Rare Plants of South Florida:

Their History, Conservation, and Restoration

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Cover photos by George D. Gann: Top: mahogany mistletoe (*Phoradendron rubrum*), a tropical species that grows only on Key Largo, and one of South Florida's rarest species. Mahogany poachers and habitat loss in the 1970s brought this species to near extinction in South Florida. Bottom: fuzzywuzzy airplant (*Tillandsia pruinosa*), a tropical epiphyte that grows in several conservation areas in and around the Big Cypress Swamp. This and other rare epiphytes are threatened by poaching, hydrological change, and exotic pest plant invasions.

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Part 3. Other Critically Imperiled Plants

Adiantum melanoleucum Willd.
Fragrant Maidenhair

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Everglades National Park; Harden Hammock), and one government owned non-conservation area (Troop 69 Boy Scout Site).
Taxonomy: Pteridophyte; Adiantaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Walls of limestone sinkholes in rockland hammocks.
Protection Status: Listed as endangered by FDACS and critically imperiled by FNAI.
Identification: Nelson (2000) has a color photo; the IRC Website has a color photo.
References: Small, 1931b; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Ward, 1978; Correll & Correll, 1982; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: None.

Historical Context in South Florida: John J. Soar discovered fragrant maidenhair in South Florida prior to 1916 (letter from J. K. Small to John J. Soar, November 28, 1917, Florida State Archives, Tallahassee). John Kunkel Small made the first collections in 1916 (7338, FLAS, US) and 1917 (8130, US) on Long Pine Key in what is now Everglades National Park. After over forty years, Frank C. Craighead made the next collection of the Long Pine Key plants in 1960 (s.n., ARCH, US). Thomas Darling, Jr. (1962) visited this station in 1960 with Craighead a short time after Hurricane Donna had struck. Darling remarked that nearly all of the ferns were destroyed. Those remaining were badly scalded. Craighead vouchered this station again in 1963 (s.n., USF). Apparently all of the collections on Long Pine Key have been made from the same hammock. George N. Avery observed two plants in this hammock in 1976, on the wall of a single limestone

sinkhole (Avery's Notes, 11 May 1976). Don Keller observed plants at this station in 1987 and 1988 (personal communication, 8 February 2001). Eight plants were the most he ever observed there. Rick Seavey, a volunteer botanist at Everglades National Park, observed plants at this station, both prior to Hurricane Andrew (1992), and again in 1993 (personal communication, 26 January 2001). Roger L. Hammer observed this station in 2000, and reports that only two or three plants were present (personal communication, 27 January 2001).

Mary Ann Bolla and Joyce W. Gann discovered a second station at Cox Hammock in 1981 (Avery's Notes, 6 July 1981). This hammock is privately owned and is divided into two ownerships; the eastern portion is operated as the Monkey Jungle, and the western portion is part of the Possum Trot Nursery. Fragrant maidenhair was found in the western portion of the hammock, but no one has looked for it there in many years. This station needs to be surveyed.

Alan Cressler collected fragrant maidenhair at Harden Hammock, now a Miami-Dade County conservation area, in 1989 (s.n., FTG). He observed ten plants. Don Keller also observed plants there in 1989 (personal communication, 8 February 2001). He counted eight plants in two large clumps. Hammer surveyed this station in January 2001, but found only four plants (personal communication, 26 January 2001).

Bradley discovered a fourth station in 1994 at a county-owned property used as a Boy Scout facility about 2.5 miles south of Cox Hammock (49, FTG). Originally, eight plants were found, but that population had been reduced to a single plant as of 1998. Bradley observed this same plant again in 2000.

At last count, there were seven or eight known plants remaining in South Florida.

Major Threats: Habitat destruction or degradation at the Boy Scout facility; poaching; exotic pest plant invasions; off-target damage from exotic species control efforts; long-term drainage on the Miami Rock Ridge.

Comments: *This is one of the species that may be affected by the Everglades restoration. In general, more water delivery into the Long Pine Key area south of the main park road would probably help this species, as it requires relatively moist conditions and high humidity. However, impoundment of water to the north by main park road may impede any additional water from reaching the habitat of this fern.*

Preliminary recommendations:

- Survey Cox Hammock station.
- Map plants at known stations on an annual basis.
- Monitor known stations on a quarterly basis.
- Protect from poaching.
- Ensure that exotic pest plant control programs at Harden Hammock do not harm fragrant maidenhair.
- Develop conservation agreement with Boy Scout Troop 69. Provide technical assistance to help manage the population at Boy Scout Troop 69 Site.
- Consider establishing an *ex situ* collection of germplasm.
- Conduct conservation biology research and conservation horticulture studies.
- Consider augmenting known populations at Everglades National Park, Harden Hammock, and Boy Scout Troop 69 Site.
- Consider reintroducing fragrant maidenhair to other sites within its historical range.
- Conduct research to determine the effects of the Everglades restoration on fragrant maidenhair.
- Promote a higher regional water table on the Miami Rock Ridge.

Agalinis filifolia (Nutt.) Raf.
Seminole False Foxglove

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Jonathan Dickinson State Park; Savannas Preserve State Park).
Taxonomy: Dicotyledon; Scrophulariaceae.
Habit: Annual terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.

South Florida Distribution: Charlotte, Collier, Lee, Martin, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Mesic flatwoods, scrubby flatwoods, and pine rocklands.
Protection Status: Not listed by any agency.
Identification: There are 11 species of *Agalinis* in Florida, all of which are fairly similar. Wunderlin (1998) has a key.
References: Chapman, 1883; Small, 1933a; Pennell, 1935; Long & Lakela, 1976; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: *A. pulchella* Pennell; *Gerardia filifolia* Nutt.

Historical Context in South Florida: Abram P. Garber collected Seminole false foxglove in 1877 in "Everglades. Miami" (s.n., NY), presumably in sandy pine rocklands near the Miami River. Mary Francis Baker collected it in 1917 in Alva in Lee County (119, US), in the vicinity of what is now the Caloosahatchee Regional Park. It was reported for freshwater wetlands at Cayo Costa Island (Herwitz, 1977), but was not found in surveys from 1990 through 1992 (Herwitz et al., 1996). This may represent a misidentification of *A. fasciculata*, which is more typical of this habitat.

In 1961, Olga Lakela collected Seminole false foxglove in the vicinity of Murdock in Charlotte County (24672, USF). While it is possible that Seminole false foxglove is still present there, the entire Murdock area has been dissected with roads and development, making its presence there improbable. Lakela also collected it in 1964 off Lake Trafford Road in the vicinity of Immokalee in Collier County (27804, USF). It was reported for the Kissimmee Billy area, now in Big Cypress National Preserve (anonymous, no date.g), but we have been unable to verify this report. In 1976, Donald R. Richardson made the only known collection from Palm Beach County, about three miles west of Boca Raton at St. Andrews Dome (s.n., FAU).

In 1977, Bruce E. Tatje made the first collection of Seminole false foxglove in Martin County west of Hobe Sound (17288, FAU). John Popenoe collected it in Martin County in 1978 along the Kitching Creek nature trail at Jonathan Dickinson State Park (1365, USF). Bradley and Woodmansee observed it in Jonathan Dickinson State Park along the Loxahatchee River in Palm Beach County. The Palm Beach County station needs to be vouchered.

In 1998, Bradley and Woodmansee also found it at Savannas Preserve State Park in Martin County (1229, FTG).

It has been reported erroneously from a number of other places including the Florida Keys – It can be keyed to *A. maritima*.

Major Threats: Fire suppression; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. However, it is an annual that may often be overlooked. It flowers in the summer and fall, when surveys should be conducted.*

Preliminary recommendations:

- Voucher plants at Palm Beach County station in Jonathan Dickinson State Park.
- Survey the Murdock area in Charlotte County, the vicinity of Lake Trafford Road in Collier County, the Kissimmee Billy Strand area in Big Cypress National Preserve, the St. Andrews Dome area of Palm Beach County, and Caloosahatchee Regional Park.
- Map and monitor known stations on a regular basis.
- Consider restoring sandy pine rocklands near the Miami River and reintroducing Seminole false foxglove.

Agalinis obtusifolia Raf.
Tenlobe False Foxglove

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Jonathan Dickinson State Park; National Key Deer Refuge).
Taxonomy: Dicotyledon; Scrophulariaceae.
Habit: Annual terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent in Florida from the peninsula west to the central and western panhandle.
South Florida Distribution: Charlotte, Collier, Lee, and Martin counties, and the Monroe County Keys.
South Florida Habitats: Flatwoods and pine rocklands.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor has a color photo.

References: Small, 1933a; Pennell, 1935; Long & Lakela, 1976; Avery & Loope, 1980a; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Wunderlin, 1998.
Synonyms: *A. erecta* Pennell; *A. keyensis* Pennell; *A. tenella* Pennell; *Gerardia obtusifolia* (Raf.) Pennell; *Gerardia tenella* (Pennell) Pennell.

Historical Context in South Florida: Albert S. Hitchcock first collected tenlobe false foxglove in 1900 in flatwoods in Fort Myers (244, US). Harold N. Moldenke collected it again in Fort Myers in 1930 (984, NY). In 1917, Jeanette P. Standley made a collection southeast of Fort Myers in the "Mullock Creek District" (436, US), in the vicinity of what is now Estero Bay State Buffer Reserve. In 1919, John Kunkel Small and John B. DeWinkeler made a collection in the Naples area in Collier County (9158, NY). Olga Lakela vouchered an additional station in Collier County near Immokalee in 1967 (30815, USF). It also has been reported for the Fakahatchee Strand Preserve State Park (Austin et al. 1990), but this was based upon a misidentified specimen of *A. fasciculata*. In 1946, O.E. Frye made the first and only collection in Charlotte County at an unspecified location (s.n., FLAS). Gann and Bradley observed Seminole false foxglove at Fred C. Babcock-Cecil M. Webb Wildlife Management Area in 1996, but this station needs to be vouchered.

John Kunkel Small made the first collection on Big Pine Key in Monroe County in 1912 (3808, NY; 3987, NY). A number of additional collections were made from this island: Small & Small 5049, NY; Small et al. 10177, NY; Lakela 27912, USF; Lakela 29280, USF; Poppleton & Shuey s.n., USF; Semple & Semple 1744, USF; Musselman & Harris 5035, USF; and Avery 2180, USF, NY. It is extant in the National Key Deer Refuge on Big Pine Key, where it is relatively frequent (J. Hays, personal communication, 26 February 2001).

It also has been reported for Jonathan Dickinson State Park (Florida Park Service District 5, no date), and will be included on an upcoming plant list for the Park (Roberts et al., in prep.). It is assumed to be present there, but needs to be vouchered.

Major Threats: Fire suppression, especially in the National Key Deer Refuge; exotic pest plant invasions; hydrological modifications.

Comments: *Tenlobe false foxglove (sensu Wunderlin, 1998) is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. It flowers in the summer and fall, when surveys should be conducted. The population on Big Pine Key has been described as an endemic to that island*, A. keyensis*. While that taxon is currently considered conspecific with* A. obtusifolia *by Wunderlin (1998), it may represent a distinct variety (J. Hays, personal communication, 7 March 2000).*

Preliminary recommendations:

- Voucher plants at Fred C. Babcock-Cecil M. Webb Wildlife Management Area and Jonathan Dickinson State Park.
- Survey Estero Bay State Buffer Reserve.
- Map and monitor known stations on a regular basis.

Amorpha herbacea Walter var. ***crenulata*** (Rydb.) Isely
Crenulate Leadplant

South Florida Status: Critically imperiled. Four occurrences in four conservation areas and one non-conservation area (A.D. "Doug" Barnes Park, & adjacent privately owned Amorpha Railroad Site; Coral Pines Park; Matheson Hammock Park; Tropical Park).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Shrub or sub-shrub.
Distribution: Endemic to South Florida.
Southern Florida Distribution: Miami-Dade County.
Southern Florida Habitats: Pine rocklands, especially in the ecotone with marl prairie.
Protection Status: Listed as endangered by USFWS, as endangered by FDACS, and as critically imperiled by FNAI.
Identification: Nelson (1996) has an illustration; Chafin (2000) has illustrations and a color photo; U.S. Fish and Wildlife Service (2000) has color photos.

References: Small, 1933a; Long & Lakela, 1976; Avery & Loope, 1980a; Isely, 1990; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; USFWS, 2000.
Synonyms: *A. crenulata* Rydb.

Historical Context in South Florida: James G. Cooper first collected crenulate leadplant in 1859 at Fort Dallas (s.n., NY), which was located north of the Miami River within the present-day Miami. It has been collected or observed a number of times from the Charles Deering Estate at Cutler (Small, 1916b, as *A. caroliniana*) north to Lemon City (W.E. Safford s.n., US), which was located north of present-day downtown Miami around N.E. 60th Street. Other historical collections were made in 1877 by Abram P. Garber, in 1903 by John Kunkel Small and Joel J. Carter (718, NY), in 1910 by S.C. Hood (71869, FLAS), in 1910 by O. Rodham (s.n., US), in 1912 by Small (4001, NY), in 1913 by Small and George K. Small (4621, NY), in 1915 by John Kunkel Small and others (s.n., FLAS), in 1927 by Harold N. Moldenke (3600, NY), in 1930 by Moldenke (514a, NY; 561, NY), in 1937 by L. Eleanor Scull (s.n., FLAS), in 1966 by R. Broom (201, FLAS, FSU), in 1967 by George N. Avery (s.n., FLAS), in 1968 by Avery (445, FLASW), and in 1976 by Pam Krauss (s.n., FTG). Most of the historical stations have been destroyed.

Four occurrences are extant. The largest is at A.D. "Doug" Barnes Park and an adjacent privately-owned property known as the Amorpha Railroad Site. Bradley and Woodmansee recently counted nearly 1,000 plants between the two sites (Fisher, 2000). The plants at the private parcel are regularly mowed. Steven R. Hill vouchered this occurrence in 1975 (3073, FTG). The second largest occurrence is at Tropical Park, where Bradley and Woodmansee recorded 85 plants (Fisher, 2000). Bian Tan and Nina Raymond vouchered this station in 1990 (22, FLAS). The two remaining sites, Coral Pines Park and Matheson Hammock Park, have but 13 plants between them (Fisher, 2000). Both of these stations need to be vouchered. Fairchild Tropical Garden has introduced an experimental population at the Charles Deering Estate at Cutler (Fisher, 2000). At the present time, no recruitment has been observed.

A review of the conservation status and scientific research can be found in U.S. Fish and Wildlife Service (2000). Fairchild Tropical Garden has conducted conservation horticulture studies on, and maintains an *ex situ* collection of, crenulate leadplant. In 2000, Fairchild Tropical Garden mapped, tagged, and recorded data on exposure to sunlight, height, spread, and reproductive status of all known plants at all known stations, with the exception of the private parcel adjacent to A.D. "Doug" Barnes Park (Fisher, 2000).

Crenulate leadplant is widely cultivated in Miami-Dade County, but is not known to have naturalized outside of its natural range.

Major Threats: Fire suppression; habitat destruction at the Amorpha Railroad Site; exotic pest plant invasions; habitat degradation.

Comments: *Historically, crenulate leadplant was associated with the ecotone between pine rockland and marl prairie and it may have been negatively affected by the lowering of the freshwater table on the Miami Rock Ridge. This especially may affect recruitment of seedlings. During the 2000 monitoring period, little to no seedling recruitment was recorded (Fisher, 2000).*

Preliminary recommendations:

- Voucher plants at Coral Pines Park and Matheson Hammock Park.
- Continue ongoing mapping and monitoring.
- Acquire Amorpha Railroad Site and incorporate into A.D. "Doug" Barnes Park.
- Continue maintenance of *ex situ* collection of germplasm at Fairchild Tropical Garden.
- Continue ongoing conservation biology research and conservation horticulture studies at Fairchild Tropical Garden.
- Continue reintroduction at Deering Estate at Cutler.
- Consider augmenting known populations at Coral Pines Park and Matheson Hammock Park.

Amphitecna latifolia (Mill.) A.H. Gentry
Black Calabash

South Florida Status: Critically imperiled. Four occurrences in four conservation areas (Alice Wainwright Park; John D. MacArthur Park; Sewell Park; Simpson Park).
Taxonomy: Dicotyledon; Bignoniaceae.
Habit: Tree or large shrub.
Distribution: South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Miami-Dade and Palm Beach counties.
South Florida Habitats: Coastal hammocks.
Identification: Sargent (1922) has an illustration.
Protection Status: Not listed by any agency.
References: Sargent, 1894; Small, 1933a; Long & Lakela, 1976; Little, 1978; Gentry, 1980; Richardson, 1984; Austin, 1992; Austin, 1995; Nelson, 1994; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *Crescentia cucurbitina* L.*, Crescentia obovata* Benth.*, Enallagma latifolia* (Mill.) Small.

Historical Context in South Florida: James G. Cooper first collected black calabash in 1859 at Fort Dallas (s.n., NY; Sargent, 1894), which was located north of the Miami River within the present-day Miami. Other early collections were made from "Miami" or "shore of Bay Biscayne" by Abram P. Garber in 1877 (59, NY; 69, NY), and Allan H. Curtiss in 1897 (5838, NY). Some of these collections probably were from Brickell Hammock, south of the Miami River. Specimens definitely were collected in Brickell Hammock as early as 1911 by John Kunkel Small and others (3293, NY), and as late as 1969 by Robert W. Long (2829, USF). Other specimens were collected in 1920 by J.P. Young (413, US) and Harold N. Moldenke (721, NY). Plants still are present in fragments of Brickell Hammock at Sewell Park, where Bradley observed a single tree in 2000, at Alice Wainwright Park, where it was recorded by Roger L. Hammer (1996a), and at Simpson Park, where it was first reported by John Popenoe in 1973 (Avery's Notes, 4 June 1973). Also, Popenoe reported plants to be present in a private property adjacent to Vizcaya, but much of that

hammock was damaged in the early and middle 1990s. Plants may no longer be present there.

Black calabash also was known from along the Little River in Miami-Dade County, about 5 miles north of Brickell Hammock. Joseph H. Simpson first collected it there in 1892 (540, NY, US), and Nathaniel L. Britton collected it there in 1904 (451, NY). This area has been completely developed.

Small and others also made a single collection in "Freeman Hammock, Arch Creek Prairie" in 1915 (6767, NY), a station about 4 miles farther north. In 1999, Woodmansee observed a cultivated plant at Enchanted Forest Park, which is located next to what is now Arch Creek Park.

In 1904, Small made a single collection on the western side of Elliott Key in Miami-Dade County (s.n., NY). Despite a great deal of botanical activity on the island, this is the only report known from that island.

In 1916, Small also made a collection in a hammock west of the historical train station at Kendall in southern Miami-Dade County (7872, NY), possibly at what is now Kendall Indian Hammocks Park. This is the only report we have seen from that area.

In 1975, Donald R. Richardson and Daniel F. Austin discovered black calabash for the first time outside of Miami-Dade County (Richardson, 1984; Austin, 1992). This population was found on a shell mound at John D. MacArthur Beach State Park in Palm Beach County, and was vouchered by Richardson in 1977 (s.n., FAU) and again in 1984 by Richard E. Roberts (s.n., USF). This station was observed in 1998 by Gann and Florida Park Service biologist Janice A. Duquesnel.

Black calabash is widely cultivated in southeastern Florida, including at several conservation areas. At present, it is not known to have naturalized outside of its historical range.

Major Threats: Exotic pest plant invasions.

Comments: *Considerable debate has focused on the nativity of this species in Florida. Austin (1992, 1995) provides excellent*

reviews of this debate, and further fuels the fire. We feel that the species is native based upon the abundance of herbarium specimens, from 1859 through the early 1900s, from many regions of Miami-Dade County. Further support for the nativity of this species is presented by Austin (1995) in which plants were reported to fruit regularly, even in the apparent absence of the species' primary pollinators, nectivorous bats, which do not occur in Florida. The species may have been utilized and cultivated by the Tequesta tribe of Native Americans.

Preliminary recommendations:

- Survey Elliott Key in Biscayne National Park.
- Map and monitor known stations on a regular basis.
- Conduct conservation biology research and conservation horticulture studies, especially regarding pollination and dispersal.
- Consider augmenting known populations at Alice Wainwright Park, Sewell Park, and Simpson Park.
- Consider introducing other populations within its historical range, at Arch Creek Park, Enchanted Forest Park, Kendall Indian Hammocks Park, and Vizcaya Museum and Gardens.
- Review for listing by FDACS and FNAI.

Anemia wrightii Baker
Wright's Pineland Fern

South Florida Status: Critically imperiled. One occurrence in two conservation areas (Everglades National Park & Frog Pond/L-31 N Transition Lands).
Taxonomy: Pteridophyte; Schizaeaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to South Florida, the Bahamas, and Cuba.
South Florida Distribution: The southern Miami Rock Ridge and adjacent rocky marl prairies.
South Florida Habitats: Rocky marl prairie and pine rocklands; lithophytic on exposed limestone and walls of limestone sinkholes.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo; Nelson (2000) has a color photo; the IRC Website has a color photo.

References: Mickel, 1981; Correll & Correll, 1982; Nauman, 1987a; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Nelson, 2000.
Synonyms: None.

Historical Context in South Florida: Frank C. Craighead first collected Wright's pineland fern in 1962 at "Simmon Camp" in Everglades National Park (s.n., Everglades National Park herbarium), presumably at one of Glen Simmons' hunting camps (see Simmons & Ogden, 1998). George N. Avery and others collected it again in 1976 along Context Road in the rocky glades west of the Homestead General Aviation Airport (1698, FTG). Essentially, all of the known plants of Wright's pineland fern are from a single population that runs from Long Pine Key in Everglades National Park in a northeasterly direction through the Frog Pond/L-31 N Transition Lands north to the Context Road area, most of which is now in Everglades National Park. Many collections have been made through 1997, when Bradley and Woodmansee recorded it for the Frog Pond/L-31 N Transition Lands just east of Everglades National Park (358, FTG). Other collections have been made by Avery (1896, FLAS; 2012, FTG), A.M. Wooten (601, USF), John Popenoe (1158, FTG, NY), Rick and Jean Seavey (847, Everglades National Park herbarium), Donovan S. Correll (50112, FTG; 50113, FTG), and A.M. Evans (s.n., NY; 4978, NY). Several hundred, to a few thousand, plants are thought to be present.

Major Threats: Exotic pest plant invasions, especially in the Frog Pond/L-31 N Transition Lands; fire suppression, especially in the Frog Pond/L-31 N Transition Lands; hydrological modifications; poaching.

Comments: *This is one of the species that may be affected by the Everglades restoration. Most of the population of Wright's pineland fern is found north of the main park road and major changes in water delivery to that area could either improve or disrupt favorable environmental conditions for this species. Close monitoring of this situation is required.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.

- Control exotic pest plants in the Frog Pond/L-31 N Transition Lands.
- Conduct prescribed burns in the Frog Pond/L-31 N Transition Lands.
- Conduct research to determine the effects of the Everglades restoration on Wright's pineland fern.

Arisaema triphyllum (L.) Schott
Jack-in-the-Pulpit

South Florida Status: Critically imperiled. Three occurrences in five conservation areas (Jonathan Dickinson State Park & Riverbend Park; Kiplinger; Peck Lake Park & Seabranch Preserve State Park).
Taxonomy: Monocotyledon; Araceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern North America. Wunderlin (1998) records it as frequent nearly throughout Florida.
South Florida Distribution: Collier, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Baygalls and riverine swamps.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Taylor (1998) has a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Bell & Taylor, 1982; Taylor, 1992; Flora of North America Editorial Committee, 1997; Wunderlin, 1998.
Synonyms: *A. acuminatum* Small.

Historical Context in South Florida: Albert S. Hitchcock (1902) first reported jack-in-the-pulpit for Fort Myers. Harold N. Moldenke also reported it from the Bonita Beach area of Lee County in 1944.

Olga Lakela made the first collection from Collier County in 1964 northwest of Naples at Little Hickory Pass (27997, USF). Lakela collected it again north of Little Hickory Pass close to the Lee County line in 1964 (28244, USF), and again in 1969 at Little Hickory Pass (31818, USF). James N. Burch made two collections in the Pelican Bay area in 1987 (177, Collier County

Natural Resources Department herbarium; 446, Collier County Natural Resources Department herbarium), and M. Kirby made a single collection in the Emerald Bay area in 1991 (446, Collier County Natural Resources Department herbarium). It is uncertain whether or not plants are still present in Collier County.

Mark Jablonski first collected jack-in-the-pulpit in Martin County in 1976 in the Stuart area (s.n., FAU). In 1977, Bruce E. Tatje made a collection west of Palm City (s.n., FAU). Tatje made another collection in 1977 south of Palm City (s.n., FAU), near what is now Kiplinger, a Martin County Park. In 1999, Woodmansee observed jack-in-the-pulpit at Kiplinger, but this station needs to be vouchered. Also, it is present in a baygall area, which spreads through two conservation areas in the vicinity of Peck Lake at Seabranch Preserve State Park and Peck Lake Park. Bradley and Woodmansee recorded it for Seabranch Preserve State Park in 1997, but this station needs to be vouchered. Bradley and Woodmansee recorded it for Peck Lake Park in 1998. Woodmansee vouchered the Peck Lake Park station in 1999 (418, FTG). Jack-in-the-pulpit is also reported for the Dupuis Reserve (Woodbury, no date), which is located in Martin and Palm Beach Counties, but this report needs to be verified.

In 1993, Steven L. Orzell and Edwin L. Bridges collected jack-in-the-pulpit along the Loxahatchee River at Riverbend Park in Palm Beach County (21230, USF). It was vouchered there again by Bradley in 1999 (1975, FTG). It has been reported for Jonathan Dickinson State Park in Martin County (Florida Park Service District 5, no date), and will be included on an upcoming plant list for the park (Roberts et al., in prep.). It is assumed to be present, but needs to be vouchered.

Major Threats: Exotic pest plant invasions, especially Old World climbing fern (*Lygodium microphyllum*) at Riverbend Park; wild hog damage; drainage of wetland habitats; sea-level rise in the vicinity of Peck Lake and at Kiplinger.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. The aboveground portions of this species are seasonally present and it may have been overlooked at additional stations. It flowers in the spring through summer, when surveys should be conducted.*

Preliminary recommendations:

- Voucher plants at Jonathan Dickinson, Kiplinger, and Seabranch Preserve State Park.
- Survey Dupuis Reserve.
- Map and monitor known stations on a regular basis.
- Continue control of Old World climbing fern at Riverbend Park and Jonathan Dickinson State Park.
- Control Old World climbing fern at Kiplinger and Peck Lake Park.

Aristida purpurascens Poir. var. ***virgata*** (Trin.) Allred
Trinius Threeawn

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Corkscrew Regional Ecosystem Watershed; Jonathan Dickinson State Park).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Lee and Martin counties.
South Florida Habitats: Depression marshes.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Chapman, 1883; Small, 1933a; Hitchcock & Chase, 1950; Hall, 1978; Godfrey & Wooten, 1979; Allred, 1986; Wunderlin, 1998.
Synonyms: *A. virgata* Trin.

Historical Context in South Florida: Edwin L. Bridges and Randy L. Mears first collected trinius threeawn in 1995 in a depression marsh in Jonathan Dickinson State Park in Martin County (23902, USF). In 1997, Loran Anderson observed plants in Lee County in the Flint Pen Strand section of what is now Corkscrew Regional Ecosystem Watershed (Anderson, 1997), but this occurrence needs to be vouchered.

Major Threats: Exotic pest plant invasions, especially Old World climbing fern (*Lygodium microphyllum*); wild hog damage; drainage of depression marsh habitat; fire suppression.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. It may be overlooked at other sites. It flowers in the fall, when surveys should be conducted.*

Preliminary recommendations:

- Voucher plants at Corkscrew Regional Ecosystem Watershed.
- Survey other depression marshes in Martin County.
- Map and monitor known stations on a regular basis.

