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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Chapter 5
The Critically Imperiled Plants of South Florida

This chapter provides accounts of 244 species that have been ranked by IRC as critically imperiled in South Florida, as defined in Table 1.1 in Chapter 1. Each account provides a detailed history of the plant in South Florida, obtained through the study of herbarium specimens, literature, correspondence with other botanists, field surveys, and additional sources. Herbarium citations (e.g. USF) are provided (Appendix 11). In some cases we had to make difficult decisions concerning reported but undocumented occurrences. We welcome any additional information on these taxa for incorporation into future editions of this manual.

The South Florida conservation status of each plant is indicated at the beginning of its account under "South Florida Status," and includes the IRC ranking and a list of known occurrences. Additional data is provided for the convenience of users. "Taxonomy" indicates the group of plants to which the taxon belongs (dicotyledon, monocotyledon, or pteridophyte), and its family, primarily following Wunderlin (1998). "Habit" indicates the form of the taxon (tree, herb, epiphyte, etc.). "Distribution" indicates the global range of the taxon, and "South Florida Distribution" gives the specifics of its range in the region. "South Florida Habitats" indicates from which South Florida habitats the species is known. "Protection Status" indicates if the taxon is listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS), the Florida Department of Consumer Services, Division of Plant Industry (FDACS), or the Florida Natural Areas Inventory (FNAI). "Identification" supplies references to photographs, illustrations, and other tools. "References" are given for additional useful literature. "Synonyms" are from Wunderlin (1998) and other publications cited in the manual.

The chapter is divided into three parts. The first treats taxa not known from any conservation areas. The second part treats taxa that are known from a single conservation area in South Florida. The third part treats all other critically imperiled taxa.

The history of each taxon was used to make conservation and restoration recommendations. In this chapter, recommendations are broad and include but are not limited to: surveying, mapping, monitoring, vouchering, habitat management, and reintroduction. These recommendations follow the guidelines discussed in Chapter 3.

The IRC Website (www.regionalconservation.org) has additional data on the plants covered in this chapter, including photographs of some species.

Part 1. Plants Not Known In Any Conservation Area

Anagallis pumila Sw.
Florida Pimpernel

South Florida Status: Critically imperiled. One occurrence at Pelican Marsh in Collier County.
Taxonomy: Dicotyledon; Primulaceae.
Habit: Annual terrestrial herb.
Distribution: Native to South Florida, central Florida (Highlands County), the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Collier and Lee counties.
South Florida Habitats: Mesic flatwoods, pond margins, and river banks.
Protection Status: Not listed by any agency.
Identification: There are three species of *Anagallis* in Florida. *A. pumila* can be distinguished from the other two by having pedicellate flowers and opposite or whorled leaves (Wunderlin, 1998).
References: Chapman, 1878; Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: *Centunculus pentandrus* R. Br.; *Centunculus. tenellus* Duby; *Micropyxis pumila* (Sw.) Duby.

Historical Context in South Florida: Alvan W. Chapman (1878) first reported Florida pimpernel from the banks of the Caloosahatchee River, presumably in Lee County. Abram P. Garber probably collected the specimen upon which this report was based, but we have been unable to locate the specimen. Florida pimpernel was not reported again for Lee County until 1985, when Elliott Brown collected it in a "damp pineland" just north of Tamiami Village and west of US 41 in North Fort Myers (s.n., USF). Gann briefly surveyed this station in 2000. No plants were found, but additional surveys of this site should be conducted.

Olga Lakela made the first collections in Collier County in 1966 near Immokalee, north of State Road 29 in "pineland; white sand with scrub oaks and Serenoa repens…" (29417, USF). Kristi

Pierce collected it again in Collier County in 1998 at Pelican Marsh in the vicinity of Naples Park (s.n., USF).

Major Threats: Habitat destruction at Pelican Marsh station.

Preliminary recommendations:

- Survey Tamiami Village Flatwoods Site.
- Map and monitor plants at Pelican Marsh annually.
- Acquire Tamiami Village Flatwoods Site.
- Review for listing by FDACS and FNAI.

Asplenium xbiscaynianum (D.C. Eaton) A.A. Eaton
Biscayne Spleenwort

South Florida Status: Critically imperiled. One occurrence at Warwick Hammock.
Taxonomy: Pteridophyte; Aspleniaceae.
Habit: Perennial lithophytic herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Moist, exposed limestone in rockland hammocks.
Protection Status: Not listed by FDACS due to its hybrid status. Listed as critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo; Nelson (2000) has a black and white photo; the IRC Website has a color photo.
References: Eaton, 1906; Small, 1938; Darling, 1961; Lakela & Long, 1976; Long & Lakela, 1976; Avery & Loope, 1980a; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *A. rhizophyllum* L. var. *biscaynianum* D.C. Eaton.

Historical Context in South Florida: Isaac Holden first collected Biscayne spleenwort in 1887 in Brickell Hammock (s.n., NY). It was collected again in Brickell Hammock by Ralph M. Munroe in 1888 (s.n., NY), and by John Kunkel Small and Joel J. Carter in 1906 (s.n., FTG). Eaton (1906) reported that it was abundant at the bluffs near the "Punch Bowl" in Brickell Hammock. Walter M. Buswell made several collections from 1938 to 1949 in Miami that were presumably from Brickell Hammock (e.g. s.n., FTG). The

last collection from Brickell Hammock was by E.P. Kearsley in 1946 (s.n., NY). Thomas Darling, Jr. observed it there again in 1961 (Darling, 1961). A single specimen was seen in a small hammock near the Rickenbacker Causeway, possibly what is now Alice C. Wainwright Park. Don Keller also reports seeing a single individual at Alice Wainwright Park in the late 1980s on the bluff facing Biscayne Bay (personal communication, 8 February 2001). This could have been the same station that was observed by Darling. Recent surveys of that hammock by Gann, Bradley, and others have failed to locate any plants.

The next station to be vouchered was at Warwick Hammock, where Small and others made the first collection in 1922 (10731A, NY, US). Frank C. Craighead and Monroe R. Birdsey probably made the next collection there in 1959 (s.n., FTG), although their locality data is somewhat vague. William G. Atwater also collected it at that station in 1960 (s.n., ARCH, USF). P.B. Tomlinson made another collection in 1962 (12562, FTG), and stated that the hammock was mostly destroyed by that date. It was later developed for single-family residences. Gann found plants in 1995 that were persisting on exposed limestone in a private garden (s.n., FTG). About 50 plants were observed. Subsequently this property was sold. While the status of the plants at this station is unknown, Biscayne spleenwort is reported to be extant in another private yard in Warwick Hammock (D. Keller, personal communication, 8 February 2001).

Small and others also made a collection in Addison Hammock, now in the Deering Estate at Cutler, in 1923 (11103, NY), as did Donovan S. Correll, Helen B. Correll, and John Popenoe in 1974 (41536, FTG). The label says that it was “Very Rare!” and it has not been observed or collected there since that time. The last station to be discovered and vouchered was at Castellow Hammock Park, where Roger L. Hammer discovered a small population in 1984 on exposed limestone in the vicinity of *Asplenium dentatum* (s.n., FTG). This population has not been observed since Hurricane Andrew in 1992, and it may no longer be extant (R.L. Hammer, personal communication, 31 January 2001).

Frank C. Craighead translocated some plants into Everglades National Park in the 1950s, and they have been observed by a

number of people over the years. Don Keller most recently observed one plant there in 1993 (personal communication, 8 February 2001).

Major Threats: Habitat degradation and destruction at Warwick Hammock stations; long-term drainage on the Miami Rock Ridge; exotic pest plant invasions; off-target damage from exotic pest plant control programs; poaching; extirpation of the parent species (both parents are extant together only at Warwick Hammock).

Comments: *Biscayne spleenwort is a hybrid between* A. dentatum *and* A. verecundum. *Both the parents and Biscayne spleenwort require exposed limestone and adequate moisture and humidity, conditions that are now found in few rockland hammocks in Miami-Dade County. Due to the lowering of the regional freshwater table, it does not seems feasible to attempt to reintroduce Biscayne spleenwort to Brickell Hammock at this time.*

Preliminary recommendations:

- Survey Warwick Hammock and Castellow Hammock Park.
- Map known plants at least every three years.
- Monitor known plants at least every year.
- Develop conservation agreements with owners of the Warwick Hammock stations. Provide technical assistance to help manage these populations.
- Consider augmenting population at Warwick Hammock.
- Consider reintroducing Biscayne spleenwort to other sites within its historical range, including the Deering Estate at Cutler (through the reintroduction of *A. verecundum*), and Castellow Hammock Park (through the reintroduction of *A. dentatum*).
- Promote a higher regional water table on the Miami Rock Ridge.

Carya glabra (Mill.) Sweet
Pignut Hickory

South Florida Status: Critically imperiled. One occurrence along Alligator Creek in Charlotte County.
Taxonomy: Dicotyledon; Juglandaceae.
Habit: Tree.

Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Charlotte County.
South Florida Habitats: Mesic hammocks.
Protection Status: Not listed by any agency.
Identification: Nelson (1994) has a color photo.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Nelson, 1994; Flora of North America Editorial Committee, 1997; Wunderlin, 1998.
Synonyms: *C. ovalis* (Wagenh.) Sarg.; *Hicoria austrina* Small; *Hicoria glabra* (Mill.) Britton.

Historical Context in South Florida: Gann and Bradley discovered pignut hickory in 1996, south of a rest area at the intersection of I-75 and Charlotte County Road 768, on the banks of Alligator Creek. This station is owned by the Florida Department of Transportation. Bradley vouchered pignut hickory there in 1998 (1288, FTG, USF). Fewer than 100 plants were observed at this station, although more plants may be present along other parts of Alligator Creek.

Major Threats: Habitat destruction; exotic pest plant invasions.

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

Preliminary recommendations:
- Survey along Alligator Creek.
- Map plants at Alligator Creek at least every three years.
- Monitor plants at Alligator Creek at least every year.
- Designate Alligator Creek Pignut Hickory Site as a conservation area.

Cucurbita okeechobeensis (Small) L.H. Bailey
Okeechobee Gourd

South Florida Status: Critically imperiled. One occurrence on islands in Lake Okeechobee.

Taxonomy: Dicotyledon; Cucurbitaceae.
Habit: Annual vine.
Distribution: Endemic to peninsular Florida.
South Florida Distribution: Glades and Palm Beach counties.
South Florida Habitats: Hardwood swamp forests and wet disturbed sites.
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: Small, 1922; Bailey, 1930; Small, 1933a; Bailey, 1943; Long & Lakela, 1976; Ward, 1978; Avery & Loope, 1980a; Walters et al., 1992; Wunderlin, 1998; Chafin, 2000; Coile, 2000; USFWS, 2000.
Synonyms: *Pepo okeechobeensis* Small.

Historical Context in South Florida: Okeechobee gourd was collected first by John Kunkel Small and George K. Small in 1913 on Torrey Island in Lake Okeechobee in Palm Beach County (4155, NY). It was this specimen that Small (1930b) designated as the type specimen of *Pepo okeechobeensis*. Small also collected it in 1917 at the southwestern shore of Lake Okeechobee (8243, FLAS), and observed it in "hammocks of the four islands of Lake Okeechobee and in the hammocks of the southern and eastern shores" (Small, 1922). Small is referring to Torrey, Kreamer, and Ritta islands, and probably Observation Island. The entire range of the plant lies within the levee that now surrounds Lake Okeechobee.

Okeechobee gourd has been collected at Lake Okeechobee numerous times since 1917: in 1930 by Walter M. Buswell (s.n., FTG), in 1941 by John H. Davis, Jr. (s.n., FLAS), in 1965 by John Beckner (705, NY), in 1978 and 1982 by John Popenoe (1852, FTG; 2366, FTG), in 1981 by Donovan S. Correll and others (51517, FTG), and in 1990 by Terrence Walters and others (614, FTG; 615, FTG). It also was collected several times in 1997 by Bradley and Woodmansee (e.g., 939, FTG), who were shown several colonies of plants by South Florida Water Management biologist Mike Bodle. Plants were observed on Ritta Island, Torrey Island, and in the South Bay area. Bodle has observed these populations annually since 1997. Fewer than 1,000 plants are thought to be extant within any one year.

Okeechobee gourd has recently been reported in disturbed areas in Broward and Miami-Dade counties (USFWS, 2000), but it does not appear that these populations are native. As a federally listed plant, much research has been conducted on Okeechobee gourd. This research is reviewed in U.S. Fish and Wildlife Service (2000). An *ex situ* collection of germplasm is maintained at Bok Tower Gardens (USFWS, 2000).

Major Threats: Hydrological modifications in Lake Okeechobee; exotic pest plant invasions, especially melaleuca (*Melaleuca quinquenervia*).

