- Fertile leaflets with lobe edges narrowed



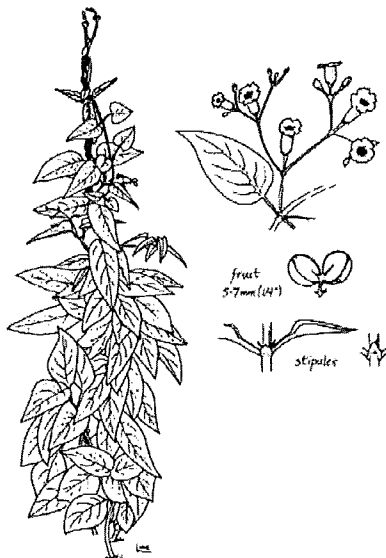
***Lygodium microphyllum* – Old World climbing fern**

- Fronds delicate, twining, to 90 ft long
- Pinnae spread out along stemlike rachis
- Pinnae more oblong shaped, not as divided
- Sterile leaflets lance shaped, not incised
- Fertile leaflets fringed with pinched lobes



***Paederia foetida* – skunk vine**

- Stems woody below, twining, climbing
- All parts with disagreeable odor
- Leaves opposite, lance shaped
- Flowers bell shaped, pale lilac
- Fruit a shiny orange-brown round capsule



***Pueraria montana* var. *lobata* – kudzu**

- Deciduous, twining vine, engulfing area
- Leaves compound with 3 large leaflets
- Young stems hairy
- Flowers pea-type, reddish lavender
- Fruit a bean pod with golden-brown hairs



Shrubs

Ardisia crenata – coral ardisia

- Small shrub tolerating deep shade
- Leaves alternate, shiny, leathery
- Leaf edges crisped, or scalloped
- Flowers white in axillary clusters
- Fruits bright red, in drooping clusters



Ardisia elliptica – shoebutton ardisia

- Glabrous evergreen shrub to 15 ft tall
- Leaves alternate, entire, gland-dotted below
- New foliage often reddish
- Flowers mauve, in clusters at leaf axils
- Fruits black when ripe



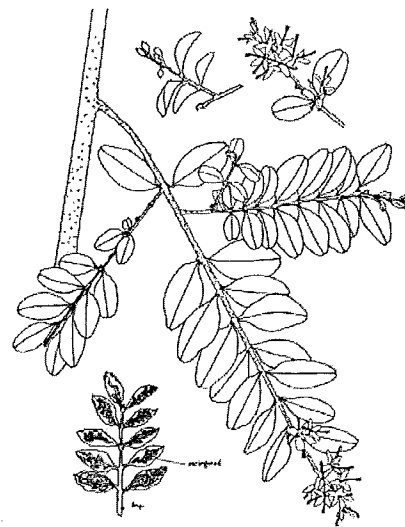
Colubrina asiatica – lather leaf

- Sprawling evergreen shrub to 20+ ft tall
- Stems glabrous, many branched
- Leaves alternate, shiny, ovate, serrate
- Flowers tiny, greenish white, in leaf axils
- Fruit a brown capsule with 3 grayish seeds



Ligustrum sinense – Chinese privet

- Semi-evergreen shrub to 15 ft tall
- Twigs densely pubescent
- Leaves opposite, small, dark green in wild
- Leaves variegated in cultivation
- Flowers white, small, many, odorous



Shrubs

Mimosa pigra – catclaw mimosa

- Thicket-forming, prickly shrub to 20 ft tall
- Large recurved prickles on stems
- Mimosa-like compound leaves, sensitive
- Flowers pink in small rounded clusters
- Fruits flat brown hairy segmented pods



Rhodomyrtus tomentosa – downy rose myrtle

- Evergreen shrub to 6 ft tall
- Young stems soft hairy
- Leaves opposite, entire, soft hairy below
- Flowers rose-pink, with 5 petals each
- Fruit a round, sweet-fleshed, purple berry