Asimina tetramera Small
Fourpetal Pawpaw

South Florida Status: Critically imperiled. Three occurrences in six conservation areas (Carlin Park, Juno Dunes Natural Area, Jupiter Inlet Natural Area & Jupiter Ridge Natural Area; Jonathan Dickinson State Park; Savannas Preserve State Park in Martin County).
Taxonomy: Dicotyledon; Annonaceae.
Habit: Shrub.
Distribution: Endemic to Martin and Palm Beach counties. It has been reported for St. Lucie County (USFWS, 2000), but this seems to be in error.
South Florida Habitats: Scrub and scrubby flatwoods.
Protection Status: Listed as endangered by USFWS, as endangered by FDACS, and as critically imperiled by FNAI.
Identification: Nelson (1996) has an illustration; Taylor (1998) has a color photo; Chafin (2000) has illustrations and color photos; U.S. Fish and Wildlife Service (2000) has an illustration and a color photo.
References: Small, 1926a; Small, 1933a; Kral, 1960a; Nelson, 1996; Flora of North America Editorial Committee, 1997; Wunderlin, 1998; Chafin, 2000; Coile, 2000; USFWS, 2000.
Synonyms: *Pityothamnus tetramerus* (Small) Small.

Historical Context in South Florida: John Kunkel Small first collected fourpetal pawpaw in 1924 in scrub near the St. Lucie

River estuary in Martin County (s.n., NY). This specimen was designated the type when Small (1926) described it as a new species. Since this collection, it has been found at numerous stations in Palm Beach and Martin counties, from the northern edge of Martin County (Garland, 1992), south to just north of West Palm Beach (Kral 5372, FSU, US), a range of nearly 40 miles. Other historical collections were made in 1924 by Small (11586, NY), in 1925 by Small (12677, NY), in 1926 by Small and others (12922, NY), in 1956 by Robert Kral (2235, FSU; 2516, FLAS, FSU; 2517, FLAS, FSU, USF), in 1957 by Kral (3963, FSU), in 1958 by Kral (6547, USF), and in 1975 by John A. Churchill (754231, FTG). Almost all of the historical stations have been destroyed.

In Martin County, fourpetal pawpaw is currently known from two conservation areas. It was collected at Jonathan Dickinson State Park in 1976 by John Popenoe (611, FTG), and in 1979 by "B.T." and Pam Krauss (s.n., FAU). Recently, 220 plants were recorded there (USFWS, 2000). It is known also from the Savannas Preserve State Park just south of the St. Lucie County line (Garland, 1992). The authors have observed this occurrence as recently as 2000. Fewer than 10 plants are present at this station, which is the northernmost station for the species.

In Palm Beach County, fourpetal pawpaw occurs in four conservation areas. It was collected at the Juno Dunes Natural Area in 1983 by Richard Moyroud (s.n., 1983), and in 1991 by Steven L. Orzell and Edwin L. Bridges (16912, FTG). Bradley and Woodmansee observed this occurrence in 1997. It is known also from the Jupiter Ridge Natural Area where it was reported by Steve Farnsworth (1994b). This occurrence was observed by Gann in 1995, but it needs to be vouchered. Bradley and Woodmansee observed these plants in 2000. Fourpetal pawpaw is also present at Jupiter Inlet Natural Area (USFWS, 2000; S. Farnsworth, personal communication, 10 April 2001) and Carlin Park (USFWS, 2000), but both of these stations need to be vouchered.

A number of additional small, privately owned stations may be extant in both Palm Beach and Martin counties (USFWS, 2000). A significant amount of research has been conducted on fourpetal

pawpaw. This research is reviewed in U.S. Fish and Wildlife Service (2000).

Major Threats: Fire suppression, especially at the Savannas Preserve State Park; exotic pest plant invasions; habitat destruction.

Preliminary recommendations:

- Voucher plants at Carlin Park, Jupiter Inlet Natural Area, and Jupiter Ridge Natural Area.
- Survey historical stations recorded by FNAI in 1988 as recommended in U.S. Fish and Wildlife Service (2000).
- Map and monitor known stations on a regular basis.
- Continue conservation biology and conservation horticulture studies.
- Consider augmenting known populations, especially at Savannas Preserve State Park.
- Consider introducing fourpetal pawpaw to other sites within its historical range.

Asplenium verecundum Chapm. ex Underw.
Modest Spleenwort

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Castellow Hammock Park; Fuchs Hammock Preserve), and one non-conservation area (Warwick Hammock).
Taxonomy: Pteridophyte; Aspleniaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to Florida and Cuba. Wunderlin & Hansen (2000) report is as occasional in Florida in the northern and central peninsula west to the central panhandle, and Miami-Dade County.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Moist, exposed limestone in rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo; Nelson (2000) has color photos; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee,

1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *A. myriophyllum* (Sw.) Roth ex Mertens, misapplied.

Historical Context in South Florida: Modest spleenwort was collected several times in the mid-to-late 1800s in Florida, but none of these specimens can be definitely attributed to South Florida (e.g., Chapman, s.n., NY; Rugel, s.n., NY). Isaac Holden made the first collection that can be attributed to South Florida in 1887 at Brickell Hammock (s.n., NY). Several other collections were made in Brickell Hammock in the late 1800s and early 1900s (Munroe s.n., NY; Britton 91, NY; and Small & Carter s.n., FTG). John Kunkel Small and others made the last collection in Brickell Hammock in 1911 (3270, NY).

Alvah A. Eaton collected modest spleenwort in Castellow Hammock, now located within Castellow Hammock Park, in 1903 (s.n., NY). It has been collected there a number of times since then (e.g. Small & Carter 2384, NY; Buswell s.n., FTG; Tomlinson 6-5-62B, FTG; Long 1870, USF; and Avery 1314, FTG). Small and others also collected it in adjacent Ross Hammock (6484, NY), part of which is located within Castellow Hammock Park. The Castellow Hammock Park population is extant and has been observed several times by Roger L. Hammer, Gann and Bradley. Hammer, Director of Castellow Hammock Park, estimates that there are fewer than 50 plants present today (personal communication, 7 February 2001). In 1915, Small and Charles A. Mosier made a collection in Cox Hammock (5520, NY, FTG), which is located less than a mile from Castellow Hammock. Harold N. Moldenke made another collection there in 1930 (645a, NY), but this population has not been observed in several decades.

Small and Mosier also collected modest spleenwort in Fuchs Hammock in 1915 (5492, NY), which is now part of Fuchs Hammock Preserve. Donovan S. Correll collected it again at Fuchs Hammock in 1936 (6094, NY), as did Carol Weymouth and Everett Skinner in 1968 (s.n., FTG). George N. Avery observed five or six sporulating plants there in 1981 (Avery's Notes, 11 November 1981), and Alan Cressler observed several colonies in 1993 (Cressler, 1993). Bradley observed several dozen plants

there in 2000. Don Keller observed plants in nearby Meissner Hammock in 1987 (personal communication, 8 February 2001), but plants at this station appear to be extirpated. Small made one collection in 1915 at Shields Hammock (6944, NY), which was located to the west of the present-day city of Homestead, but this hammock has been destroyed.

In 1922, Small and others made a collection at Warwick Hammock, which is located along Old Cutler Road to the north of the Deering Estate at Cutler (10731, US). In 1959, Frank C. Craighead and Monroe R. Birdsey made another collection along Old Cutler Road (s.n., FTG), presumably at the same location. This hammock was later subdivided and developed for single-family residences. In 1995, Gann found plants there that were persisting on exposed limestone in a private garden (s.n., FTG). About 25 plants were observed. Subsequently this property was sold. While the status of the plants at this station is unknown, modest spleenwort may be present on other properties in Warwick Hammock.

Small made one last collection in 1923 in Addison Hammock, now part of the Deering Estate at Cutler (11104, NY). While modest spleenwort has not been collected there since that time, Donovan S. Correll and others made a collection of *A.* x*biscaynianum* in 1974, suggesting that modest spleenwort may have been present (see *Asplenium* x*biscaynianum* account in Part One of this Chapter). Don Keller reports that he observed a few plants in Addison Hammock in 1987 (personal observation, 8 February 2001), but no one has seen any plants recently, despite a great deal of botanical activity.

Major Threats: Long-term drainage on the Miami Rock Ridge; exotic pest plant invasions; off-target damage from exotic pest plant control programs; habitat degradation and destruction at Warwick Hammock; poaching.

Comments: A. verecundum *may be conspecific with* A. myriophyllum *of the West Indies and South America (Flora of North America Editorial Committee, 1993*; *Nelson, 2000). Modest spleenwort is one of the parents of the endemic Biscayne spleenwort (*A. xbiscaynianum*), which is discussed in Part 1 of this chapter. Due to the lowering of the regional freshwater table, it*

does not seem feasible to attempt to reintroduce modest spleenwort to Brickell Hammock at this time.

Preliminary recommendations:

- Survey Warwick Hammock.
- Map and monitor known stations on a regular basis.
- Develop conservation agreements with the Warwick Hammock station owners, and provide technical assistance.
- Conduct conservation biology and conservation horticulture studies.
- Consider augmenting known populations.
- Consider reintroducing modest spleenwort to other sites within its historical range, including the Deering Estate at Cutler.
- Consider introducing modest spleenwort to other sites within its historical range.
- Promote a higher regional water table on the Miami Rock Ridge.

Aster reticulatus Pursh
Pinebarren Aster

South Florida Status: Critically imperiled. Four occurrences in four conservation areas (Bessemer; Danforth; Jonathan Dickinson State Park; Kiplinger).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Glades, Lee, and Martin counties.
South Florida Habitats: Wet flatwoods.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Taylor (1998) has a color photo; the IRC Website has a color photo.
References: Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Taylor, 1992; Wunderlin, 1998.
Synonyms: *Doellingeria reticulata* (Pursh) Greene.

Historical Context in South Florida: Walter M. Buswell first collected pinebarren aster in 1932 in Lee County without specific locality data (s.n., FTG). Hilsenbeck (1997) reported it for Corkscrew Regional Ecosystem Watershed (CREW) in Lee County, but this record needs to be verified. Daniel B. Ward and others collected it once in Glades County in 1960 west of Palmdale (3-12, FLAS), in or near the newly acquired Fisheating Creek Wildlife Management Area.

In 1988, Roy O. Woodbury first collected pinebarren aster in Martin County at Jonathan Dickinson State Park, where it is assumed to be extant. Edwin L. Bridges and Steven L. Orzell also collected pinebarren aster in Martin County in 1993, just southwest of Palm City (21267, USF). Woodmansee collected it twice in 1999 at two Martin County parks: Bessemer (441, FTG), and Kiplinger (258, FTG). In 2000, Woodmansee also collected pinebarren aster at Danforth (479, FTG), another Martin County park.

Major Threats: Fire suppression; exotic pest plant invasions; wild hog damage; hydrological modifications, especially drainage of wet flatwoods habitat.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. It flowers in the spring, when surveys should be conducted.*

Preliminary recommendations:

- Survey Corkscrew Regional Ecosystem Watershed, Fisheating Creek Wildlife Management Area, and Palm City station.
- Map and monitor known stations on a regular basis.

Aster tortifolius Michx.
Dixie Aster

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (Corkscrew Regional Ecosystem Watershed; Jonathan Dickinson State Park; Kiplinger), and one non-conservation area (Lake Trafford Flatwoods Site).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.

Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Broward, Collier, Glades, Lee, Martin, and Miami-Dade counties.
South Florida Habitats: Flatwoods, sandhills, and pine rocklands.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Taylor (1998) has a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Taylor, 1992; Wunderlin, 1998.
Synonyms: *Sericocarpus acutisquamosus* (Nash) Small; *Sericocarpus bifoliatus* Porter; *Sericocarpus tortifolius* (Michx.) Nees.

Historical Context in South Florida: Albert S. Hitchcock first collected Dixie aster in Lee County in 1900 in Fort Myers (165, NY). Harold N. Moldenke collected it again in Lee County at Coconut in 1930 (5893, NY). Elliott Brown made a single collection in 1985 just south of the North Fort Myers Library (s.n., USF). This station has probably been destroyed, but this area should be surveyed.

John Kunkel Small first collected Dixie aster in Miami-Dade County in 1904 near Arch Creek in the northern part of the county (2206, NY). In 1913, Small and George K. Small made another collection in Miami-Dade County in pinelands south of the Miami River (4751, FLAS, NY). The last collection made in Miami-Dade was by R. Bruce Ledin in 1947 in what is now Little Havana (s.n., FLAS). It is apparently extirpated in Miami-Dade County.

In 1962, George Cooley and others made a collection in Collier County just south of Naples (9083, USF), and in 1967 Olga Lakela made a collection northeast of Naples in Palm River Estates (30070, USF). Durbin Tabb also collected Dixie aster in the North Naples area in 1979 (s.n., USF). No additional collections from the Naples area are known, but the area should be surveyed. In 1965, Olga Lakela made a collection in the vicinity of Immokalee (29267, USF). Bradley made a single collection in 1998 in a mesic flatwoods fragment along Lake Trafford Road in Immokalee (1878, FTG, USF). Hilsenbeck (1997) reported it for Corkscrew Regional

Ecosystem Watershed (CREW) in Lee County. Woodmansee observed plants in CREW in Collier County in 2000.

William L. McCart made a collection in 1969 in Glades County four miles east of Palmdale (11029, FLAS), in the vicinity of the recently acquired Fisheating Creek Wildlife Management Area.

Donovan S. Correll and Helen B. Correll collected Dixie aster in Broward County in 1973 in the Tamarac area south of the Fort Lauderdale Executive Airport (40199, NY). This is the only report known from Broward County, where it is probably extirpated.

Bradley and Woodmansee made the first collection in Martin County in 1997 (594, FTG), along the Loxahatchee River in Jonathan Dickinson State Park, although John Popenoe (1981) had previously reported it for the park. In 1999, Woodmansee made another collection in Martin County at Kiplinger, a Martin County park (351, FTG). Fewer than 10 plants were observed.

Major Threats: Fire suppression; exotic pest plant invasions; habitat destruction at Immokalee site.

Comments: *Based upon the large number of collections, this species may be more common than we think. It is possible that, following additional surveys, Dixie aster could be down-ranked to imperiled in South Florida.*

Preliminary recommendations:

- Voucher plants at CREW.
- Survey Fisheating Creek Wildlife Management Area, and the vicinity of Naples, Fort Myers, and North Fort Myers.
- Map and monitor known stations on a regular basis.
- Acquire Lake Trafford Flatwoods Site.
- Consider restoring sandy pine rocklands near the Miami River and reintroducing Dixie aster.

Bartonia paniculata (Michx.) Muhl.
Twining Screwstem

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Jonathan Dickinson State Park; Pal-Mar).
Taxonomy: Dicotyledon; Gentianaceae.

Habit: Annual terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as occasional in Florida from the northern peninsula west to the central and western panhandle.
South Florida Distribution: Martin, and Palm Beach counties.
South Florida Habitats: Wet and mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: There are three species of *Bartonia* in South Florida: *B. paniculata*, *B. virginica* (see treatment below in this chapter), and *B. verna*. *B. verna* has corolla lobes 5-10 mm long, while *B. paniculata* and *B. virginica* have corolla lobes 1-5 mm long; *B. paniculata* has blunt anthers while *B. virginica* has apiculate anthers (Wunderlin, 1998).
References: Chapman, 1883; Small, 1933a; Gillett, 1959; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: *B. lanceolata* Small; *B. tenella* Muhl. ex Willd.

Historical Context in South Florida: Roy O. Woodbury first collected twining screwstem in 1988 at Jonathan Dickinson State Park in Martin County (s.n., FTG). In 1997, Gann and Bradley collected it at Pal-Mar in Palm Beach County (1041b, FTG). Bradley and Woodmansee also vouchered this population in 1997 (679, FTG).

Major Threats: Fire suppression; exotic pest plant invasions; wild hog damage; drainage of its flatwoods habitat.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. It is extremely inconspicuous and may prove to be more common following additional surveys. It was completely overlooked in South Florida until 1988, and was even unknown in central Florida until fairly recently (Gillett, 1959; Wunderlin, 1982).*

Preliminary recommendations:
- Survey Pal-Mar Natural Area and un-acquired portions of Pal-Mar CARL Site.
- Map and monitor known stations on a regular basis.

Bartonia virginica (L.) Britton et al.
Yellow Screwstem

South Florida Status: Critically imperiled. Three occurrences in three conservation areas and one non-conservation area (Big Cypress National Preserve; Jonathan Dickinson State Park; Pal-Mar & Pal-Mar CARL Site).
Taxonomy: Dicotyledon; Gentianaceae.
Habit: Annual terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Collier, Martin, and Palm Beach counties.
South Florida Habitats: Mesic and wet flatwoods.
Protection Status: Not listed by any agency.
Identification: There are three species of *Bartonia* in South Florida, *B. paniculata* (see treatment above in this chapter), *B. virginica*, and *B. verna*. *B. verna* has corolla lobes 5-10 mm long, while *B. paniculata* and *B. virginica* has corolla lobes 1-5 mm long; *B. paniculata* has blunt anthers while *B. virginica* has apiculate anthers (Wunderlin, 1998).
References: Small, 1933a; Gillett, 1959; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Ruben P. Sauleda first collected yellow screwstem in 1979 west of Palm City in Martin County (3195, USF). This site has probably been developed. Steven L. Orzell and Edwin L. Bridges made the next collection in Martin County in 1991 within the Pal-Mar CARL Site (18261, FTG). Gann and Bradley vouchered yellow screwstem at Pal-Mar in 1997 (1041a, FTG). Pal-Mar and Pal-Mar CARL Site are adjacent and these two stations are considered to be the same occurrence. In 1998, Bradley collected yellow screwstem at Jonathan Dickinson State Park in Martin County (1326, FTG).

Yellow screwstem is also present in the Bear Island area of Big Cypress National Preserve, where Bradley collected it in 1997 (1068, FTG, USF) and 1998 (1593, FTG).

Major Threats: Fire suppression; exotic pest plant invasions; hydrological modifications; recreational off-road vehicle use in Big Cypress National Preserve; wild hog damage.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. However, it is an extremely inconspicuous plant that may prove to be more common following additional field surveys. It was completely overlooked in South Florida until 1979, and was even unknown in central Florida until fairly recently (Gillett, 1959; Wunderlin, 1982).*

Preliminary recommendations:

- Survey Pal-Mar Natural Area.
- Map and monitor known stations on a regular basis.
- Acquire unprotected portions of the Pal-Mar CARL Site.

Basiphyllaea corallicola (Small) Ames
Carter's Orchid

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (Deering Estate at Cutler; Everglades National Park; National Key Deer Refuge), and one non-conservation area (Naranja School Board Pineland).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Luer (1972) has illustrations and color photos; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Small, 1910; Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Correll & Correll, 1982; Hammer, 1992g; McCartney, 1991; McCartney, 1992b; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Martin, 2001.
Synonyms: *B. angustifolia* Schltr; *Carteria corallicola* Small.

Historical Context in South Florida: John Kunkel Small, Alvah A. Eaton, and Joel J. Carter first collected Carter's orchid in 1903 in Long Prairie in Miami-Dade County (s.n., AMES). Only two plants were found (Small, 1910), and both, apparently, were collected. In 1906, Small found two additional plants about two miles south of this station (Small, 1910). It was this specimen that Small designated as the type of *Carteria corallicola* (Small, 1910). Long Prairie was located within the present day cities of Homestead and Florida City, but it has been destroyed.

Frank C. Craighead discovered Carter's orchid in the eastern part of Long Pine Key in Everglades National Park in or before 1971 (Avery's Notes, 21 November 1971; Martin, 2001). Chuck McCartney apparently rediscovered this station in 1988 (McCartney, 1991). Only one plant was observed. Everglades National Park biologist James Snyder found a second station on Long Pine Key in 1982, which was vouchered by George N. Avery that same year (2375, FTG, SEL). Snyder's station was apparently located about 1/8 mile from Craighead's station (Avery, 1982 in Martin, 2001). In 1987, Alan Herndon discovered an additional station in western Long Pine Key (McCartney, 1991). A single specimen was accidentally cut during a research project. This specimen was deposited in the Everglades National Park herbarium (Herndon 1779). An additional station in western Long Pine Key was discovered in 1999 by Andrew Martin and Richard G. Reimus (Martin, 2001). Three fertile stems were observed. It is unclear how close Herndon's station and Martin's station are to each other.

Gann and others discovered a new population at Deering Estate at Cutler in 1991 (Hammer, 1992g). Roger L. Hammer vouchered the population in 1991 (s.n., FTG), and Hammer and Carol Lippincott observed an estimated 50 plants at that station that same year (Hammer, 2001). The plants were growing in a firebreak road, and in leaf litter in an adjacent fire-suppressed pine rockland. Chuck McCartney vouchered this station again in 1995 (55, SEL). Hammer also observed six plants at the Miami-Dade County School Board pineland property in Naranja in 1993 (Hammer, 2001), but this station needs to be vouchered.

Herndon first discovered Carter's orchid outside of Miami-Dade County in 1988 on Big Pine Key (McCartney, 1991), presumably in the National Key Deer Refuge. Herndon found only a single plant, so he did not voucher this station. In 1988, Herndon showed the plants to Chuck McCartney, who collected a voucher specimen (18, SEL). Fourteen plants were observed at this time (McCartney, 1991). Joseph O'Brien observed plants nearby on Big Pine Key at the Boss Tract in 1991 (Hammer, 1992g), but this station was not vouchered. The Boss Tract is now managed as part of the National Key Deer Refuge. No recent observations of plants from either station are known, but they are assumed to be extant.

Major Threats: Fire suppression; exotic pest plant invasions, especially by Burmareed (*Neyraudia reynaudiana*).

Comments: *This is one of the species that may be affected by the Everglades restoration if more water is delivered into the Long Pine Key area.*

Luer (1972) considered B. corallicola *as an endemic of South Florida and the Bahamas. Ackerman (1995) placed* B. angustifolia *Schltr. into synonymy with* B. corallicola*, extending the range of the species into Cuba, Hispaniola, and Puerto Rico.*

Preliminary recommendations:

- Voucher plants at Audubon Society's Boss Tract and Naranja School Board Pineland.
- Map and monitor known stations on a regular basis.
- Acquire Naranja School Board Pineland.
- Conduct research to determine the effects of the Everglades restoration on Carter's orchid.

Bourreria cassinifolia (A. Rich.) Griseb.
Pineland Strongback

South Florida Status: Critically imperiled. Eight occurrences in six conservation areas (Camp Owaissa Bauer; Everglades National Park; Ingram Pineland; Larry and Penny Thompson Park; National Key Deer Refuge; Ned Glenn Nature Preserve) and two non-conservation areas (Old Dixie Pineland; USDA Subtropical Horticulture Research Station).

Taxonomy: Dicotyledon; Boraginaceae.
Habit: Shrub.
Distribution: Native to South Florida and Cuba.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Pine rocklands and rockland hammock edges.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Nelson (1996) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Long & Lakela, 1976; Tomlinson, 1980; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected pineland strongback in 1909 in pinelands east of Naranja in Miami-Dade County (2818, NY), in the vicinity of what is now the Homestead Air Reserve Base. Many collections and observations have been made in Miami-Dade County since then, from as far south as Long Pine Key in Everglades National Park (Craighead s.n., USF) to as far north as the USDA Subtropical Horticulture Research Station, where it has been observed by Bradley.

This species is currently extant on seven sites in Miami-Dade County, four of which are conservation areas. Frank C. Craighead first collected it on Long Pine Key in Everglades National Park in 1959 (s.n., Everglades National Park herbarium), and it was observed there as recently as 2000 by the authors and others. Fewer than 100 plants are thought to be present there. It was discovered in the Richmond Pine Rocklands at Larry and Penny Thompson Park in 1978 by George N. Avery (Avery's Notes, 3 September 1978), and was observed there as recently as 2000 by Bradley and Woodmansee. Fewer than 100 plants are present. This station needs to be vouchered. Avery found it at Camp Owaissa Bauer in 1983 (Avery's Notes, 9 March 1983), and it was observed there as recently as 2001 by Roger L. Hammer (personal communication, 5 March 2001). One plant is known to

be present, and it needs to be vouchered. Bradley vouchered it at the Ned Glenn Nature Preserve in 1995 (104, FTG). Fewer than 10 plants are present there. In 2000, Bradley found one plant at Ingram Pineland, but this station needs to be vouchered.

Of the private sites in Miami-Dade County, the Old Dixie Pineland is the most important as it contains the largest population of pineland strongback in South Florida. This station was first observed by Hammer in 1989 (personal communication, 5 March 2001). Bradley vouchered this station in 1995 (186, FTG). Bradley and others have observed several hundred plants there as recently as 2000. This site should be acquired, but it is in the path of a major transportation corridor, and probably will be destroyed. Another important site is the USDA Subtropical Horticulture Research Station where George N. Avery recorded it in 1974 (Avery's Notes, 19 May 1974). Bradley observed it there as recently as 1996. Fewer than 10 plants were present. This site is severely threatened by development, and needs to be vouchered. Pineland strongback also was reported for Navy Wells #2 (anonymous, no date.a), a private pine rockland being considered for acquisition by Miami-Dade County, but this report needs to be verified.

Avery discovered pineland strongback outside of Miami-Dade County on Big Pine Key in Monroe County in 1962 (Avery's Notes, 15 September 1962). The station was reported to be located between the Blue Hole and Koehn's subdivision. Frank C. Craighead vouchered this population later that year (s.n., Everglades National Park herbarium). Subsequent collections, presumably from the same location on Big Pine, were made by Daniel B. Ward and others in 1964 (4289, FSU), and by W.L. Stern and others in 1970 (2892, FTG). Avery made a number of observations on Big Pine between 1962 and 1976 (Avery's Notes, 1962-1976), from the station noted above and from a station he referred to as "Cassinifolia Hammock," an unknown location. T. Ann Williams observed the Koehn's subdivision population in March 2001 within the National Key Deer Refuge (personal communication, 9 March 2001). Three plants were seen.

Major Threats: Habitat destruction at the Old Dixie Pineland and the USDA Subtropical Horticulture Research Station; fire suppression; exotic pest plant invasions.

Comments: *Bradley has observed pineland strongback at a pineland across the street from the Gifford Arboretum at the University of Miami in Coral Gables. This species has been cultivated at the Arboretum, and it is likely that the population across the street from the Arboretum is naturalized from the Gifford Arboretum plants. Pineland strongback is also cultivated in other locations in Miami-Dade County.*

Preliminary recommendations:

- Voucher plants at Camp Owaissa Bauer, Ingram Pineland, Larry and Penny Thompson Park, and USDA Subtropical Horticulture Research Station.
- Survey Navy Wells #2.
- Map and monitor known stations on a regular basis.
- Acquire Old Dixie Pineland. Develop conservation agreement with the USDA Subtropical Horticulture Research Station, and provide technical assistance.
- Consider introducing pineland strongback to other sites within its historical range, including Bill Sadowski Park and Deering Estate at Cutler.
- Determine status in Cuba.

Burmannia biflora L.
Bluethread

South Florida Status: Critically imperiled. Three occurrences in three conservation areas and one non-conservation area (Bessemer; Jonathan Dickinson State Park; Pal-Mar & Pal-Mar CARL Site).
Taxonomy: Monocotyledon; Burmanniaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Wet and mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: There are three species of *Burmannia* in Florida. *B. biflora* can be distinguished from the other two by having blue flowers.

References: Chapman, 1883; Small, 1933a; Jonker, 1938; Long & Lakela, 1976; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: G.L. Foster first collected bluethread in 1964 at Bonita Springs in Lee County (s.n., USF). In 1966, Olga Lakela collected it north of Immokalee in Collier County (30056, USF). In 1976, John Popenoe and Daniel F. Austin collected bluethread in Martin County at Jonathan Dickinson State Park (735, FTG). Bradley observed it there in 1997. Steven L. Orzell and Edwin L. Bridges collected bluethread once in 1991 at the Pal-Mar CARL Site in Martin County (18262, FTG). In 1997, Bradley and Woodmansee collected it nearby in Palm Beach County at Pal-Mar (686, FTG), a South Florida Water Management District conservation area. In 1993, Orzell and Bridges collected it at a private site in Martin County near Port Salerno (21254, USF), but it is not known if this station has been developed. In 1999, Woodmansee collected it nearby at Bessemer, a Martin County conservation area (439, FTG). Bluethread was also reported for Dupuis Reserve (Woodbury, no date), but this station needs to be verified. Dupuis Reserve is located in both Palm Beach and Martin counties.

Major Threats: Fire suppression; drainage of flatwoods habitats; exotic pest plant invasions; wild hog damage.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. However, bluethread is easily overlooked in the field and may be more common than it appears.*

Preliminary recommendations:

- Survey Dupuis Reserve, Pal-Mar Natural Area, and the Port Salerno station**.**
- Map and monitor known stations on a regular basis.
- Acquire unprotected portions of the Pal-Mar CARL Site.