Comments: Okeechobee gourd *was discovered in 1774 by William Bartram (1791) along the St. Johns River in northern Florida. It has been rediscovered in that area and has been collected in Lake, Seminole, and Volusia counties (USFWS, 2000; Wunderlin & Hansen, 2001).*

Preliminary recommendations:

- Map and monitor known stations annually
- Control exotic pest plants, especially melaleuca.
- Ensure that water management practices in Lake Okeechobee do not threaten Okeechobee gourd.
- Continue conservation biology and conservation horticulture studies.
- Continue maintenance of *ex situ* collection of germplasm at Bok Tower Gardens.
- Consider augmenting population in Lake Okeechobee.

Cuscuta americana L.
American Dodder

South Florida Status: Critically imperiled. One occurrence on disturbed private property in Miami-Dade County.
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Annual parasitic vine.
Distribution: Native to peninsular Florida, the West Indies, Mexico, and South America. Wunderlin (1998) reports it as rare in Florida. It has been collected in South Florida, and in Lake and Polk counties (Wunderlin & Hansen, 2001).

South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Rockland hammocks, pinelands, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Austin (1980) has an illustration; Correll & Correll (1982) has an illustration.
References: Yuncker, 1932; Small, 1933a; Long & Lakela, 1976; Austin, 1980; Correll & Correll, 1982; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small and others first collected American dodder in 1925 in a rockland hammock on Lower Matecumbe Key (s.n., FLAS, NY). This is the only known collection from the Florida Keys. That same year, Ethel Z. Bailey made a collection in Coconut Grove in Miami-Dade County (6457, NY). It was collected in a pineland at Buena Vista in 1929 by Charles A. Mosier (s.n., NY), and again in 1930 by Mosier (s.n., NY) and Harold N. Moldenke (372a, NY). Buena Vista was located just north of present-day downtown Miami. Walter M. Buswell made several collections in Coral Gables beginning in 1940 (s.n., FTG), and ending in 1943 (s.n., FTG; s.n., NY). Robert T. Clausen and Buswell also made a collection in Coral Gables in 1943 (6231, NY). American dodder was not recorded again until 1999, when Bradley found it growing in a disturbed thicket across the street from Old Dixie Pineland in Naranja. Bradley vouchered this station in 2000 (2086, FTG).

Major Threats: Habitat destruction.

Comments: *American dodder flowers in the summer through fall, when surveys should be conducted.*

Preliminary recommendations:
- Map and monitor known stations annually.
- Acquire Old Dixie Pineland site.
- Consider establishing an *ex situ* collection of germplasm.

- Assess appropriateness and study feasibility of introducing American dodder to other sites within its historical range, including the Old Dixie Pineland site and Klopp Tract, Lignumvitae Key Botanical State Park on Lower Matecumbe Key.
- Assess appropriateness and study feasibility of restoring sandy pine rocklands near the Miami River and reintroducing American dodder.
- Review for listing by FDACS and FNAI.

Desmodium strictum (Pursh) DC.
Pinebarren Ticktrefoil

South Florida Status: Critically imperiled. One occurrence at the Ludlam Florida Power and Light Easement in southern Miami-Dade County.
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern North America. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Miami-Dade County, where it is disjunct from Polk County.
South Florida Habitats: Sandy pockets in 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 stricta* (Pursh) Kuntze.

Historical Context in South Florida: George N. Avery first collected pinebarren ticktrefoil in 1978 at the Ludlam Pineland (1975, FTG, FLAS; 1983, FTG, FLAS), just north of what is now Deering Estate at Cutler. Part of Ludlam Pineland is now the Ludlam Pineland Tract, a Miami-Dade County conservation area, and part is a power line easement owned by Florida Power and Light. Although it is not certain, it appears that Avery found plants on property now owned by the county, just across the property line from the Florida Power and Light easement. In the mid-1990s Bradley found plants about 25 meters away in the Florida Power

and Light easement. Bradley and Woodmansee observed this station again in 2000.

Major Threats: Habitat destruction at the Ludlam Florida Power and Light Easement; fire suppression; exotic pest plant invasions, especially by Burmareed (*Neyraudia reynaudiana*).

Preliminary recommendations:

- Survey Ludlam Pineland Tract.
- Map plants at Ludlam Pineland at least every three years.
- Monitor plants at Ludlam Pineland at least every year.
- Develop conservation agreement with Florida Power and Light to restore and manage a viable population of pinebarren ticktrefoil at the Ludlam Florida Power and Light Easement. Provide technical assistance to help restore and manage this population.
- Control exotic pest plants, especially Burmareed.

Dicranopteris flexuosa (Schrad.) Underw.
Drooping Forked Fern

South Florida Status: Critically imperiled. One occurrence on the bank of a canal in northwestern Palm Beach County.
Taxonomy: Pteridophyte; Gleicheniaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to Florida, Alabama, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Palm Beach County.
South Florida Habitats: Known only from a disturbed canal bank.
Protection Status: Not listed by any agency.
Identification: Nelson (2000) has two color photos; Wunderlin & Hansen (2000) has two illustrations; the IRC Website has a color photo.
References: Small, 1938; Lakela & Long, 1976; Moyroud & Nauman, 1989; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: None.

Historical Context in South Florida: Drooping forked fern was discovered first in northeastern Palm Beach County by Steve Farnsworth in 1988 (Moyroud and Nauman, 1989), and vouchered by Richard Moyroud that same year (s.n.; NY, USF), and again in 1989 (s.n.; USF). The colony is growing on the bank of a canal adjacent to a school. The North County Water Control District manages this site. Richard Moyroud observed this colony in 2000, and fewer than 1,000 plants were thought to be present (R. Moyroud, personal communication, 19 January 2001).

Major Threats: Habitat destruction; exotic pest plant invasions, including Old World climbing fern (*Lygodium microphyllum*); hydrological modifications; poaching.

Comments: *Drooping forked fern prefers soil with a high clay content (Wunderlin & Hansen, 2000), and probably became established in South Florida after a canal was constructed, exposing a clay-like hardpan (Moyroud and Nauman, 1989). Based upon canal construction data obtained by Moyroud and Nauman, the Palm Beach County colony was less than 13 years old at the time of its discovery. Moyroud (personal communication, 19 January 2001) feels that unique conditions, including an even moisture flow across the hardpan from the adjacent uplands, low soil fertility, and highly acid soils provide the appropriate habitat for this species. It is uncertain that these conditions would be found in South Florida except in unusual, and temporary, circumstances. It seems possible that, without human disturbance, drooping forked fern would not have become well established in South Florida.*

Preliminary recommendations:

- Map and monitor plants annually.
- Develop a conservation agreement with the North County Water Control District to protect and manage Drooping Forked Fern Site. Provide technical assistance to help manage this population.
- Control exotic pest plants, especially Old World climbing fern.
- Consider introducing drooping forked fern to other sites within Palm Beach County, where it can be managed and studied.

Gymnopogon chapmanianus Hitchc.
Chapman's Skeleton Grass

South Florida Status: Critically imperiled. One occurrence in scrub along State Road 764 in Charlotte County.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to Florida. Wunderlin (1998) reports it as occasional in the peninsula west to Wakulla County.
South Florida Distribution: Broward, Charlotte, Collier, and Lee counties.
South Florida Habitats: Flatwoods and scrub.
Protection Status: Listed as rare by FNAI.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Small, 1933a; Hitchcock & Chase, 1950; Smith, 1971; Long & Lakela, 1976; Hall, 1978; Wunderlin, 1998.
Synonyms: *G*. *floridanus* Swallen.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected Chapman's skeleton grass in 1903 in pinelands in Fort Lauderdale (1030, NY). It was collected twice in Charlotte County, the first time in 1946 in flatwoods without precise locality data by O.E. Frye (s.n., FLAS), and the second time in 1999 by Richard P. Wunderlin along State Road 764 (10714, USF). The latter station is the only extant station known.

Olga Lakela collected Chapman's skeleton grass several times in Collier County beginning in 1964. She collected it first west of Immokalee (27419, USF), and again in 1964 in scrub northwest of Naples at County Road 846 (27703, USF). She collected it again in 1965 in scrub in the vicinity of Little Hickory Pass (29251, USF), and collected it twice in 1967 on Marco Island, the first time in scrub (27527, FLAS, USF), and the second in partly cleared scrub on the grounds of the schoolhouse (31185, FLAS, USF).

Olga Lakela collected Chapman's skeleton grass once in Lee County in 1967 on Pine Island in a recently cleared area, on the east side of State Road 767 north of the junction with State Road 78 (30566, USF). Gann attempted to locate the this station in 2001, but it appeared to have been destroyed. However, there are

pinelands in the vicinity that could contain populations of Chapman's skeleton grass, and these sites should be surveyed.

Major Threats: Habitat destruction of only known population; fire suppression; exotic pest plant invasions.

Preliminary recommendations:

- Survey Pine Island in Lee County.
- Map and monitor known stations annually.
- Acquire State Road 764 Chapman's Skeleton Grass Site.
- Consider introducing Chapman's skeleton grass to other sites within its historical range, including the Fort Lauderdale Executive Airport Gopher Tortoise Preserve in Broward County.
- Consider restoring scrub and scrubby flatwoods on Marco Island and reintroducing Chapman's skeleton grass.

Lactuca floridana (L.) Gaertn.
Woodland Lettuce

South Florida Status: Critically imperiled. One occurrence on Observation Island in Lake Okeechobee.
Taxonomy: Dicotyledon; Asteraceae.
Habit: Annual or biennial herb.
Distribution: Native to the eastern United States. Wunderlin (1998) reports this as occasional nearly throughout Florida.
South Florida Distribution: Glades County.
South Florida Habitats: Mesic hammocks.
Protection Status: Not listed by any agency.
Identification: It can be distinguished from other *Lactuca* species in Florida by having achenes with a short stout beak to 1/3 as long as the body, or no beak, rather than having a filiform beak more than 1/2 as long as the body (Wunderlin, 1998).
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *Mulgedium floridanum* (L.) DC.; *Mulgedium villosum* (Jacq.) Small.

Historical Context in South Florida: Gann and Bradley first collected woodland lettuce in Glades County in 1997 on

Observation Island in Lake Okeechobee (1000, FTG). Fewer than 10 plants were found on disturbed ground in a mesic hammock.

Major Threats: Manipulation of water levels in Lake Okeechobee; 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 or ephemeral in South Florida. In 1980, George N. Avery collected this species in Miami-Dade County at the edge of a guava thicket (2210, FTG). This was probably an introduced, short-lived occurrence.*

Preliminary recommendations:

- Map and monitor plants on Observation Island annually.
- Control wild hogs.

Nelumbo lutea Willd.
American Lotus

South Florida Status: Critically imperiled. Three occurrences in Lake Okeechobee, Lake Hicpochee, and Lake Trafford.
Taxonomy: Dicotyledon; Nymphaeaceae.
Habit: Perennial aquatic herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as occasional in Florida from the central peninsula to the central panhandle.
South Florida Distribution: Collier, Glades, and Palm Beach counties. It needs to be vouchered in Collier County.
South Florida Habitats: Lakes.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Tobe et al. (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Wood, 1959; Long & Lakela, 1976; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Taylor, 1992; Flora of North America Editorial Committee, 1997; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *N. pentapetala* (Walter) Willd.; *Nelumbium luteum* Willd.

Historical Context in South Florida: William G. Atwater first collected American lotus in 1960 along the western shore of Lake

Okeechobee in Glades County (M-234, FLAS). The Glades County occurrence was re-vouchered in 1997 by Bradley and Woodmansee, who observed large stands of American lotus in Fisheating Bay (406, FTG). Bradley and Woodmansee also collected it that same year in Palm Beach County along the eastern edge of Torrey Island in Lake Okeechobee (384, FTG).

Florida Department of Environmental Protection biologist Jackie Smith observed plants in Lake Hicpochee in Glades County in 2000 and in Lake Trafford in Collier County in 2001 (personal communication, 26 February 2001). Black & Black (1980) reported American lotus for Big Cypress National Preserve, but this probably represented a cultivated population. American lotus has been cultivated elsewhere in South Florida outside of its historical range (e.g., Treetops Park in Broward County), but it is not known to escape from cultivation.

Major Threats: Manipulations of water levels in Lake Okeechobee; off-target damage from exotic pest plant control programs; poaching.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. The dried infructescences of this species have been collected in Lake Okeechobee and used in floral arrangements. It is unknown what impact this collecting has had on the population.*

Preliminary recommendations:

- Voucher plants in Lake Hicpochee and Lake Trafford.
- Survey Big Cypress National Preserve.
- Map known stations at least every three years.
- Monitor known stations annually.
- Determine impacts of the collecting of infructescences on American lotus.

Nolina atopocarpa Bartlett
Florida Beargrass

South Florida Status: Critically imperiled. One occurrence in northwestern Lee County and southwestern Charlotte County on non-conservation lands along Burnt Store Road.
Taxonomy: Monocotyledon; Agavaceae.