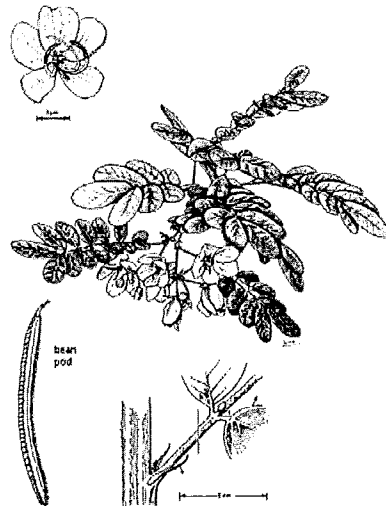
Scaevola sericea – beach naupaka

- Large shrub, forming dense mounds
- Leaves alternate, crowded near stem tips
- Leaf blades coarse, shiny, with curved edges
- Flowers white to pale lilac, “half-flowers”
- Fruits round, shiny white



Senna pendula – climbing cassia

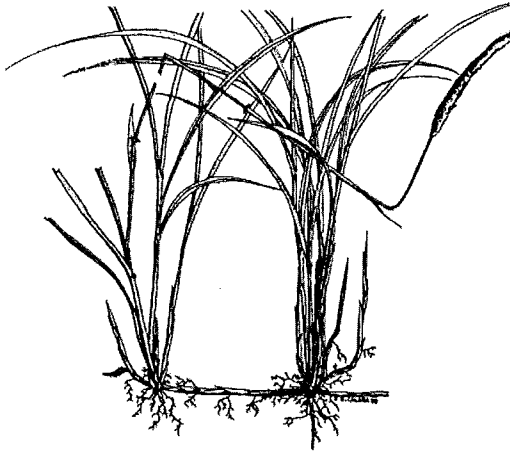
- Sprawling evergreen shrub to 14 ft tall
- Stems somewhat zigzag, sparsely hairy
- Leaves compound with 3-6 leaflet pairs
- Flowers yellow, 5 petaled, near stem tips
- Pods brown, slender, cylindric, glabrous



Grasses

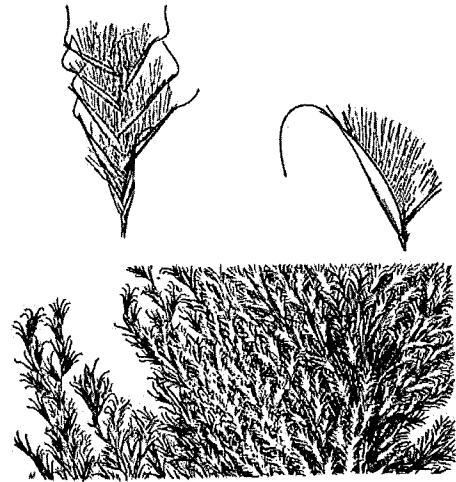
***Imperata cylindrica* – cogon grass**

- Rhizomes scaly, pointy like *Panicum repens*
- Leaves yellow-green, long pointed, erect
- Leaf-blade midvein off-center
- Leaf blades hairy at base
- Flowers in narrow, fluffy, white spikes



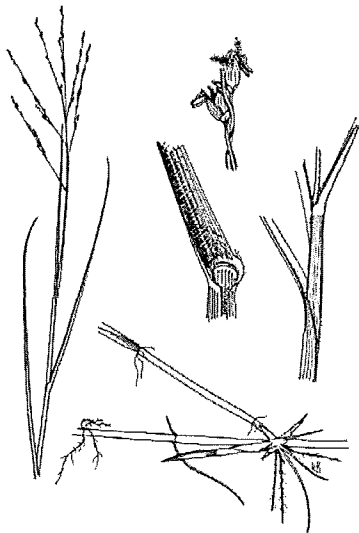
***Neyraudia reynaudiana* – silk, or Burma, reed**

- Stems reedlike, to 9 ft tall
- Stems often branched
- Leaf sheaths woolly at top
- Large, densely feathery, nodding panicles
- Spikelets long-hairy, short awned



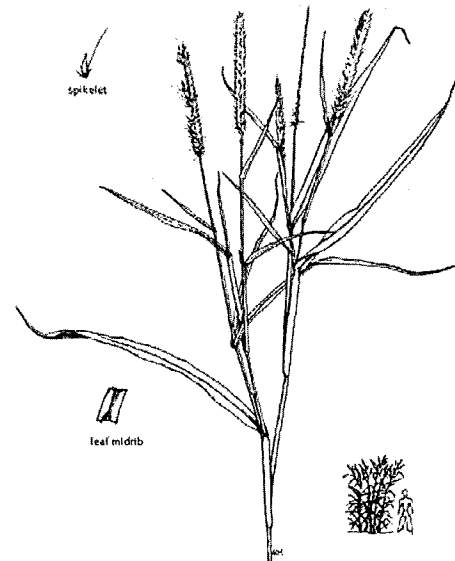
***Panicum repens* – torpedo grass**

- Rhizomes with hard torpedo-like tips
- Leaf blades with sparse hairs on upper side
- Ligule a tiny collar with short hairs at top
- Sheaths glabrous or hairy near top
- Inflorescence branched & open