Caesalpinia major (Medik.) Dandy & Exell
Yellow Nicker

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Biscayne National Park; Vizcaya Museum and Gardens), and one non-conservation area (Plantation Key residential development).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Vine.
Distribution: Pantropical.
South Florida Distribution: Martin, Miami-Dade, and Palm Beach counties and the Monroe County Keys.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS.
Identification: Very similar to *C. bonduc*, but lacking the large foliaceous stipules and having yellow rather than gray seeds. Scurlock (1987) has photos of both species.
References: Small, 1933a; Long & Lakela, 1976; Correll & Correll, 1982; Isely, 1982; Scurlock, 1987; Isely, 1990; Nelson, 1996; Wunderlin, 1998; Coile, 2000; Liogier and Martorell, 2000.
Synonyms: *C. bonduc* of Long & Lakela, not (L.) Roxb.; *C. globulorum* Bakh. f. & P. Royen; *Guilandina bonduc* of Small (1933a), not L.; *Guilandina ovalifolia* of Small (1933a), not (Urban) Britton.

Historical Context in South Florida: Abram P. Garber first collected yellow nicker in the 1880s in Miami (s.n., FLAS), presumably in Brickell Hammock. The next collection made in Miami-Dade County was not until 1992, when Carol Lippincott and Randy Tate collected it at the Vizcaya Museum and Gardens (s.n., FTG), a fragment of historical Brickell Hammock. Yellow nicker is extant there, and was observed in 1996 by Bradley and Miami-Dade County biologists Roger L. Hammer and Linda McDonald. It is possible that a single large clonal individual is present.

A number of collections and observations are known for the Florida Keys. In 1941, John H. Davis, Jr. collected yellow nicker on Barracuda Key (s.n., FLAS), an island northwest of Sugarloaf Key in Great White Heron National Wildlife Refuge. In 1954, Leonard J. Brass collected it on Key Largo (29010, FLAS), where

George N. Avery observed it several times between 1964 and 1967 (Avery's Notes, 1964-1967). Avery's station is now part of John Pennekamp Coral Reef State Park, but Gann has been unable to locate it there despite numerous searches. Avery discovered yellow nicker on Elliott Key in what is now Biscayne National Park in 1966 (Avery's Notes, 18 May 1966). Gann and Bradley observed this population in 1996, and Bradley and Woodmansee observed plants there in 2001. Avery also found it in Biscayne National Park on Totten Key in 1971 (Avery's Notes, 28 January 1971), but Gann and Bradley have thus far been unable to locate this population during inventory work there in 2001. Both of these stations need to be vouchered. In 1998, Bradley observed a population on Plantation Key that had been previously discovered by Wayne Hoffman. Fewer than 10 plants were seen in a hammock fragment in a residential development, a site that is not a good candidate for acquisition. Yellow nicker has been reported from other islands in the Florida Keys, including Big Coppitt Key and Lower Matecumbe Key by Scurlock (1987), and from Teatable Hammock on Upper Matecumbe Key (National Audubon Society, 1992). These stations need to be surveyed.

Two collections were made outside of Miami-Dade and Monroe counties. In 1924, John Kunkel Small and others collected yellow nicker on sand dunes south of Delray Beach in Palm Beach County (s.n., FLAS) and in 1954 Roy S. Rood collected it on Jupiter Island in Martin County (4, FLAS). No recent sightings or collections are known from either county.

Major Threats: Exotic pest plant invasions; habitat destruction; off-target damage from exotic pest plant control programs.

Comments: *This species was confused in the literature with* C. bonduc *(L.) Roxb. by Small (1933a) and Long & Lakela (1976). Dandy and Exell (1938) describe the correct application of the names* C. bonduc *and* C. major*. In addition, Small used a different genus,* Guilandina*, for these species, and attributed two names,* G. bonduc *and* G. ovalifolia*, to what is now known as* C. major*. Unlike* C. bonduc*,* C. major *is not a colonizer of disturbed sites.*

Preliminary recommendations:

- Voucher plants at Elliott Key and Totten Key in Biscayne National Park. If possible, voucher private site on Plantation Key.
- Survey Barracuda Key in the Great White Heron National Wildlife Refuge, Totten Key in Biscayne National Park, Big Coppitt Key, Lower Matecumbe Key, and Teatable Hammock on Upper Matecumbe Key. Continue surveys in appropriate habitats within historical range, including John Pennekamp Coral Reef State Park.
- Map and monitor known stations on a regular basis.
- Acquire Teatable Hammock on Upper Matecumbe Key.
- Control exotic pest plants, while preventing off-target damage to yellow nicker. This is especially critical at Vizcaya Museum and Garden where yellow nicker could easily be extirpated due to management error.
- Consider augmenting population at Vizcaya Museum and Gardens.
- Consider reintroducing or introducing yellow nicker to other sites within its historical range, including Lake San Pedro Hammocks on Plantation Key, Red Reef Park in southern Palm Beach County, and The Nature Conservancy's Blowing Rocks Preserve on Jupiter Island in Martin County.
- Review for listing by FNAI.

Campsis radicans (L.) Seemann ex Bureau
Trumpet Creeper

South Florida Status: Critically imperiled. Two native occurrences in two conservation area (Caloosahatchee Regional Park; La Belle Nature Park).
Taxonomy: Dicotyledon; Bignoniaceae.
Habit: Vine.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as common in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Hendry and Lee counties.
South Florida Habitats: Mesic hammocks.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Nelson (1996) has a color photo.

References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Nelson, 1996; Wunderlin, 1998.
Synonyms: *Bignonia radicans* L.; *Tecoma radicans* (L.) DC.

Historical Context in South Florida: Apparently, trumpet creeper has not been vouchered in South Florida. The earliest reports of this species were made in 1994, when it was reported for the Koreshan State Historic Site in Lee County (Florida Park Service District 4, 1994d), and Corkscrew Swamp Sanctuary (Judd, 1994). Both of these occurrences could represent cultivated plants. In 2000, Gann observed plants at the Caloosahatchee Regional Park in mesic hammock along the Caloosahatchee River in Lee County. This population appears to be an historical occurrence, and needs to be vouchered. Bradley also observed trumpet creeper in 2000 in a mesic hammock along the Caloosahatchee River at the La Belle Nature Park in Hendry County. This also appeared to be a naturally occurring population. Plants may also be present in the Fisheating Creek Wildlife Management Area in Glades County. Gann and Bradley have observed plants along Fisheating Creek in Highlands County.

Trumpet creeper is a temperate species that is widely cultivated in Florida, but has apparently not naturalized outside of its historical range.

Major Threats: Exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. No vouchers exist for South Florida in Florida herbaria (see Wunderlin and Hansen, 2001). South Florida specimens may be at the New York Botanical Garden or the Smithsonian Institution, and these herbaria should be searched.*

Preliminary recommendations:

- Voucher plants at Caloosahatchee Regional Park and La Belle Nature Park.
- Survey Corkscrew Swamp Sanctuary, Koreshan State Historic Site, and Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Campyloneurum costatum (Kunze) C. Presl
Tailed Strap Fern

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Corkscrew Swamp Sanctuary; Fakahatchee Strand Preserve State Park).
Taxonomy: Pteridophyte; Polypodiaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida, the West Indies, Central America, and South America.
South Florida Distribution: Collier and Miami-Dade counties.
South Florida Habitats: Rockland hammocks and strand swamps.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification Aides: Chafin (2000) has illustrations and a color photo; Nelson (2000) has a color photo; the IRC Website has a color photo.
References: Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Polypodium costatum* Kunze.

Historical Context in South Florida: Alvah A. Eaton first collected tailed strap fern in 1904 in the Fakahatchee Strand (1135, GH). Walter M. Buswell collected it again in 1937 (s.n., USF). Although Buswell's labels for the Fakahatchee cite the location as "Big Cypress" or "Big Cypress Hammock," his collections during this period are from what is now Fakahatchee Strand Preserve State Park. Several other collections of tailed strap fern have been made from the Fakahatchee including those by Leonard J. Brass (15803, ARCH), George N. Avery (1678, FTG), and Clifton E. Nauman (332, USF; 545, USF). Florida Park Service biologist Mike Owen estimates that there are fewer than 1,000 plants in the park (personal communication, 22 January 2001).

Tailed strap fern was observed at Corkscrew Swamp Sanctuary by Roger L. Hammer in 1989 (personal communication, 7 February

2001). Walter Judd (1994) also reported it for this station, but this occurrence needs to be vouchered. It is assumed to be extant.

Apparently, tailed strap fern was collected first in Miami-Dade County by L. Eleanor Scull in Timms Hammock in 1938 (s.n., FLAS). Timms Hammock is now part of the Miami-Dade County park, Camp Owaissa Bauer. Gertrude Peterson made another collection in nearby Hattie Bauer Hammock between 1934 and 1940 (s.n., FLAS), but the specimen is without a date. Most of Hattie Bauer Hammock is now a Miami-Dade County conservation area.

Major Threats: Poaching; hydrological modifications; exotic pest plant invasions, especially Old World climbing fern (*Lygodium microphyllum*).

Preliminary recommendations:

- Voucher plants at Corkscrew Swamp Sanctuary.
- Continue ongoing surveys at Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control *Lygodium microphyllum*.
- Consider reintroducing tailed strap fern to other sites within its historical range, including Timms Hammock in Camp Owaissa Bauer and Hattie Bauer Hammock.
- Review FNAI rank.

Carex gigantea Rudge
Giant Sedge

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Big Cypress National Preserve; Fakahatchee Strand Preserve State Park; Six Mile Cypress Slough Preserve).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Collier, Lee, and Miami-Dade counties, and the Monroe County mainland.
South Florida Habitats: Cypress domes and strand swamps.

Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Paul C. Standley first collected giant sedge in 1916 near Fort Myers (3008, US). He made another collection there in 1927 (52549, NY). These were the only known records for the species in Lee County until 1997, when Bradley and Woodmansee observed it at the Six Mile Cypress Slough Preserve near Fort Myers. This station needs to be vouchered.

In 1917, John Kunkel Small made a collection in the Okaloacoochee Slough (8318, NY). It is unknown where Small actually made this collection. Portions of this slough are found in both Collier and Hendry counties, within Big Cypress National Preserve, the Florida Panther National Wildlife Refuge, Okaloacoochee Slough State Forest, Okaloacoochee Slough Wildlife Management Area, and on private lands. George N. Avery (1976) also reported giant sedge from the Devil's Garden area of Hendry County.

A number of collections have been made in Fakahatchee Strand Preserve State Park. The first collection was made by Frank C. Craighead in 1966 (s.n., FTG). Other collections were made in 1966 by Olga Lakela (30006, USF), in 1967 by Lakela (30744, USF), in 1975 by Steven R. Hill (2745, FTG), and in 1985 by Ruben P. Sauleda (8779, USF). It is presumably extant there.

Giant sedge also has been collected in a number of localities in and around Big Cypress National Preserve. The first collection was from the Pinecrest area by C.R. Jackson in 1949 (s.n., FTG). It was vouchered in the same general area by David and Sally Black in 1978 (177, FTG). Robert W. Long collected it in 1966 in Gator Hook Strand (1692, USF), which is located to the west of Pinecrest and south of Monroe Station, and P. Silverstone made a collection in the vicinity of Monroe Station in 1964 (96, FTG). Another collection was made in the Kissimmee Billy Strand area

by Donovan S. and Helen B. Correll in 1976 (47126, FTG). Black & Black (1980) reported giant sedge as uncommon in Big Cypress National Preserve.

A single collection was made in Miami-Dade County in 1965 by R. Metzger (188, USF). The collection was made in a disturbed area, and may not represent a native population.

Major Threats: Exotic pest plant invasions; hydrological modifications; recreational off-road vehicle use in Big Cypress National Preserve; wild hog damage.

Comments: *Because of the difficulty in identifying* Carex *species, other stations may remain unreported.*

Preliminary recommendations:

- Voucher plants at Six Mile Cypress.
- Survey Okaloacoochee Slough in Big Cypress National Preserve, Florida Panther National Wildlife Refuge, Okaloacoochee Slough State Forest, Okaloacoochee Slough State Forest, and the Devil's Garden area in Hendry County.
- Map and monitor known stations on a regular basis.

Catesbaea parviflora Sw.
Smallflower Lilythorn

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Bahia Honda State Park; National Key Deer Refuge)
Taxonomy: Dicotyledon; Rubiaceae.
Habit: Shrub.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Coastal berms and pine rocklands.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Nelson (1996) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Ward, 1978; Correll & Correll, 1982; Scurlock, 1987; Nelson,

1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *C. parviflora* var. *septentrionalis* Krug & Urban.

Historical Context in South Florida: John Loomis Blodgett first collected smallflower lilythorn between 1838 and 1853 on Big Pine Key (s.n., NY). Many other collections have been made from Big Pine Key, where it is still present (e.g. Brumbach 9544, FSU, FTG, NY, USF). Gann observed plants in 2000 in the vicinity of the Blue Hole, within the National Key Deer Refuge.

Allan H. Curtiss first collected it on Bahia Honda Key in the 1880s (1130, NY), and it has been collected there a number of times (e.g. Long et al. 2613, FSU). It is extant on Bahia Honda in Bahia Honda State Park, where it is frequent on coastal berms. Gann, Bradley and Florida Park Service biologist Janice A. Duquesnel have observed these plants as recently as 2001.

Major Threats: Exotic pest plant invasions; sea-level rise.

Preliminary recommendations:
- Survey appropriate habitats within historical range, including private sites on Big Pine Key.
- Map and monitor known stations on a regular basis.

Celtis pallida Torr.
Spiny Hackberry

South Florida Status: Critically imperiled. Two known occurrences in two conservation areas (Mound Key Archaeological State Park; J.N. "Ding" Darling National Wildlife Refuge).
Taxonomy: Dicotyledon; Ulmaceae.
Habit: Shrub.
Distribution: Native to South Florida, the West Indies, southwestern North America (including Mexico), Central America, and South America.
South Florida Distribution: Lee County.
South Florida Habitats: Shell mounds.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.

Identification: Nelson (1996) has an illustration; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Small, 1933a; Long & Lakela, 1976; Ward, 1978; Nelson, 1996; Flora of North America Editorial Committee, 1997; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *Momisia pallida* (Torr.) Planch. ex Small.

Historical Context in South Florida: Abram P. Garber first collected spiny hackberry in 1878 on an island in Estero Bay (45, NY), probably at what is now Mound Key Archaeological State Park (Ward, 1978). It was collected there by George N. Avery and others in 1973 (1466, FTG), and several times in 1974 by Susan Todd (s.n., FSU, USF). It is extant on Mound Key, and was observed there in 2001 by Gann and Florida Park Service biologists R. "Bobby" Hattaway and Sally Braem. Only two plants were seen during a brief survey, and a thorough survey of the island is needed.

William C. Brumbach collected spiny hackberry on Sanibel Island at J.N. "Ding" Darling National Wildlife Refuge in 1972 (7856, USF). Richard P. Wunderlin and others also vouchered it there in 1978 (6248, FTG, USF). Brumbach made an additional collection from Sanibel Island that may have been from the Refuge in 1978 (9618, FTG, NY, USF). The locality data given is "near exit #10 from the Darling Sanctuary." Gann observed plants at the refuge in 2001.

In 1981, Bruce F. Hansen and others collected spiny hackberry on Big Panther Key west of Pine Island (8356, FTG, USF). This station is protected within the Pine Island Sound Aquatic Preserve, but it is unknown whether or not plants still occur there. Herwitz (1977) reported spiny hackberry for Cayo Costa Island in Cayo Costa State Park, but was unable to find any plants in surveys from 1990 through 1992 (Herwitz et al. 1996). Gann and Florida Park Service biologist R. "Bobby" Hattaway made a brief search of the reported station in 2001, but were unable to locate any plants. Spiny hackberry is apparently extirpated there.

Major Threats: Exotic pest plant invasions.

Comments: *Chapman (1883) improperly attributed Garber's 1878 collection of* C. pallida *to* Trema micrantha*, also in the Ulmaceae.*

Preliminary recommendations:

- Survey Big Panther Key in Pine Island Sound Aquatic Preserve.
- Map and monitor known stations on a regular basis.
- Consider establishing an *ex situ* collection of germplasm.
- Conduct conservation biology and conservation horticulture studies.
- Consider reintroducing spiny hackberry to Cayo Costa Island in Cayo Costa State Park.
- Consider reintroducing or introducing other populations within historical range.

Ceratopteris pteridoides (Hook.) Hieron.
Water Horn Fern

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Jonathan Dickinson State Park).
Taxonomy: Pteridophyte; Parkeriaceae.
Habit: Perennial aquatic herb.
Distribution: Native to peninsular Florida, Louisiana, the West Indies, Central America, and South America. It also has been recorded in Vietnam. Wunderlin & Hansen (2000) reports it as occasional in Florida in Alachua County and the central and southern peninsula.
South Florida Distribution: Charlotte, Martin, and Miami-Dade counties.
South Florida Habitats: The natural habitat is cypress swamps, and slow-moving streams and rivers. It is now primarily found in ditches and canals.
Protection Status: Not listed by any agency.
Identification: There are two species of Ceratopteris in South Florida – *C. pteridoides* and the exotic *C. thalictroides* (L.) Brongn. Flora of North America Editorial Committee (1993) has illustrations of both *C. pteridoides* and *C. thalictroides*; Nelson (2000) has a color photo of *C. pteridoides*; the IRC Website has a color photo.

References: Small, 1938; Lloyd, 1974; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: None.

Historical Context in South Florida: Walter M. Buswell first collected water horn fern in 1938 in Coral Gables in Miami-Dade County (s.n., FTG). In the early 1990s, Roger L. Hammer and Don Keller discovered it in a ditch at Shark Valley in Everglades National Park (Hammer, 1994). Hammer and Keller have returned several times in an attempt to find this population without success (R.L. Hammer, personal communication, 31 January 2001).

Gann and Bradley first collected water horn fern in Charlotte County in 1995 at the Fred C. Babcock-Cecil M. Webb Wildlife Management Area (10, FTG). The plants were floating in a ditch. Gann found additional plants in a canal north of Bermont on SR 31 in 2000. Several dozen sporulating plants were observed.

Water horn fern also is present at Jonathan Dickinson State Park in Martin County where it is growing on the edge of a cypress strand (R.E. Roberts, personal communication, 31 January 2001). This station needs to be vouchered.

It has been reported for Corkscrew Swamp Sanctuary (Judd, 1994), which is located in Collier and Lee counties, and Dupuis Reserve (Woodbury, no date), which is located in Martin and Palm Beach counties, but both of these stations need to be verified.

Major Threats: Exotic pest plant invasions; herbicide spraying in canals and ditches.

Preliminary recommendations:

- Voucher plants in Jonathan Dickinson State Park.
- Survey Corkscrew Swamp Sanctuary and Dupuis Reserve.
- Map and monitor known stations on a regular basis.

Chamaesyce deltoidea (Engelm. ex Chapm.) Small subsp. ***adhaerens*** (Small) Herndon
Redland Sandmat

South Florida Status: Critically imperiled. Four occurrences in five conservation areas (Andrew Dodge Memorial Pineland, Black Creek Forest, Goulds Pineland, & Institute for Regional Conservation Preserve; Camp Owaissa Bauer), and two non-conservation areas (Naranja School Board Property; Old Dixie Pineland). Additional plants are present on private lands in the Goulds area.
Taxonomy: Dicotyledon; Euphorbiaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by USFWS (as *C. deltoidea* subsp. *deltoidea*), as endangered by FDACS (as *C. deltoidea*), and as critically imperiled by FNAI.
Identification: Distinguished from other subspecies of *Chamaesyce deltoidea* in having prostrate or appressed stems and uncinate appressed hairs on the upper surface of the leaves (Herndon, 1993).
References: Small, 1933a; Long & Lakela, 1976; Avery & Loope, 1980a; Dade County Department of Environmental Resources Management, 1993b; Herndon, 1993; Coile, 2000; USFWS, 2000.
Synonyms: *C. adhaerens* Small; *C. deltoidea* subsp. *deltoidea* of authors, in part.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected Redland sandmat in 1903 between Cutler and Camp Longview (860, NY). Camp Longview was historically located to the west of present-day Florida City. Small and Carter made the next collection in 1906 between Peter's Prairie and Homestead (2531, NY). It was this collection that Small (1927) designated as his type of *Chamaesyce adhaerens.* Since the above collections, Redland sandmat has been collected and observed numerous times from S.W. 216 Street (by Bradley) south to S.W. 288 Street (Herndon 339, FTG) in Miami-Dade County, although most of its historical habitat has been destroyed.

Redland sandmat is now known from four occurrences within its historical range.

The largest concentration is in the Goulds area, where it is protected at several conservation areas. Bradley vouchered plants at Goulds Pineland in 1998 (1807, FTG). We estimate that there are several hundred plants at that station. Plants also are present at Black Creek Forest, where Bradley observed plants in 1992. This station needs to be vouchered. There is a small population at The Institute for Regional Conservation Preserve in southern Goulds, where the authors have observed plants as recently as 2001. Fewer than 100 plants are present there. Redland sandmat also is present at the Andrew Dodge Memorial Pineland (Klein & Bradley, 1996), where Gann and Bradley have observed fewer than 10 plants. Both The Institute for Regional Conservation Preserve and Andrew Dodge Memorial Pineland stations need to be vouchered. Additional plants occur on private pine rockland fragments in the Goulds area, some of which should be considered for acquisition.

Lloyd L. Loope (1979) and others reported Redland sandmat for Camp Owaissa Bauer several miles to the southwest of Goulds, and it has been collected and reported for pinelands surrounding Camp Owaissa Bauer (e.g., Herndon 399, FTG; Houghton s.n., FTG; Popenoe 658, FTG). Roger L. Hammer observed six plants there in 2001 (personal communication, 26 March 2001). George N. Avery observed plants at what is now Ingram Pineland in 1979 (Avery's Notes, 27 October 1979), a station that was vouchered by Alan Herndon in 1980 (339, FTG). Bradley conducted a vascular plant inventory of the site in 2000, but failed to locate any plants.

Two important non-conservation areas are the School Board property next to the Florida Turnpike in Naranja (Avery's Notes, 27 June 1979), and the Old Dixie Pineland in Naranja (anonymous, 1994a). Plants at both of these stations are assumed to be extant, but need to be vouchered. The Old Dixie Pineland is located within a future transportation corridor, and will probably be destroyed.

Major Threats: Fire suppression; exotic pest plant invasions; habitat destruction.

Comments: *Wunderlin (1998) places this into synonymy with* C. deltoidea *subsp.* deltoidea*. We follow Herndon (1993).*

Preliminary recommendations:

- Voucher plants at Andrew Dodge Memorial Pineland, Black Creek Forest, Institute for Regional Conservation Preserve, Naranja School Board Property, and Old Dixie Pineland.
- Survey Ingram Pineland.
- Map and monitor known stations on a regular basis.
- Acquire Old Dixie Pineland and pine rockland fragments in Goulds.
- Designate and manage Naranja School Board Property as a conservation area.
- Conduct conservation biology and conservation horticulture studies.

Chamaesyce deltoidea (Engelm. ex Chapm.) Small subsp. ***serpyllum*** (Small) D.G. Burch
Florida Keys Sandmat

South Florida Status: Critically imperiled. One occurrence at National Key Deer Refuge, Terrestris Preserve, & adjacent non-conservation areas.
Taxonomy: Dicotyledon; Euphorbiaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: This can be distinguished from other subspecies of *Chamaesyce deltoidea* by having irregularly twisted trichomes instead of uncinate trichomes (Wunderlin, 1998).
References: Small, 1933a; Long & Lakela, 1976; Avery & Loope, 1980a; Herndon, 1993; Wunderlin, 1998; Bradley & Gann, 1999b; Coile, 2000.
Synonyms: *C. serpyllum* Small.

Historical Context in South Florida: John Kunkel Small first collected Florida Keys sandmat in 1912 on Big Pine Key (3768,

NY). It has been collected and observed numerous times since then, but only on Big Pine Key. Florida Keys sandmat is extant at the National Key Deer Refuge, The Nature Conservancy's Terrestris Preserve (J. O'Brien, personal communication, 1991) and, presumably, on other properties on Big Pine Key. Gann observed plants at the National Key Deer Refuge in 2000. An estimated 1,000-10,000 plants are extant on Big Pine Key (Bradley & Gann, 1999b).

Major Threats: Fire suppression; exotic pest plant invasions; habit destruction; sea-level rise.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Acquire additional habitat and incorporate it into National Key Deer Refuge.
- Conduct conservation biology and conservation horticulture studies.
- Encourage USFWS to list *Chamaesyce deltoidea subsp. serpyllum*.

Chromolaena frustrata (B.L. Rob.) R.M. King & H. Rob. **Florida Keys Thoroughwort**

South Florida Status: Critically imperiled. Four occurrences in two conservation areas (Lignumvitae Key Botanical State Park; Long Key State Park) and three non-conservation areas (Big Munson Island; North Layton Hammock; Teatable Hammock).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Monroe County.
South Florida Habitats: Coastal rock barrens, edges of rockland hammocks, and coastal berms.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1933a; Ledin, 1951; Long & Lakela, 1976; Avery & Loope, 1980a; Cronquist, 1980; Wunderlin, 1998; Bradley & Gann, 1999b; Chafin, 2000; Coile, 2000.

Synonyms: *Eupatorium frustratum* B.L. Rob.; *Eupatorium heteroclinium* Griseb., misapplied; *Osmia frustrata* (B.L. Rob.) Small.

Historical Context in South Florida: John Loomis Blodgett first collected Florida Keys thoroughwort between 1838 and 1853 on Big Pine Key (s.n., NY). Frank C. Craighead collected it again on Big Pine Key in 1955 (s.n., FLAS), but it has not been recorded there since that time. Allan H. Curtiss collected the type specimen in the late 1800s on Lignumvitae Key (1195, NY, GH, FLAS), now within Lignumvitae Key Botanical State Park. It has been collected and observed there a number of times, including by George N. Avery in 1964 (Avery's Notes, 7 March 1964), by C.P. Sreemadhaven in 1971 (4906, USF), and by Bradley in 1995 (458, FTG). Gann and Florida Park Service biologist Janice A. Duquesnel observed fewer than 100 plants there in 2000.

Alvan W. Chapman made another early collection in 1875 on Long Key (20023, US), where two extant stations are known. The first is at Long Key State Park, where Ann Buckley and Ted Hendrickson first vouchered it in 1986 (322, FTG). Gann and Duquesnel observed fewer than 100 plants there in 2000. In 1998, Bradley observed Florida Keys thoroughwort on Long Key on the edge of privately owned North Layton Hammock. In 1892, Joseph H. Simpson made the first collection on Upper Matecumbe Key (565, NY). John Kunkel Small and Nathaniel L. Britton made a collection there in 1919 (9329, NY), Craighead made another collection there in 1962 (s.n., USF), and Olga Lakela vouchered the station again in 1968 (31601, FTG, USF). Plants are extant on Upper Matecumbe Key on the edge of privately owned Teatable Hammock, where Bradley observed them in 1998. Fewer than 10 plants were seen.

Florida Keys thoroughwort also was collected and observed at a number of sites in the Florida Keys where it is apparently extirpated. John H. Davis, Jr. made a collection in 1940 on Boca Grande Key (s.n., FLAS), which is located to the west of Key West in what is now Key West National Wildlife Refuge. Gann and Bradley surveyed this island in 1996, but did not observe any plants. Avery observed plants on Knight's Key in 1962 (Avery's Notes, 21 November 1962), a station that was vouchered in 1979

by Donovan S. Correll (50973, FTG, USF). Harold N. Moldenke made a collection on Lower Matecumbe Key in 1930 (623, NY), and Walter M. Buswell collected a single specimen on Key Largo in 1930 (s.n., FTG). In 2001, Bradley made a collection on Big Munson Island where it was abundant in rockland hammocks and a coastal rock barren (2128, FTG). This site is owned by the Boy Scouts of America.