Habit: Perennial terrestrial herb.
Distribution: Endemic to Florida. Wunderlin (1998) reports it as occasional from the central panhandle to the central peninsula.
South Florida Distribution: Charlotte and Lee counties.
South Florida Habitats: Mesic flatwoods.
Protection Status: Listed as threatened by FDACS and as rare by FNAI.
Identification: It can be distinguished from *N. brittoniana* of central Florida by having leaves 2-4 mm wide, rather than 6-15 mm wide (Wunderlin, 1998).
References: Small, 1933a; Ward, 1978; Wunderlin, 1998; Coile, 2000.
Synonyms: *N. georgiana* Michx., misapplied.

Historical Context in South Florida: Florida beargrass has been collected three times in South Florida. All three collections were made near the Charlotte County-Lee County line off State Road 765 (Burnt Store Road). Robert B. McCartney and Nancy Bissett made the first collection in 1989 in Charlotte County (s.n., USF), followed in 1991 by Steven L. Orzell and Edwin L. Bridges in Lee County (16497, USF) and Dorothy P. Zysko in Charlotte County (s.n., USF). Gann briefly surveyed the Charlotte County stations in 2000. The McCartney and Bissett station had been destroyed, but habitat was still present in the vicinity of the Zysko station, both on private property and in the Yucca Pen Unit of the Fred C. Babcock-Cecil M. Webb Wildlife Management Area. In 2001, Gann also attempted to locate the Orzell and Bridges station. Habitat still exists at the station, but it is in private ownership and is posted. Florida beargrass is assumed to be extant at one or both of the latter two stations.

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

Comments: *Florida beargrass flowers in the spring, when surveys should be conducted*.

Preliminary recommendations:

- Survey appropriate habitats along Burnt Store Road in Charlotte and Lee counties, including the Yucca Pen Unit of Fred C. Babcock-Cecil M. Webb Wildlife Management Area.

- Map known stations at least every three years.
- Monitor known stations at least every year.
- Continue acquisition projects to expand Fred C. Babcock-Cecil M. Webb Wildlife Management Area and Charlotte Harbor State Buffer Preserve along Burnt Store Road.

Orontium aquaticum L.
Goldenclub

South Florida Status: Critically imperiled. One occurrence on private property in Glades County.
Taxonomy: Monocotyledon; Araceae.
Habit: Perennial terrestrial herb.
Distribution: Native primarily 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: Martin, Glades, and Lee counties, and either Collier or Hendry County.
South Florida Habitats: Cypress swamps.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Tobe et al. (1998) has an illustration and color photos.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1979; Bell & Taylor, 1982; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small first collected goldenclub in 1917 in the Okaloacoochee Slough (s.n., US), which runs through both Hendry and Collier counties, and is now partially protected in Big Cypress National Preserve, Florida Panther National Wildlife Reserve, Okaloacoochee Slough State Forest, and Okaloacoochee Slough Wildlife Management Area. Paul C. Standley collected the next specimen in 1927 in a cypress swamp in the vicinity of Fort Myers (52568, US). In 1978, Bruce E. Tatje made a single collection in Martin County on the headwaters of the south fork of the St. Lucie River (61, FAU). This collection may have been made within what is now the South Fork

St. Lucie River site, which is being managed as part of Jonathan Dickinson State Park.

In 2000, Bradley discovered goldenclub in Glades County (2095, FTG). A small colony of plants was found under a bridge along John Hendry Slough just south of the Highlands County line. The species is probably present along the creek on private property to the east and west of this bridge. It seems likely that goldenclub is present in the newly protected Fisheating Creek Wildlife Management Area.

Major Threats: Habitat destruction; hydrological modifications; 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:

- Survey Fisheating Creek Wildlife Management Area, South Fork St. Lucie River in Jonathan Dickinson State Park, and the Okaloacoochee Slough in Big Cypress National Preserve, Florida Panther National Wildlife Reserve, Okaloacoochee Slough State Forest, and Okaloacoochee Slough Wildlife Management Area.
- Map known stations at least every three years.
- Monitor known stations annually.

Potamogeton pusillus L.
Small Pondweed

South Florida Status: Critically imperiled. One occurrence in Lake Okeechobee.
Taxonomy: Monocotyledon; Potamogetonaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to North America, Mexico, and the Old World. Wunderlin (1998) reports it as occasional in Florida in the panhandle and the central peninsula.
South Florida Distribution: Charlotte, Martin, and Palm Beach counties.
South Florida Habitats: Lakes and creeks.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.

References: Small, 1933a; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: *P. pusillus* subsp. *tenuissimus* (Mert. & W.D.J. Koch) R.R. Haynes & Hellq.

Historical Context in South Florida: T.S. Denike first collected small pondweed in 1973 in a pond inside the IBM Corporation complex in Boca Raton in Palm Beach County (s.n., FAU). It is not certain whether or not this population was native. In 1980, Ruben P. Sauleda made a collection in Charlotte County in the vicinity of Murdock (3385, USF). The specimen was reported to have been collected in a creek running through a pineland. Gann surveyed this area in 2000, but did not locate any plants. The Murdock area has been heavily developed and all natural waterways have been canalized. In 1983, Ken Langeland collected small pondweed in Martin County in a lake at a Florida Power and Light property in Indiantown (s.n., FLAS). The plants were stated to be frequent there. In 1997, South Florida Water Management District biologist Mike Bodle showed plants of this species to Bradley and Woodmansee at Halifax Bank in Lake Okeechobee in Palm Beach County. Bradley and Woodmansee vouchered this population (390, FTG). A few plants were seen floating in deep water.

Major Threats: Hydrological modifications; exotic pest plant invasions.

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

Preliminary recommendations:
- Survey Indiantown area.
- Map known stations at least every three years.
- Monitor known stations annually.

Rhynchospora pusilla Chapm. ex M.A. Curtis
Fairy Beaksedge

South Florida Status: Critically imperiled. One occurrence at Lake Trafford Flatwoods Site.
Taxonomy: Monocotyledon; Cyperaceae.

Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain and the West Indies. Wunderlin (1998) reports it as occasional in Florida from the western panhandle to the peninsula.
South Florida Distribution: Collier, Lee, Glades, and possibly Miami-Dade counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *R. intermixta* C. Wright.

Historical Context in South Florida: Abram P. Garber first collected fairy beaksedge in 1877, with the location given as "Everglades. Florida" (s.n., US). This station may have been in Miami-Dade County, where Garber collected extensively in 1877. In 1919, Paul C. Standley made a collection in the vicinity of Fort Myers (18905, US). In 1964, Olga Lakela made a collection in Collier County near Corkscrew Swamp Sanctuary (27057, USF). In 1998, Bradley collected fairy beaksedge at the Lake Trafford Flatwoods Site in Immokalee (1870, FTG). This is the only known extant location. Daniel B. Ward and others also collected fairy beaksedge in Glades County in 1965, southwest of Palmdale (5196, FLAS), in the vicinity of what is now the Fisheating Creek Wildlife Management Area.

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

Preliminary recommendations:

- Survey Corkscrew Swamp Sanctuary, Corkscrew Regional Ecosystem Watershed, and Fisheating Creek Wildlife Management Area.
- Map known stations at least every three years.
- Monitor known stations at least annually.
- Acquire Lake Trafford Flatwoods Site.

Schizachyrium sericatum (Swallen) Gould
Silky Bluestem

South Florida Status: Critically imperiled. One occurrence on a roadside on Ramrod Key.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Original habitat unknown, but possibly in pinelands, openings in hammocks, or on coastal berms. Now confined to a single roadside.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Swallen, 1941; Hitchcock & Chase, 1950; Hall, 1978; Avery & Loope, 1980a; Wunderlin, 1998; Coile, 2000.
Synonyms: *Andropogon sericatus* Swallen.

Historical Context in South Florida: W.A. Silveus first collected silky bluestem in 1940 on Ramrod Key (6633, US). This collection was designated as the type specimen when Jason R. Swallen described it as a new species in 1941. No habitat data was specified. It was not seen again until 1995, when Bradley made two collections on roadsides on Ramrod Key (269, FTG; 278, FTG). Fewer than 50 plants were seen. This species was erroneously reported for Key Largo (Hall, 1978).

Major Threats: Mowing; herbicide applications; dumping.

Comments: *This is one of the state's most imperiled plant species. It will be under constant threat of extinction until a population is established within an appropriate habitat in at least one conservation area.*

Preliminary recommendations:
- Survey additional areas on Ramrod Key, including the Ramrod Key Coastal Berm Site.
- Map and monitor plants at least annually.

- Develop conservation agreement with Monroe County to insure that maintenance personnel do not accidentally kill the Ramrod Key population.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Assess appropriateness and study feasibility of introducing silky bluestem to other sites within its historical range, including Ramrod Hammocks, Florida Keys Wildlife and Environmental Area.
- Review for listing by USFWS.

Tephrosia angustissima Shuttlew. ex Chapm. *var.* ***corallicola*** (Small) Isely **Coral Hoarypea**

South Florida Status: Critically imperiled. One occurrence at USDA Subtropical Horticulture Research Station.
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida and Cuba.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by FDACS (as *T. angustissima*) and as critically imperiled by FNAI.
Identification: *T. angustissima* is distinguished from other species of *Tephrosia* in Florida by having a glabrous style (Wunderlin, 1998). The variety *corallicola* is distinguished from other varieties of *T. angustissima* by being finely villous or canescent (Wunderlin, 1998). Chafin (2000) has illustrations and a color photo (by Hammer).
References: Small, 1909; Small, 1933a; León & Alain, 1951; Shinners, 1962b; Long & Lakela, 1976; Austin et al., 1980b; Isely, 1982; Isely, 1990; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *T. corallicola* (Small) Léon; *Cracca corallicola* Small.

Historical Context in South Florida: John Kunkel Small first collected coral hoarypea in 1904 in pinelands between Coconut Grove and Cutler (2112, NY). Small (1909) later described it as a new species, *Cracca corallicola*. The next collection was not made until 1935, when Walter M. Buswell vouchered it south of

Coral Gables (s.n., FTG, NY) and photographed it in that location in 1937 (s.n., USF). In 1948, Roy O. Woodbury collected it at Cutler (s.n., FTG). It was not seen again until 1968, when George N. Avery collected it in pinelands across from Fairchild Tropical Garden (463, FLAS, FTG, USF), a station that has been destroyed. Avery made another collection at the USDA Subtropical Horticulture Research Station in 1978 (1807, FLAS; Avery's Notes, 4 January 1978). Around 1995, Bradley, Woodmansee, and Dena Garvue observed this station. Plants were found growing in an open mowed field near a small pine rockland fragment. This remains the only known station in South Florida. Fairchild Tropical Garden maintains an *ex situ* collection of coral hoarypea.

Major Threats: Destruction of plants at the USDA Subtropical Horticulture Research Station.

Comments: *The status of this species in Cuba is unknown.*

Preliminary recommendations:

- Map and monitor plants annually.
- Develop conservation agreement with USDA to protect and restore a viable population of coral hoarypea at the USDA Subtropical Horticulture Research Station.
- Consider establishing an *ex situ* collection of germplasm.
- Conduct conservation biology and conservation horticulture studies.
- Consider introducing coral hoarypea to other stations within its historical range, including Ludlam Pineland Tract.
- Determine status in Cuba.

Rare Plants of South Florida:

Their History, Conservation, and Restoration

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The Institute for Regional Conservation

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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 2. Plants In One Conservation Area

Adiantum villosum L.
Woolly Maidenhair

South Florida Status: Critically imperiled. One occurrence at Castellow Hammock Park.
Taxonomy: Pteridophyte; Adiantaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Oolitic limestone in rockland hammocks.
Protection Status: Not listed by any agency.
Identification: Nelson (2000) has a color photo.
References: Nauman, 1987b; Wunderlin, 1998; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *A. tetraphyllum* of Nauman, not Humb. & Bonpl. ex Willd.

Historical Context in South Florida: Alan Cressler discovered woolly maidenhair in 1987 in Ross Hammock in Castellow Hammock Park, and it was vouchered there that same year by Clifton E. Nauman, Roger L. Hammer, and Cressler (1881, FTG). Only one plant was present, and this individual is still the only plant known in Florida.

Major Threats: Stochastic events (e.g., hurricanes); poaching; exotic pest plant invasions; off-target damage from exotic species control efforts; long-term drainage on the Miami Rock Ridge.

Comments: *Wunderlin (1998) lists this as an exotic, but there is no evidence that this species has escaped from cultivation (Nauman, 1987b). Wunderlin & Hansen (2000) treats it as a recent range extension from the West Indies.*

Preliminary recommendations:
- Map plant(s) at Castellow Hammock Park on an annual basis.
- Monitor plant(s) on a quarterly basis.
- Protect from poaching.
- Consider establishing an *ex situ* collection of germplasm.