***Pennisetum purpureum* – elephant grass**

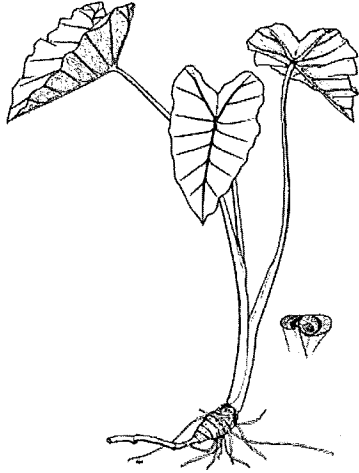
- Perennial grass to 9+ ft tall
- Stem nodes bluish, leaves often bluish green
- Leaf blades with stout, keeled midrib
- Inflorescence a dense, bristly, tawny spike
- Spikelets with bristles falling at maturity



Other Herbaceous Plants

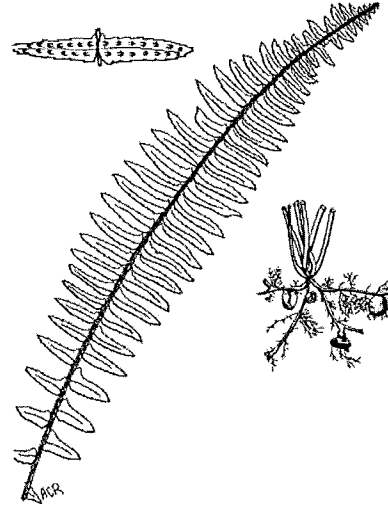
Colocasia esculenta – wild taro

- Perennial in stands to 5 ft tall
- Leaves from corms, stolons, rhizomes
- Leaves large, arrowhead shape
- Petioles attached to back of leaf blade (leaves “peltate”)
- Flowers tiny, hidden within yellow spathe



Nephrolepis cordifolia – tuber sword fern

- Stolons many, often with small buried tubers
- Fronds compound, erect, to 3 ft tall
- Leaflets crowded, with small lobe at bases
- Rachis with hair-like, 2-colored scales
- Fertile & sterile fronds similar in shape, size



Ruellia brittoniana – Mexican petunia

- Perennial to 3 ft tall
- Stems mostly erect, with swollen nodes
- Leaves opposite, to 11 in, with pointed tips
- Flowers prominent, purple to white
- Fruit a 1-in capsule with many brown seeds