Small (1918, 1919) reports finding this in 1916 at "Madeira," to the east of Flamingo in what is now Everglades National Park. Small and John B. DeWinkeler vouchered a population between West Lake and Flamingo in 1921 (9995, NY). George N. Avery observed it twice in that region in 1977, once on the west side of Buttonwood Canal, and once south of West Lake (Avery's Notes, 9 May 1977, 10 May 1977). R. Bruce Ledin made two collections to the west of that area in 1947, the first from "Stream Bank, above Cape Sable" (s.n., FLAS) and the second from "Cape Sable" (s.n., FTG). Harold N. Moldenke (1944) also reported it for the Turner River Mound in the Ten Thousand Islands area in Everglades National Park, but this station apparently was never vouchered. Despite Avery & Loope's statement that it could be quite common on the mainland in Everglades National Park (Avery & Loope, 1980a), it may be extirpated there (Reimus, 1999).

Major Threats: Exotic pest plant invasions; habitat destruction; management error; sea-level rise.

Comments: *At Lignumvitae Key Botanical State Park, Florida Keys thoroughwort apparently is now limited to a small area immediately adjacent to a trail that is regularly mowed. It was formerly known from around the historic house. Gann and Duquesnel were unable to locate plants near the historic house in recent surveys, and it may have been extirpated there through the regular mowing and "weed-eating" of the area. Extreme care should be exercised to prevent the loss of Florida Keys thoroughwort from its type locality*.

Preliminary recommendations:

- Voucher plants at Teatable Hammock.
- Survey Cape Sable region of Everglades National Park.
- Encourage USFWS to list *Chromolaena frustrata*.
- Map and monitor known stations on a regular basis.

- Acquire North Layton Hammock and Teatable Hammock.
- Develop conservation agreement with Boy Scouts of America to manage a viable population of Florida Keys thoroughwort on Big Munson Island, and provide technical assistance.
- Prevent extirpation at Lignumvitae Key Botanical State Park.
- Consider establishing an *ex situ* collection of germplasm.
- Conduct conservation biology and conservation horticulture studies.
- Consider introducing Florida Keys thoroughwort to other sites within its historical range, including the Klopp Tract, Lignumvitae Key Botanical State Park on Lower Matecumbe Key.

Cienfuegosia yucatanensis Millsp.
Yucatan Flymallow

South Florida Status: Critically imperiled. Three occurrences in three conservation areas and two non-conservation areas (Klopp Tract, Lignumvitae Key Botanical State Park; Long Key State Park, Long Key Layton Coastal Rock Barren, & North Layton Hammock; Windley Key Fossil Reef Geological State Park).
Taxonomy: Dicotyledon; Malvaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the West Indies, and Mexico in the Yucatan.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Coastal rock barrens, margins of tidal swamps, and edges of rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Small, 1933a; Fryxell, 1969; Scurlock, 1987; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *C. heterophylla* (Vent.) Garcke, misapplied.

Historical Context in South Florida: John Loomis Blodgett first collected Yucatan flymallow between 1838 and 1853 on Lignumvitae Key (s.n., NY). It was subsequently reported or

collected from Windley Key, where it needs to be vouchered, south to Key West (Chapman s.n., US). It is extirpated on Key West, Grassy Key (Curtiss 398, US), and Lignumvitae Key.

In 1892, Joseph H. Simpson made a collection on Long Key (469, GH, NY, US), where it was vouchered again in 1964 by Olga Lakela (27938, FLAS, USF). George N. Avery observed it there in 1966, noting that there were "large stands of this here" (Avery's Notes, 19 April 1966). It is extant on that island at three stations. The first is at Long Key State Park, where Avery vouchered it in 1971 (1084, FTG). Gann, Bradley and Florida Park Service biologist Janice A. Duquesnel observed plants there as recently as 2000. A few hundred plants were estimated to be present. It also has been observed in both Long Key Layton Coastal Rock Barren and North Layton Hammock, two privately owned parcels that are adjacent to each other on Long Key. Bradley and Wayne Hoffman observed plants there in 1998. Close to 1,000 plants were estimated to be present. This is the largest extant colony of Yucatan flymallow.

John Kunkel Small made a collection on Lower Matecumbe Key in 1917 (8392, FSU, NY), a station that was vouchered again by several collectors: Small and others in 1925 (11599, FLAS, FSU, GH, NY); Walter M. Buswell in 1933 (s.n., ARIZ); and George N. Avery in 1965 (s.n., FLAS, GH). Gann and Duquesnel rediscovered it on that island at the Klopp Tract, Lignumvitae Key Botanical State Park in 2000. Fewer than 100 plants were observed. This station needs to be vouchered. Development of the Klopp Tract as a support facility for Lignumvitae Key Botanical State Park threatens this population of Yucatan flymallow.

Yucatan flymallow also has been observed at Windley Key Fossil Reef Geological State Park, where it needs to be vouchered. Karen Achor first reported it there in 1982 (in Weiner 1980, as appended). J. Paul Scurlock reported plants there in 1987, as did Curtis R. Kruer in 1992. Gann, Duquesnel, and Bradley observed plants there as recently as 1999. Fewer than 100 plants were seen in and around a small coastal rock barren.

Major Threats: Habitat destruction at the Long Key Layton Rock Barren site, North Layton Hammock, and Klopp Tract, Lignumvitae

Key Botanical State Park; exotic pest plant invasions; sea-level rise.

Comments: *The population at Windley Key is found in and around an extremely small coastal rock barren and some research to determine management options for this unique and critically important site are encouraged.*

Preliminary recommendations:

- Voucher plants at Klopp Tract, Lignumvitae Key Botanical State Park and Windley Key Fossil Reef Geological State Park.
- Map and monitor known stations on a regular basis.
- Acquire Long Key Layton Coastal Rock Barren and North Layton Hammock sites.
- Study management options at Windley Key Fossil Reef Geological State Park.
- Ensure that development of facilities at Klopp Tract does not harm Yucatan flymallow.
- Consider reintroducing Yucatan flymallow to other sites within its historical range, including Lignumvitae Key Botanical State Park.
- Consider introducing Yucatan flymallow to other sites within its historical range, including Little Hamaca Park.

Croton lobatus L.
Lobed Croton

South Florida Status: Critically imperiled. Five occurrences in four conservation areas and three non-conservation areas (Camp Owaissa Bauer; Everglades National Park; Fuchs Hammock Preserve; Pine Ridge Sanctuary & privately owned Nixon-Lewis Hammock; privately owned Little Cox Hammock & privately owned portions of Ross Hammock).
Taxonomy: Dicotyledon; Euphorbiaceae.
Habit: Annual terrestrial herb.
Distribution: Native to South Florida, central Florida (in Manatee and Pinellas counties), the West Indies, Mexico, Central America, South America, and tropical Africa.
South Florida Distribution: Miami-Dade County.

South Florida Habitats: Rockland hammock margins and gaps, and pine rocklands.
Protection Status: Not listed by any agency.
Identification: There are 12 species of *Croton* in Florida. Wunderlin (1998) has a key. The leaves of *C. lobatus* are 3-5 lobed.
References: Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Frank C. Craighead apparently first collected lobed croton in South Florida in 1962 (s.n., USF). This collection was made in Fuchs Hammock, now part of Fuchs Hammock Preserve. John Popenoe later collected it at Fuchs Hammock in 1971 (148, FTG). In 1966, George N. Avery observed lobed croton at Timms Hammock in Camp Owaissa Bauer, a Miami-Dade County park (Avery's Notes, 4 August 1966). In 1977, Avery and others found one plant of this species at a site near downtown Miami along the Florida East Coast Railway tracks (1743, FTG). This station is just north of Simpson Park and was formerly part of Brickell Hammock. The plant was found in a spot where a cut was made through a limestone hill.

Alan H. Herndon collected it once in Everglades National Park in 1988 (s.n., FTG). The plants were found in a pine rockland adjacent to a hammock on Long Pine Key. A prescribed fire had burned this site about seven weeks before the collection was made, and Herndon reported that there was a massive germination of seeds with seedlings abundant at that time. It has apparently not been seen there since that time.

Gann observed plants in the early 1990s at the privately owned Little Cox Hammock, the seedlings germinating a few weeks after a prescribed fire had burned through the edge of the rockland hammock. Surveys in subsequent years failed to locate any plants. Around 1995, Bradley made an observation of plants in a privately owned portion of Ross Hammock, which is in the vicinity of Little Cox Hammock and adjacent to Castellow Hammock Park. These two stations are considered to be the same occurrence.

Lobed croton also was observed at the Pine Ridge Sanctuary sometime before 1998 by Barbara Glancy. It was vouchered there by Bradley in 1998 (1596, FTG), where it was growing in and along the edge of a pine rockland. Bradley also collected it near Pine Ridge Sanctuary at the privately owned Nixon-Lewis Hammock in 1998 (1843, FTG). This hammock had been almost completely destroyed and the plants were growing around its edge, partly in a fallow agricultural field.

Major Threats: Fire suppression around rockland hammock margins; exotic pest plant invasions; habitat destruction.

Comments: *This is an extremely ephemeral annual herb that most often appears following disturbance, including fire. Surveys for this species should be conducted at different seasons over a period of several years. South Florida specimens have been collected in March, June, July, and September. Ferdinand Rugel collected a specimen in Manatee County in 1845 (311, NA), showing that this species is not a recent immigrant to Florida. A collection made by Ferdinand Rugel in 1849 (6779, US), labeled "Florida," may have been collected in Cuba or elsewhere. Rugel apparently did not collect in Florida in 1849.*

Preliminary recommendations:

- Voucher known stations whenever plants are present.
- Survey appropriate habitats within historical range following fires or other disturbances.
- Map known stations whenever plants are present.
- Monitor known stations following fires or other disturbances.
- Acquire Little Cox Hammock.
- Review for listing by FDACS and FNAI.

Croton michauxii G.L. Webster
Rushfoil

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Frenchman's Forest Natural Area; Juno Dunes Natural Area; Savannas Preserve State Park)
Taxonomy: Dicotyledon; Euphorbiaceae.
Habit: Annual terrestrial herb.

Distribution: Native to the southeastern United States. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Glades, Martin, and Palm Beach counties.
South Florida Habitats: Flatwoods and scrub, along the ecotone with depression marshes or other freshwater wetlands.
Protection Status: Not listed by any agency.
Identification: There are 12 species of *Croton* in Florida. Wunderlin (1998) has a key.
References: Chapman, 1883; Small, 1933a; Wunderlin, 1998.
Synonyms: *Crotonopsis linearis* Michx.

Historical Context in South Florida: Hugh O'Neill first collected rushfoil in 1928 just west of Ortona in Glades County (s.n., FLAS). In 1967, R.R. Smith made a collection in Glades County in the Palmdale area near Fisheating Creek (1632, FLAS), in what may now be the Fisheating Creek Wildlife Management Area. In 1972, Robert Kral made a collection west of Jensen Beach in Martin County (48066, NY). It was observed in this vicinity in 1997 by Gann and Bradley at the Savannas Preserve State Park.

In 1996, Gann and Bradley made the first known collection in Palm Beach County at Frenchman's Forest Natural Area (808, FTG). The plants were growing on the edge of a depression marsh. Several hundred plants were observed. Bradley and Woodmansee collected rushfoil in 1997 at Juno Dunes Natural Area in Palm Beach County (312, FTG), in the ecotone between scrubby flatwoods and a depression marsh. Several hundred plants were observed there as well.

Major Threats: Exotic pest plant invasions; hydrological modifications; fire suppression.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. A specimen of this species at FLAS collected by Allan H. Curtiss (2526) is labeled "Pease [sic] Creek, Southwest Florida." Someone later added the writing "Charlotte County" to the specimen. A duplicate at US does not have this writing. Very little of the Peace River, which is what Curtiss was referring to, is*

actually in Charlotte County. Most of the river is to the north of our area, and we feel that the specimen was incorrectly attributed to Charlotte County.

Preliminary recommendations:

- Survey Fisheating Creek area, including Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Ctenitis submarginalis (Langsd. & Fisch.) Ching
Brown-hair Comb Fern

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Deering Estate at Cutler; Fakahatchee Strand Preserve State Park) and one non-conservation area (Strawberry Fields Hammock).
Taxonomy: Pteridophyte; Dryopteridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, central Florida (Hardee and Seminole counties), Louisiana, the West Indies (Hispaniola), Mexico, Central America, and South America.
South Florida Distribution: Broward, Collier, Miami-Dade, and Palm Beach counties. It has not been vouchered for Miami-Dade County.
South Florida Habitats: Mesic-hydric hammocks, rockland hammocks, and strand swamps.
Protection Status: Listed as endangered by FDACS.
Identification: There are two species of *Ctenitis* in South Florida. *C. submarginalis* can be distinguished from *C. sloanei* in that its leaf blades are 1-pinnate-pinnatifid vs. 2- to 4-pinnate-pinnatifid in *C. sloanei* (Wunderlin & Hansen, 2000). Tobe et al. (1998) has a color photo and an illustration; Nelson (2000) has color photos; the IRC Website has a color photo.
References: Small, 1933a; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Tobe et al., 1998; Wunderlin, 1998; Coile, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Thelypteris submarginalis* (Langsd. & Fisch.) Small ex R.P. St. John.

Historical Context in South Florida: John Kunkel Small and others first collected brown-hair comb fern in 1926 in a hammock near Belle Glade in Palm Beach County (s.n., NY). It has not been collected in that area since that time.

The next station to be discovered was in the Fakahatchee Strand in Collier County, in what is now Fakahatchee Strand Preserve State Park. Walter M. Buswell made the first collection there in March 1933, with the locality given as "Big Cypress Swamp, W. of Deep Lake, Fla." (s.n., NY). Buswell made several subsequent collections there in June 1933 (s.n., FTG, USF), in 1934 (s.n., FTG, USF), and in 1937 (s.n., FTG, USF). Other collections have been made by J.R. Lorenz (s.n., FTG), George N. Avery (1146, FTG; 2329, FTG), Clifton E. Nauman and others (284, USF), Bruce E. Tatje and Jane H. Thompson (141, USF), David and Sally Black (s.n., FTG), and John Beckner (s.n., FTG).

Thomas Darling, Jr. (1962) first reported brown-hair comb fern for the Miami area. However, it has yet to be vouchered in Miami-Dade County. Two stations are currently extant. The first is at the Deering Estate at Cutler, where it was reported first on a plant list for the site (Fairchild Tropical Garden, 1990c). Alan Cressler found two patches of plants in close proximity to each other in 1993 while conducting a survey for rare ferns following Hurricane Andrew in 1992 (Cressler, 1993). Approximately 30 plants were found during this survey. Don Keller found a third patch there in the late 1990s but that patch has since disappeared (personal communication, 30 January 2001).

A second station in Miami-Dade County is at the privately owned Strawberry Fields Hammock in southern Miami-Dade County. Don Keller, Alan Cressler, and Carol Lippincott discovered this station on Thanksgiving Day, 1989 (D. Keller, personal communication, 8 February 2001). Keller visited the site again in the late 1990s, and three or four plants were observed. Bradley observed more than 10 plants at this station in 2001.

In Broward County, Clifton E. Nauman and J.A. Nauman made the first collection in "Cypress Creek Hammock" in 1978 (384, USF; 385, USF), now in the Fern Forest Nature Center, which is managed by Broward County. Austin et al. (1979) reported

several plants present, but that it was rare at the site. It is assumed to be present.

Major Threats: Exotic pest plant invasions; poaching; hydrological modifications; wild hog damage.

Preliminary recommendations:

- Voucher plants at Deering Estate at Cutler and Strawberry Fields Hammock.
- Map and monitor known stations on a regular basis.
- Acquire Strawberry Fields Hammock.
- Protect from poaching.
- Consider restoring hammocks in the Belle Glade area and reintroducing brown-hair comb fern.
- Review for listing by FNAI.

Cupania glabra Sw.
American Toadwood

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (National Key Deer Refuge; Great White Heron National Wildlife Refuge), and one non-conservation area (Cupania Hammock).
Taxonomy: Dicotyledon; Sapindaceae.
Habit: Tree.
Distribution: Native to South Florida, the West Indies, and Central America.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Nelson (1994) has a color photo; Nelson (1996) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Long & Lakela, 1976; Little, 1978; Ward, 1978; Tomlinson, 1980; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: John Loomis Blodgett first collected American toadwood between 1838 and 1853 on Big Pine

Key (Blodgett s.n., NY). Blodgett's specimen was unidentified until Nathaniel L. Britton studied the specimen and determined it to be *Cupania glabra* (Britton, 1901). It was not rediscovered until 1921 when Charles Torrey Simpson found it on Big Pine Key (Small, 1924). It was vouchered later that year by John Kunkel Small and others (10198, NY). T. Ann Williams observed plants on Big Pine Key from the 1970s through the 1990s (personal communication, 6 March 2001). American toadwood is present on Big Pine Key at Watson Hammock in National Key Deer Refuge. Ellsworth P. Killip made the first collection that can be definitely attributed to this station in 1951 (40877, US). Several other collections were made from Watson Hammock including one by Steven R. Hill in 1984 (13387, NY). Bradley and Woodmansee observed plants there in 2001.

The next station to be discovered was at Cupania Hammock, a privately owned site on Summerland Key, where George N. Avery found a few plants in 1964 (Avery's Notes, 27 September 1963). Robert W. Long vouchered this station in 1967 (2470, USF). According to Kruer (1992), it is common here and this is the second largest population in the Keys, after Watson Hammock.

In 1965, a few plants were found by Lois and Stan Kitching on Johnston Key in the Great White Heron National Wildlife Refuge (Avery's Notes, 20 February 1965). Avery observed a few plants at this station later that year. Kruer (1992) reported three small trees at this site. American toadwood is assumed to be extant at this station, but needs to be vouchered.

Major Threats: Habitat destruction; exotic pest plant invasions; sea-level rise.

Preliminary recommendations:

- Voucher plants at Johnston Key.
- Map and monitor known stations on a regular basis.
- Acquire Cupania Hammock.

Cuscuta exaltata Engelm.
Tall Dodder

South Florida Status: Critically imperiled. Four occurrences in five (or six) conservation areas (Jupiter Ridge Natural Area & Juno

Dunes Natural Area; Jupiter Inlet Lot 13 and/or Jupiter Inlet Natural Area; Rocky Point Hammock; Yamato Scrub Natural Area).
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Annual parasitic vine.
Distribution: Native to Florida and Texas. Wunderlin (1998) reports it as rare in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Martin and Palm Beach counties.
South Florida Habitats: Scrub and scrubby flatwoods.
Protection Status: Not listed by any agency.
Identification: Austin (1980) has an illustration; the IRC Website has a color photo.
References: Yuncker, 1932; Small, 1933a; Austin, 1980; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Palm Beach County biologist Steve Farnsworth first reported an unknown *Cuscuta* species for several sites in northern Palm Beach County: Jupiter Inlet Tract (Farnsworth, 1993c), part of which is now Jupiter Inlet Natural Area and part of which is now Jupiter Inlet Lot 13; Jupiter Ridge Natural Area (Farnsworth, 1994b); and, Juno Dunes Natural Area (Farnsworth, 1995a). Daniel F. Austin observed these plants and reported that they were all *C. exaltata* (personal communication, 3 April 2001). In July 2001, Chris Lockhart observed plants at the Juno Dunes Natural Area (personal communication, 25 July 2001), a station that was vouchered by Lytton Musselman in 2001 (personal communication, 14 January 2002). Plants at Jupiter Ridge Natural Area are assumed to be present, as are plants at the Jupiter Inlet Tract, although both the Jupiter Inlet Natural Area and Jupiter Inlet Lot 13 need to be surveyed.

In 1998, Bradley and Woodmansee discovered tall dodder at Yamato Scrub Natural Area in southern Palm Beach County (1006, FTG, USF). A single large patch of plants was observed growing parasitically on oaks (*Quercus* spp.) in a recently cleared firebreak. Austin observed this station in April 2001, and saw two-dozen or more seedlings (personal communication, 5 April 2001).

Also in 1998, Bradley and Woodmansee discovered tall dodder in Martin County in scrubby flatwoods at Rocky Point Hammock, a Martin County park (1206, FTG). A single patch was observed growing parasitically on *Quercus myrtifolia*.

Major Threats: Exotic pest plant invasions; fire suppression.

Comments: *Tall dodder is parasitic on a variety of hardwood hosts (Godfrey & Wooten 1981). It flowers in the summer through fall, so surveys should be conducted during this time period. It appears to be an extremely ephemeral species, sometimes disappearing for years at a time (D.F. Austin, personal communication, 3 April 2001).*

Preliminary recommendations:

- Voucher plants at Jupiter Inlet Tract and Jupiter Ridge Natural Area.
- Voucher all stations each year plants are present.
- Survey Jupiter Inlet Natural Area and Jupiter Inlet Lot 13.
- Map known stations whenever plants are present.
- Monitor known stations on a quarterly basis.
- Conduct conservation biology research.
- Determine status in Florida and Texas.
- Review for listing by FDACS and FNAI.

Cuscuta indecora Choisy
Bigseed Alfalfa Dodder

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Corkscrew Swamp Sanctuary; Nicodemus Slough) and one non-conservation area (Sunniland area in Collier County).
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Annual parasitic vine.
Distribution: Native to North America, the West Indies, Mexico, and South America. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier and Glades counties.
South Florida Habitats: Pinelands, hammocks, marshes, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Austin (1980) has an illustration.

References: Chapman, 1883; Yuncker, 1932; Small, 1933a; Austin, 1980; Godfrey & Wooten, 1981; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *C. indecora* var. *neuropetala* (Engelm.) Hitchc.; *C. neuropetala* Engelm.

Historical Context in South Florida: Gerald F. "Stinger" Guala collected bigseed alfalfa dodder in 1987 in flatwoods at Corkscrew Swamp Sanctuary in Collier County (666, FLAS). Bradley made an additional collection in Collier County in 1998 along State Road 29 in the Sunniland area (1852, FTG). In 1997, Bradley & Woodmansee made a collection at Nicodemus Slough in Glades County (804, FTG).

It was reported for Blowing Rocks Preserve in Martin County (Richardson et al., 1992), but this occurrence needs to be verified.

Major Threats: Fire suppression; exotic pest plant invasions.

Comments: *It is parasitic on a number of woody and herbaceous hosts (Godfrey & Wooten, 1981).*

Preliminary recommendations:
- Survey Blowing Rocks Preserve.
- Map and monitor known stations on a regular basis.

Cyperus floridanus Britton ex Small
Florida Flatsedge

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Bill Baggs Cape Florida State Park; R. Hardy Matheson Preserve) and one non-conservation area (Key West Cemetery).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the Bahamas, and Cuba.
South Florida Distribution: Collier and Miami-Dade counties and the Monroe County Keys.
South Florida Habitats: Rockland hammocks, shell mounds, and open sand.

Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: There are about 50 species of Cyperus in Florida. Wunderlin (1998) has a key. In Florida this is a very small plant, usually about five cm or less in height.
References: Small, 1933a; McLaughlin, 1944; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Coile, 2000.
Synonyms: *C. filiformis* Sw., misapplied*; C. filiformis* var. *densiceps* Kük.

Historical Context in South Florida: John Loomis Blodgett first collected Florida flatsedge between 1838 and 1853 on the island of Key West (s.n., NY, US). Abram P. Garber also collected it on Key West in 1877 (1221, NY, FLAS). In 1903, Nathaniel L. Britton described Blodgett's plant as a new species, designating his Key West collection the type (in Small, 1903). It was not seen in the Florida Keys again until George N. Avery discovered it persisting at the Key West Cemetery in 1965 (Avery's Notes, 13 March 1965). Avery vouchered this population in 1978 (1898, FLAS, FTG). Bradley re-vouchered this population in 1995 (268, FTG), and observed plants in and around the cemetery in 2001.

The next station was discovered by Garber, who collected it in Miami in 1877 (1220, NY). Florida flatsedge was not seen in Miami-Dade County again until John Popenoe and others collected it on Key Biscayne at Bill Baggs Cape Florida State Park in 1983 (2345, FTG, USF). Bradley re-vouchered it at this station in 1995 (242, FTG). Gann has observed plants, nearly throughout the park, as recently as 2000. In 1995, Gann and Bradley discovered a station on the mainland at the R. Hardy Matheson Preserve in Miami-Dade County (5, FTG). Plants were observed growing in the ecotone between pine rockland and rockland hammock.

In 1965, Olga Lakela collected Florida flatsedge on Chokoloskee Island in Collier County (29105, USF; 29324, USF). The plants were growing on shell mounds. Avery observed this population in 1980 (Avery's Notes, 2 July 1980). The last hammock fragments on this island have been developed, and it is unlikely that this species persists there.

Major Threats: Exotic pest plant invasions; off-road bicycle use at R. Hardy Matheson Preserve.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Eliminate off-road bicycle use within area Florida flatsedge area at R. Hardy Matheson Preserve.
- Consider introducing Florida flatsedge to other sites within its historical range, including Little Hamaca Park on Key West.
- Consider restoring shell mounds hammocks on Chokoloskee Island and reintroducing Florida flatsedge.

Cyperus fuligineus Chapm.
Limestone Flatsedge

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (Long Key State Park; National Key Deer Refuge, Snake Creek Hammocks) and one non-conservation area (Valhalla Rock Barren Site).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Rockland hammocks, coastal berms, and coastal rock barrens.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: There are about 50 species of *Cyperus* in Florida. Wunderlin (1998) has a key. The stems and spikelets are rusty reddish.
References: Chapman, 1883; Small, 1933a; McLaughlin, 1944; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Limestone flatsedge was collected first on the island of Key West either by John Loomis Blodgett, between 1838 and 1853 (s.n., NY), or by Ferdinand Rugel in 1846 (s.n., F). It was observed there by J. Cosmo Melville in 1872 (Melville, 1882) and was collected there by Abram

P. Garber in 1877 (s.n., NY). John Kunkel Small and others made another collection, probably in 1913 (the label is damaged), on Key Largo, and in 1919, Small and Nathaniel L. Britton made a collection on Upper Matecumbe Key (9332, NY). The next collection was made by Small in 1921 on the southern end of Big Pine Key (10147, NY), presumably in Cactus Hammock, where Ellsworth P. Killip collected it in 1952 (41958, F), George N. Avery collected limestone flatsedge in 1971 (1975, FTG), and Bradley observed it several times from 1995-2001. Donovan S. Correll and Helen B. Correll also collected limestone flatsedge on the northern end of Big Pine Key in 1982 (54042, FTG).

In 1965, George N. Avery observed plants in a hammock at the southwestern point of Ramrod Key, at the Ramrod Key Coastal Berm Site (Avery's Notes, 12 December 1965). This station was not vouchered. The property is still undeveloped and plants could remain there. Part of this site is owned by Monroe County and part is privately owned. In 1966, Avery observed limestone flatsedge on Crawl Key at the Valhalla Rock Barren Site (Avery's Notes, 19 April 1966). Bradley also observed this station in 1998, where perhaps a few hundred plants are extant. This is a privately owned site immediately adjacent to Curry Hammock State Park. In 1995, Bradley discovered limestone flatsedge in a coastal rock barren at the Long Key State Park (249, USF, FTG), where it is extant. Bradley, Gann, and Florida Park service biologist Janice A. Duquesnel observed plants there in 2000. Bradley also found plants in 1999 at the edge of a rockland hammock on Plantation Key at Snake Creek Hammocks, Florida Keys Wildlife and Environmental Area. This station was mapped, but needs to be vouchered.

Major Threats: Habitat destruction at the Valhalla Rock Barren; exotic pest plant invasions.

Preliminary recommendations:

- Voucher plants at Snake Creek Hammocks.
- Survey Ramrod Key Coastal Berm Site.
- Map and monitor known stations on a regular basis.
- Acquire privately owned portion of Ramrod Key Coastal Berm Site. Designate and manage the entire site as a conservation area. Acquire Valhalla Rock Barren Site.

- Consider introducing limestone flatsedge to other sites within its historical range, including Little Hamaca Park.

Dalea carthagenensis (Jacq.) J.F. Macbr. var***. floridana*** (Rydb.) Barneby **Florida Prairieclover**

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (two occurrences in Big Cypress National Preserve; Deering Estate at Cutler; R. Hardy Matheson Preserve).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Shrub.
Distribution: Endemic to South Florida.
South Florida Distribution: Collier, Miami-Dade, and Palm Beach counties and the Monroe County mainland.
South Florida Habitats: Pine rocklands, edges of rockland hammocks, marl prairies, and coastal strand.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Isely, 1990; Wunderlin, 1998; Bradley & Gann, 1999b; Chafin, 2000; Coile, 2000.
Synonyms: *D. carthagenensis* var. *domingensis* (DC.) R.T. Clausen, misapplied; *D. domingensis* D.C., misapplied; *Parosela floridana* Rydb.