Anagallis minima (L.) E.H.L. Krause
Chaffweed

South Florida Status: Critically imperiled. One occurrence at Corkscrew Regional Ecosystem Watershed.
Taxonomy: Dicotyledon; Primulaceae.
Habit: Annual terrestrial herb.
Distribution: Native to much of North America south to Mexico. It is also present in the Old World.
South Florida Distribution: Charlotte, Collier, Glades, and Lee counties. Reported in error for the Florida Keys in Monroe County by Small (1913). Wunderlin (1998) reports it as occasional in Florida in the peninsula and the central and western panhandle.
South Florida Habitats: Moist, usually disturbed soils.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1981) has an illustration.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: *Centunculus minimus* L.

Historical Context in South Florida: Alvan W. Chapman first collected chaffweed in the mid 1800s along the Caloosahatchee River (s.n., US), presumably in Lee County. Paul C. Standley collected it next in Lee County in a pineland ditch in Fort Myers in 1916 (2641, US). William C. Brumbach collected chaffweed on Sanibel Island four times between 1969 (6605, FLAS) and 1973 (8253, NY). All of these collections were from damp, disturbed soils. Loran C. Anderson observed it in 1997 in the Flint Pen Strand section of what is now Corkscrew Regional Ecosystem Watershed (Anderson, 1997), where it is presumed to be extant.

Allan H. Curtiss collected chaffweed in 1901 in ditches near Punta Gorda in Charlotte County (6756, NY, USF). In 1924, John Kunkel Small and others made a collection on the edge of a swamp near Naples in Collier County (11156, NY). In 1968, Olga Lakela made a collection along State Road 29 north of Immokalee (31708, USF). Frank C. Craighead collected it in 1962 about eight miles west of Palmdale along State Road 74 in Glades County (s.n., FTG).

Major Threats: Exotic pest plant invasions; hydrological modifications.

Comments: *This is a small, annual terrestrial herb that could easily be overlooked. Collections from South Florida have been made from January through April, when surveys should be conducted.*

Preliminary recommendations:

- Voucher plants at Corkscrew Regional Ecosystem Watershed.
- Survey along Caloosahatchee River, including Caloosahatchee Regional Park.
- Survey other historical stations.
- Map and monitor known stations on a regular basis.

Aristida floridana (Chapm.) Vasey
Key West Threeawn

South Florida Status: Critically imperiled. One occurrence at Little Hamaca Park.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Apparently native to South Florida. Native to Mexico.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Dry, disturbed sites.
Protection Status: Not listed by any agency due to dispute as to origin (see Comments).
Identification: Hitchcock & Chase (1950) has an illustration.
References: Chapman, 1883; Hitchcock, 1924; Henrard, 1926; Small, 1933a; Hitchcock & Chase, 1950; Long & Lakela, 1976; Hall, 1978; Wunderlin, 1998.
Synonyms: *A. ternipes* Cav., misapplied; *Ortachne floridana* (Chapm.) Nash; *Streptachne floridana* Chapm.

Historical Context in South Florida: Key West threeawn was collected first on the island of Key West in the mid 1800s by either John Loomis Blodgett (s.n., NY) or Alvan W. Chapman (s.n., NY). It was not seen again until George N. Avery observed it in 1965 on Ramrod Key on a disturbed roadside (Avery's Notes, 29 July

1965). Avery returned to that station in 1978, but the site had been destroyed (Avery's Notes, 17 August 1978). Avery also found Key West threeawn on Key West along a railroad embankment in 1966, a site that was almost completely destroyed by 1978 (Avery's Notes, 7 August 1966, 30 August 1978). Bradley rediscovered Key West threeawn in 1998 along a disturbed roadside at Little Hamaca Park on Key West.

Major Threats: Stochastic extinction (e.g., hurricanes); management error; exotic pest plant invasions.

Comments: *There has been some discussion as to whether or not Key West threeawn is really native (e.g., Austin, 1981). It has been found only in the lower Florida Keys in open, dry, disturbed soils. Although it was originally thought to be a South Florida endemic, it is now known to be native to the Yucatan peninsula in Mexico, where it is relatively abundant. This issue needs further study. At a minimum, Key West threeawn should be protected from extirpation until the issue can be resolved.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Study nativity of Key West threeawn. If the species is native, implement additional recommendations.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting population at Little Hamaca Park.
- Consider introducing populations to other sites within its historical range.

Aristolochia pentandra Jacq.
Marsh's Dutchman's-pipe

South Florida Status: Critically imperiled. One occurrence at Biscayne National Park.
Taxonomy: Dicotyledon; Aristolochiaceae.
Habit: Perennial vine.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.

South Florida Habitats: Coastal rockland hammocks and coastal berms.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Correll & Correll (1982) has an illustration.
References: Chapman, 1883; Small, 1933a; Pfeifer, 1970; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Abram P. Garber first collected Marsh's dutchman's-pipe in 1877 in Miami (1129a; F, GH, NA, US), presumably in Brickell Hammock. In 1913, John Kunkel Small and George K. Small collected it in a hammock between Miami and Coconut Grove (4634, NY). This collection was almost certainly from Brickell Hammock. In 1926, Small and others made the last collection on the South Florida mainland at what is now Deering Estate at Cutler (s.n., USF).

Small and George V. Nash first collected Marsh's dutchman's-pipe in the Florida Keys in 1901 on Elliott Key (223, NY), in what is now Biscayne National Park. It has been collected three other times on Elliott Key, once by J.L. Fennell in 1939 (1046, UC), once by Frank C. Craighead in 1966 (s.n., FTG), and once by George N. Avery in 1978 (1823, FTG, USF). It has been observed on Elliott Key more recently by Roger L. Hammer in 1990 and 1996 (personal communication, 5 March 2001), and by Bradley and Woodmansee in 2001. The plants are primarily found on a coastal berm that runs along the eastern side of the island. Bradley and Woodmansee have collected geographical coordinates for the plants they have located on the island.

In 1904, Nathaniel L. Britton collected Marsh's dutchman's-pipe on Soldier Key (335, F, NY), also in what is now Biscayne National Park. Small and Joel J. Carter subsequently collected it there in 1909 (3141, FTG, GH, NY, US). Bradley and Woodmansee surveyed this station in 2001, but no viable habitat for this species remains due to anthropogenic disturbances and rising sea level. In 1915, Small and Charles A. Mosier made a collection on Pumpkin Key (5674, MO, NY), a privately held island just outside of Biscayne National Park in Monroe County. Small and Mosier

also made a single collection in 1912 in a hammock on Upper Matecumbe Key (3912, NY). This is the only known record for the middle Florida Keys.

Major Threats: Exotic pest plant invasions, especially latherleaf (*Colubrina asiatica*); off-target damage from exotic species control efforts; sea-level rise.

Comments: *This species is a larval food plant for the polydamus swallowtail butterfly (*Battus polydamas*). The presence of a population of polydamas swallowtails on Elliott Key indicates that the population of Marsh's Dutchman's-pipe on Elliott Key may be larger than thought (R.L. Hammer, personal communication, 5 March 2001).*

Preliminary recommendations:

- Survey Pumpkin Key and Upper Matecumbe Key.
- Map and monitor known stations on a regular basis.
- Control latherleaf and other exotic pest plants on Elliott Key.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider reintroducing Marsh's dutchman's-pipe to other sites within its historical range, including Addison Hammock at the Deering Estate at Cutler.
- Consider introducing Marsh's dutchman's-pipe to other sites within its historical range, including Alice Wainwright Park, Simpson Park, and Vizcaya Museum and Gardens within historic Brickell Hammock, and Attwood Addition, Indian Key Historic State Park on Upper Matecumbe Key.

Asimina obovata (Willd.) Nash
Bigflower Pawpaw

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Annonaceae.
Habit: Shrub.
Distribution: Endemic to peninsular Florida.
South Florida Distribution: Glades and Martin counties. Kral (1960a) cited an improperly labeled specimen attributed to Miami-

Dade County (J. Popenoe, personal communication, 13 March 2001). The Martin County station needs to be vouchered.
South Florida Habitats: Scrub.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Nelson (1996) has a photo and an illustration; Taylor (1998) has a color photo.
References: Small, 1933a; Kral, 1960a; Godfrey, 1988; Taylor, 1992; Nelson, 1996; Flora of North America Editorial Committee, 1997; Wunderlin, 1998.
Synonyms: *Pityothamnus obovatus* (Willd.) Small.

Historical Context in South Florida: Ruben P. Sauleda first collected bigflower pawpaw in 1981 near Palmdale in Glades County (4991, FTG), in the vicinity of what is now the Fisheating Creek Wildlife Management Area. Loran C. Anderson recently discovered it at Jonathan Dickinson State Park (Anderson, 1997), but this station needs to be vouchered.

Major Threats: Fire suppression; exotic pest plant invasions.

Preliminary recommendations:
- Voucher plants at Jonathan Dickinson State Park.
- Survey Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Asplenium abscissum Willd.
Cutleaf Spleenwort

South Florida Status: Critically imperiled. One occurrence at Fern Forest Nature Center.
Taxonomy: Pteridophyte; Aspleniaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to peninsular Florida, the West Indies, Mexico, Central America, and South America. Wunderlin & Hansen (2000) reports it as occasional in Florida from Alachua County south to Miami-Dade County.
South Florida Distribution: Broward and Miami-Dade counties.
South Florida Habitats: Exposed limestone in rockland hammocks.
Protection Status: Not listed by any agency.

Identification: Nelson (2000) has a color photo; 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; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *A. firmum* Kunze.

Historical Context in South Florida: John J. Soar first collected cutleaf spleenwort in 1903 in a hammock near Homestead (s.n., NY), possibly at Hattie Bauer Hammock, Fuchs Hammock, or Meissner Hammock. In 1979, Grace Iverson collected cutleaf spleenwort in Broward County (s.n., USF), in what is now Fern Forest Nature Center. Bradley and Alan Cressler observed this population in 1996. Fewer than 10 plants were observed.

Major Threats: Exotic pest plant invasions; off-target damage from exotic species control programs; poaching; long-term drainage of rockland hammock habitat in both Broward and Miami-Dade counties.

Preliminary recommendations:
- Map and monitor plants at Fern Forest Nature Center.
- Protect from poaching.
- Consider augmenting population at Fern Forest Nature Center.
- Consider introducing cutleaf spleenwort to other sites within its historical range, including Hattie Bauer Hammock, Fuchs Hammock, and Meissner Hammock.

Asplenium erosum L.
Eared Spleenwort

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Pteridophyte; Aspleniaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to peninsular Florida, the West Indies, Central America, and South America. Wunderlin & Hansen (2000) reports it as occasional in Florida in the central and southern peninsula.

South Florida Distribution: Collier County.
South Florida Habitats: Strand swamps.
Protection Status: Listed as endangered by FDACS and imperiled by FNAI.
Identification: Nelson (2000) has color photos; Chafin (2000) has an illustration.
References: Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Nelson, 2000; Liogier & Martorell, 2000; Wunderlin & Hansen, 2000.
Synonyms: *A. auritum* Sw.

Historical Context in South Florida: Eared spleenwort was collected first in 1938 by Walter M. Buswell in "Big Cypress Hammock" (s.n., NY) and on the same day by W.S. Phillips in "Big Cypress" (s.n., FTG, USF). Presumably the two were collecting together. Both locations refer to the Fakahatchee Strand, now within Fakahatchee Strand Preserve State Park. Subsequent collections were made in 1938 by Roy O. Woodbury and "Waldeck" (s.n., FTG, USF), in 1943 by Buswell (s.n., FTG), in 1944 by Buswell (s.n., FTG, USF), in 1945 by Leonard J. Brass (15801, ARCH), in 1963 by J.A. Lassiter and Rita Lassiter (1, USF), in 1968 by E. Skinner and C. Weymouth (s.n., FTG), in 1978 by Daniel F. Austin and others (6760, USF; 6761, USF), and in 1978 by Clifton E. Nauman and others (330, USF). Florida Park Service biologist Mike Owen estimates that there are fewer than 1,000 plants in Fakahatchee Strand Preserve State Park (personal communication, 22 January 2001).

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

Comments: *Lakela & Long (1976), in error, reported this species as being introduced from Jamaica.*

Preliminary recommendations:
- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

- Control Old World climbing fern and other exotic pest plants that threaten eared spleenwort.

Bourreria radula (Poir.) G. Don
Rough Strongback

South Florida Status: Critically imperiled. One occurrence at Little Hamaca Park and nearby areas on the island of Key West.
Taxonomy: Dicotyledon; Boraginaceae.
Habit: Shrub or small tree.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
Southern Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Distinguished in the field from *B. succulenta* (syn. = *B. ovata*) by its having very rough leaves, rather than having relatively smooth leaves like adult *B. succulenta*. *B. succulenta*, however, can have rough leaves when young, and has been misidentified as *B. radula* at a number of sites in the Florida Keys. Scurlock (1987) has color photos of both species; Chafin (2000); has an illustration of *B. radula* and a photo of *B. succulenta*.
References: Nuttall, 1849; Small, 1933a; Ward & Fantz, 1977; Little, 1978; Tomlinson, 1980; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *B. revoluta* Kunth, misapplied; *Cordia floridana* Nutt.; *Ehretia radula* Poir.