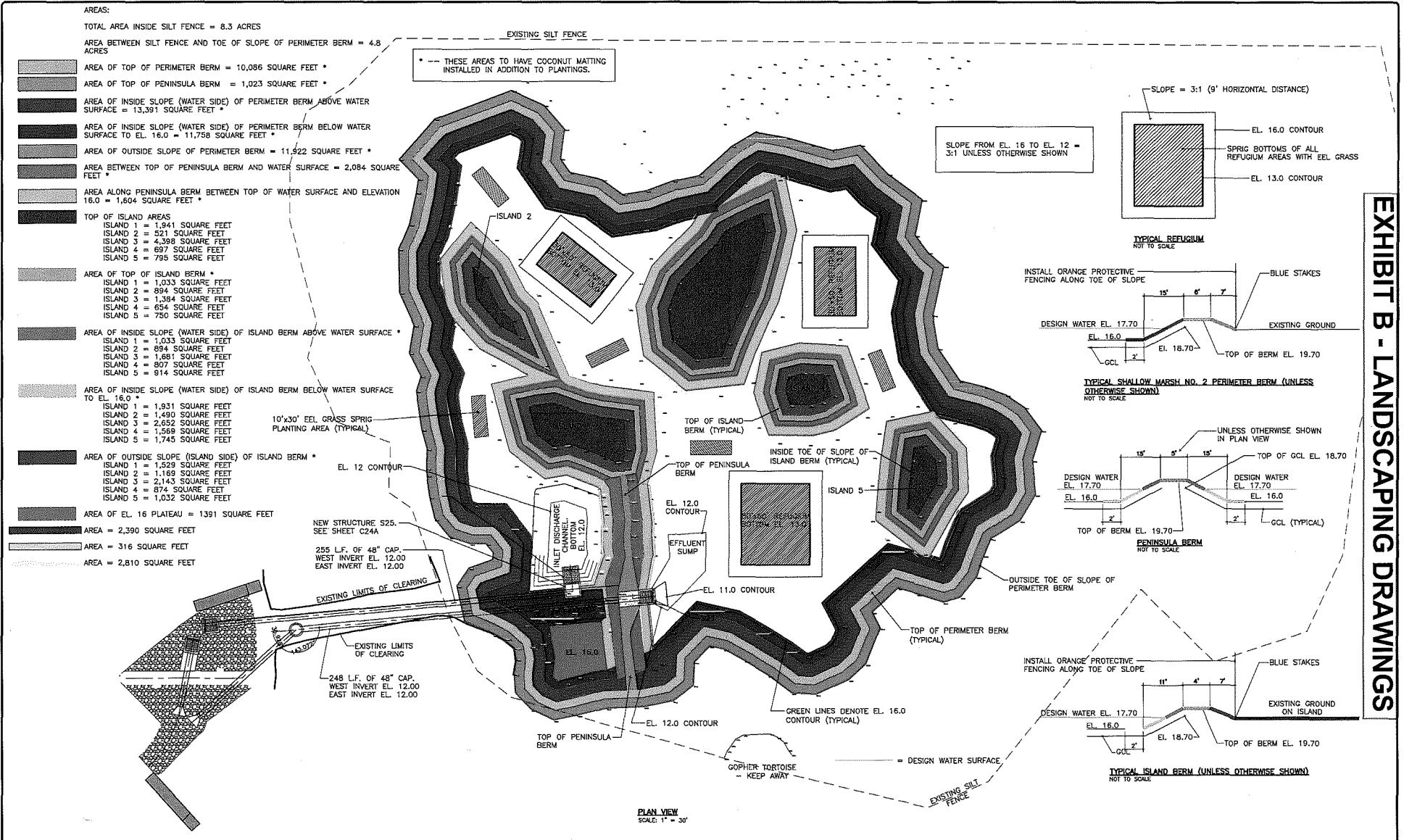
Solanum viarum – tropical soda apple

- Bushy perennial to 6 ft tall
- Stems with scattered, small, hooked prickles
- Leaves alternate, angle-lobed, velvety
- Flowers white with recurved petals
- Mature fruits leathery skinned, yellow



NOTES

EXHIBIT B - LANDSCAPING DRAWINGS



CONFORMED DRAWING

DESIGNED BY	DRWN BY	CHECKED BY	DATE
KM	KM	KM	08/12/2018

INDIAN RIVER COUNTY
STORMWATER DIVISION
1901 27th STREET
VERO BEACH, FLORIDA 32960
(772) 225-1562

OSPREY ACRES FLOWAY
AND NATURE PRESERVE

W. KEITH MACULLY, P.E.
FLORIDA P.E. NO. 32007
DATE:

















SHALLOW MARSH NO. 2
LANDSCAPING

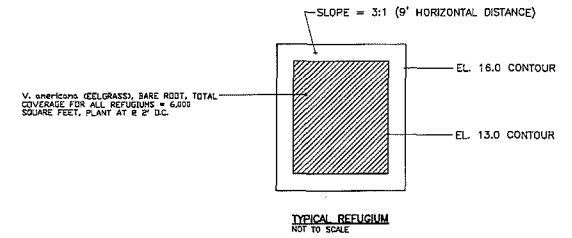
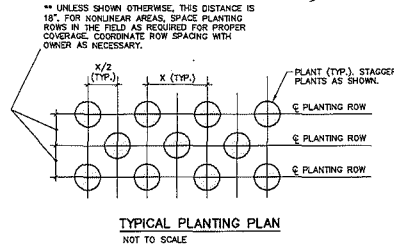
PROJECT NO.
DATE 8/12/2018
SCALE AS NOTED
SML-1

* -- THESE AREAS TO HAVE COCONUT MATTING INSTALLED IN ADDITION TO PLANTINGS.