Historical Context in South Florida: Abram P. Garber first collected Florida prairieclover in 1877 in Miami (57, FLAS; 67, NY), presumably in sandy pine rocklands near the Miami River. Garber also made collections in Miami in 1878 (s.n., FLAS, NY), as did Joseph H. Simpson in 1892 (s.n., NY). Allan H. Curtiss also collected it later in 1892 from the "east border of Everglades" (563, NY), presumably near present day downtown Miami. In 1898, it was collected in Miami by Charles Pollard and G.N. Collins (221, NY). In 1901, John Kunkel Small and George V. Nash made a collection in Miami (s.n., NY), followed by Nathaniel L. Britton (s.n., NY) and S.M. Tracy (9069, NY) in 1905. In 1912, Small made a collection in the pinelands south of the Miami River (4071, NY), a

station he vouchered again with George K. Small in 1913 (4762, NY). Small also made a collection in pinelands between Miami and Coconut Grove in 1912 (4083, NY). No modern collections have been made north of Coconut Grove, and Florida prairieclover is apparently extirpated in that part of Miami-Dade County.

The first collection from southern Miami-Dade County was made by Small and Joel J. Carter in 1903 in hammocks between Cutler and Camp Longview (868, NY). Camp Longview was historically located to the west of present-day Florida City. The next collection was made in 1930 by Harold N. Moldenke from the edge of Cox Hammock (646, NY), most of which was later developed into the Monkey Jungle. It is apparently extirpated there. In 1938, L. Eleanor Scull made a collection from the edge of a hammock in Silver Palm (s.n., FLAS). This station could refer to a number of hammocks including Cox, Castellow, and Ross. In 1975, George N. Avery observed a few plants along the southern edge of Castellow Hammock (Avery's Notes, 20 August 1975). The species has not been reported from this area since then and it is apparently extirpated there.

Florida prairieclover was collected in Everglades National Park in 1951 by Ellsworth P. Killip (41210, US). This collection was made along a canal about 14 miles southwest of Paradise Key, a location near the junction of the Old Ingraham Highway and what is now the Main Park Road. The main park road did not exist in 1951, and the section of the Old Ingraham Highway that Killip may be referring to was removed after the Main Park Road was constructed. No other collections have been seen from that area of the park. In 1964, Frank C. Craighead and Maxie Simmons made a single collection along the eastern edge of the National Park (s.n., FTG). No additional collections or reports have been seen from Everglades National Park. It is possible that Florida prairieclover was never well established there.

Chapman (1883) cited a Curtiss collection from Key Biscayne. George N. Avery collected it there in 1966 at Crandon Park (s.n., FTG). No recent reports have been seen from Key Biscayne and it is assumed to be extirpated there.

Florida prairieclover is currently known from two populations in Miami-Dade County, both in conservation areas. It was reported

first for the Deering Estate at Cutler in 1916 by Small. It was vouchered there in 1974 by Donovan S. and Helen B. Correll and John Popenoe (41541, FTG). It was observed there in 2000 by Gann and Bradley, and is present in two widely separated stations in the park. Roger L. Hammer also observed a single plant nearby at Ludlam Pineland in February 2001, either in the Miami-Dade County conservation area Ludlam Pineland Tract, or in the Ludlam Florida Power and Light Easement (personal communication, March 26, 2001). This station is considered to be the same occurrence as that at the Deering Estate at Cutler, but needs to be surveyed and vouchered.

Florida prairieclover also is known from the R. Hardy Matheson Preserve. It was reported there as early as 1966 by George N. Avery (Avery's Notes, April 1966). It was observed there again in 1995 by Gann and Bradley, and by Bradley in 2001. It was collected very close to this station in 1969 by William T. Gillis at what is now the Fairchild Tropical Garden Research Center (7714, FTG), and was observed in a pineland across the street from Gillis' station in 1967 by Avery (Avery's Notes, 15 October 1967). These stations, now extirpated, were part of the same occurrence as that at R. Hardy Matheson.

Florida prairieclover was collected in Palm Beach County by Allan H. Curtiss in 1895 "between the ocean and Palm Beach" (5374, FLAS, NY). It also was collected in 1918 by Small, south of Palm Beach (8512, FLAS, NY). It has not been collected or reported from Palm Beach County since that time.

In 1930, Harold N. Moldenke collected Florida prairieclover in Pinecrest in Monroe County (346, NY), presumably within the boundaries of what is now Big Cypress National Preserve. It was collected there in 1960 by William G. Atwater (M-211, FLAS), in 1964 by Daniel B. Ward and Derek Burch (3970, FLAS), in 1965 by Leonard J. Brass (33458, FSU, USF), and in 1998 by Bradley (1541, FTG). In 1999, Chuck McCartney found this species in Big Cypress National Preserve in Collier County north of the Oasis Ranger Station (personal communication, 2 April 1999). Bradley observed this station in 1999, but it has not yet been vouchered.

Major Threats: Fire suppression; off road vehicles use in Big Cypress National Preserve; exotic pest plant invasions; wild hog damage.

Preliminary recommendations:

- Voucher plants at Big Cypress National Preserve north of the Oasis Ranger Station.
- Survey Ludlam Pineland tract.
- Encourage USFWS to list *Dalea carthagenensis* var. *floridana*.
- Map and monitor known stations on a regular basis.
- Consider reintroducing Florida prairieclover to other sites within its historical range, including Crandon Park on Key Biscayne, and Castellow Hammock Park.
- Consider restoring coastal strand on the island of Palm Beach and reintroducing Florida prairieclover.
- Consider restoring sandy pine rocklands near the Miami River and reintroducing Florida prairieclover.

Deeringothamnus pulchellus Small
Pretty False Pawpaw

South Florida Status: Critically imperiled. One occurrence at Fred C. Babcock-Cecil M. Webb Wildlife Management Area and adjacent private properties along Burnt Store Road (State Road 765) in Charlotte County and one occurrence on several private properties on Pine Island in Lee County.
Taxonomy: Dicotyledon; Annonaceae.
Habit: Shrub.
Distribution: Endemic to peninsular Florida. It is known from Charlotte, Lee, and Orange counties (USFWS, 2000).
South Florida Distribution: Charlotte and Lee counties.
South Florida Habitats: Flatwoods.
Protection Status: Listed as endangered by the USFWS, as endangered by FDACS, and as critically imperiled by FNAI.
Identification: Nelson (1996) has a color photo; Taylor (1998) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Kral, 1960a; Long & Lakela, 1976; Nelson, 1996; Flora of North America Editorial Committee, 1997; Wunderlin, 1998; Chafin, 2000; Coile, 2000; USFWS, 2000.
Synonyms: *Asimina pulchella* (Small) Rehder & Dayton.

Historical Context in South Florida: John Kunkel Small and others first collected pretty false pawpaw in 1923 in pinelands east of Punta Gorda in Charlotte County (10925, NY). It has been collected numerous times from this location east to the Tuckers Corner area of Charlotte County. Small and others made collections in this area in 1924 (11481, NY; 11150, NY), 1925 (11632, NY), 1927 (s.n., NY, USF), and 1928 (s.n., NY, USF). Much of this range is now protected in the Fred C. Babcock-Cecil M. Webb Wildlife Management Area, where Gann and Bradley observed pretty false pawpaw in 1996. In 1992, Steven L. Orzell found several thousand plants in Webb, in and around what is now the Yucca Pen unit of Webb, and on private lands around Tucker's Grade (Florida Natural Areas Inventory, unpublished data, 21 August 1996). Randy Mears also collected it to the west of the Yucca Pen unit near Pirate Harbor in 1992 (s.n., USF). While there are several stations in this area, it should be considered a single occurrence.

Small first collected pretty false pawpaw in Lee County on Pine Island in 1928 (s.n., NY). It was collected there by Harold N. Moldenke in 1930 (930, NY; 931, NY), by Walter M. Buswell in 1930 (s.n., NY), by Robert Kral in 1956 (2123, US), and by Donald R. Richardson in 1981 (862, USF). Gann briefly visited the Richardson station in February 2001, and while plants were not observed, the pineland habitat was still intact, and pretty false pawpaw is assumed to be extant there. According to the U.S. Fish and Wildlife Service (2000), it is extant on Pine Island in flatwoods, on road edges, and in mowed lots. It has been reported for Estero Bay State Buffer Preserve in southern Lee County (Vanasse & Daylor, LLP, 2001), but this report needs to be verified.

Three attempts to translocate pretty false pawpaw have been made, but none have thus far resulted in a successful introduction (USFWS, 2000). Two conservation areas, the St. James Creek Preserve on Pine Island and Charlotte Harbor Environmental Center in Charlotte Harbor State Buffer Preserve in Charlotte County, have been recipients of translocated material.

Some research on the biology of pretty false pawpaw has been done, which is reviewed in U.S. Fish and Wildlife Service (2000).

Treats: Habitat destruction; exotic pest plant invasions; fire suppression.

Comments: *Specimens collected by John Kunkel Small from "Cudjoe Key" in 1928 (s.n., USF) are undoubtedly labeled incorrectly.*

Preliminary recommendations:

- Survey Estero Bay State Buffer Preserve.
- Map and monitor known stations on a regular basis.
- Acquire privately owned sites along Burnt Store Road and on Pine Island.
- Continue conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm as recommended by U.S. Fish and Wildlife Service (2000).

Desmodium floridanum Chapm.
Florida Ticktrefoil

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Deering Estate at Cutler; Pine Shore Preserve).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Collier, Lee, and Miami-Dade counties.
South Florida Habitats: Scrub, pine flatwoods, sandy pockets in pine rockland, and rockland hammock edges.
Protection Status: Not listed by any agency.
Identification: There are 26 species of *Desmodium* in Florida. Wunderlin (1998) has a key.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Isely, 1990; Wunderlin, 1998.
Synonyms: *D. rhombifolium* Elliott, misapplied; *Meibomia rhombifolia* (Elliott) Vail, misapplied.

Historical Context in South Florida: Albert S. Hitchcock first collected Florida ticktrefoil in 1902 near Fort Myers (67, US). No

subsequent collections or reports from Lee County have been made.

Olga Lakela made three collections in Collier County. Her first was in 1965 about one mile south of the Collier-Hendry county line north of Immokalee in an area of *Myrica-Serenoa-Salix* with grasses and forbs (29184, USF). She collected it again in the same general region on 1966, two miles north of Immokalee, along State Road 29 (30326, USF). Lakela also made a collection in 1967, in Palm River Estates, one mile east of North Naples on State Road 848, in a dry, grassy pineland with *Serenoa* and *Quercus* (31074, USF). Only one plant was noted. Florida ticktrefoil has also been reported for Rookery Bay National Estuarine Research Reserve (Burch, 1998), but this report needs to be verified.

John Kunkel Small and others first collected Florida ticktrefoil in Miami-Dade County in 1915, at Arch Creek Prairie in the northern section of the county (6779, US). Lakela collected it in 1964 along a hammock trail in the vicinity of Fairchild Tropical Garden and Old Cutler Road (27254, USF). This collection could have been made in Matheson Hammock Park, R. Hardy Matheson Preserve, or one of the numerous, now developed, hammock areas surrounding the Garden. In 1979, Alan Herndon reported to George N. Avery that he found Florida ticktrefoil in a sandy pocket in pine rockland at Ned Glenn Nature Preserve (Avery's Notes, 21 October 1979). Avery looked for these plants in 1980 but could not find them. It also was reported for Miami Metrozoo (Fairchild Tropical Garden, 1991g), but this station has never been verified. Bradley and Woodmansee surveyed the portions of this station that would most likely contain this species in 2000 but did not observe any plants.

Florida ticktrefoil is currently known from only two stations in Miami-Dade County. It was observed by Bradley in a sand pocket in pine rockland at the Deering Estate at Cutler in 1994, a station that needs to be vouchered. In 1997, Bradley collected it at Pine Shore Preserve (637, FTG). Fewer than 100 plants are thought to be extant in South Florida.

Major Threats: Fire suppression; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:
- Voucher plants at Deering Estate at Cutler.
- Survey Miami Metrozoo, Ned Glenn Nature Preserve, and Rookery Bay National Estuarine Research Reserve.
- Map and monitor known stations on a regular basis.

Desmodium lineatum DC.
Sand Ticktrefoil

South Florida Status: Critically imperiled. Four occurrences in four conservation areas and three non-conservation areas (Everglades National Park; Goulds Pineland; Larry and Penny Thompson Park, Naval Observatory site, & Girl Scout Camp Choee; Navy Wells & privately owned Navy Wells #2).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southern United States. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to Lake and Hernando counties.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Pine rocklands.
Protection Status: Not listed by any agency.
Identification: There are 26 species of *Desmodium* in Florida. Wunderlin (1998) has a key.
References: Chapman, 1883; Small, 1933a; Isely, 1990; Wunderlin, 1998.
Synonyms: *Meibomia arenicola* Vail; *Meibomia polymorpha* (Vail) Small.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter collected sand ticktrefoil first in 1903 between Cutler and Camp Longview (1083, NY). Small also collected it in 1904 near the Silver Palm School (2259, NY), which was located near what is now Castellow Hammock Park in the Redland area. Small and others collected it in pinelands around Castellow and Ross hammocks in 1915 (6569, NY). There is also a collection from a scarified lot in Homestead by "Hawkins" in 1927 (41, FLAS). Sand ticktrefoil apparently was not collected again until Frank C.

Craighead vouchered it on Long Pine Key in Everglades National Park in 1963 (s.n., FTG). George N. Avery also vouchered this station in 1977 (1759, FTG), where it is assumed to be extant.

In 1977, Avery and Lloyd L. Loope observed plants in a pine rockland fragment near Richmond Heights (Avery's Notes, 29 September 1977). This station has been developed. Avery (1978a) subsequently reported sand ticktrefoil for Larry and Penny Thompson Park in the Richmond Pine Rocklands (1978). Bradley and Woodmansee observed plants at this station as recently as 2000, but this station needs to be vouchered. In 1996, Gann and Bradley observed plants at the former U.S. Naval Observatory site in the Richmond Pine Rocklands. The University of Miami now owns this station. Fewer than 1,000 plants are thought to be extant in the Richmond Pine Rocklands. It also has been reported for Girl Scout property Camp Choee just east of the Richmond Pine Rocklands (Hammer, 1992e). Plants may be extant there, although exotic pest plants have heavily invaded the site.

In 1979, Avery observed it at Navy Wells, a Miami-Dade County conservation areas west of Florida City (Avery's Notes, 22 October 1979). This station is assumed to be extant, but needs to be vouchered. In 1997, Bradley vouchered sand ticktrefoil at a privately owned station less than two miles north of Navy Wells known as Navy Wells #2 (734, FTG).

In 1998, Bradley also vouchered it at Goulds Pineland, a Miami-Dade County conservation area (1779, FTG). Fewer than 100 plants are thought to be present there, but this station needs to be more thoroughly surveyed.

Major Threats: Exotic pest plant invasions; fire suppression; habitat destruction or degradation at the Navy Wells #2 site and the Girl Scout site.

Comments: *Additional stations of sand ticktrefoil probably exist in other pine rockland fragments on the Miami Rock Ridge. These stations should be found and managed.*

Preliminary recommendations:

- Voucher plants at Larry and Penny Thompson Park and Navy Wells.

- Survey pine rocklands in the Goulds area, including Andrew Dodge Memorial Pineland, Black Creek Forest, and Institute for Regional Conservation Preserve.
- Map and monitor known stations on a regular basis.
- Acquire Navy Wells #2 site. Develop conservation agreement with the Girl Scouts of America to restore and maintain a viable population of sand ticktrefoil at Camp Choee, and provide technical assistance.

Echinochloa muricata (P. Beauv.) Fernald
Rough Barnyard Grass

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Corkscrew Regional Ecosystem Watershed; Six Mile Cypress Slough Preserve).
Taxonomy: Monocotyledon; Poaceae.
Habit: Annual terrestrial herb.
Distribution: Native to North America and Mexico. Wunderlin (1998) reports it as occasional in peninsular Florida.
South Florida Distribution: Collier, Lee, and Palm Beach counties.
South Florida Habitats: Flatwoods, depression marshes, strand swamps, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Similar to *E. crusgalli* (introduced), but the apex of the fertile lemma is acuminate without a ring of short trichomes before the membranaceous tip (Wunderlin, 1998).
References: Gould, 1972; Hall, 1978; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small first collected rough barnyard grass in 1917 in "Everglades along the Palm Beach Canal" in Palm Beach County (8279, NY).

In 1916, Jeanette P. Standley made a collection in Fort Myers (357a, US). In 1997, Bradley and Woodmansee collected rough barnyard grass at Six Mile Cypress Slough Preserve (517, FTG), near Fort Myers in Lee County. The plants were growing at the edge of strand swamp. Edwin L. Bridges and Randy L. Mears made a collection in 1995 at the Flint Pen Strand in the Corkscrew Regional Ecosystem Watershed (24183, USF). This station is

approximately 13 miles southeast of the Six Mile Cypress station in Lee County.

Olga Lakela collected it in the Deep Lake area, probably in what is now Big Cypress National Preserve in 1965 (29127, USF). The collection was made in a "swampy hammock." It may still be present in Big Cypress National Preserve, but no recent observations are known.

The next station to be vouchered was Captiva Island. William C. Brumbach made a collection on middle Captiva in 1975 (8825, USF) and on upper Captiva in 1976 (9124, USF). Both collections were made in disturbed areas. Brumbach also made a collection on Sanibel Island in 1976 (9100, USF). This collection was made along a canal. No additional reports are known from Captiva or Sanibel islands. It is not certain if these collections represent native populations.

Major Threats: Hydrological modifications; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. It is also somewhat weedy, and may be an ephemeral part of the South Florida flora. Also, it may be overlooked. Gould (1972) cites a Broward County specimen from the New York Botanical Garden herbarium. We were unable to locate this specimen.*

Preliminary recommendations:

- Survey Deep Lake area in Big Cypress National Preserve.
- Map and monitor known stations on a regular basis.

Eleocharis vivipara Link
Viviparous Spikerush

South Florida Status: Critically imperiled. Three occurrences in four conservation areas (Jonathan Dickinson State Park; Juno Dunes Natural Area & Jupiter Ridge Natural Area; Savannas Preserve State Park)
Taxonomy: Monocotyledon; Cyperaceae
Habit: Perennial terrestrial herb.

Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as common nearly throughout Florida.
South Florida Distribution: Broward, Glades, Martin, and Palm Beach counties.
South Florida Habitats: Depression marshes, wet prairies, and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration.
References: Chapman, 1883; Small, 1933a; Ward & Hodgson, 1975; Long & Lakela, 1976; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *E. prolifera* Torr.

Historical Context in South Florida: Leonard J. Brass first collected viviparous spikerush in 1963 in Tasmania in Glades County (32971, USF), a station about 9.5 miles northwest of Palmdale. The plants were found on a sandy roadside, and it is not clear if this station represented a native population.

In 1975, John Popenoe made a collection at Jonathan Dickinson State Park in Martin County (439, FTG), where it is presumably extant. In 1992, Mark A. Garland and Bob Przekop also collected it in Martin County at Savannas Preserve State Park northwest of Jensen Beach (797, FLAS). It is assumed to be extant there.

Bradley and Woodmansee first collected viviparous spikerush in Palm Beach County in 1997 at Juno Dunes Natural Area (313, FTG). It has been reported for the nearby Jupiter Ridge Natural Area (Ecohorizons, Inc. and Palm Beach County Environmental Resources Management, 1996a). Plants at this station are assumed to be extant, but need to be vouchered. It has been reported for the Dupuis Reserve (Woodbury, no date), which is located in both Martin and Palm Beach counties, but this station needs to be verified.

Ted Hendrickson and Ann Buckley made a single collection in Broward County in 1986 in a drainage ditch in the East Coast Buffer (504, FTG), a property that is managed by the South Florida Water Management District and is located south of Alligator Alley and west of US 27. It is not clear if this station represents a native population.

Major Threats: Drainage of wetland habitats; fire suppression; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. Ward and Hodgson (1975) suggest that it may be more common than is thought. Plants rarely fruit except when growing terrestrially. They are more often found growing prolifically in deep water and are sterile in that condition.*

Preliminary recommendations:

- Voucher plants at Jupiter Ridge Natural Area.
- Survey Dupuis Reserve.
- Map and monitor known stations on a regular basis.

Eltroplectris calcarata (Sw.) Garay & H.R. Sweet
Longclaw Orchid

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Camp Owaissa Bauer; Everglades National Park).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to peninsular Florida in Highlands and Miami-Dade counties, the West Indies, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Luer (1972) has illustrations and color photos; Chafin (2000) has illustrations and color photos.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Ward, 1978; Correll & Correll, 1982; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *Centrogenium setaceum* (Lindl.) Schltr.; *Pelexia setacea* Lindl.

Historical Context in South Florida: Alvah A. Eaton first collected longclaw orchid in 1903 in Miami-Dade County (s.n., AMES). The exact location of this station is unknown. In 1905,

Eaton collected longclaw orchid in Timms Hammock (1233, AMES, NY), now part of the Miami-Dade County park, Camp Owaissa Bauer. George N. Avery subsequently collected it there in 1968 (395, FLAS). Avery observed plants in Timms Hammock and one other hammock in Camp Owaissa Bauer several times between 1967 and 1981 (Avery's Notes, 1967-1981). Roger L. Hammer last observed these plants in 1999 (personal communication, 19 February 2001).

In 1981, Avery observed 13 plants in a hammock on Long Pine Key in Everglades National Park (Avery's Notes, 4 April 1981). This was, apparently, the first observation of this species in the park. In 1983, Avery observed it in a second hammock on Long Pine Key (Avery's Notes, 24 February 1983). Gann and Bradley observed plants on Long Pine Key in 2000 with Roger L. Hammer. Paul Martin Brown reports that this species is present in six hammocks on Long Pine Key and estimates that there are fewer than 200 plants extant in South Florida today (personal communication, 7 February 2001).

Longclaw orchid was reported from Castellow Hammock Park (Hammer, 1992f), but this represented a small colony of plants that were salvaged from Timms Hammock and translocated into Castellow Hammock. The plants were uprooted at Timms Hammock during the construction of a trail. These plants are no longer present at Castellow Hammock Park (R.L. Hammer, personal communication, 19 February 2001).

Major Threats: Poaching; exotic pest plant invasions; wild or prescribed fire during the dry season on in Everglades National Park; hydrological modifications in Everglades National Park.

Comments: *This is one of the species that may be affected by the Everglades restoration. The Highlands County station is at Highland Hammock State Park, where it has been severely impacted by wild hogs (R.L. Hammer, personal communication, 19 February 2001; P.M. Brown, personal communication, 6 April 2001). It may already be extirpated there.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Protect from poaching.

- Conduct conservation biology and conservation horticulture studies.
- Conduct research to determine the effects of the Everglades restoration on longclaw orchid.

Eragrostis hypnoides (Lam.) Britton et al.
Teal Love Grass

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Corkscrew Regional Ecosystem Watershed; Riverbend Park).
Taxonomy: Monocotyledon; Poaceae.
Habit: Annual terrestrial herb.
Distribution: Native to much of North America, the West Indies, Central America, and South America. Wunderlin (1998) reports it as occasional in Florida in the central panhandle and the central and southern peninsula.
South Florida Distribution: Charlotte, Collier, Glades, Lee, and Palm Beach counties. The Lee County station needs to be vouchered.
South Florida Habitats: Strand swamps, floodplain forests, and drying ponds.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration; Tobe et al. (1998) has an illustration.
References: Small, 1933a; Hitchcock & Chase, 1950; Hall, 1978; Long & Lakela, 1976; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: O.E Frye first collected teal love grass in 1946 in Charlotte County at an unspecified locality (s.n., FLAS). The collection was made in "middle of open muck pond." Frank C. Craighead made a single collection in Glades County in 1962, about seven miles west of Palmdale (s.n., FTG). This area is now occupied primarily by cattle ranches, as it was probably in 1962. Alan H. Herndon collected teal love grass in 1985 along the Big Cypress Bend boardwalk in Fakahatchee Strand Preserve State Park in Collier County (1211, FTG, FLAS). The collection was made in a strand swamp in a drying pond. Loran C. Anderson (1997) observed teal love grass at Flint Pen

Strand in the Corkscrew Regional Ecosystem Watershed in Lee County, but this station needs to be vouchered. Bradley made a collection along a road edge in Riverbend Park in Palm Beach County in 1998 (1768, FTG).

Major Threats: Exotic pest plant invasions; hydrological modifications.

Comments: *This is a widespread species in the New World that is infrequent in Florida. It may have always been uncommon in South Florida, and appears to be somewhat ephemeral in our area. It flowers in the summer, when surveys should be conducted.*

Preliminary recommendations:

- Survey Big Cypress Bend area of Fakahatchee Strand Preserve State Park during dry down periods.
- Map and monitor known stations on a regular basis.

Ernodea cokeri Britton ex Coker
Coker's Beach Creeper

South Florida Status: Critically imperiled. Six occurrences in five conservation areas and two non-conservation areas (Institute for Regional Conservation Preserve; Ingram Pineland; Larry and Penny Thompson Park & Luis Martinez U.S. Army Reserve Station in the Richmond Pine Rocklands; Navy Wells Pineland; Seminole Wayside Park; privately owned Notre Dame Pineland).
Taxonomy: Dicotyledon; Rubiaceae.
Habit: Sub-shrub.
Distribution: Native to South Florida and the Bahamas.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: The leaves of Coker's beach creeper have only 1-2 veins per leaf, while the related *E. littoralis* has 3-7 (Wunderlin, 1998). Chafin (2000) has illustrations and a color photo.
References: Correll & Correll, 1982; Negron-Ortiz & Hickey, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Nathaniel L. Britton first collected Coker's beach creeper in 1904 in pinelands near Long Prairie (191, NY). Long Prairie was historically located between Homestead and Florida City in southern Miami-Dade County and is now destroyed. This locality represents the southernmost station for this species on the mainland. The northernmost collection was from Coconut Grove (Jack 8404, A, in Negron-Ortiz & Hickey, 1997). Other historical collections were made by John Kunkel Small and Joel J. Carter in 1906 (2707, NY; 2708, NY; 2709, NY), by Small and Carter in 1909 (3159, NY), by Small and others in 1915 (5764, NY), by S.H. Richmond in 1915 (s.n., NY), by Small and others in 1915 (6448, NY), and by Olga Lakela in 1964 (27299, USF). Coker's beach creeper has been extirpated throughout most of its range in Miami-Dade County.

Coker's beach creeper currently is known from six stations in Miami-Dade County. George N. Avery discovered the first extant station in 1979 at Seminole Wayside Park (2086, FTG). Bradley and Woodmansee observed this station as recently as 2000. Fewer than 100 plants were observed. Bradley vouchered plants at Larry and Penny Thompson Park in the Richmond Pine Rocklands in 1995 (451, FTG; 490, FTG). Fewer than 100 plants are estimated to be extant at that station. Woodmansee also observed plants at the Luis Martinez U.S. Army Reserve Station in the Richmond Pine Rocklands in 2000, a station that needs to be vouchered. Fewer than 10 plants were observed there. The two Richmond Pine Rockland stations are considered to be the same occurrence. Bradley also discovered a population at Notre Dame Pineland in 1998, a private site near the Homestead Air Reserve Base (1840, FTG). By far, this is the station with the most plants, with several hundred plants present. In 2000, Bradley and Woodmansee discovered a new station at Navy Wells Pineland, a Miami-Dade County conservation area. Fewer than 100 plants were observed at this site. Bradley also found a few plants at Ingram Pineland in 2000. Woodmansee made a new discovery at the Institute for Regional Conservation Preserve in 2001. One plant was observed. The latter three stations need to be vouchered.

Only one collection is known from the Florida Keys, where Ellsworth P. Killip collected it on Big Pine Key in 1950 (40218, NY). It is not known to be extant there, but the National Key Deer Refuge should be surveyed.

Major Threats: Habitat destruction at Luis Martinez U.S. Army Reserve Station and Notre Dame Pineland; fire suppression; exotic pest plant invasions.