Historical Context in South Florida: John Loomis Blodgett first collected rough strongback on the island of Key West between 1838 and 1853 (s.n., NY). Other collections were made in 1874 by Edward Palmer (405, NY), in 1877 by Abram P. Garber (s.n., NY), in 1895 by Allan H. Curtiss (5427, NY), and in 1913 by John Kunkel Small and George K. Small (4935, NY). It also has been collected and observed many times in several yards in the city of Key West where it is extant. George N. Avery discovered it at the Key West Cemetery in 1964 (Avery's Notes, 28 August 1964). This occurrence was vouchered by Bradley in 1995 (266, FTG), and last observed by Bradley in 2001, when fewer than 10 plants were seen. T. Ann Williams discovered rough strongback at Little

Hamaca Park in the city of Key West in 1986 (s.n., FTG). One mature individual was observed (T.A. Williams, personal communication, 6 March 2001). It was extant there in 1992, when Gann observed a single mature plant, presumably the same individual discovered by Williams. Little (1978) also reported rough strongback from Stock Island just north of Key West, although no collections from that island have been seen by the authors.

Rough strongback is cultivated throughout South Florida, and has sparingly naturalized outside of its natural range.

Major Threats: Exotic pest plant invasions; destruction of individual plants; stochastic events (e.g., hurricanes).

Preliminary recommendations:

- Map individual plants on an annual basis.
- Monitor individual plants on a quarterly basis and observe condition and reproductive status.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting population at Little Hamaca Park.
- Consider restoring rockland hammock on Key West and introducing rough strongback.

Brasenia schreberi J.F. Gmel.
Watershield

South Florida Status: Critically imperiled. One occurrence at Savannas Preserve State Park.
Taxonomy: Dicotyledon; Cabombaceae.
Habit: Perennial aquatic herb.
Distribution: Native to North America, the West Indies, Central America, South America, and the Old World. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Martin County.
South Florida Habitats: Basin marshes.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo.

References: Chapman, 1883; Small, 1933a; Wood, 1959; Long & Lakela, 1976; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: *B. peltata* Pursh.

Historical Context in South Florida: Gann and Bradley first observed watershield in 1997 at Savannas Preserve State Park in Martin County. Bradley and Woodmansee vouchered this population in 2001 (1333, FTG).

Major Threats: Hydrological modifications; exotic pest plant invasions.

Comments: *This is the southernmost station for watershield in Florida. It is unknown why there is a gap in its natural range in the rest of South Florida. It is widespread in North America and tropical America.*

Preliminary recommendations:
- Map and monitor known stations on a regular basis.

Burmannia flava Mart.
Fakahatchee Bluethread

South Florida Status: Critically imperiled. One occurrence at Big Cypress National Preserve.
Taxonomy: Monocotyledon; Burmanniaceae.
Habit: Annual terrestrial herb.
Distribution: Native to South Florida, Cuba, Central America, and South America.
South Florida Distribution: Collier and Lee counties.
South Florida Habitats: Mesic flatwoods.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: There is an illustration in Ward (1978).
References: Jonker, 1938; Long & Lakela, 1976; Ward, 1978; Godfrey & Wooten, 1979; Popenoe, 1986; Wunderlin, 1998; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Jeanette P. Standley first collected Fakahatchee bluethread in 1916 in the vicinity of Fort Myers (376, NY). Leonard J. Brass made the next collection in 1946, six miles west of Miles City (15874, US), either in what is now the Fakahatchee Strand Preserve State Park or in what is now the Florida Panther National Wildlife Refuge. Ward (1978) provides an account of this discovery. Fakahatchee bluethread is extant in Big Cypress National Preserve, where John Popenoe first collected it in 1984 in the Kissimmee Billy Strand area (2394, FTG, USF). Popenoe (1986) described this discovery. Alan Herndon also collected it in 1988 in the Bear Island area of Big Cypress National Preserve (2271, FTG). Bradley collected it at two localities in Bear Island in 1997 (1067, FTG; 1099, FTG).

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

Comments: *Fakahatchee bluethread is overlooked easily in the field. It flowers spring through fall, when surveys should be conducted. Ward (1978) suggested that it may be partially saprophytic, and dependent upon mycorrhizal fungi for the decomposition of organic matter.*

Preliminary recommendations:

- Survey Kissimmee Billy Strand area of Big Cypress National Preserve, Fakahatchee Strand Preserve State Park, and Florida Panther National Wildlife Refuge.
- Map and monitor known stations on a regular basis.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.

Caesalpinia pauciflora (Griseb.) C. Wright
Fewflower Holdback

South Florida Status: Critically imperiled. One occurrence at the National Key Deer Refuge and surrounding private properties on Big Pine Key.
Taxonomy: Dicotyledon; Fabaceae.
Habit: Shrub.

Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Pine rocklands.
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.
References: Chapman, 1883; Small, 1933a; Isely, 1982; Long & Lakela, 1976; Isely, 1980; Scurlock, 1987; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Allan H. Curtiss first collected fewflower holdback in 1880 on Big Pine Key (713, US, NY). Since that collection, numerous other collections have been made on Big Pine Key, where the species occurs today within the boundaries of National Key Deer Refuge. T. Ann Williams has observed plants on Big Pine Key in pinelands south of Watson Boulevard and east of Key Deer Boulevard, and in another area in a pineland near the industrial area behind the Chamber of Commerce building (personal communication, 6 March 2001).

Francis W. Pennell vouchered plants on Cudjoe Key in 1917 (9563, US). It was not seen there again until George N. Avery observed it in 1964 and 1965 (Avery's Notes, 1964-1965). Bruce F. Hansen and others vouchered it there in 1985 (10674, USF, FTG). Presumably this station was in or near National Key Deer Refuge property on the island. In 1964, Avery discovered a population on Summerland Key (Avery's Notes, 11 February 1964). Robert W. Long and R. Broome vouchered this population in 1967 (2480, USF). No recent reports from this island have been seen, and it is probably extirpated there. Suitable habitat for this species may exist on other islands, such as Sugarloaf Key or Little Pine Key. T. Ann Williams has searched for this species extensively on No Name Key to no avail (personal communication, 6 March 2001).

Davis (1942) reported fewflower holdback from the lower Sandy Keys, west of Key West. No specimens from this area have been seen. Gann and Bradley surveyed this area in 1996, but no plants were seen. Davis' report may have been made in error.

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

Preliminary recommendations:

- Survey Cudjoe Key and Summerland Key.
- Map and monitor known stations on a regular basis.
- Acquire private sites with populations of fewflower holdback and add to National Key Deer Refuge.

Campylocentrum pachyrrhizum (Rchb. f.) Rolfe
Leafless Bentspur Orchid

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida, the West Indies, 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; Bell & Taylor (1982) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Ward, 1978; Bell & Taylor, 1982; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Alvah A. Eaton first collected leafless bentspur orchid in 1905 (s.n., NY), presumably in what is now Fakahatchee Strand Preserve State Park. It was subsequently vouchered there by Daniel B. Ward in 1965 (5364, FLAS, FSU) and by George N. Avery in 1969 (2075, FTG). It is extant in deep sloughs in the center of the strand. Gann and Woodmansee observed it 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 present in the Fakahatchee Strand (personal communication, 7 February 2001).

E.P. St. John also made two collections in the late 1930s from the Deep Lake area (s.n., FLAS; s.n., FLAS), which is located immediately to the east of the Fakahatchee Strand within Big Cypress National Preserve. However, St. John's Deep Lake specimens all appear to be from the Fakahatchee Strand. Black & Black (1980) reported leafless bentspur orchid from Big Cypress National Preserve based upon a 1956 specimen, which we have been unable to verify. It seems doubtful that leafless bentspur orchid was ever present in Big Cypress National Preserve.

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

Comments: *This is one of the few epiphytic orchids that will grow on the trunks of royal palms (*Roystonea regia*) (R.L. Hammer, personal communication, 19 February 2001).*

Preliminary recommendations:

- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten leafless bentspur orchid.

Campyloneurum angustifolium (Sw.) Fée
Narrow Strap Fern

South Florida Status: Critically imperiled. One occurrence at 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: Miami-Dade and Collier counties.
South Florida Habitats: Rockland hammocks and strand swamps.
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: Eaton, 1906; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Ward, 1978; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Polypodium angustifolium* Sw.

Historical Context in South Florida: John J. Soar and Alvah A. Eaton first collected narrow strap fern in 1903 in Timms Hammock (Eaton, s.n., NY; Small, 1938), now part of the Miami-Dade County park Camp Owaissa Bauer. Eaton (1906) reported that there were a considerable number of plants in Timms Hammock. It was collected again in Timms Hammock by Charles A. Mosier in 1918 and 1919 (s.n., NY; s.n., NY), and by Mary W. Diddell in 1932 (s.n., FLAS). The last collection of narrow strap fern at Timms Hammock was by "Mrs. Peterson" in 1935 (s.n., FTG).

E.P. Kearsley first collected narrow strap fern outside of Miami-Dade County in 1949 "40 miles west of Miami" (s.n., NY). It is probable that this collection came from what is now the Pinecrest region of Big Cypress National Preserve, where there are numerous rockland hammocks providing appropriate habitat for narrow strap fern.

In 1931, John Kunkel Small mentioned narrow strap fern only for Timms Hammock, but, by the time of his 1938 work, he knew of its presence in the Fakahatchee Strand (Small 1931, 1938). Eaton (1906) reported that Oakes Ames observed numerous plants in bayheads near Naples, which referred probably to the Fakahatchee Strand. Bruce E. Tatje and Jane H. Thompson vouchered it at Fakahatchee Strand Preserve State Park in 1978 (157, FAU, USF). Gann and Woodmansee observed it there in 2000 on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are fewer than 100 plants present in Fakahatchee Strand Preserve State Park (personal communication, 22 January 2001).

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

Comments: *Although Small (1931, 1938) stated that its preferred habitat was live oak (*Quercus virginiana*) trees, this preference refers to its habitat in Timms Hammock. Plants in the Fakahatchee grow on hardwoods, such as pond apple (*Annona glabra*) and pop ash (*Fraxinus caroliniana*).*

Preliminary recommendations:

- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Survey Pinecrest region of Big Cypress National Preserve.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten narrow strap fern.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting Fakahatchee population.
- Consider reintroducing narrow strap fern to other sites within its historical range, including Timms Hammock in Camp Owaissa Bauer.

Carex verrucosa Muhl.
Warty Sedge

South Florida Status: Critically imperiled. One occurrence in two conservation areas (Corkscrew Regional Ecosystem Watershed & Corkscrew Swamp Sanctuary).
Taxonomy: Monocotyledon; Cyperaceae.
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 Palm Beach counties.
South Florida Habitats: Freshwater swamps.
Protection Status: Not listed by any agency.
Identification: There is an illustration in Godfrey & Wooten (1979).

References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: *C. joorii* L.H. Bailey, misapplied.

Historical Context in South Florida: Paul C. Standley first collected warty sedge in 1919 near Fort Myers (18952, US). In 1921, Walter M. Buswell made another collection in Lee County from an unspecified station (s.n., FTG). Since then, it remained uncollected in Lee County until 1995, when Steven L. Orzell and Edwin L. Bridges collected it in the Flint Pen Strand (24160, FTG), now part of the Corkscrew Regional Ecosystem Watershed. In 1968, Olga Lakela made a single collection of this species in Collier County in the Corkscrew area (31353, USF). It also is reported for Corkscrew Swamp Sanctuary (Judd, 1994), which is located in both Collier and Lee counties. It is assumed to be extant there, but needs to be vouchered. These two stations are thought to represent a single population.

A collection was made in Palm Beach County in 1980 by David and Sally Black at the J.W. Corbett Wildlife Management Area (851, FTG). The authors have spent considerable time at Corbett, but have not observed warty sedge there. This occurrence is treated as historical.

Major Threats: Exotic pest plant invasions, especially Old World climbing fern (*Lygodium microphyllum*); hydrologic 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:
- Voucher plants at Corkscrew Swamp Sanctuary.
- Survey J.W. Corbett Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Catopsis nutans (Sw.) Griseb.
Nodding Strap Airplant

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Monocotyledon; Bromeliaceae.