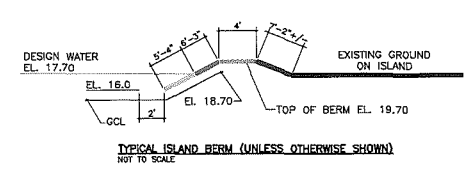
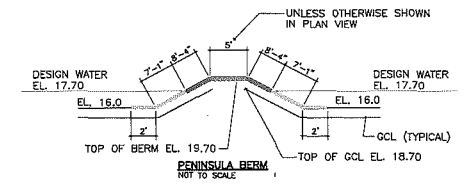
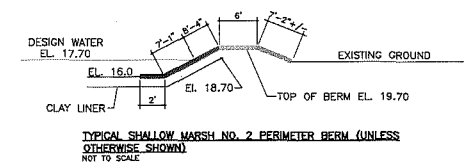
PLANTING AREAS:

TOTAL AREA INSIDE SILT FENCE = 8.3 ACRES
 AREA BETWEEN SILT FENCE AND TOF OF SLOPE OF PERIMETER BERM = 4.8 ACRES

-  AREA OF TOP OF PERIMETER BERM = 10,086 SQUARE FEET *
 -  AREA OF TOP OF PENINSULA BERM = 1,023 SQUARE FEET *
 -  AREA OF INSIDE SLOPE (WATER SIDE) OF PERIMETER BERM ABOVE WATER SURFACE = 13,391 SQUARE FEET *
 -  AREA OF INSIDE SLOPE (WATER SIDE) OF PERIMETER BERM BELOW WATER SURFACE TO EL. 16.0 = 11,758 SQUARE FEET *
 -  AREA OF OUTSIDE SLOPE OF PERIMETER BERM = 11,922 SQUARE FEET *
 -  AREA BETWEEN TOP OF PENINSULA BERM AND WATER SURFACE = 2,084 SQUARE FEET *
 -  AREA ALONG PENINSULA BERM BETWEEN TOP OF WATER SURFACE AND ELEVATION 16.0 = 1,604 SQUARE FEET *
 -  TOP OF ISLAND AREAS
 - ISLAND 1 = 1,941 SQUARE FEET
 - ISLAND 2 = 521 SQUARE FEET
 - ISLAND 3 = 4,398 SQUARE FEET
 - ISLAND 4 = 697 SQUARE FEET
 - ISLAND 5 = 795 SQUARE FEET
 -  AREA OF TOP OF ISLAND BERM *
 - ISLAND 1 = 1,033 SQUARE FEET
 - ISLAND 2 = 894 SQUARE FEET
 - ISLAND 3 = 1,384 SQUARE FEET
 - ISLAND 4 = 654 SQUARE FEET
 - ISLAND 5 = 750 SQUARE FEET
 -  AREA OF INSIDE SLOPE (WATER SIDE) OF ISLAND BERM ABOVE WATER SURFACE *
 - ISLAND 1 = 1,941 SQUARE FEET
 - ISLAND 2 = 521 SQUARE FEET
 - ISLAND 3 = 4,398 SQUARE FEET
 - ISLAND 4 = 697 SQUARE FEET
 - ISLAND 5 = 795 SQUARE FEET
 -  AREA OF INSIDE SLOPE (WATER SIDE) OF ISLAND BERM BELOW WATER SURFACE TO EL. 16.0 *
 - ISLAND 1 = 1,931 SQUARE FEET
 - ISLAND 2 = 1,480 SQUARE FEET
 - ISLAND 3 = 2,652 SQUARE FEET
 - ISLAND 4 = 1,569 SQUARE FEET
 - ISLAND 5 = 1,745 SQUARE FEET
 -  AREA OF OUTSIDE SLOPE (ISLAND SIDE) OF ISLAND BERM *
 - ISLAND 1 = 1,529 SQUARE FEET
 - ISLAND 2 = 1,169 SQUARE FEET
 - ISLAND 3 = 2,143 SQUARE FEET
 - ISLAND 4 = 674 SQUARE FEET
 - ISLAND 5 = 1,032 SQUARE FEET
 -  AREA OF EL. 16 PLATEAU = 1391 SQUARE FEET
 -  AREA = 2,390 SQUARE FEET
 -  AREA = 316 SQUARE FEET
 -  AREA = 2,810 SQUARE FEET
- INTERIOR 20'x30' EEL GRASS SPRIG PLANTINGS = 5 * 300 = 1,500 SQUARE FEET
 TOTAL REFUGIUM BOTTOM EEL GRASS SPRIG PLANTINGS = 6,000 SQUARE FEET