Comments: *Coker's beach creeper only recently was recognized as being part of the South Florida flora (Negron-Ortiz & Hickey, 1996). This species was formerly confused with* Ernodea littoralis*, especially those populations described as* E. littoralis *var.* angusta (= E. angusta *Small*). *Some reports of* E. littoralis *from Miami-Dade County and the Florida Keys could represent additional stations of* E. cokeri*.*

Preliminary recommendations:

- Voucher plants at the Ingram Pineland, Institute for Regional Conservation Preserve, Luis Martinez U.S. Army Reserve Station, and Navy Wells.
- Survey National Key Deer Refuge on Big Pine Key.
- Map and monitor known stations on a regular basis.
- Acquire Notre Dame Pineland.
- Designate surplus property at Luis Martinez U.S. Army Reserve Station as a conservation area.

Eugenia rhombea Krug & Urb. ex Urb.
Red Stopper

South Florida Status: Critically imperiled. Four occurrences in five conservation areas and two non-conservation areas (Attwood Addition, Indian Key Historic State Park & privately owned Teatable Hammock; Biscayne National Park; Crocodile Lake National Wildlife Refuge & Dagny Johnson Key Largo Hammocks Botanical State Park; Lignumvitae Key Botanical State Park; Vaca Key Red Stopper Site).
Taxonomy: Dicotyledon; Myrtaceae.
Habit: Small tree.
Distribution: Native to South Florida, the West Indies, Mexico, and Central America.

South Florida Distribution: Miami-Dade County and the Monroe County Keys. Reported in error from Lee County (see "Comments" below).
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Nelson (1996) has an illustration; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Nuttall, 1849; Chapman, 1883; Sargent, 1893; Small, 1933a; Long & Lakela, 1976; Little, 1978; Tomlinson, 1980; Correll & Correll, 1982; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *E. procera* (Sw.) Poir., misapplied.

Historical Context in South Florida: John Loomis Blodgett first collected red stopper between 1838 and 1853 on the island of Key West (s.n., NY). Blodgett's specimen states that the tree was common there, as Nuttall (1849) and Sargent (1893) also reported. Several other collections were made in hammocks on Key West: in 1896 by Allan H. Curtiss (5626, NY); in 1913 by John Kunkel Small and George K. Small (4967, NY); and in 1954 by Robert F. Thorne (s.n., FSU). Since 1954, it has only been collected in small hammock fragments at private residences, or as individual trees in private yards. T. Ann Williams observed plants in private yards in the city of Key West from the 1980s through the 1990s (personal communication, 6 March 2001). Only one small hammock remains on Key West, Little Hamaca Park, where red stopper has been cultivated as part of a hammock restoration project. It is unknown whether or not any recruitment has occurred there. Gann last observed these plants in 1992.

Alfred Russell and H.R. Totten made a collection on Key Largo in 1940 (s.n., NY). W.L. Stern subsequently collected it on North Key Largo in 1961 (1439, GH, US), probably in what is now Crocodile Lake National Wildlife Refuge. Bradley collected a voucher in the refuge in 1999 (2003, FTG), at a station that had been observed by Karen Achor and others since at least 1977 (in Weiner, 1980). It was reported for what is now Dagny Johnson Key Largo Hammocks Botanical State Park by Arthur H. Weiner (1980), at a station directly across the street from what is now

Crocodile Lake National Wildlife Refuge. Gann and Florida Park Service biologists Janice A. Duquesnel and James G. Duquesnel observed this station in 1999. Several hundred plants are thought to be present between the two stations.

In 1973, Kenneth C. Alvarez discovered plants on Upper Matecumbe Key (Avery's Notes, 4 July 1973), in what appears to have been the privately owned Teatable Hammock. In 1974, Alvarez vouchered this station (s.n., NY). Both Weiner (1980) and Kruer (1992) reported plants there, and this station is thought to be extant. In 1999, Gann, Bradley, and J.A. Duquesnel observed plants at the Attwood Addition of the Indian Key Historic State Park, a small hammock fragment on Upper Matecumbe Key. This station is only a few blocks from Teatable Hammock on Upper Matecumbe Key, and is considered part of the same occurrence. Fewer than 10 plants were observed. J.A. Duquesnel collected geographic coordinates in 2001 (personal communication, 26 March 2001), but this station needs to be vouchered.

In 1975, Avery discovered one small tree on Totten Key in Biscayne National Park (Avery 1583, FLAS). While surveys of Totten Key by Gann and Bradley in 2001 have failed to locate any plants, surveys in 2001 by Bradley and Woodmansee located four plants on Meig's Key and two plants on Old Rhodes Key in Biscayne National Park. The Meig's Key station was vouchered (1519, FTG). In 1982, Avery also found one tree on Palo Alto Key (2373, FTG, USF), which is located between Totten Key and Key Largo in John Pennekamp Coral Reef State Park. This is the only report known from that island or from Pennekamp.

In 1983, Avery observed plants reported to him by Arthur H. Weiner in a private hammock on Vaca Key just south of the Key Lime Resort. Twelve plants were observed at this station. T. Ann Williams reports that she observed these plants in the mid-1980s (personal communication, 6 March 2001), that this hammock was still intact as of 2001, and that the plants are probably still present (personal communication, 18 March 2001).

J. Paul Scurlock (1987) reported the discovery of a single tree at Lignumvitae Key Botanical State Park. Gann and Duquesnel also observed a single tree there in 2000, but this station needs to be vouchered.

Red stopper has been collected at or reported for a number of other sites where it is apparently now extirpated. Allan H. Curtiss collected red stopper on "Umbrella Key" (1115, GH), now Windley Key in the late 1880s. Sargent (1893) also reported it for that island. It is currently cultivated at Windley Key Fossil Reef Geological State Park. Avery observed red stopper on Lower Sugarloaf Key in 1963 and 1964 (Avery's Notes, 1963-1964). This station is now within Sugarloaf Hammocks, part of Florida Keys Wildlife and Environmental Area. Bradley and Woodmansee conducted a brief search for red stopper in 2000, but no plants were observed. In 1974, Robert Kral made a collection on Big Pine Key, south of US1 (53887, GH), perhaps in what is now National Key Deer Refuge.

Red stopper is widely cultivated in South Florida, and it has been out-planted in many locations in the Florida Keys. Thus far, it has not been known to naturalize outside of its historical range in South Florida.

Major Threats: Habitat destruction; exotic pest plant invasions.

Comments: *In 1937, L. Eleanor Scull collected this species at "Chapman's Hammock. Miami" (s.n., FLAS). We are unfamiliar with this locality and know of no valid reports of wild populations on the mainland. Reports from the west coast (cf. Brumbach 7474, FLAS; Wunderlin, 1982) are based upon misidentified specimens of* E. axillaris *or* E. uniflora*. The Gray Herbarium at Harvard University has a specimen from "Palm Beach & Martin counties, on Jupiter Island" collected by George R. Cooley and others in 1956 (4876, GH). This specimen has not been examined by us and should be verified.*

Preliminary recommendations:

- Voucher plants at Attwood Addition, Key Vaca Red Stopper Site, Lignumvitae Key Botanical State Park, and Old Rhodes Key in Biscayne National Park.
- Continue surveys at Sugarloaf Hammocks.
- Survey National Key Deer Refuge on Big Pine Key, Palo Alto Key in John Pennekamp Coral Reef State Park, and Totten Key in Biscayne National Park.
- Map and monitor known stations on a regular basis.

- Acquire Teatable Hammock and Vaca Key Red Stopper Site.
- Consider augmenting population at Lignumvitae Key Botanical State Park.
- Consider introducing red stopper to other sites within its historical range, including Little Hamaca Park and Windley Key Fossil Reef Geological State Park.

Galeandra beyrichii Rchb. f.
Beyrich's Hooded Orchid

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Castellow Hammock Park; Everglades National Park).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the West Indies, Central America, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Luer (1972) has illustrations and color photos.
References: Hawkes, 1947; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Karl O. Kramer discovered Beyrich's hooded orchid in 1946 in Castellow Hammock (Hawkes, 1947), which is now within Castellow Hammock Park. Only one plant was observed, and this was collected and presumably deposited at the Ames Herbarium at Harvard University (Hawkes, 1947). Carlyle Luer, Monroe R. Birdsey and others observed plants in Castellow Hammock again in the early 1960s (Luer, 1972). George N. Avery, Mary Ann Bolla, Sally Black, Joyce W. Gann, Roger L. Hammer and others observed plants at Castellow Hammock from 1974 to 1978 (Avery's Notes). Hammer vouchered this station in 1988 (s.n., FTG). Hammer observed this population in 2000, and estimates that there are fewer than three-dozen extant plants (personal communication, 19 February 2001).

In 1974, C. Eugene Delchamps reported to George N. Avery that he and Roland Eves had observed a new station in a hammock on Long Pine Key in Everglades National Park (Avery's Notes, 10 December 1974). Daniel F. Austin, Avery, and others subsequently observed these plants in 1977 (Avery's Notes, 22 August 1977). Don Keller observed 44 plants in one hammock in Everglades National Park in 1988, and a few others in two other hammocks (personal communication, 19 February 2001). Roger L. Hammer reports that it has been observed in three hammocks on Long Pine Key (personal communication, 19 February 2001). He estimates that there are about 50 plants present in Everglades National Park today.

Chuck McCartney, Sally Black and the Native Plant Workshop discovered an additional station at Fuchs Hammock west of Homestead in 1975 (Avery's Notes, 16 March 1975). Hammer and Luer observed six plants at this station in 1977 (R.L. Hammer, personal communication, 19 February 2001). Hammer observed just two sterile plants in 1990, prior to Hurricane Andrew in 1992. This station must be treated as historical until it can be verified that Beyrich's hooded orchid is still present.

Major Threats: Poaching; exotic pest plant invasions; hydrological modifications.

Comments: *This is one of the species that may be affected by the Everglades restoration. It can remain dormant for years, making it difficult to accurately survey populations from year-to-year (R.L. Hammer, personal communication, 19 February 2001).* Galeandra bicarinata *G.A. Romero & P.M. Br. has been published as a new name for the Florida plants of* Galeandra*, treating it as a Miami-Dade County endemic (Romero-González & Brown, 2000).*

Preliminary recommendations:

- Survey Fuchs Hammock Preserve on an annual basis until 2010.
- Map and monitor known stations on a regular basis.
- Conduct research to determine the effects of the Everglades restoration on Beyrich's hooded orchid.

Guajacum sanctum L.
Lignumvitae

South Florida Status: Critically imperiled. Six occurrences in seven conservation areas and three non-conservation areas (Biscayne National Park; Crocodile Lake National Wildlife Refuge & Dagny Johnson Key Largo Hammocks Botanical State Park; Klopp Tract, Lignumvitae Key Botanical State Park & Lignumvitae Key Botanical State Park; Long Key State Park & North Layton Hammock; privately owned Big Munson Island; privately owned Teatable Hammock on Upper Matecumbe Key).
Taxonomy: Dicotyledon; Zygophyllaceae.
Habit: Tree.
Distribution: Native to South Florida, the West Indies, Central America, and South America.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Nelson (1994) has a color photo; Nelson (1996) has a color photo; the IRC Website has a color photo.
References: Romans, 1775; Nuttall, 1849; Chapman, 1883; Sargent, 1891; Small, 1933a; Long & Lakela, 1976; Little, 1978; Ward, 1978; Tomlinson, 1980; Correll & Correll, 1982; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Bernard Romans (1775) first reported lignumvitae for South Florida, writing that by the late 1700s it had already been nearly exterminated by loggers. He observed lignumvitae being logged from Elliott Key south to Windley Key, but failed to note it from Upper Matecumbe south to Key West. John Loomis Blodgett collected lignumvitae first in Florida on the island of Key West between 1838 and 1853 (s.n., NY). Nuttall (1849) stated that Blodgett had found it to be abundant there. John Kunkel Small and Charles A. Mosier vouchered the Key West station again in 1915 (5997, NY), but

apparently it was extirpated in the wild there a short time later. Ward & Ing (1997) lists a candidate for Florida champion tree designation in the city of Key West that is 31 feet high, with a spread of 38.5 feet. They state that this tree must be a relict of pre-settlement vegetation.

Abram P. Garber made a collection on Lignumvitae Key in 1877 (s.n., NY), a station that also was vouchered by C.P. Sreemadhaven in 1971 (4916, USF), and by B.C. Schmitt in 1974 (30, FTG). Numerous botanists have observed it there at Lignumvitae Key Botanical State Park. It was observed there in 2000 by Gann and Florida Park Service biologist Janice A. Duquesnel. Several hundred plants are present there, the largest population in South Florida.

A number of collections have been made on Upper Matecumbe Key, the first probably by Allan H. Curtiss in the late 1800s (417, NY, US). Joseph H. Simpson also vouchered this station in 1882 (345, NY). George N. Avery later observed it at several stations on Upper Matecumbe beginning in 1963 (Avery's Notes, 1963-1966). Avery vouchered one of these stations in 1971 (1072, FTG). It is apparently extant on Upper Matecumbe Key at Teatable Hammock, where it was first reported by Karen Achor in 1982 (Weiner, 1980 as amended). Kruer (1992) also reported lignumvitae for this station, which needs to be vouchered.

In 1909, Small and Joel J. Carter made the first collection on Key Largo (3055, NY), a station that was later vouchered by Hugh O'Neill in 1929 (s.n., NY), D.H. Caldwell in 1952 (8774, NY), George R. Cooley in 1962 (9296, USF), Martha Meagher in 1969 (81a, USF), and Avery in 1971 (1070, FTG). Almost all of the plants on Key Largo have been observed in North Key Largo, in what are now Dagny Johnson Key Largo Hammocks Botanical State Park and Crocodile Lake National Wildlife Refuge. Gann and Duquesnel observed plants in Dagny Johnson Key Largo Hammocks Botanical State Park in 2000, and Bradley and Woodmansee observed plants in Crocodile Lake National Wildlife Refuge in 2000. A few dozen plants are thought to be present at each station. Both stations need to be vouchered. It also has been reported on Key Largo at the Key Largo Ranger Station of Everglades National Park (Avery & Loope, 1980b), and for Dove Creek Hammocks (Kruer, 1992). A portion of Dove Creek

Hammocks has been acquired by the State of Florida and is now part of the Florida Keys Wildlife and Environmental Area. Bradley and Woodmansee surveyed this portion of the hammock in 2000, but did not observe lignumvitae to be present. The Key Largo Ranger Station of Everglades National Park needs to be surveyed.

Small and George K. Small made a collection on Sands Key to the north of Elliott Key in Miami-Dade County in 1915 (6989, NY), in what is now Biscayne National Park. This is the northernmost station ever recorded. Kruer (1992) reported lignumvitae for Sands Key based upon Avery (1978c), but this report needs to be verified.

Hugh O'Neill made a collection in 1929 on Lower Matecumbe Key (s.n., US), a station that also was vouchered by Harold N. Moldenke in 1930 (5743, NY), and David Fairchild in 1931 (s.n., FTG). It was later reported there by Avery in 1968 (Avery's Notes, 9 October 1968), and by Karen Achor in 1982 at a site known as the Hall Tract (Weiner, 1980 as amended). Most of this hammock is now part of the Klopp Tract of Lignumvitae Key Botanical State Park. Although Gann and Duquesnel found no adult plants in surveys of the Klopp Tract in 2000, one seedling was found on the property. It is possible that mature plants still exist on the privately owned portions of this hammock.

In 1930, Small made a collection on Long Key (s.n., NY). Lignumvitae was later reported for Long Key State Park (Hammer, 1995c), a station that was observed by Gann and Duquesnel in 1999. Fewer than 10 plants are believed to be present at the park; this station needs to be vouchered. Kruer (1992) and the National Audubon Society (1992) also reported plants at the privately owned North Layton Hammock on Long Key. These reports were based upon observation of plants by National Audubon Society biologist Wayne Hoffman (Kruer, 1992).

In 1956, G.K. Brizicky and W.L. Stern made a collection on Windley Key (543, US). Lignumvitae is now cultivated at Windley Key Fossil Reef Geological State Park, but no recent observations of wild plants have been made.

Avery reported that in 1969 "the Websters" had visited Totten Key, now in Biscayne National Park, and had found several "sizable

trees" (Avery's Notes, 18 March 1969). Curry (1991 in Kruer, 1992) reported it as common on Totten Key. Ward & Ing (1997) lists a lignumvitae tree on Totten Key as the Florida and National champion, but this station needs to be vouchered. Avery and Achor also reported lignumvitae in 1982 from Palo Alto Key (Weiner 1980, as amended), which is very close to Totten Key and now part of John Pennekamp Coral Reef State Park. The only other plants known from Pennekamp are cultivated specimens. In 2001, Gann and Bradley discovered one tree on Old Rhodes Key, just east of Totten Key in Biscayne National Park (1120, FTG).

Avery made a collection in 1971 on Plantation Key in a hammock that was in the process of being destroyed (1071, FTG). Karen Achor observed lignumvitae in Plantation Hammock in 1982 (Weiner 1980, as amended), and Kruer (1992) reported lignumvitae from this hammock based upon a personal communication with Mike Ross in 1991. The National Audubon Society's 1992 report for Lake San Pedro (National Audubon Society et al., 1992), is almost certainly based upon the Weiner and Kruer reports. A portion of Lake San Pedro is now protected in the Florida Keys Wildlife and Environmental Area. Bradley and Woodmansee surveyed this portion of the hammock in 2000, but did not find any plants of lignumvitae. The remaining portions of Plantation Hammock need to be surveyed.

In 1987, T. Ann Williams discovered four plants of lignumvitae on Big Munson Island in the lower Florida Keys. This station was verified by Curtis R. Kruer in 1991 (Kruer, 1992), and was vouchered by Bradley in 2001 (2130, FTG), who found a single large tree.

Major Threats: Exotic pest plant invasions; habitat destruction at privately owned portions of the Klopp Tract on Lower Matecumbe Key, North Layton Hammock on Long Key, Plantation Hammock on Plantation Key, and Teatable Hammock on Upper Matecumbe Key; poaching.

Comments: *The wood is highly valued by woodworkers and populations have been logged in the Florida Keys since at least the late 1700s (Romans, 1775).*

Preliminary recommendations:

- Voucher plants at Crocodile Lake National Wildlife Refuge, Key Largo State Botanical Site, Long Key State Park, Teatable Hammock, and Totten Key.
- Survey Key Largo Ranger Station of Everglades National Park, Sands Key in Biscayne National Park, Palo Alto Key in John Pennekamp Coral Reef State Park, private hammocks to the south of the Klopp Tract on Lower Matecumbe Key, and Plantation Hammock on Plantation Key.
- Map and monitor known stations on a regular basis.
- Acquire North Layton Hammock on Long Key, the unprotected portions of Plantation Hammock on Plantation Key, Teatable Hammock on Upper Matecumbe Key, and private hammocks to the south of the Klopp Tract on Lower Matecumbe Key.
- Develop conservation agreement with Boy Scouts of America to manage a viable population of lignumvitae on Big Munson Island, and provide technical assistance.
- Protect from poaching.
- Consider augmenting known populations, including at the Klopp Tract, Lignumvitae Key Botanical State Park.
- Consider introducing lignumvitae to other sites within its historical range, including Dove Creek Hammocks, Little Hamaca Park, and Windley Key Fossil Reef Geological State Park.
- Review FNAI rank.

Gymnopogon brevifolius Trin.
Shortleaf Skeleton Grass

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Big Cypress National Preserve; Jonathan Dickinson State Park).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier, Hendry, Lee, Martin, and Miami-Dade counties.
South Florida Habitats: Mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.

References: Small, 1933a; Hitchcock & Chase, 1950; Smith, 1971; Hall, 1978; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Shortleaf skeleton grass may have been collected first by Joseph H. Simpson in 1892 (s.n., NY), although the locality is given only as "Southern Florida." The first definite collection in South Florida was made in 1919 by John Kunkel Small and others, west of Miami along the Tamiami Trail in a "pineland prairie" (9388, NY), presumably in pinelands south of the Miami River. W.A. Silveus made the next collection in 1940 near Fort Myers Beach (6579, US), perhaps in what is now Estero Bay State Buffer Preserve. In 1941, John H. Davis, Jr. made a collection in a pineland south of Clewiston in Hendry County (s.n., FLAS). All pinelands in that area have been destroyed.

In 1997, Bradley and Woodmansee made a collection of shortleaf skeleton grass along the Loxahatchee River in Jonathan Dickinson State Park in Martin County in (646, FTG, USF). Several hundred plants were observed in mesic flatwoods. Bradley also collected shortleaf skeleton grass in 1997 in the Bear Island area of Big Cypress National Preserve (1100, FTG). Bradley and Woodmansee observed several hundred plants there in 2001.

Major Threats: Fire suppression; exotic pest plant invasions; recreational off-road vehicle use in Big Cypress National Preserve; wild hog damage.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. Most collections have been made from October to December, when surveys should be conducted.*

Preliminary recommendations:

- Survey Estero Bay State Buffer Preserve.
- Map and monitor known stations on a regular basis.
- Consider restoring sandy pine rocklands near the Miami River and reintroducing shortleaf skeleton grass.

Habenaria distans Griseb.
Hammock False Rein Orchid

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Collier-Seminole State Park; Fakahatchee Strand Preserve State Park).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to peninsular Florida in Collier, Lee, and Highlands counties, and to the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Collier and Lee counties.
South Florida Habitats: Strand swamps and wet hammocks.
Protection Status: Listed as endangered by FDACS.
Identification: Luer (1972) has illustrations and color photos; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Correll, 1950; Luer, 1972; Godfrey & Wooten, 1979; McCartney, 1990; Tobe et al., 1998; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Abram P. Garber first collected hammock false rein orchid in 1878 along the Caloosahatchee River (s.n., AMES, NY). Correll (1950) attributed this collection to Lee County, which makes sense given Garber's known collecting activities.

Two stations are known from Collier County: Collier-Seminole State Park and Fakahatchee Strand Preserve State Park. Luer (1972) reported observing a "thriving colony" in August 1960 at Collier-Seminole State Park, immediately before Hurricane Donna struck. He returned a short time later to find the colony decimated, but it did persist. Chuck McCartney vouchered this population in 1991 (51, FTG), collecting only an inflorescence. Florida Park Service biologist R. "Bobby" Hattaway confirms that this station is extant, and estimates that fewer than 1,000 plants are present (personal communication, 12 January 2001).

John Popenoe apparently first vouchered the Fakahatchee Strand population in 1978 from cultivated material originally collected by

Robert Riefer in 1976 (1345, FTG). There are differing accounts as to whether or not these plants came from the Fakahatchee, as the label states, or Collier-Seminole State Park (cf. Avery's Notes, 3 September 1980, 16 September 1980). Nevertheless, Bruce E. Tatje and Jane H. Thompson collected hammock false rein orchid in Fakahatchee Strand Preserve State Park in 1978 (143, FAU). Chuck McCartney, in the company of Alan Herndon, also observed and photographed a few plants in the Fakahatchee in 1987 (personal communication, 21 February 2001). Florida Park Service biologist Mike Owen observed a single plant there with Roger L. Hammer (personal observation, 7 February 2001).

Major Threats: Poaching; exotic pest plant invasions; wild hog damage.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Consider reintroducing hammock false rein orchid to Lee County along the Caloosahatchee River, including at Caloosahatchee Regional Park.
- Determine status in Highlands County.
- Review for listing by FNAI.

Harrisia aboriginum Small ex Britton & Rose
Aboriginal Pricklyapples

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (Gasparilla Island Conservation and Improvement Association Tract A & Kitchen Key; J.N. "Ding" Darling National Wildlife Refuge.
Taxonomy: Dicotyledon; Cactaceae.
Habit: Shrub.
Distribution: Endemic to peninsular Florida in Lee, Manatee, and Sarasota counties.
South Florida Distribution: Lee County.
South Florida Habitats: Coastal berms and spoil mounds.
Protection Status: Listed as endangered by FDACS (as *Cereus gracilis*) and as imperiled by FNAI.
Identification: Similar to *H. fragrans* and *H. simpsonii*, but having the combination of young buds covered with brown pubescence,

trichomes of areoles on hypanthium 6-8 mm long, margins of inner petals erose, and fruits yellow at maturity (Wunderlin, 1998).
References: Small, 1933a; Britton & Rose, 1937; Long & Lakela, 1976; Austin et al., 1980b; Benson, 1982; Austin, 1984; Hooten, 1991; Wunderlin, 1998; Coile, 2000.
Synonyms: *Cereus gracilis* Mill. var. *aboriginum* (Small ex Britton & Rose) L.D. Benson.; *Harrisia gracilis*, of authors, not (Mill.) Britt.

Historical Context in South Florida: Albert S. Hitchcock first collected aboriginal pricklyapples in Lee County in 1900 (Austin et al., 1980b). Daniel F. Austin and Sandra K. Austin made the next collection in 1979 on Buck Key, just east of Captiva Island (Austin et al., 1980b). Mark L. Hooten also collected it at this station (s.n., US), and illegitimately described it as a new species, *H. donae-antoniae* (Hooten, 1991). Buck Key is divided amongst several owners, including the U.S. Fish and Wildlife Service, the Sanibel-Captiva Conservation Foundation, and a private owner. Richard Workman has observed plants there on several occasions (personal communication, 26 June 2001). He estimates that between 100 and 200 plants are present on Buck Key, the majority on property now protected within the J.N. "Ding" Darling National Wildlife Refuge. In 2001, Gann observed several dozen plants there with Workman, Dee Serage of the Sanibel-Captiva Conservation Foundation, and Meghan Fellows and Jennifer Possley of Fairchild Tropical Garden. Fellows and Possley began mapping the aboriginal pricklyapples on the island during that visit. All of the plants observed appeared to be within the boundaries of J.N. "Ding" Darling National Wildlife Refuge.

Aboriginal pricklyapples is also present at two locations in the vicinity of Gasparilla Island, which is located in both Lee and Charlotte counties. It was reported from Gasparilla Island State Park (Clark, 1978) and for Kitchen Key (Live Oak Key in Morris & Miller, 1981), which is immediately adjacent to Gasparilla Island in Charlotte County. Kitchen Key is now a conservation area managed by Charlotte County. In 2001, Gann, Fellows, and Possley observed plants on Kitchen Key, together with Misty Nabers of the Gasparilla Island Conservation and Improvement Association (GICIA), her father Clyde Nabers, and Rick Joyce of Lee County (Gann, 2001b). Fewer than 10 plants were observed, and it appears that the aboriginal pricklyapple population on this

low elevation island may be suffering from sea-level rise. On the same day, Joyce showed the group a single aboriginal pricklyapple plant at a GICIA property to the south of Kitchen Key.

Aboriginal pricklyapples has been reported for a number of other stations including Cayo Costa island in Cayo Costa State Park in Lee County (Herwitz, 1977; Herwitz et al., 1996; Florida Park Service District 4, 1994a), the Bocilla Preserve in Lee County (anonymous, no date.r), and Delnor-Wiggins Pass State Park in Collier County (Florida Park Service District 4, 1994g). Since aboriginal pricklyapples has never been collected in Collier County, the Delnor-Wiggins Pass State Park record is treated as doubtful until it can be confirmed.

Fairchild Tropical Garden has twenty-eight seedlings of aboriginal pricklyapples propagated from seed collected on Longboat Key in Sarasota County in 1997 (M. Collins, personal communication, 18 June 2001). The Sanibel Captiva Conservation Foundation has also propagated and grown aboriginal pricklyapples at its nursery on Sanibel Island (D. Serage, personal communication, 23 October 2001).

Major Threats: Poaching; habitat destruction; exotic pest plant invasions; sea-level rise. Austin (1984) reports that a disease, possibly bacterial, attacks this species, turning the stems to "slush."

Comments: *This species has been reported, in error, for Biscayne National Park (Hammer & Bradley, 1998; Stalter, 1999).*

Preliminary recommendations:

- Survey Bocilla Preserve, Delnor-Wiggins Pass State Park, Gasparilla Island State Park, and Cayo Costa State Park on Cayo Costa Island.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Maintain *ex situ* collection of germplasm.
- Conduct conservation biology research and conservation horticulture studies, including the impacts of the bacterial infection reported by Austin (1984).
- Review for listing by USFWS. Review FNAI rank.

Helianthus debilis Nutt.
subsp. ***vestitus*** (E. Watson) Heiser
West Coast Dune Sunflower

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Don Pedro Island State Park; Stump Pass Beach State Park).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Annual or short-lived perennial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as occasional in the western central peninsula.
Southern Florida Distribution: Charlotte and Lee counties.
Southern Florida Habitats: Beach dunes.
Protection Status: Not listed by FDACS, because it is a subspecies. Listed as imperiled by FNAI.
Identification: Distinguished from *H. debilis* subsp. *debilis* by having leaves coarsely and irregularly toothed rather than entire to shallowly and evenly toothed. Also, the stems are villous rather than short hispid. The IRC Website has a color photo
References: Small, 1933a; Heiser, 1956; Heiser et al., 1966; Ward, 1978; Cronquist, 1980; Ward, 1981; Wunderlin, 1998.
Synonyms: *H. vestitus* E. Watson; *H. debilis* var. *vestitus* (E. Watson) Cronq.