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: Chafin (2000) has a color photo.
References: Long & Lakela, 1976; Smith & Downs, 1977; Ward, 1978; Flora of North America Editorial Committee, 1997; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Henry E. Brown and William G. Atwater discovered nodding strap airplant in 1959 in Collier County (Ward, 1978), in what is now Fakahatchee Strand Preserve State Park. C. Eugene Delchamps vouchered it there that same year (s.n., US). In a 1960 letter from Brown to Lyman B. Smith of the Smithsonian Institution, Brown described the many stations where he and Atwater found plants, often in abundance, believing it to be the most abundant *Catopsis* in the Fakahatchee. Roger L. Hammer has observed it at a dozen or more stations within the Fakahatchee Strand (personal communication, 26 March 2001). Nodding strap airplant is extant there, and was observed in 2000 by Gann and Woodmansee on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are fewer than 1,000 plants present in the Fakahatchee Strand (personal communication, 11 June 2000).

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

Comments: *Chapman (1883) used* Catopsis nutans *for plants that were really* C. berteroniana *(Small, 1905), and Small (1933a) used the name* Catopsis nutans *to refer to plants that were really* C. floribunda *(Ward, 1978).*

Preliminary recommendations:

- Continue ongoing surveys at Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten nodding strap airplant.

Cayaponia americana (Lam.) Cogn.
American Melonleaf

South Florida Status: Critically imperiled. One occurrence at Castellow Hammock Park.
Taxonomy: Dicotyledon; Cucurbitaceae.
Habit: Perennial vine.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks.
Protection Status: Not listed by any agency.
Identification: Correll & Correll (1982) has an illustration of a related species, C. racemosa. In South Florida, *Cayaponia americana* most resembles *Melothria pendula*. *Cayaponia* can be distinguished from *Melothria* by its green or greenish white corolla instead of a yellow corolla and its fruit in racemes rather than solitary fruit (R.P. Wunderlin, personal communication, 23 May 2001).
References: Small, 1905; Small, 1933a; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *C. racemosa* Cogn., misapplied.

Historical Context in South Florida: American melonleaf was collected first by Ferdinand Rugel in 1846 in "Florida" (s.n., US), but this specimen almost certainly came from Miami-Dade County. John Kunkel Small and Joel J. Carter made the next collection in 1903 between Cutler and Camp Longview (792, NY). Camp Longview was historically located to the west of present day Florida City. Small and Percy Wilson made another collection near Camp Longview in 1904 (1593, NY). Small (1905) reported on his discovery of this species in Florida. In 1906, Small and Carter collected American melonleaf in Castellow Hammock (2722, NY), now part of Castellow Hammock Park. It was

observed there several times by George N. Avery from 1976 to 1982 (Avery's Notes), and was vouchered by Avery in 1976 (1245, FTG) and 1982 (2370, GH, FTG). Gann and Bradley observed fewer than 100 plants there in 1997.

Major Threats: Exotic pest plant invasions; off-target damage from exotic plant species control efforts.

Preliminary recommendations:

- Map and monitor plants at Castellow Hammock Park.
- Control exotic pest plants, while preventing off-target damage to American melonleaf.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider introducing American melonleaf to other sites within its historical range.
- Review for listing by FDACS and FNAI.

Celtis iguanaea (Jacq.) Sarg**.**
Iguana Hackberry

South Florida Status: Critically imperiled. One occurrence at Mound Key Archaeological State Park.
Taxonomy: Dicotyledon; Ulmaceae.
Habit: Shrub.
Distribution: Native to South Florida, central Florida (Manatee County), the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Collier and Lee counties.
South Florida Habitats: Shell mounds.
Protection Status: Listed as endangered by FDACS and as historical by FNAI.
Identification: Chafin (2000) has an illustration; the IRC Website has a color photo.
References: Small, 1933a; Long & Lakela, 1976; Ward, 1978; Tomlinson, 1980; Correll & Correll, 1982; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *Momisia iguanaea* (Jacq.) Rose & Standl.

Historical Context in South Florida: John Kunkel Small first collected iguana hackberry in 1922 on Horr's Island in Collier County (10479, GH, NY). George N. Avery collected it again on Horr's Island in 1970 (838, FTG, USF), as did Bruce F. Hansen and others in 1988 (11806, USF). It was apparently absent from the island when Bradley and Joseph O'Brien surveyed it in 1996. The island was in the process of being developed at the time, and the species is probably extirpated there.

George Cooley and others collected iguana hackberry in 1954 on Sanibel Island in Lee County (s.n., GH). William C. Brumbach also collected it on Sanibel Island in 1972 at the J.N. "Ding" Darling National Wildlife Refuge (7856, US). However, it was not recorded for the refuge by Wunderlin et al. (1980), who conducted extensive fieldwork there in 1978 and 1979. Brumbach collected it on upper Captiva Island in 1971 (7772, GH, USF), 1972 (8060, GH), and again in 1978 (9348, FTG, GH, USF). It is assumed to be extirpated there due to development. Susan Todd collected it at the Mound Key Archaeological State Park in 1974 (44, USF). It was observed there in 2001 by Gann and Florida Park Service biologists R. "Bobby" Hattaway and Sally Braem.

Major Threats: Exotic pest plant invasions.

Comments: *This species is reported in the United States only for peninsular Florida and southern Texas, although the report of plants from Texas may be in error (Flora of North America Editorial Committee, 1997). Joseph H. Simpson collected the Manatee County specimen in 1891 (s.n., GH, NY), where it is extirpated. The only known plants in the continental United States are at Mound Key Archaeological State Park.*

Preliminary recommendations:

- Survey J.N. "Ding" Darling National Wildlife Refuge.
- 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 augmenting population at Mound Key Archaeological State Park.

- Consider reintroducing iguana hackberry to other sites within its historical range.
- Consider introducing iguana hackberry to other sites within its historical range.
- Review FNAI rank.

Cenchrus myosuroides Kunth
Big Sandbur

South Florida Status: Critically imperiled. One occurrence at Dry Tortugas National Park.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to Florida, the West Indies, Texas, Mexico, Central America, and South America.
South Florida Distribution: Lee, Collier and Monroe counties.
South Florida Habitats: Shell mounds, coastal berms, dunes, and disturbed areas.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Chapman, 1883; Chase, 1920; Small, 1933a; Hitchcock & Chase, 1950; Delisle, 1963; Long & Lakela, 1976; Hall, 1978; Correll & Correll, 1982; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: John Loomis Blodgett first collected big sandbur between 1838 and 1853 on the island of Key West. Allan H. Curtiss made the next collection prior to 1896 on Indian Key (3620, ISC, US), in what is now Indian Key Historic State Park. Curtiss collected it again on Indian Key in 1896 (5643, ISC, MO, US), and John Kunkel Small and Nathaniel L. Britton collected it there in 1919 (9347, NY). John Kunkel Small and others collected it on West Summerland Key in 1911 (3629, NY). It was observed there again by George N. Avery in 1966 (Avery's Notes, 12 February 1966), and vouchered again by John Popenoe in 1981 (1950, USF). F.R. Fosberg made a collection on Loggerhead Key in Dry Tortugas National Park in 1962 (43041, US). Reimus and Robertson (1997) reported that it has been observed south of the lighthouse on that key since 1962. Richard E. Reimus reports that he observed perhaps 10-15 plants on

Loggerhead Key in March 2001 (personal communication, March 12, 2001).

There are also a few collections of big sandbur from the middle and upper Keys. Percy Jones made a collection "South of Upper Matecumbe Key" in 1898 (985, US). This collection was made on railroad and road fill, and may not have represented a native population. Agnes Chase made a collection on Key Largo in 1907 (3936, US), in an "open hammock near Planter." This may have been in the vicinity of what is now Dove Creek Hammocks, Florida Keys Wildlife and Environmental Area, near the southern end of Key Largo. Jason R. Swallen made a collection on "Key Vacca (Grassy Key)" in 1935 (5201, US), presumably in the vicinity of what is now Curry Hammock State Park. George N. Avery observed it once at Boot Key south of Marathon 1964 (Avery's Notes, 7 August 1964). In 1980, R.W. Pohl made a collection on dunes on the Atlantic side of 20th Street on "Key Vaca" (13901, ISC). This collection was probably made on Boot Key.

Additional collections and reports have been made for islands in Florida Bay, in what is now Everglades National Park. Alvah A. Eaton made the first collection on Joe Kemps Key in 1905 (1345, US). William B. Robertson collected it on Frank Key, just south of Joe Kemps Key, in 1968 (s.n., FTG).

Abram P. Garber collected big sandbur at "Caloosa" in 1878 (11906, MO), presumably in what is now coastal Lee County. It also was collected on Marco Island in coastal Collier County. Joseph H. Simpson made the first collection there in 1891 (281, US). Subsequent collections were made by Harold N. Moldenke in 1930 (s.n., FTG) and Olga Lakela in 1962 (s.n., USF; 29070, USF; 29086, USF; 29243, USF).

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

Comments: *Wunderlin (1998) lists big sandbur only for Collier and Monroe counties. There is a specimen collected by Robert Combs in 1898 at Homosassa in Citrus County (Chase, 1920), where it is apparently extirpated. J. Richard Abbott also collected it in Levy County in 1996 (9518, FLAS). This is a perennial*

species that rarely produces inflorescences in its first year (Delisle, 1963).

Preliminary recommendations:

- Survey Curry Hammock State Park, West Summerland Key and islands in Florida Bay in Everglades National Park, and Tigertail Beach County Park on Marco Island.
- Map and monitor known stations on a regular basis.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting population at Dry Tortugas National Park.
- Consider reintroducing big sandbur to other sites within its historical range, including Indian Key Historic State Park.
- Review for listing by FDACS and FNAI.

Cheilanthes microphylla (Sw.) Sw.
Southern Lip Fern

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Pteridophyte; Adiantaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southern United States, the West Indies, Mexico, Central America, and South America. Wunderlin & Hansen (2000) reports it as rare in Washington County and the peninsula. Wunderlin & Hansen (2001) record it for Alachua, Citrus, Collier, Duval, and Washington counties.
South Florida Distribution: Collier County.
South Florida Habitats: Coastal shell mounds.
Protection Status: Listed as endangered by FDACS and as rare by FNAI.
Identification: Nelson (2000) has a black and white photo; Wunderlin & Hansen (2000) has illustrations.
References: Chapman, 1883; Small, 1938; Evans, 1975; 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 Kunkel Small first collected southern lip fern in 1916 on the Turner River Mound near the mouth of the Turner River (7756, FTG, NY), now in Everglades National Park. It was collected at the same station in 1933 by Hugh O'Neill (7590, NY, US), in 1938 by John H. Davis, Jr. (s.n., FLAS), and in 1960 by Frank C. Craighead (s.n., FLAS). Bradley and Woodmansee observed these plants in 1997. Fewer than 100 plants were seen growing in small swales on the backside of the mound.

In 1977, Sally Black and K. Hipps collected southern lip fern on Horr's Island in association with *Celtis iguanaea* (s.n., FTG). Bradley and Joseph O'Brien surveyed Horr's Island in 1996, but southern lip fern was not seen. The island was undergoing rapid residential development at that time. James N. Burch reported that he had seen some plants in the 1990s on an island in Addison Bay that had been mostly destroyed for fill (personal communication, November, 2000). It is unknown whether or not this station is extant. There have been other reports of southern lip fern on shell mounds in southwestern Florida, but none that we have been able to verify. More surveys should be conducted in the Ten Thousand Islands region.

There was one station in Miami-Dade County that was observed as early as 1959 (Darling, 1962), and collected in 1963 by E.S. Ford (s.n., FLAS). This specimen was found growing on a rock wall in Matheson Hammock Park, but it is not clear that this station represented a native population of this fern, or even if this actually represented *C. microphylla* (Knoblock, 1967; Evans, 1975; Wunderlin & Hansen, 2000).

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

Comments*: It appears that the natural habitat and range of southern lip fern is on shell mounds in southwestern Florida, and that it has never been common. However, with the loss of the Horr's Island station, it would be prudent to establish at least one other population between Turner River Mound and Horr's Island.*

Preliminary recommendations:

- Survey shell mounds in the Ten Thousand Islands region.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider introducing southern lip fern to other sites within its historical range.

Chrysopsis mariana (L.) Elliott
Maryland Goldenaster

South Florida Status: Critically imperiled. One occurrence at Big Cypress National Preserve.
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern North America. Wunderlin (1998) lists it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Charlotte and Collier counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo.
References: Small, 1933a; Cronquist, 1980; Semple, 1981; Taylor, 1992; Wunderlin, 1998.
Synonyms: *Heterotheca mariana* (L.) Shinners.

Historical Context in South Florida: Elliott Brown collected Maryland goldenaster once in 1985 in cleared flatwoods at the "head of Lake Port Charlotte" (s.n., USF), presumably in the vicinity of Port Charlotte in Charlotte County. The locality data for this specimen is confusing, and Gann was unable to find this station in 2000. Also, it is unclear whether or not this station represented a native population.