V. SPECIENS (EELGRASS), BARE ROOT, TOTAL COVERAGE FOR ALL REFUGIUMS = 6,000 SQUARE FEET, PLANT AT 6" D.C.



CONFORMED DRAWING

REVISIONS	REVISIONS	REVISIONS	REVISIONS	REVISIONS	REVISIONS	REVISIONS	REVISIONS

INDIAN RIVER COUNTY
 STORMWATER DIVISION
 1901 27TH STREET
 VERO BEACH, FLORIDA 32900
 (772) 225-1800

OSPREY ACRES FLOWAY
 AND NATURE PRESERVE

W. KEITH McCULLY, P.E.
 FLORIDA P.E. NO. 32007
 DATE:

SHALLOW MARSH NO. 2
 LANDSCAPING

PROJECT NO.
 DATE: 6/13/2018
 SEAL: AS NOTED
 SHEET: SML-2

OSPREY ACRES – SHALLOW MARSH – G. K. Environmental, Inc. Planting Breakdown and Proposal to Complete
(based on Indian River County drawings dated 6/12/18)
8.3 Acre Area of Planting and Maintenance
October 10, 2018

PHASE I

A) <u>Pre-Planting Exotic Control On All Berms</u>	<u>\$each</u>	<u>#units</u>	<u>\$total</u>
<u>(if needed) 8.3 ac. include open water and area outside perimeter dike</u> 1 time pre-application of herbicide within 30 days of berm completion	1,400.00	all berms	\$ 1,400.00
TOTAL FOR PHASE I			\$ 1,400.00

PHASE II

A) <u>Polyacrylomide Application</u>	<u>\$each</u>	<u>#units</u>	<u>\$total</u>
1 application on all berms/slopes and top of berms - 77,381 SF Product / material Application to all berms	350.00 / bag	2	\$ 700.00
B) <u>Coconut Matting Installed</u>	<u>\$each</u>	<u>#units</u>	<u>\$total</u>
all berm side slopes (perimeter, peninsula, and islands) & overlap top 1' on both sides = 61,557 SF @ .31 per SF	0.31/sf	61,557sf	\$ 19,082.67
tops of all berms including islands	0.31/sf	12,160 sf	\$ 3,769.60
TOTAL FOR PHASE II			\$23,552.27

PHASE III

A) <u>Perimeter Berm</u>	<u>\$each</u>	<u>#units</u>	<u>\$total</u>
Dr Purple 2,390 SF – submerged – pickerelweed & duck potato clusters of 50 each/2" plugs / 18" OC every 200' = 747	1.00	747	\$ 747.00
Red 11,758 SF – submerged – Eleocharis, BR, 18" OC = 3,675	1.00	3,675	\$ 3,675.00
Dr Blue 13,391 SF – s. patens / BR 2" plugs / 18" OC = 4,185	1.45	4,185	\$ 6,068.25

EXHIBIT C - SCOPE OF WORK

Pink 1	10,086 SF – saltgrass / BR 2” plugs / 18” OC = 3,152	1.45	3,152	\$ 4,570.40
Pink 2	clusters of 50 plants every 100 ft. / 1 Gal / 24” OC	3.75	800	\$ 3,000.00
Lt Blue (A)	11,922 SF – s. patens / BR 2” plugs / 18” OC = 3,726	1.45	3,726	\$ 5,402.70
Lt Blue (B)	at toe of slope: plant clusters of 50/1 Gal 3’OC muhly and S. bakeri every 100 ft., alternating every species every 100’ = 800 plants) (1,600’ divided by 100’ = 16 planting areas of 50 plants each)	3.75	800	\$ 3,000.00