Historical Context in South Florida: Virginia Ducey first collected west coast dune sunflower in 1957 on Sanibel Island in Lee County (231, USF). It also has been reported for Gasparilla Island State Park in northern Lee County (Florida Park Service District 4, 1994c), but this represents a misidentification of *H. debilis* subsp. *debilis* that has been introduced to the park (S. Braem, personal communication, 9 April 2001; B.F. Hansen, personal communication, 12 April 2001).

In 1991, S. Erickson made a collection at Stump Pass Beach State Park in Charlotte County (PC0048, USF). Gann observed this occurrence in 2000, although the construction of a parking lot on the north end of the park appeared to have destroyed most of the population there. Fewer than 10 plants were observed. Florida Park Service biologist Sally Braem has observed plants at Don Pedro Island State Park in Charlotte County (personal

communication, 13 February 2001), but this station needs to be vouchered.

West coast dune sunflower also has been reported from Delnor-Wiggins Pass State Park in Collier County (Florida Park Service District 4, 1994g). It has not been vouchered in Collier County, so this report is treated as doubtful.

Major Threats: Habitat destruction; hybridization with *H. debilis* subsp. *debilis*; exotic pest plant invasions; management error; physical damage from park visitors.

Comments: *East coast dune sunflower (*H. debilis *subsp.* debilis*) has been widely planted within the historical range of* H. debilis *subsp.* vestitus*, and threatens its existence. These planted populations should be eradicated.*

Preliminary recommendations:

- Voucher plants at Don Pedro Island State Park.
- Survey Delnor-Wiggins Pass State Park.
- Map and monitor known stations on a regular basis.
- Eliminate populations of *H. debilis* subsp. *debilis* at Gasparilla Island State Park and from within the range of *H. debilis* subsp. *vestitus*.
- Ensure that park development does not destroy additional plants at Stump Pass Beach State Park. Control pedestrian traffic, so that beach visitors do not damage west coast dune sunflower.
- Consider establishing an *ex situ* collection of germplasm.
- Conduct conservation biology and conservation horticulture studies.
- Consider augmenting population at Stump Pass Beach State Park.
- Consider reintroducing west coast dune sunflower to other sites within its historical range.
- Review for listing by USFWS. Review FNAI rank.

Hypericum crux-andreae (L.) Crantz
St. Peter's-wort

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Big Cypress National Preserve; Corkscrew Regional Ecosystem Watershed).
Taxonomy: Dicotyledon; Hypericaceae.
Habit: Shrub.
Distribution: Native to the eastern and northern United States. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Collier and Lee counties.
South Florida Habitats: Mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Nelson (1996) has an illustration; Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Small, 1933a; Adams, 1962; Godfrey & Wooten, 1981; Taylor, 1992; Nelson, 1996; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *H. stans* (Michx.) W.P. Adams & N. Robson; *Ascyrum crux-andreae* L.; *Ascyrum cuneifolium* Chapm.; *Ascyrum stans* Michx.

Historical Context in South Florida: Walter M. Buswell first collected St. Peter's-wort in 1934 in Fort Myers (s.n., FTG). The next collection made in Lee County was in 1995, when Edwin L. Bridges and Randy L. Mears vouchered it for the Flint Pen Strand (24155, FTG), now part of the Corkscrew Regional Ecosystem Watershed.

In 1978, John Popenoe collected St. Peter's-wort in Collier County in the Kissimmee Billy Strand area, which is now within Big Cypress National Preserve (1321, FTG), but this station needs to be surveyed. Bradley observed it in the Bear Island area of Big Cypress National Preserve in 1997, but this station needs to be vouchered. Bear Island is less than 12 miles west of the Kissimmee Billy Strand station and is considered to be part of the same occurrence.

Major Threats: Fire suppression; recreational off-road vehicle use in Big Cypress National Preserve; exotic pest plant invasions; wild hog damage.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:

- Voucher plants in Bear Island area of Big Cypress National Preserve.
- Survey Kissimmee Billy Strand area of Big Cypress National Preserve.
- Map and monitor known stations on a regular basis.

Indigofera mucronata Spreng. ex DC. var. ***keyensis*** (Small) Isely **Florida Keys Indigo**

South Florida Status: Critically imperiled. Five occurrences in four conservation areas (John Pennekamp Coral Reef State Park; Long Key State Park; Snake Creek Hammocks; Windley Key Fossil Reef Geological State Park), and two non-conservation areas (Burnt Point Florida Keys Indigo Site & Valhalla Rock Barren).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Collier and Miami-Dade counties, and the Monroe County Keys.
South Florida Habitats: Rockland hammocks, coastal rock barrens, coastal berms, and shell mounds.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: Chafin 2000 has illustrations and a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Avery & Loope, 1980a; Isely, 1990; Wunderlin, 1998, Bradley & Gann, 1999b; Coile, 2000.
Synonyms: *I. keyensis* Small*; I. subulata* Vahl, misapplied; *I. trita* L. f. subsp. *scabra* (Roth) de Kort & Thijsse.

Historical Context in South Florida: John Loomis Blodgett first collected Florida Keys indigo between 1838 and 1853 on Lignumvitae Key (s.n., NY). This is the only collection known from that island. Additional collections have been made from Key Largo (Curtiss 586, NY, US) south to Knights Key (Britton 552, NY). It is apparently extirpated on Knights Key, Lignumvitae Key, and Vaca Key (Simpson 466, NY, US), where it was last observed in 1964 by George N. Avery (Avery's Notes, 20 June 1964).

Florida Keys indigo is extant on Key Largo where Allan H. Curtiss collected it first in 1880 (586, NY, US). William G. Atwater also made a collection there in 1959, with the locality given as "along shore" (M-170, FLAS). Avery observed plants in 1964 on private property later added to John Pennekamp Coral Reef State Park (Avery's Notes, 11 September 1964). These plants were observed by Gann and Bradley in 1995, and by Gann and Florida Park Service biologist Janice A. Duquesnel in 1998. Fewer than 10 plants were present. This station needs to be vouchered.

John Kunkel Small made a collection on Lower Matecumbe Key in 1907 (s.n., NY), a station that also was vouchered by Small in 1917 (8390, NY), Small and others in 1925 (11595, NY), Harold N. Moldenke in 1930 (625, NY), and S. Mori and C. Gracie in 1988 (18790, NY). Gann and Duquesnel rediscovered this population in 2000 at the Klopp Tract, Lignumvitae Key Botanical State Park. Unfortunately, this population may have been destroyed by an exotic species control project.

In 1958, W.L. Stern and K.L. Chambers made the first collection on Crawl Key (340, NY, US), a station that was observed by Avery in 1966 (Avery's Notes, 19 April 1966). Bradley found plants there in 1998 at the privately owned Valhalla Rock Barren Site, which is immediately adjacent to Curry Hammock State Park. Several hundred plants are still present. Plants were also reported for the privately owned Burnt Point Florida Keys Indigo Site on nearby Long Point Key (Ross & Ruiz, 1996), but this station needs to be surveyed.

Avery also observed Florida Keys indigo on Long Key in what is now Long Key State Park (Avery's Notes, 19 April 1966). Carol Lippincott vouchered this station in 1991 (s.n., FTG). This station

also was reported by Kruer (1992) and Ross & Ruiz (1996). Gann, Bradley, and Duquesnel have observed plants there as recently as 2000. Several hundred plants may be present at this station, but a thorough census is needed. In 1965, Avery also noted plants on Craig Key, which is located between Long Key and Crawl Key (Avery's Notes, 20 January 1965), but this is a fill island and is not considered a natural population.

In 1962, Frank C. Craighead collected a specimen on Upper Matecumbe Key (s.n., USF). Karen Achor observed plants there in 1982 in privately owned Teatable Hammock (in Weiner 1980, as amended). Bradley has searched for Florida Keys indigo there, but has not been able to locate any plants. More survey work is needed at that station.

Conrad Byrd made the first collection on Windley Key in 1968 (s.n., FTG), in what is now Windley Key Fossil Reef Geological State Park. This station also was reported by Kruer (1992), and has been observed as recently as 2000 by Gann, Bradley, and Duquesnel. In 1999, Bradley discovered an additional population on Plantation Key at Snake Creek Hammocks, Florida Keys Wildlife and Environmental Area, but this station needs to be vouchered. Bradley and Woodmansee observed plants there again in 2000 (Bradley et al., 2000b).

Two collections were made outside of the Florida Keys in the 1800s. Abram P. Garber made a collection in 1877 in Miami (s.n., NY, US). Alvan W. Chapman made a second collection (s.n., NY) in the 1800s on "Robert's Key. Caximbas Bay." This station appears to be part of Marco Island in Collier County, which is now mostly developed.

Major Threats: Exotic pest plant invasions; habitat destruction; sea-level rise.

Preliminary recommendations:

- Voucher plants at John Pennekamp Coral Reef State Park and Snake Creek Hammocks.
- Survey Burnt Point Florida Keys Indigo Site, Klopp Tract, and Teatable Hammock.
- Map and monitor known stations on a regular basis.

- Acquire Burnt Point Florida Keys Indigo Site, Teatable Hammock, and Valhalla Rock Barren.
- Consider reintroduction to sites within its historical range, including Lignumvitae Key Botanical State Park.
- Encourage USFWS to list *Indigofera mucronata* var. *keyensis*.

Ionopsis utricularioides (Sw.) Lindl.
Delicate Violet Orchid

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Arthur R. Marshall National Wildlife Refuge; Big Cypress National Preserve; Fakahatchee Strand Preserve State Park).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Collier and Palm Beach counties and the Monroe County mainland.
South Florida Habitats: Strand swamps.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Luer (1972) has illustrations and color photos; Bell & Taylor (1982) has a color photo.
References: Ames, 1904b; Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Bell & Taylor, 1982; Wunderlin, 1998; Coile, 2000.
Synonyms: *I. paniculata* Lindl.; *I. tenera* Lindl.

Historical Context in South Florida: Oakes Ames first collected delicate violet orchid in "Gobblers Head" near Naples in southwestern Collier County (s.n., AMES; Ames, 1904b). Only four or five plants were found according to Ames' journal (Plimpton, 1979). The location of this station is uncertain. John Kunkel Small made the next collection in 1925 on *Citrus* trees at "Deep Lake Hammock" (12706, NY), presumably in what is now Big Cypress National Preserve, but possibly in the Fakahatchee Strand. L.P. Brewer made an additional collection near Deep Lake in 1950, also on *Citrus* trees (s.n., FLAS). Delicate violet orchid has been reported from two areas of Big Cypress National Preserve north of Alligator Alley. Chuck McCartney collected a

specimen in the Rabenau Camp area of Big Cypress National Preserve in 1989 (30, SEL). There is also a report for the Kissimmee Billy Strand area (anonymous, no date.g), but this report needs to be verified. Roger L. Hammer photographed a plant south of the Tamiami Trail in Gum Slough in 1991 (personal communication, 13 June 2001). Black & Black (1980) listed delicate violet orchid as rare for Big Cypress National Preserve.

Daniel B. Ward made the first collection in the Fakahatchee Strand in 1965 (5366, FLAS), in what is now Fakahatchee Strand Preserve State Park. Gann and Woodmansee observed plants there in 2000 on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are fewer than 1,000 plants in the Fakahatchee Strand (personal communication, 7 February 2001).

In 1956, Frank C. Craighead made a collection of delicate violet orchid along the Rogers River in Everglades National Park in Monroe County (s.n., FLAS). Daniel F. Austin and Sandra K. Austin also observed it and collected it at Arthur R. Marshall Loxahatchee National Wildlife Refuge in Palm Beach County in the early 1970s (personal communication, 8 February 2001; s.n., FAU). Plants are still present there, but they have been translocated to an area where they will not be easily accessible to collectors (M. Bailey, personal communication, 13 April 2001). Delicate violet orchid also was reported for Corkscrew Swamp Sanctuary (Judd, 1994), but this station needs to be verified.

Major Threats: Poaching; exotic pest plant invasions.

Comments: *Hammer (2001) suspects that this is a short-lived species that is cold-sensitive. As a result, it may be somewhat ephemeral in South Florida.*

Preliminary recommendations:

- Survey Rogers River area in Everglades National Park. Continue ongoing surveys at Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

Jacquemontia havanensis (Jacq.) Urb.
Havana Clustervine

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Bahia Honda State Park; Dagny Johnson Key Largo Hammocks Botanical State Park).
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Vine.
Distribution: Native to South Florida, the West Indies, Mexico, and Central America.
South Florida Distribution: Monroe County Keys.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
South Florida Habitats: Beach dunes, coastal berms, and edges of rockland hammocks.
Identification: Nelson (1996) has a color photo; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Robertson, 1971; Correll & Correll, 1982; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Gann et al., 2001.
Synonyms: *J. jamaicensis* (Jacq.) Hallier f.; *Convolvulus nodiflorus* Desr., misapplied.

Historical Context in South Florida: Allan H. Curtiss first collected Havana clustervine in 1882 on Bahia Honda Key (s.n., US; 2171, NY), in what is now Bahia Honda State Park. Curtiss made a second collection there in 1896 (5646, NY). It also was collected there by John Kunkel Small in 1916 (7459, US), by Daniel B. Ward in 1964 (4308, USF), and by Bradley in 1995 (257, FTG). Gann and Bradley have both observed plants at Bahia Honda State Park. In 2001, Bradley and Florida Park Service biologist Janice A. Duquesnel mapped plants at Bahia Honda State Park (Gann et al., 2001a).

Curtiss discovered the next station on Boca Chica Key in 1891 (s.n., GH). This station was vouchered only one additional time, by Robert W. Long, in 1966 (2142, USF). Bradley and Woodmansee surveyed Boca Chica Key in 2001, but failed to find any plants (Gann et al., 2001a).

Curtiss may have collected it on No Name Key in 1896 (Robertson, 1971). We have not observed the specimen that Robertson reports (5631, G), but this is the same number used by Curtiss on a collection of *J. pentanthos* from No Name Key (5631, NY), which has been observed by Bradley. It seems likely that the Robertson report is in error. A specimen was possibly collected by Frank C. Craighead and George N. Avery on Big Pine Key in 1963 (s.n., Everglades National Park herbarium). Strangely, this location is not mentioned in Avery's botanical notes, so this may represent a mislabeled specimen from Bahia Honda Key. Avery only recorded observing Havana clustervine on Bahia Honda Key in the lower Florida Keys.

William G. Atwater collected Havana clustervine first on North Key Largo in 1959 (M-164, Everglades National Park herbarium). This station is within what is now Dagny Johnson Key Largo Hammocks Botanical State Park. Additional collections were made there by George N. Avery in 1971 (904, FTG, USF), and by Ruben P. Sauleda and Diane K. Sauleda in 1982 (7980, FTG, USF). Most of the plants at this station are growing along the edge of a hammock that is divided by the intersection of Card Sound Road and State Road 905. It was not clear exactly what the natural habitat was for this species on North Key Largo until 2000, when Gann and Duquesnel found additional plants in the ecotone between Crossroads Hammock, immediately to the north of the main station, and Dispatch Slough to the east. Plants at Key Largo Hammock State Botanical Sites were mapped in 2001 by Gann, J.A. Duquesnel, Florida Park Service biologist James G. Duquesnel, and Fairchild Tropical Garden biologists Megan Fellows and Jennifer Possley (Gann et al., 2001b).

Major Threats: Exotic pest plant invasions; sea-level rise.

Comments: *A specimen cited by Robertson (1971) from Virginia Key in Miami-Dade County, collected by Simpson (544, F), is actually a specimen of* J. reclinata*.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.

Jacquemontia reclinata House ex Small
Beach Clustervine

South Florida Status: Nine occurrences in nine conservation areas (Atlantic Dunes Park; Coral Cove Park; Crandon Park; Hugh Taylor Beach State Park; Loggerhead Park; Red Reef Park; South Beach Park; Spanish River Park).
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Vine.
Distribution: Endemic to southern Florida.
South Florida Distribution: Endemic to coastal southeastern Florida from Key Biscayne, Miami-Dade County, north to Martin County.
South Florida Habitats: Sand dunes.
Protection Status: Listed as endangered by the USFWS, as endangered by FDACS, and as critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1905; Small, 1933a; Small, 1934; Robertson, 1971; Long & Lakela, 1976; Ward, 1978; Avery & Loope, 1980a; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; USFWS, 2000.
Synonyms: *Convolvulus havanensis* Jacq., misapplied.

Historical Context in South Florida: Abram P. Garber first collected beach clustervine in 1877 in Miami-Dade County at "Miami, Keys and Main-land" (s.n., FLAS). In 1892, it was collected on Virginia Key by Joseph H. Simpson (544, F), the only collection known from that island. This specimen was incorrectly cited as *J. havanensis* by Robertson (1971).

In 1903, John Kunkel Small and Joel J. Carter collected beach clustervine on "Bull Key near Miami" (630, F), referring to Miami Beach. This collection was specified as the type specimen of this species when described by House (in Small, 1905). It also was collected on Miami Beach by Small and others in 1911 (3306, NY; 3382, NY), and by Small and Charles A. Mosier in 1915 (5825, FLAS, FSU). Small (1934) discussed this occurrence. In 1930, Harold N. Moldenke collected it at the north end of Miami Beach on Golden Beach (587, NY). The last definite collection of this

species on Miami Beach was made by Delzie Demaree, probably around 1933 (10178, US).

In 1964, A.P. Christman collected beach clustervine was collected at Crandon Park on Key Biscayne (15, FLAS). George N. Avery observed this occurrence several times from 1965 to 1982 (Avery's Notes). This station also was vouchered in 1979 by Donovan Correll and others (50517, FTG). Beach clustervine still occurs there and is currently being studied by biologists from Fairchild Tropical Garden.

Beach clustervine was collected first in Palm Beach County at Palm Beach in 1895 by William M. Canby (s.n., US) and later that year by Herbert J. Webber (230, MO). Allan H. Curtiss made the next collection at Palm Beach in 1897 (5860, FLAS). A collection was made in the vicinity of Palm Beach in 1908 by W. Garvens (s.n., F). It was collected at Jupiter in 1889 by George L. Bates (s.n., F), in 1928 by "Brown & West" (s.n., FLAS), in 1933 by Erdman West (s.n., FLAS), in 1949 by Leonard J. Brass (20540, FLAS), and at "West Jupiter" in 1904 by Allen B. Burgess (770, F). Collections were made on Jupiter Island in Palm Beach County by Small and John B. DeWinkeler in 1921 (9867, FLAS) and by Olga Lakela in 1962 (25201, FLAS, FSU).

Demaree made the first collection in Broward County at Hollywood in 1938 (18708, FSU). Additional collections have been made in Broward in 1940 at Fort Lauderdale Beach by J.M. Crevasse (s.n., FLAS) and in 1969 by William L. McCart (11277, FLAS), and at Pompano Beach in 1969 by McCart (11275, FLAS). A single specimen is known from Martin County, collected at Hobe Sound by F.R. Randolph in 1921 (50, GH).

Natural occurrences still exist in Miami-Dade County at Crandon Park, in Broward County at Hugh Taylor Birch State Park, and in Palm Beach County at Atlantic Dunes Park, Coral Cove Park, Red Reef Park, Loggerhead Park, Radnor Beach Park, South Beach Park, and Spanish River Park. The authors have observed several of these populations.

Fairchild Tropical Garden (FTG) and the Florida Park Service have initiated a formal introduction program at Bill Baggs Cape Florida

State Park. FTG has initiated a comprehensive research program on this species.

Major Threats: Habitat destruction.

Preliminary recommendations:
- Map and monitor known stations on a regular basis.
- Continue introduction at Bill Baggs Cape Florida State Park.
- Continue research program at FTG.

Juncus dichotomus Elliott
Forked Rush

South Florida Status: Critically imperiled. Three occurrences in four conservation areas (Halpatiokee Regional Park; Jonathan Dickinson State Park & Riverbend Park; Seabranch Preserve State Park).
Taxonomy: Monocotyledon; Juncaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as frequent in Florida from the northern counties to the central peninsula.
South Florida Distribution: Charlotte, Hendry, Martin, and Palm Beach counties.
South Florida Habitats: Flatwoods and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.
References: Small, 1933a; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: *J. platyphyllus* (Wiegand) Fernald.

Historical Context in South Florida: Bruce F. Hansen and others first collected forked rush in 1980 in the Tuckers Corner area of Charlotte County (7022, USF), in the vicinity of Fred C. Babcock-Cecil M. Webb Wildlife Management Area. Joanne Korvick made a collection in Hendry County in 1982 in a ditch in an orange grove in La Belle (s.n., FLAS). It is uncertain whether or not this represented a natural population.

Forked rush was collected for the first time in Palm Beach County by Bradley and Woodmansee in 1997 along the Loxahatchee

River in Jonathan Dickinson State Park (64, FTG). It also was observed by Bradley and Woodmansee along the Loxahatchee River in Riverbend Park, which is managed by Palm Beach County, but this station needs to be vouchered.

In 1998, Bradley and Woodmansee observed forked rush in Martin County at Seabranch Preserve State Park (Bradley et al., 1999), but this station needs to be vouchered. In 1999, forked rush was collected by Woodmansee in Martin County at Halpatiokee Regional Park (401, FTG).

Major Threats: Fire suppression; exotic pest plants; wild hog damage.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:

- Voucher plants at Riverbend Park and Seabranch Preserve State Park.
- Survey Tuckers Corner area, including the Fred C. Babcock-Cecil M. Webb Wildlife Management Area
- Map and monitor known stations on a regular basis.

Juncus repens Michx.
Lesser Creeping Rush

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Jonathan Dickinson State Park).
Taxonomy: Dicotyledon; Juncaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Charlotte, Collier, Martin, and Palm Beach counties.
South Florida Habitats: Depression marshes and flatwoods.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998.

Synonyms: None.

Historical Context in South Florida: O.E. Frye first collected lesser creeping rush in 1946 at an unspecified locality in Charlotte County (s.n., FLAS). It was collected in Charlotte County again in 1997 by Gann and Bradley at the Fred C. Babcock-Cecil M. Webb Wildlife Management Area (727, FTG).

Lesser creeping rush was collected twice in Collier County in 1967. Anne F. Bellenger collected it first in the Monument Road area of Big Cypress National Preserve (671, USF). Olga Lakela made the next collection in "Collier County...pineland association...flanked by a brackish lagoon..." (30847, USF), presumably from Marco Island (see Lakela 30848, USF [*Lechea sessiliflora*]).

John Popenoe made the only collection in Martin County in 1978 at Jonathan Dickinson State Park (1241, USF), a station that later was observed by Bradley. Plants were found to be abundant in deep water in a depression marsh. In 1997, Bradley and Woodmansee made a collection in Palm Beach County along the Loxahatchee River in Jonathan Dickinson State Park (738a, FTG). Lesser creeping rush has been reported for Dupuis Reserve (Woodbury, no date), which is located in Martin and Palm Beach counties, but this report needs to be verified.

Lesser creeping rush also was reported to have been collected a single in 1961 inside Fort Jefferson on Loggerhead Key in Dry Tortugas National Park in Monroe County (Reimus and Robertson, 1997). If a specimen was actually collected there, it represents only a waif occurrence.

Major Threats: Hydrological modifications; fire suppression; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:

- Survey Dupuis Reserve and the Monument Road area of Big Cypress National Preserve.

- Map and monitor known stations on a regular basis.

Lachnocaulon engleri Ruhland
Engler's Bogbutton

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Jonathan Dickinson State Park; Savannas Preserve State Park; Six Mile Cypress Slough Preserve).
Taxonomy: Monocotyledon; Eriocaulaceae.
Habit: Short-lived perennial herb.
Distribution: Native to the southeastern coastal plain in Alabama and Florida. Wunderlin (1998) reports it as occasional in Florida in the northern and central peninsula.
South Florida Distribution: Lee, Martin, and Palm Beach counties.
South Florida Habitats: Mesic flatwoods and rarely wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Small, 1933a; Kral, 1966a; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: *L. engleri* var. *caulescens* Moldenke.

Historical Context in South Florida: Robert Kral first collected Engler's bogbutton in 1963 in Stuart in Martin County (18235, FSU). In 1964, Kral collected it again on the north side of Stuart (20386, FSU). In 1998, Gann and Bradley observed Engler's bogbutton north of Stuart at the Savannas Preserve State Park in Martin County, but this station needs to be vouchered. It has been reported for Jonathan Dickinson State Park in Martin County (Florida Park Service District 5, no date), and will be included on an upcoming plant list for the Park (Roberts et al., in prep.). It is assumed to be present there, but this station needs to be vouchered.

Paul M. Cassen made a single collection from West Palm Beach in 1968 (428, FLAS), where it is almost certainly extirpated due to development. It also has been reported for the Dupuis Reserve

(Woodbury, no date), which is located in both Martin and Palm Beach counties, but this station needs to be verified.

In 1997, Bradley and Woodmansee collected Engler's bogbutton in Lee County at the Six Mile Cypress Slough Preserve (765, FTG, USF).

Major Threats: Fire suppression; exotic pest plant invasions; hydrological modifications.

Comments: *Kral (1966a) discussed how ephemeral this species sometimes is, especially in areas where water levels have fallen recently, as well as is in disturbed sites. Kral also mentions that the seeds of this species may have the capacity to remain dormant for extended periods of time.*

Preliminary recommendations:

- Voucher plants at Jonathan Dickinson State Park and Savannas Preserve State Park in Martin County.
- Survey Dupuis Reserve.
- Map and monitor known stations on a regular basis.

Lachnocaulon minus (Chapm.) Small
Small's Bogbutton

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (J.W. Corbett Wildlife Management Area; Jonathan Dickinson State Park).
Taxonomy: Monocotyledon; Eriocaulaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Martin and Palm Beach counties.
South Florida Habitats: Wet flatwoods and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and color photos.
References: Small, 1933a; Kral, 1966a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: *L. eciliatum* Small; *L. michauxii* Kunth var. *minus* Chapm.

Historical Context in South Florida: Small's bogbutton was reported for three South Florida counties by Kral (1966): Broward, Martin, and Palm Beach. We have only been able to locate a single specimen from South Florida. This specimen was collected in Martin County southeast of Salerno by Olga Lakela in 1962 (25393, GH). The exact location of Lakela's station is unknown, but it may have been developed.

Gann and Bradley observed Small's bogbutton at J.W. Corbett Wildlife Management Area in Palm County in 1995, but this station needs to be vouchered.

Small's bogbutton has been reported for Jonathan Dickinson State Park in Martin County (Florida Park Service District 5, no date), and will be included on an upcoming plant list for the Park (Roberts et al., in prep.). It is assumed to be present there, but this station needs to be vouchered. It also has been reported for Dupuis Reserve (Woodbury, no date), which is located in both Martin and Palm Beach counties, but this report needs to be verified.

Major Threats: Hydrological modifications; fire suppression; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:

- Voucher plants at J.W. Corbett Wildlife Management Area and Jonathan Dickinson State Park.
- Survey Dupuis Reserve.
- Map and monitor known stations on a regular basis.

Lantana canescens Kunth
Hammock Shrubverbena

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Camp Owaissa Bauer; Castellow Hammock Park; Silver Palm Hammock).
Taxonomy: Dicotyledon; Verbenaceae.

Habit: Shrub.
Distribution: Native to South Florida, the West Indies, southern Texas, Mexico, Central America, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Edges of rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Small, 1933a; Long & Lakela, 1976; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *L. microcephala* A. Rich.; *Goniostachyum citrosum* Small.

Historical Context in South Florida: John Kunkel Small first collected hammock shrubverbena in 1904 in a hammock near Silver Palm School (2142, NY). In 1909, Small used this collection as the type specimen in describing a new species from Florida and Cuba, *Goniostachyum citrosum* (Small, 1909). This collection probably was from Castellow Hammock, a station that Small and Charles A. Mosier vouchered in 1915 (5530, FSU). Castellow Hammock and portions of adjacent Ross Hammock are now protected within Castellow Hammock Park. Roger L. Hammer (personal communication, 11 June 2001), Gann, and Bradley have all observed plants there.