Bradley collected Maryland goldenaster again in 1997 in the Bear Island area of Big Cypress National Preserve (1085, FTG, USF). Bradley and Woodmansee observed it there as recently as 2001.

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. Maryland goldenaster flowers during the fall, when surveys should be conducted.*

Preliminary recommendations:
- Map and monitor known stations on a regular basis.

Clitoria mariana L.
Atlantic Pigeonwings

South Florida Status: Critically imperiled. One occurrence at Juno Dunes Natural Area.
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial vine.
Distribution: Native to the eastern United States. Wunderlin (1998) lists it as frequent nearly throughout Florida.
South Florida Distribution: Collier, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Mesic flatwoods, scrubby flatwoods, and pine rocklands.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Isely, 1990; Taylor, 1992; Wunderlin, 1998.
Synonyms: *Martiusia mariana* (L.) Small.

Historical Context in South Florida: John Kunkel Small and others first collected Atlantic pigeonwings in 1915 in a pineland south of the Miami River (6432, FLAS, NY). William G. Atwater made the next collection in 1958 on Marco Island in Collier County (s.n., FLAS). Nixon Smiley collected Atlantic pigeonwings in 1976 in the Kissimmee Billy Strand area of what is now Big Cypress National Preserve (s.n., FTG). Donovan S. Correll and others vouchered it there that same year (47169, FTG). It is unknown whether or not plants at this station are extant. Atlantic

pigeonwings was recorded for Palm Beach County at Juno Dunes Natural Area by Palm Beach County biologist Steve Farnsworth (1995a, 1997). Bradley and Woodmansee vouchered this station in 1997 (339, FTG). It is estimated that fewer than 10 plants are present.

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:

- Survey Kissimmee Billy Strand area in Big Cypress National Preserve.
- Map and monitor known stations on a regular basis.
- Consider feasibility of restoring scrubby flatwoods on Marco Island and reintroducing Atlantic pigeonwings.
- Consider restoring pine rocklands along the Miami River and reintroducing Atlantic pigeonwings.

Coelorachis tuberculosa (Nash) Nash
Florida Joint-tail Grass

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park and perhaps adjacent private properties.
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: Martin County.
South Florida Habitats: Depression marshes.
Protection Status: Listed as threatened by FDACS and as rare by FNAI.
Identification: Hitchcock & Chase (1950) has an illustration; Tobe et al. (1998) has an illustration.
References: Small, 1933a; Hitchcock & Chase, 1950; Hall, 1978; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998; Coile, 2000.
Synonyms: *Manisuris tuberculosa* Nash.

Historical Context in South Florida: John Popenoe first collected Florida joint-tail grass in 1975 at Jonathan Dickinson State Park (350, FTG). It also was collected there in 1995 by Edwin L. Bridges and Randy L. Mears (23905, FTG), and later that year by Bradley (166, FTG). Sally Black also collected it in 1989 near Jonathan Dickinson State Park at the Diamond T. Ranch in Martin County (1174, FLAS). It may be present at this or other private properties adjacent to Jonathan Dickinson State Park.

Major Threats: Exotic pest plant invasions; hydrological modifications; wild hog damage; habitat destruction outside of Jonathan Dickinson State Park.

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 appropriate habitats in Martin County for additional plants.
- Map and monitor known stations on a regular basis.
- Acquire lands with depression marshes near Jonathan Dickinson State Park.

Croton humilis L.
Pepperbush

South Florida Status: Critically imperiled. One occurrence at Big Cypress National Preserve.
Taxonomy: Dicotyledon; Euphorbiaceae.
Habit: Shrub.
Distribution: Native to South Florida, the West Indies, and Mexico.
South Florida Distribution: Collier and Monroe counties.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS.
Identification: There are 12 species of *Croton* in Florida. Wunderlin (1998) has a key. This species superficially resembles *Rivina humilis*. The IRC Website has a color photo
References: Chapman, 1883; Ferguson, 1901; Small, 1933a; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.

Synonyms: *C. berlandieri* Torr.

Historical Context in South Florida: Alva Bennett first collected pepperbush in 1834 or 1835 on the island of Key West (s.n., NY). It was collected there again by John Loomis Blodgett between 1938 and 1852 (s.n., NY), by Allan H. Curtiss in the late 1800s, and by John Kunkel Small in 1913 (4899, NY; s.n., FTG). In 1952, it was collected at Cactus Hammock on Big Pine Key by Ellsworth P. Killip (41961, NY), and later the same year by "Dickson" (s.n., FTG). Cactus Hammock is located within the National Key Deer Refuge.

Hugh O'Neill made the first collection on the mainland in the Pinecrest area in 1929 (s.n., FTG), either in or near what is now Big Cypress National Preserve. Other vouchers were collected in that area by Frank C. Craighead in 1963 (s.n., USF), by George N. Avery in 1971 (1040, FTG, USF), and by David and Sally Black in 1978 (218, FTG). Black & Black (1980) reported it as rare in Big Cypress National Preserve. Ann Buckley and Ted Hendrickson last vouchered this station in 1984 (46, FAU), but it is assumed to be extant.

It also was collected once in Miami-Dade County in 1978 as a weed at Fairchild Tropical Garden by Donovan S. Correll (50387, FTG). This should not be considered part of its natural range in Florida.

Major Threats: Exotic pest plant invasions.

Comments: *Plants with a known provenance from the Pinecrest area are in cultivation by Joyce W. Gann and by Bradley.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider reintroducing pepperbush to sites within its historical range, including Cactus Hammock in the National Key Deer Refuge.

- Consider introducing pepperbush to other sites within its historical range, including Little Hamaca Park.
- Review for listing by FNAI.

Cyperus squarrosus L.
Bearded Flatsedge

South Florida Status: Critically imperiled. Two occurrences in one conservation area (National Key Deer Refuge) and one non-conservation area (Valhalla Rock Barren Site).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Annual terrestrial herb.
Distribution: Native to the United States, Mexico, Central America, South America, the West Indies, and the Old World. Wunderlin (1998) reports it as occasional in Florida in South Florida, and in Hillsborough County, Escambia County, and the central panhandle.
South Florida Distribution: Collier County and the Monroe County Keys.
South Florida Habitats: Coastal rock barrens, rockland hammocks, shell mounds, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: There are about 50 species of *Cyperus* in Florida. Wunderlin (1998) has a key.
References: Chapman, 1883; Small, 1933a; McLaughlin, 1944; Long & Lakela, 1976; Godfrey & Wooten, 1979; Correll & Correll, 1982; Wunderlin, 1998.
Synonyms: *C. aristatus* Rottb.; *C. inflexus* Muhl.

Historical Context in South Florida: John Loomis Blodgett first collected bearded flatsedge between 1838 and 1853 on the island of Key West (s.n., NY). It also was observed at Key West by J. Cosmo Melville in 1872 (Melville, 1884). Subsequent collections were made by John Kunkel Small and Elizabeth W. Small in 1913 (4885, NY) and by Small and Charles A. Mosier in 1915 (5981, NY). Small and others made a collection on Big Pine Key in 1921 (10144, NY). This collection was made on the southern end of the island, probably in Cactus Hammock, which is now part of the National Key Deer Refuge. George N. Avery observed this population in 1964 (Avery's Notes, 23 August 1964) and vouchered it there in 1971 (1074, USF). Bradley observed this

population in 2001. In 1966, Avery also observed plants in Watson Hammock on Big Pine Key (Avery's Notes, 1 July 1966). In 1966, Avery observed plants on Crawl Key at the Valhalla Rock Barren site (Avery's Notes, 31 August 1966), and he vouchered this population in 1981 (s.n., USF). Bradley re-vouchered plants there in 1998 (1468, FTG, USF). It is estimated that fewer than 100 plants occur on Crawl Key.

Olga Lakela collected bearded flatsedge first in Collier County in 1965 on a shell mound on Marco Island (29238, NY, USF). This station has been destroyed. Bradley collected bearded flatsedge at a second station in Collier County in Immokalee in 1998 (1853, FTG, USF). This population was growing along the edge of a road, and may not represent a native population.

Major Threats: Habitat destruction; sea-level rise.

Preliminary recommendations:

- Survey Cactus Hammock and Watson Hammock on Big Pine Key in the National Key Deer Refuge.
- Map and monitor known stations annually.
- Acquire Valhalla Rock Barren site.
- Consider introducing bearded flatsedge to other sites within its historical range, including Little Hamaca on Key West.

Dalea pinnata (J.F. Gmel.) Barneby var. ***pinnata*** **Summer Farewell**

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Fabaceae.
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: Martin County.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Taylor (1998) has a color photograph. The species is distinguished from other species of *Dalea* in South Florida by having flower spikes subtended by a conspicuous involucre and by having plumose calyx segments (Wunderlin

1998). The variety is distinguished from var. *adenopoda* by having leaflets that are filiform to linear rather than elliptic-oblanceolate and 0.3-0.6 mm wide rather than 1-2 mm wide (Wunderlin, 1998).
References: Small, 1933a; Long & Lakela, 1976; Barneby, 1977; Isely, 1990; Wunderlin, 1998.
Synonyms: *Kuhnistera pinnata* (J.F. Gmel.) Kuntze; *Petalostemon pinnatum* (J.F. Gmel.) S.F. Blake.

Historical Context: Richard Meyers first collected summer farewell in 1967 at Jonathan Dickinson State Park (s.n., FAU). Roy O. Woodbury also collected it there in 1989 (s.n., FTG). In 1997, Bradley and Woodmansee collected it along the Loxahatchee River within Jonathan Dickinson State Park (585, FTG).

A number of authors have reported occurrences of *Dalea pinnata* or *Petalostemon pinnata* from sites in Collier, Lee, Palm Beach, and Martin counties. Reports in Palm Beach and Martin counties may be referable to this taxon, but they need to be verified. Reports from Collier and Lee counties probably refer to *D. pinnata* var. *adenopoda*.

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:
- Map and monitor known stations on a regular basis.

Dichanthelium scabriusculum (Elliott) Gould & C.A. Clark **Woolly Witchgrass**

South Florida Status: Critically imperiled. One occurrence at Pal-Mar.
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 Hillsborough County.

South Florida Distribution: Palm Beach County, where it is disjunct from the nearest population in Hillsborough County.
South Florida Habitats: Wet flatwoods.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration; Tobe et al. (1998) has a photo and illustrations. This is a large *Dichanthelium* with culms 1-1.5 meters tall (Hitchcock & Chase, 1950).
References: Chapman, 1883; Small, 1933a; Hitchcock & Chase, 1950; Hall, 1978; Godfrey & Wooten, 1979; Hansen & Wunderlin, 1988; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *Panicum cryptanthum* Ashe; *Panicum scabriusculum* Elliott.

Historical Context in South Florida: Bradley and Woodmansee first collected woolly witchgrass in 1997 at Pal-Mar in Palm Beach County (229, FTG). Fewer than 10 plants were seen in one small colony. It 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 wet flatwoods habitat; 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:
- 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.

Digitaria pauciflora Hitchc.
Twospike Crab Grass

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to South Florida.
South Florida Distribution: Miami-Dade County.

South Florida Habitats: Pine rocklands and marl prairies.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: Hitchcock & Chase (1950) has an illustration; the IRC Website has a color photo.
References: Small, 1933a; Henrard, 1950; Hitchcock & Chase, 1950; Hall, 1978; Avery & Loope, 1980a; Avery, 1983b; Webster & Hatch, 1990; Wunderlin, 1998; Bradley & Gann, 1999b; Coile, 2000; USFWS, 2000.
Synonyms: *Syntherisma pauciflorum* (Hitchc.) Hitchc. ex Small.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected twospike crab grass in 1903 between Cutler and Camp Longview in Miami-Dade County (916, NY). Alvah A. Eaton was probably with Small and Carter when he collected it also in 1903 (230, US), reporting the station as Cutler. Twospike crabgrass was collected next by W.A. Silveus in 1939 in South Miami (5285, TAES). It was not seen again until 1963 when Frank C. Craighead collected it on Long Pine Key in Everglades National Park (s.n., FTG). It subsequently was found at many stations on Long Pine Key by a number of botanists. George N. Avery gives detailed notes about finding it at many stations from 1978 to 1980 (Avery's Notes, 1978-1980). Gann and Bradley observed it on Long Pine Key in 2000. In 2001, Gann and Bradley assisted Fairchild Tropical Garden biologists Cynthia Lane, Meghan Fellows, and Jennifer Possley, who began the process of mapping twospike crabgrass in Everglades National Park.

In 1996, Bradley and Roger L. Hammer found a single plant at the Luis C. Martinez U.S. Army Reserve Station in the Richmond Pine Rocklands (Hammer, 1996c). Only a single sterile plant was observed in a marl prairie. While it was observed several times in 1996, surveys in subsequent years have failed to find this plant. It may be extirpated there, but additional surveys are needed.