subtotal **\$26,463.35**

B) Peninsula Berm

		\$each	#units	\$total
Gray	316 SF – submerged - pickerelweed & duck potato clusters of 50 each/2” plugs / 18” OC every 200’ = 99	1.00	99	\$ 99.00
Orange	1,604 SF – submerged – Eleocharis, BR, 18” OC = 502	1.00	502	\$ 502.00
Lt Green	2,084 SF – S. patens / BR 2” plugs / 18” OC = 652	1.45	652	\$ 945.40
Blue 1	1,023 SF – saltgrass / BR 2” plugs / 18” OC = 320	1.45	320	\$ 464.00
Blue 2	4 clusters of 50 plants (mixed-dune sunflower, native lantana, and blanket flower) every 50 ft. / 1 Gal / 24” OC	3.75	200	\$ 750.00

subtotal **\$ 2,760.40**

C) Island Berms

		\$each	#units	\$total
Yellow	2,810 SF – submerged –pickerelweed & duck potato clusters of 50 each/2” plugs / 18” OC every 200’ = 879	1.00	879	\$ 879.00
Med Blue	5,329 SF – submerged – Eleocharis, BR, 18” OC = 1,665	1.00	1,665	\$ 1,665.00
Lt Purple	8,352 SF – S. patens / BR 2” plugs / 18” OC = 2,610	1.45	2,610	\$ 3,784.50

Tan	4,715 SF - S. patens / BR 2" plugs / 18" OC = 1,475	1.45	1,475	\$2,138.75
Dr Green	6,747 SF - S. patens / BR 2" plugs / 18" OC = 2,108	1.45	2,108	\$ 3,056.60
Dr Brown	5,329 SF - 1 Gal muhly, S. bakeri, & wild coffee / 5' OC = 215	3.75	215	\$ 806.25
subtotal				\$12,330.10

D)	EEL Grass Areas	\$each	#units	\$total
	EEL Grass or white lilies (availability) = 825	2.75	825	\$ 2,268.75
	3 Refugium / 2,640 SF / BR 2" plugs / 18" OC / 3' band around top of slop perimeter only (880 lineal ft x 3 = 2,640 SF)			
	5 plant areas - 1,500 SF, BR / 2' plugs / 18' OC			
subtotal				\$ 2,268.75

E)	4.8 Acres / Area From Perimeter Berm to Silt Fence	\$each	#units	\$total
	3.0 ac of S. bakeri / 1 Gal on 5' OC = 5,226 plants (1,742 per acre = 3 ac x 1,742 = 5,226 plants)	3.75	5,226	\$19,597.50
	1.8 ac muhly grass / 1 Gal on 5' OC = 3,136 plants (1,742 per acre = 1.8 ac x 1,741 = 3,136)	3.75	3,136	\$11,760.00
subtotal				\$ 31,357.50

F)	0.6 AC. / 26,800 SF / Seed Filter Marsh with Eel Grass Liners / Plugs	\$each	#units	\$total
	EEL Grass - 3 ft. OC	2.75	2,977	\$8,186.75
subtotal				\$ 8,186.75

TOTAL FOR PHASE III (A, B, C, D, E, & F) \$83,366.85

PHASE IV

A) Maintenance for All Areas	\$each	#units	\$total
8.3 acres: open water areas, islands, berms, & open upland areas 1 event per month / 9 months except 2 events per month in June, July, August = 12 events (based on starting in December 2018)	1,400.00	12 events	\$16,800.00
TOTAL FOR PHASE IV			\$16,800.00

GRAND TOTAL GKE COST FOR PROJECT / PHASES I, II, III, AND IV..... \$125,119.12
(includes installation, fertilization, initial watering, warranty, and 9 months maintenance) & as noted below.

NOTE 1:

All plants will be watered in, fertilized, and warranted for 85% survival for the 9 month maintenance period. It is not anticipated that additional watering will be necessary based on the time of year that planting will be completed (ie: November / December 2018) and the type of plants being planted.

NOTE 2: TOTAL SITE PLANTING AREAS - 298,312 SF / 6.85 acres

This includes the proposed square footage of eel grass planted. There is an additional 1.8 acres of open water that will not be planted, but will need to be maintained for cattails, etc.

NOTE 3: TOTAL SITE MAINTENANCE AREAS / 353,248 SF / 8.3 acres

NOTE 4:

The above pricing is based on the site being ready / prepped (by others) to plant.

NOTE 5:

We will need a minimum of 7-8 weeks advance notice prior to planting in order to grow the appropriate number of plants. Growing plants in our own nursery helps with cost reduction, quality of plant material, and survival ability.

NOTE 6:

Pricing is based on all planting going in at the same time and the above note.

END OF PROPOSAL