Hammock shrubverbena was collected in the same area in 1906 by Small and Joel J. Carter at Caldwell Hammock (2680, NY), now Silver Palm Hammock, a Miami-Dade County conservation area. Collections also were made there in 1930 by Harold N. Moldenke (559, NY) and Charles Mosier (s.n., US), and in 1998 by Bradley (1387, FTG). Gann has observed this population over several years. Gann and Joyce W. Gann observed a single plant there in December, 2001.

In 1961, Frank C. Craighead collected hammock shrubverbena at Camp Owaissa Bauer (s.n., USF), a Miami-Dade County Park, and this station was re-vouchered in 1995 by Bradley (232, FTG). Bradley observed this population as recently as 2000, and Hammer observed plants there in 2001 (personal communication, 13 June 2001). Fewer then 10 individuals are thought to remain,

although following Hurricane Andrew in 1992 the population had increased substantially for several years.

Major Threats: Fire suppression, which causes the loss of the pine rockland-rockland hammock ecotone; exotic pest plant invasions; management error.

Comments: *This species seems to respond positively to disturbances such as hurricanes and fires and seems to become less abundant in their absence. Camp Owaissa Bauer, Castellow Hammock Park, and Silver Palm Hammock are all less than five miles away from each other.*

Preliminary recommendations:

- Map known stations annually.
- Monitor known stations every three months.
- Conduct prescribed burns to maintain pine rockland-rockland hammock ecotone at Camp Owaissa Bauer.
- Restore pine rockland-rockland hammock ecotone at Castellow Hammock Park and Silver Palm Hammock.

Lantana depressa Small var. ***floridana*** (Moldenke) R.W. Sanders **Florida Shrubverbena**

South Florida Status: Critically imperiled. Three occurrences in five conservation areas (Bill Baggs Cape Florida State Park, Crandon Park, & Virginia Key Hammock; Juno Dunes Natural Area; Rocky Point Hammock).
Taxonomy: Dicotyledon; Verbenaceae.
Habit: Shrub.
Distribution: Endemic to peninsular Florida.
South Florida Distribution: Broward, Martin, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Sand dunes, mesic hammocks, and coastal strand.
Protection Status: Listed as endangered by FDACS (as *L. depressa*) and as imperiled by FNAI.
Identification: The species is distinguished from other Florida *Lantana* by having flowers in dense, flat topped heads and having leaf blades that are ovate-elliptic to lanceolate-elliptic (Wunderlin 1998). The variety is distinguished by being an erect shrub over

0.5 m tall and having stems with antrorse or spreading trichomes that are 0.5-1 mm long and a corolla limb that is 8-10 mm long (Wunderlin 1998).
References: Small, 1933a; Long & Lakela, 1976*;* Sanders, 1987; Nelson, 1996; Wunderlin, 1998; Coile, 2000.
Synonyms: *L. bahamensis* Britt. var. *floridana* Moldenke; *L. ovatifolia* Britton, misapplied.

Historical Context in South Florida: Abram P. Garber first collected Florida shrubverbena in 1877 in Miami (s.n., FLAS). In 1903, it was collected on "Bull Key" (Miami Beach) by John Kunkel Small and George K. Small (s.n, FLAS). The type specimen was collected in 1904, also on Miami Beach, by Small (2101, NY). Since these early collections, it has been vouchered from Key Biscayne north along the coast to Martin County. In 1984, Roger W. Sanders made the only known collection from the Miami-Dade County mainland at the northern end of the county in scrubby flatwoods (1656, FTG). Plants still occur on Key Biscayne at Bill Baggs Cape Florida State Park, where they have been observed by Gann and Bradley, and at Crandon Park (Bradley 240, FTG). Florida shrubverbena is also present on Virginia Key at the City of Miami's maritime hammock restoration site at the Virginia Key and Marine Stadium. Gann and Bradley observed plants there in 1999. The Bill Baggs Cape Florida State Park and Virginia Key stations need to be vouchered.

Sanders (1987) reported occurrences of this species north of Miami-Dade County in Broward, Palm Beach, and Martin counties. While we have not seen specimens from Broward County, it is reported to occur at Hollywood North Beach Regional Park (MacAdam, 1988) and at the Dania Tract (Johnson & Muller, 1993a). Both of these stations need to be verified.

In Palm Beach County, it was collected by Olga Lakela in 1962 north of Juno Beach (25425, NY). It was observed in this area at Juno Dunes Natural Area by the authors in 1997, but this station needs to be vouchered. It is also reported to occur at Atlantic Dunes Park (Johnson & Muller, 1993a) and Jupiter Lighthouse Tract (Farnsworth, 1993c), a portion of which is now the Palm Beach County conservation area Jupiter Inlet Natural Area. Both the Atlantic Dunes Park and Jupiter Inlet Natural Area need to be

vouchered. In Martin County, it was collected in 1998 at Rocky Point Hammock Park by Bradley and Woodmansee (1019, FTG).

Major Threats: Hybridization with *L. camara*; exotic pest plant invasions.

Comments: *Florida shrubverbena hybridizes with the exotic* L. camara *(Sanders, 1987). Many wild plants are now hybrids between these two species, rather than pure* L. depressa *var.* floridana*. Because of this, the native Florida shrubverbena is often difficult to identify.*

Preliminary recommendations:

- Voucher plants at Crandon Park, Juno Dunes Natural Area, and Virginia Key Hammock.
- Survey Atlantic Dune Park, Dania Tract, Hollywood North Beach Regional Park, and Jupiter Inlet Natural Area.
- Map and monitor known stations on a regular basis.
- Eliminate populations of *L. camara* that could contaminate populations of Florida shrubverbena and destroy hybrids.
- Review for listing by USFWS. Review FNAI rank.

Linum carteri Small var. ***carteri***
Carter's Flax

South Florida Status: Critically imperiled. Seven occurrences in three conservation areas (Camp Owaissa Bauer; R. Hardy Matheson; Rockdale Preserve) and four non-conservation areas (Cocoplum Development Carter's Flax Site; Old Dixie Pineland; Ponce and Riviera Pineland; USDA Subtropical Horticulture Research Station).
Taxonomy: Dicotyledon; Linaceae.
Habit: Annual terrestrial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by FDCAS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: Chafin (2000) has illustrations and a color photo.
References: Small, 1905; Small, 1933a; Rogers, 1963; Mosquin & Hayley, 1967; Rogers, 1968; Long & Lakela, 1976; Avery &

Loope, 1980a; Godfrey & Wooten, 1981; Tobe et al., 1998; Wunderlin, 1998; Bradley & Gann, 1999b; Chafin, 2000; Coile, 2000.
Synonyms: *Cathartolinum carteri* (Small) Small.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected Carter's flax in 1903 between Coconut Grove and Cutler (7518, NY). Small described it as a new species in 1905. Since 1903, it has been found in pine rocklands from as far north as the vicinity of Brickell Hammock (Small 3269, NY), to as far south as the Naranja area (Bradley 188, FTG). Most of the habitat for this plant has been destroyed.

Carter's flax is currently known from three conservation areas: Camp Owaissa Bauer, where it was observed first by Bradley in 1994, R. Hardy Matheson Preserve where it was recorded by Fairchild Tropical Garden (1990), and Rockdale Pineland where it was found by Bradley in 1999.

It is also known from four non-conservation areas: Cocoplum Development Carter's Flax Site; Old Dixie Pineland; Ponce and Riviera Pineland; USDA Subtropical Horticulture Research Station. These stations were all observed by Bradley in the mid to late 1990s. Bradley observed the USDA Subtropical Horticulture Research Station site in 2001. Woodmansee observed plants at the Ponce and Riviera Pineland in 2001.

Fairchild Tropical Garden is in the process of mapping all seven stations.

Major Threats: Habitat destruction; fire suppression; exotic pest plant invasions.

Comments: *This species can persist in scarified pine rocklands, which can be restored.*

Preliminary recommendations:
- Map and monitor known stations on a regular basis.
- Acquire Cocoplum Development Carter's Flax Site, Old Dixie Pineland, and Ponce and Riviera Pineland.

- Designate area with pine rockland fragments at the USDA Subtropical Horticulture Research Station as a conservation area and restore disturbed areas to re-connect the fragments.
- Encourage USFWS to list *Linum carteri* var. *carteri*.

Lomariopsis kunzeana (Underw.) Holttum
Holly Vine Fern

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Camp Owaissa Bauer; Everglades National Park; Matheson Hammock Park).
Taxonomy: Pteridophyte; Lomariopsidaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to South Florida, Cuba, and Hispaniola.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Moist limestone sinkholes and outcrops in rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Nelson (2000) has a color photo; Wunderlin & Hansen (2000) has two illustrations; the IRC Website has a color photo.
References: Small, 1931b; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000; Moran, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Stenochlaena kunzeana* Underw.

Historical Context in South Florida: Holly vine fern was collected first in November 1903 by John Kunkel Small and Joel J. Carter (856, NY) and separately by Alvah A. Eaton (677, GH, NY, US) in southern Miami-Dade County. Small's specimen gives the locality as between Cutler and Camp Longview while Eaton's label is from Ross Hammock. Eaton also found plants at Castellow Hammock (Eaton, 1906). Both Castellow Hammock and a portion of Ross Hammock are protected in what is now Castellow Hammock Park. Small and Carter collected holly vine fern at Ross Hammock in 1906 (2383, NY), and Mary W. Diddell collected it there in 1931 (s.n., FLAS). George N. Avery observed one plant in 1976 in a small sinkhole at Castellow Hammock within Castellow Hammock Park (Avery's Notes, 11 March 1976). Roger

L. Hammer also observed this station, but holly vine fern has not been seen at Castellow Hammock Park since Hurricane Andrew in 1992 (R.L. Hammer, personal communication, 19 January 2001).

Eaton (1906) reported observing holly vine fern at Timms Hammock, a station that was vouchered by Donovan S. Correll in 1936 (6068, US). Timms Hammock is now part of the Miami-Dade County park, Camp Owaissa Bauer. Avery and others observed it there in the 1960s. Hammer and Don Keller observed eight plants there in 2000 (D. Keller, personal communication, 8 February 2001). Eaton (1906) also reported it for nearby Hattie Bauer Hammock, but this station was never vouchered.

Small made several collections on Long Pine Key in 1916 and 1917 (7346, NY; 7488, NY; 8126, NY), in what is now Everglades National Park. Frank C. Craighead also made a collection there in 1960 (s.n., ARCH). In 1975 and 1976, Avery observed a single plant in one hammock on Long Pine Key. Don Keller observed one very large plant in that same hammock in 1988 and again in 1990 (personal communication, 8 February 2001).

In 1962, Thomas Darling, Jr. made a collection at Warwick Hammock (s.n., US), which is located north of Deering Estate at Cutler. William G. Atwater made a collection in that area in 1960 (s.n.; FLAS), but it has not been collected there since that time. The entire hammock has been subdivided and developed, although a few remnants of native vegetation and limestone substrate remain in some yards. Gann surveyed some of these yards in the late 1990s, but did not find any holly vine fern.

The most recent station to be vouchered was at Matheson Hammock Park, where Avery collected holly vine fern in 1970 (754, FTG). There is an early collection without a date from that area by Alicia Rodham (s.n., NY), but the locality data is uncertain. Alan Cressler recorded around 50 plants in 1993 during a fern survey he conducted following Hurricane Andrew in 1992 (Cressler, 1993). Most of the plants at the site were wiped out by the exotic sewer vine (*Paederia cruddasiana*) following Hurricane Andrew (D. Keller, personal communication, 8 February 2001).

Major Threats: Long-term drainage on the Miami Rock Ridge; poaching; stochastic extinction (e.g., hurricanes); exotic pest plant invasions.

Comments: *As with many fern species, the gametophytes of holly leaf fern may be more widespread than the sporophytes. Peck (in Flora of North America Editorial Committee, 1993) reports that the gametophytes are often found among the stem scales of the sporophytes. Peck and Roger L. Hammer found gametophytes in a number of solution holes in Castellow Hammock Park (R.L. Hammer, personal communication, 13 June 2001).*

Preliminary recommendations:

- Survey Castellow Hammock Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Consider establishing an *ex situ* collection of germplasm.
- Consider reintroducing holly vine fern to sites within its historical range, including Hattie Bauer Hammock.
- Promote a higher regional water table on the Miami Rock Ridge.
- Determine status in Cuba and Hispaniola.

Ludwigia arcuata Walter
Piedmont Primrosewillow

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Halpatiokee Regional Park).
Taxonomy: Dicotyledon; Onagraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it was frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Charlotte, Collier, and Martin counties.
South Florida Habitats: Mesic flatwoods and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Tobe et al. (1998) has an illustration.

References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *Ludwigiantha arcuata* (Walter) Small.

Historical Context in South Florida: Piedmont primrosewillow was collected twice in Collier County in 1967 by Olga Lakela, both times near Immokalee. Lakela's first collection was made in a canal (30874, USF). Her next collection was made "about in excavated ponds in pinelands" (30817, USF). Bradley observed this species on Marco Island in Collier County in 1999. A small colony was found on a wet roadside and was most likely introduced there with sod. It is not clear if Piedmont primrosewillow is native to Collier County.

Bruce F. Hansen and others first collected Piedmont primrosewillow in Charlotte County in 1980 at Tucker's Corner (7027, USF). This collection was made in flatwoods. This station is adjacent to Fred C. Babcock-Cecil M. Webb Wildlife Management Area, where Piedmont primrosewillow was collected by Gann and Bradley in 1996 (710, FTG). The plants were found in one small area of the site in disturbed flatwoods. Woodmansee observed Piedmont primrosewillow in Martin County at Halpatiokee Regional Park, but this station needs to be vouchered.

Piedmont primrosewillow has been reported for Loxahatchee Slough Natural Area in Palm Beach County (Farnsworth, 1994c), and Dupuis Reserve (Woodbury, no date), which is located in both Martin and Palm Beach counties. Both of the stations need be verified.

Major Threats: Exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. Some populations of this species may have been introduced by cattle, with sod, or by other means.*

Preliminary recommendations:

- Voucher Dupuis Reserve, Halpatiokee Regional Park, and Loxahatchee Slough Natural Area.
- Map and monitor known stations on a regular basis.

Ludwigia pilosa Walter
Hairy Primrosewillow

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Arthur R. Marshall Loxahatchee National Wildlife Refuge; Pal-Mar; Jonathan Dickinson State Park).
Taxonomy: Dicotyledon; Onagraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Martin and Palm Beach counties.
South Florida Habitats: Riverside swamp forests, tree islands, and basin marshes.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1981) has an illustration.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Roy O. Woodbury first collected hairy primrosewillow in 1989 at Jonathan Dickinson State Park in Martin County (s.n., FTG). The collection was made in a swamp along Kitching Creek. In 1997, Bradley and Woodmansee discovered and vouchered a small colony of this species in Palm Beach County at Pal-Mar (218, FTG), a conservation area managed by South Florida Water Management District. Later that year Gann and Bradley vouchered an additional colony at this site (1057, FTG). Plants at this station were found growing at the edges of basin marshes in the ecotone with mesic flatwoods or small tree islands. Hairy primrosewillow also has been reported from the Dupuis Reserve (Woodbury, no date), which is located in Palm Beach and Martin counties, but this report needs to be verified. Bradley and Woodmansee observed hairy primrosewillow

again in 1997 at Arthur R. Marshall Loxahatchee National Wildlife Refuge, and the station was vouchered by the authors in 1998 (67, FTG). Plants were found growing on the edge of a tree island.

Major Threats: Exotic pest plant invasions; fire suppression; hydrological modifications.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:

- Survey Dupuis Reserve and Pal-Mar Natural Area, and un-acquired portions of the Pal-Mar CARL Site.
- Map and monitor known stations on a regular basis.

Lycopodiella caroliniana (L.) Pic. Serm.
Slender Club-Moss

South Florida Status: Critically imperiled. Two occurrences in four conservation areas (Loxahatchee Slough Natural Area, Pond Cypress Natural Area & West Palm Beach Water Catchment Area; Jonathan Dickinson State Park).
Taxonomy: Pteridophyte; Lycopodiaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern and central North America, the West Indies, Mexico, Central America, South America, and the Old World. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier, Martin, and Palm Beach counties.
South Florida Habitats: Wet flatwoods and wet prairies.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has color photos and an illustration; Nelson (2000) has a color photo; Wunderlin & Hansen (2000) has an illustration; the IRC Website has a color photo.
References: Chapman, 1883; Lloyd & Underwood, 1900; Small, 1931b; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Tobe et al., 1998; Wunderlin, 1998; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Lycopodium carolinianum* L.; *Pseudolycopodiella caroliniana* (L.) Holub.

Historical Context in South Florida: L.M. Underwood first collected slender club-moss in 1891 at Lake Worth in Palm Beach County (2226, NY). It has not been collected since then in that immediate area, but it has been reported for three mostly contiguous conservation areas in north-central Palm Beach County: City of West Palm Beach Water Catchment Buffer (Farnsworth, 1993b), Pond Cypress Natural Area (Farnsworth, 1994a), and Loxahatchee Slough Natural Area (Farnsworth 1994c). These stations probably represent a single large population. Slender club-moss is assumed extant there, but all of these occurrences need to be vouchered.

In 1916, Paul C. Standley made a collection of slender club-moss "in the vicinity of Marco…" in Collier County (12710, US). Olga Lakela made two other collections in Collier County, the first in 1965 along State Road 82 near Corkscrew Junction (28119, USF), and the second in 1966 along State Road 82 northwest of Immokalee (30507, USF).

John Popenoe made the first collection in Martin County in 1977 from a ditch "east of the stables" in Jonathan Dickinson State Park (844, FTG). Donovan S. Correll and Popenoe vouchered it a second time in Jonathan Dickinson in 1977, this time in a savanna in the Wilson Creek area (48597, FTG, NY, US). It is assumed to be extant there.

Hitchcock (1902) reported plants from Fort Myers in Lee County, and Eaton (1906) reported plants from Fort Lauderdale in Broward County, but we have not been able to locate vouchers for these stations.

Major Threats: Drainage of wetland habitats; fire suppression; exotic pest plant invasions; wild hog damage.

Preliminary recommendations:

- Voucher plants at City of West Palm Beach Water Catchment Area, Loxahatchee Slough Natural Area, and Pond Cypress Natural Area.
- Map and monitor known stations on a regular basis.

Malachra urens Poit.
Roadside Leafbract

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Everglades National Park; Manatee Park).
Taxonomy: Dicotyledon; Malvaceae.
Habit: Annual terrestrial herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Collier and Lee counties, and the Monroe County mainland.
South Florida Habitats: Shell mounds, salt marshes, coastal berms, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: It can be distinguished from the exotic *M. capitata* by having sessile or short pedunculate heads, rather then long pedunculate heads (Wunderlin, 1998).
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *M. alceifolia* Jacq., misapplied.; *M. capitata* (L.) L., misapplied.

Historical Context in South Florida: Allan H. Curtiss first collected roadside leafbract at “Chuckaluskee Bay” (383, NY). The specimen was undated, but was probably made in 1881 or 1882. This location is probably Chokoloskee Island in Collier County, where Joseph H. Simpson collected roadside leafbract in 1891 (220, US). Collections also were made near Everglades City in 1925 by Walter M. Buswell (s.n., NY), and in Everglades City by John Popenoe and Roger W. Sanders in 1981 (2141, FTG). Frank C. Craighead made an additional collection from Collier County in 1964 (s.n., FTG, USF). The specimen was collected along the “Sunniland Air Beacon Road” a location with which we are not familiar. Sunniland is on State Road 29 north of Big Cypress National Preserve.

In 1930, Charles A. Mosier made a collection along Loop Road in the vicinity of Pinecrest (s.n., NY), within what is now Big Cypress National Preserve. It was collected there the same month by

Harold N. Moldenke (367a, NY). It is possible that this was a waif population established on road fill.

In 1942, John H. Davis, Jr. made a collection from "Cape Sable" (s.n., FLAS), in what is now Everglades National Park. In the broad sense, Cape Sable can refer to a large region including the Flamingo area, where roadside leafbract has been collected a number of times. It was collected near Flamingo by William G. Atwater in 1963 (717, FLAS), by George N. Avery in 1966 (s.n., FLAS) and again in 1972 (1100, FTG), and by Maxie Simmons in 1969 (Avery 608, FLAS). Gann and Bradley have both observed plants in the vicinity of Flamingo in Everglades National Park.

Richard Workman made a collection in Lee County in 1996 at Manatee Park (s.n., FLAS, USF), where it is assumed to be extant.

Major Threats: Exotic pest plant invasions.

Preliminary recommendations:
- Map and monitor known stations on a regular basis.
- Review for listing by FDACS and FNAI.

Marshallia tenuifolia Raf.
Grassleaf Barbara's Buttons

South Florida Status: Critically imperiled. Three occurrences in four conservation areas (Danforth; Pal-Mar; Jonathan Dickinson State Park & Loxahatchee River Natural Area).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional in Florida from the western panhandle to the central peninsula.
South Florida Distribution: Martin and Palm Beach counties.
South Florida Habitats: Wet flatwoods and depression marshes.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Tobe et al. (1998) has color photos.
References: Channell, 1957; Cronquist, 1980; Godfrey & Wooten, 1981; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: John Popenoe and Richard E. Roberts first collected grassleaf Barbara's buttons in 1980 at Jonathan Dickinson State Park in Martin County (1908, USF). It also has been reported for Loxahatchee River Natural Area in Palm Beach County (Palm Beach County Environmental Resources Management, 2001), a station that needs to be vouchered. This station is considered the same occurrence as that at Jonathan Dickinson State Park. Woodmansee made a collection at Danforth in Martin County in 2000 (512, FTG).

In 1997, Bradley and Woodmansee collected grassleaf Barbara's buttons in Palm Beach County at Pal-Mar (222, FTG), a conservation area managed by South Florida Water Management District. It also has been reported for Dupuis Reserve (Woodbury, no date), which is located nearby in Palm Beach and Martin counties, but this report needs to be verified.

Major Threats: Drainage of wetland habitats; fire suppression; exotic pest plant invasions; wild hog damage.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida.*

Preliminary recommendations:

- Voucher Loxahatchee River Natural Area.
- Survey Dupuis Reserve, Pal-Mar Natural Area, and un-acquired portions of the Pal-Mar CARL Site.
- Map and monitor known stations on a regular basis.

Maxillaria crassifolia (Lindl.) Rchb. f.
Hidden Orchid

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Big Cypress National Preserve; Fakahatchee Strand Preserve State Park).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Collier County.

South Florida Habitats: Strand swamps.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Luer (1972) has both illustrations and color photos; Chafin (2000) has both illustrations and color photos.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Ward, 1978; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *M. sessilis* (Sw.) Fawc. & Rendle.

Historical Context in South Florida: Charles A. Mosier first collected hidden orchid between 1917 and 1930 (s.n., NY), without specific locality data. John Kunkel Small (1933a) reported that it had been collected in the Big Cypress Swamp. Walter M. Buswell collected it in 1939 from "Big Cypress" (s.n., USF). Both Mosier's and Buswell's collections are probably from the Fakahatchee Strand, now in Fakahatchee Strand Preserve State Park. R.E. Vagner made the first definitive voucher from the Fakahatchee Strand in 1964 (s.n., USF). Daniel B. Ward vouchered it there again in 1965 (5365, FSU). It has been observed a number of times since then in the Fakahatchee. Florida Park Service biologist Mike Owen estimates that there are fewer than 1,000 plants in the Fakahatchee Strand (personal communication, 7 February 2001).

George N. Avery first reported hidden orchid from the Loop Road area of Big Cypress National Preserve in 1978 (Avery's Notes, 20 February 1978). Avery, Lloyd L. Loope, and Oron L. "Sonny" Bass observed plants in a pond apple slough, where it was common. Black & Black (1980) reported it as rare for the preserve. Tony Pernas discovered a second station within the Loop Road area in 1999. Bradley observed this population with Pernas and Amy Ferriter in 1999. A single tree was observed with fewer than 10 plants present there.

Earlier, there were reports of hidden orchid from the Jetport area of the Big Cypress Swamp by Frank C. Craighead (Botanical Notes of Frank C. Craighead). Several plants were given to Craighead by the Eastern Airlines Orchid Club and moved to the Long Pine Key area of Everglades National Park. George N. Avery observed one of these plants "probably dead" in Deer

Hammock in 1977 (Avery's Notes, 25 February 1977). Chuck McCartney photographed what appeared to have been a translocated plant in Winkley Hammock on Long Pine Key in 1986 (personal communication, 21 February 2001). There is no indication that hidden orchid is native to any portion of Everglades National Park, nor that an introduced population has ever become established.

Major Threats: Poaching; hydrological modifications; exotic pest plant invasions.

Preliminary recommendations:

- Continue ongoing survey at Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

Micranthemum umbrosum (J.F. Gmel.) S.F. Blake
Shade Mudflower

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (Halpatiokee Regional Park; Jonathan Dickinson State Park; Six Mile Cypress Slough Preserve) and one non-conservation area (vicinity of Fisheating Creek).
Taxonomy: Dicotyledon; Scrophulariaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Glades, Lee, and Martin counties.
South Florida Habitats: Cypress swamps, riverside swamp forests, river banks, and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Small, 1933a; Pennell, 1935; Godfrey & Wooten, 1981; Tobe et al., 1998; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *M. orbiculatum* Michx.; *Globifera umbrosa* J.F. Gmel.

Historical Context in South Florida: Leonard J. Brass first collected shade mudflower in 1945 along Fisheating Creek in Glades County (14834, US). It also was collected along Fisheating Creek by John Popenoe in 1977 (1010, FTG). In 2000, Bradley observed this species to be common in ditches in the vicinity of Fisheating Creek north of Palmdale. It is almost certainly present within the newly established Fisheating Creek Wildlife Management Area.

In 1980, Richard P. Wunderlin and others collected shade mudflower in a canal in North Fort Myers (8849, USF). In 1997, it was observed by Bradley and Woodmansee in a strand swamp at Six Mile Cypress Slough Preserve southeast of Fort Myers, but this station needs to be vouchered.

In 1981, John Popenoe collected shade mudflower at Jonathan Dickinson State Park in Martin County (1971, USF). This collection was made at the edge of a sewage treatment plant, but the species probably occurs in cypress domes or river banks in the park. In 2000, Woodmansee and Martin County biologist Sandra Vardaman observed shade mudflower at Halpatiokee Regional Park, also in Martin County, but this station needs to be vouchered.

Major Threats: Hydrological modifications; exotic pest plant invasions.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. Additional surveys may indicate that shade mudflower is more common than it appears, and it may be down-ranked to imperiled in South Florida in the future.*

Preliminary recommendations:

- Voucher plants at Halpatiokee Regional Park and Six Mile Cypress Slough Preserve.
- Survey Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Micromeria brownei (Sw.) Benth.
var. *pilosiuscula* A. Gray
Browne's Savory

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Six Mile Cypress Slough Preserve).
Taxonomy: Dicotyledon; Lamiaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States, Mexico, and Central America. Wunderlin (1998) reports it as frequent in Florida from the peninsula to the central panhandle.
South Florida Distribution: Broward, Charlotte, Lee, and Miami-Dade counties.
South Florida Habitats: Wet flatwoods and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Correll & Correll, 1982; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *M. pilosiuscula* (A. Gray) Small; *Satureja brownei* (Sw.) Briq.

Historical Context in South Florida: Leland M. Baltzell first collected Browne's savory in 1975 in the vicinity of Bermont in Charlotte County (7861, FLAS). While this area has been developed, Gann and Bradley observed it nearby at Fred C. Babcock-Cecil M. Webb Wildlife Management Area in 1996.

Browne's savory was reported for Corkscrew Swamp Sanctuary (Judd, 1994), which is located in Lee and Collier counties, but this station needs to be verified. Bradley and Woodmansee observed plants at Six Mile Cypress Slough Preserve in Lee County, but this station needs to be vouchered.

Additional collections exist for Broward County (Hendrickson & Buckley 595, FTG) and Miami-Dade County (Avery 771, USF; Popenoe 1621, USF). These collections are all from disturbed wet sites and are probably introduced.

Major Threats: Fire suppression; exotic pest plant invasions.

Preliminary recommendations:

- Voucher plants at Fred C. Babcock-Cecil M. Webb Wildlife Management Area and Six Mile Cypress Slough Preserve.
- Survey Corkscrew Swamp Sanctuary.
- Map and monitor known stations on a regular basis.