There are three specimens labeled as having been collected on Big Pine Key in the U.S. National Herbarium. Jason R. Swallen collected them all on the same day in 1954. From an examination of Swallen's collection books at the herbarium library, it seems

unlikely that Swallen actually collected this species on Big Pine Key.

Major Threats: Habitat destruction at Luis C. Martinez U.S. Army Reserve Station; hydrological modifications; fire suppression; exotic pest plant invasions.

Comments: *This species may be sensitive to hydrological changes, which may have contributed to its demise at the Richmond Pine Rocklands. It may also be affected, negatively or positively, by the Everglades restoration. An increase in water delivery to Long Pine Key north of main park road could have a negative impact upon this species.*

Preliminary recommendations:

- Continue surveys at Luis C. Martinez U.S. Army Reserve Station.
- Continue mapping plants at Everglades National Park.
- Monitor plants at Everglades National Park on a regular basis.
- Transfer surplus 144-acre parcel at Luis C. Martinez U.S. Army Reserve Station to a conservation agency.
- Conduct conservation biology and conservation horticulture studies.
- Conduct research to determine the effects of the Everglades restoration on twospike woolly crabgrass.
- Encourage USFWS to list *Digitaria pauciflora*.

Eleocharis albida Torr.
White Spikerush

South Florida Status: Critically imperiled. One occurrence at Bill Baggs Cape Florida State Park.
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain west to Texas and Mexico. It is also native to Bermuda. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier, Lee, Hendry, Martin, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Moist brackish soils.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.

References: Chapman, 1883; Small, 1933a; Ward & Hodgson, 1975; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Joseph H. Simpson first collected white spikerush in Fort Myers in 1892 (588, NY). Albert S. Hitchcock also collected it in Fort Myers in 1900 (405, US). The next collections in Lee County were not made until 1975 and 1976 when William C. Brumbach vouchered it on Sanibel Island at "Caloosa Bayous" (8781, USF; 9031, FTG, USF). This station appears to be near or within the J.N. "Ding" Darling National Wildlife Refuge, but white spikerush was not recorded for that site by Wunderlin et al. (1980), who conducted extensive inventory work there in 1978 and 1979.

In 1956, white spikerush was collected in "Palm Beach & Martin Cos.', Jupiter Island" by George R. Cooley and Erdman West (s.n., USF). It was mapped for both of these counties by Ward & Leigh (1975), which has been followed by Wunderlin & Hansen (2001). It is unclear if white spikerush was collected in both counties, or only one of them. Frank C. Craighead made a collection in Hendry County in 1962, somewhere along a 17-mile stretch of State Road 29 between Felda and La Belle (s.n., FTG). In 1967, Olga Lakela collected white spikerush in Collier County on Marco Island in a beach lagoon (30960, USF). Marco Island has been extensively developed since that time, and it is probably extirpated there.

White spikerush is currently known only from the cultural area at Bill Baggs Cape Florida State Park. William T. Gillis first collected it there in 1970 (9262, FTG). It was subsequently collected there by Gillis in 1971 (10865, FTG, USF), by George N. Avery and others in 1972 (1196, USF), and by Gann and others in 1995 (136, FTG). It was observed there as recently as 2000 by Gann and Florida park service biologist Janice A. Duquesnel. Fewer than 100 plants were seen. The population appeared to be declining due to the installation of a nature trail and other factors.

Major Threats: Habitat degradation; exotic pest plant invasions; 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 Blowing Rocks Preserve, the Jupiter Island portion of Hobe Sound National Wildlife Refuge, the vicinity of Caloosa Bayous on Sanibel Island, and Tigertail Beach County Park on Marco Island.
- Map and monitor known stations on a regular basis.
- Consider augmenting population at Bill Baggs Cape Florida State Park.
- Consider introducing white spikerush to other sites within its historical range, including Blowing Rocks Preserve and Hobe Sound National Wildlife Refuge on Jupiter Island and J.N. "Ding" Darling National Wildlife Refuge.

Encyclia pygmaea (Hook.) Dressler
Dwarf Butterfly Orchid

South Florida Status: Critically imperiled. One occurrence at 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 illustrations and color photos; Chafin (2000) has a color photo.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Ward, 1978; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *Epidendrum pygmaeum* Hook.; *Hormidium pygmaeum* (Hook.) Benth. & Hook. f. ex Hemsl.; *Prosthechea pygmaea* (Hook.) W.E. Higgins.

Historical Context in South Florida: Alvah A. Eaton first collected dwarf butterfly orchid in 1905 in the Fakahatchee Strand (1400, AMES), within what is now Fakahatchee Strand Preserve

State Park. William G. Atwater re-vouchered this population in 1960 (M-193, FLAS). Gann and Woodmansee observed this population in 2000 on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are fewer than 100 plants present in the Fakahatchee Strand (personal communication, 25 January 2001).

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

Preliminary recommendations:

- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten dwarf butterfly orchid.
- Conduct conservation biology and conservation horticulture studies.
- Consider augmenting population at Fakahatchee Strand Preserve State Park.

Epidendrum strobiliferum Rchb. f.
Big Cypress Star Orchid

South Florida Status: Critically imperiled. One occurrence at 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 illustrations and color photos.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Coile, 2000.
Synonyms: *Spathiger strobiliferus* (Rchb. f.) Small.

Historical Context in South Florida: Oakes Ames first collected Big Cypress star orchid in 1904 (s.n., NY), presumably in the Fakahatchee Strand (cf. Ames, 1904b). Alvah A. Eaton collected it again in 1904 (1126, AMES; 1125, AMES) and 1905 (1386, NY). Both of these collections were from what is now Fakahatchee Strand Preserve State Park. J.A. Lassiter and Rita Lassiter re-vouchered it for the Fakahatchee Strand in 1963 (14, USF), as did R. Vagner in 1966 (s.n., USF). Gann and Woodmansee observed this population in 2000 on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are fewer than 1,000 plants present in the Fakahatchee Strand (personal communication, 25 January 2001).

John Kunkel Small and Walter M. Buswell also made a single collection from the Deep Lake area in 1925 (12709, NY). Deep Lake is located immediately to the east of the Fakahatchee Strand and is now mostly within the boundaries of Big Cypress National Preserve. No plants have been observed or collected in that area since 1925, and Big Cypress star orchid is not thought to be extant in Big Cypress National Preserve. It is possible that Small and Buswell's collection was from the Fakahatchee Strand.

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

Comments: *A specimen at Harvard University (AMES) collected by Hugh O'Neill (7880) is from "a hammock, 3 miles north of Homestead, along Avocado Drive." in 1933. This refers to either Fuchs Hammock or Meissner Hammock. No other reports are known from Miami-Dade County, and this label data may be in error.*

Preliminary recommendations:

- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten Big Cypress star orchid.

Eragrostis tracyi Hitchc.
Sanibel Island Love Grass

South Florida Status: Critically imperiled. One occurrence at Mound Key Archaeological State Park and one occurrence on private property on Sanibel Island.
Taxonomy: Monocotyledon; Poaceae.
Habit: Annual terrestrial herb.
Distribution: Endemic to the west coast of peninsular Florida from Pinellas County to Lee County.
South Florida Distribution: Lee County.
South Florida Habitats: Shell mounds, coastal grasslands, and disturbed sites.
Protection Status: Listed as endangered by FDACS and as historical by FNAI.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Hitchcock & Chase, 1950; Lakela, 1965; Koch, 1972; Hall, 1978; Koch, 1978; Ward, 1978; Peterson, 1996; Wunderlin, 1998; Coile, 2000.
Synonyms: *E. pectinacea* (Michx.) Nees ex Jedwabn. var. *tracyi* (Hitchc.) P.M. Peterson.

Historical Context in South Florida: Samuel M. Tracy first collected Sanibel Island love grass in 1901 on Sanibel Island (7168, US). Other collections were made on Sanibel Island by George R. Cooley in 1953 (4938, USF) and 1954 (2608, USF), and by William C. Brumbach in 1976 (8938, USF). Ward (1978) stated that Brumbach had found this plant on all parts of Sanibel Island, but it was not reported for the J.N. “Ding” Darling National Wildlife Refuge by Wunderlin et al. (1980). Sanibel-Captiva Conservation Foundation biologist David Ceilley reported that Sanibel love grass had been found at the Sea Oats subdivision adjacent to one of the Foundation’s conservation areas on Sanibel Island (personal communication, 27 July 2001), but this area needs to be surveyed. Gann, Dick Workman, and others observed plants on the edge of an unpaved road on eastern Sanibel Island in 2001, but this station needs to be vouchered.

In 1978, Sandy Morrill collected Sanibel love grass on North Captiva Island (112, USF), to the north of Sanibel Island. It was

reported for Cayo Costa State Park (Florida Park Service District 4, 1994a), which includes the southern portion of North Captiva Island. Gann and Florida Park Service biologist R. "Bobby" Hattaway surveyed the Cayo Costa State Park portion of North Captiva Island in March 2001, but did not observe any plants.

Olga Lakela discovered Sanibel Island love grass on Mound Key in 1964 (27043, USF), now Mound Key Archaeological State Park. Gann, Hattaway, and Florida Park Service biologist Sally Braem observed it there during a brief survey 2001. Plants were seen growing on the disturbed edge of a nature trail. This station should be re-vouchered.

Major Threats: Exotic pest plant invasions.

Comments: *This species tolerates disturbance and colonizes recently disturbed areas. Koch (1972) conducted surveys for Sanibel Island love grass at Gasparilla Island in Charlotte County, Pine Island and Fort Myers Beach in Lee County, and Naples in Collier County. No new stations were discovered.*

Preliminary recommendations:

- Voucher plants at Mound Key Archaeological State Park and Sanibel Island stations.
- Survey North Captiva Island and Sanibel Island.

Eupatorium compositifolium Walter
Yankeeweed

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Nixon Smiley Pineland Preserve) and one non-conservation area (Federal Correctional Institution in the Richmond Pine Rocklands).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Native primarily to the southeastern coastal plain. Wunderlin (1998) reports it as common nearly throughout Florida.
South Florida Distribution: Martin and Miami-Dade counties.
South Florida Habitats: Pine rocklands and flatwoods.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Taylor (1998) has a color photo.

References: Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Godfrey & Wooten, 1981; Taylor, 1992; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Nathaniel L. Britton first collected yankeeweed in 1904, in pinelands in Perrine in Miami-Dade County (148, NY). John Kunkel Small also made a collection in 1916 in pinelands to the west of Perrine (7896, NY), perhaps in or near the Richmond Pine Rocklands. In 2000, Bradley and Woodmansee discovered it in the Richmond Pine Rocklands at the Federal Correctional Institution (Bradley et al., 2000a). Only one plant was observed at this station, so it was not vouchered. In 1975, George N. Avery discovered yankeeweed at what is now the Nixon Smiley Pineland Preserve, which is located to the north of the Richmond Pine Rocklands and to the northwest of Perrine (1663, USF, FTG). Bradley observed this station again in 1995. Fewer than 100 plants are thought to be present there. Two other stations were vouchered in Miami-Dade County. Small and Joel J. Carter made a collection in 1906 between Perrine and Homestead (2736, NY), and Walter M. Buswell made a collection in a rocky pineland in Coral Gables in 1943 (s.n., FTG).

Leland M. Baltzell made a collection of yankeeweed in 1977 in the vicinity of Marcy in northeastern Martin County (10028, FLAS). No habitat data was given but it may have been collected in flatwoods. It has been reported for a number of conservation areas in South Florida that need to be verified. These sites include Corkscrew Swamp Sanctuary (Judd, 1994) and Corkscrew Regional Ecosystem Watershed (Anderson, 1997), both of which are located in Collier and Lee counties. It has also been reported for a number of sites in Palm Beach County, including Juno Dunes Natural Area (Farnsworth, 1995a), Loxahatchee Slough Natural Area (Farnsworth, 1994c), and Royal Palm Beach Pines Natural Area (Farnsworth, 1995c).

Major Threats: Fire suppression; exotic pest plant invasions; habitat destruction at the Federal Correctional Institution in the Richmond Pine Rocklands.

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

However, the disjunct population in Miami-Dade County is floristically interesting and should be protected. Small plants of Eupatorium capillifolium *can be mistaken for* E. compositifolium.

Preliminary recommendations:

- Survey Corkscrew Swamp Sanctuary, Corkscrew Regional Ecosystem Watershed, Juno Dunes Natural Area, Loxahatchee Slough Natural Area, and Royal Palm Beach Pines Natural Area.
- Map and monitor known stations on a regular basis.
- Negotiate conservation agreement the Federal Correctional Institution to restore and maintain a viable population of yankeeweed. Provide technical assistance to help restore and manage this population.

Euphorbia inundata Torr. ex Chapm.
Florida Pineland Spurge

South Florida Status: Critically imperiled. One occurrence at Fred C. Babcock-Cecil M. Webb Wildlife Management Area.
Taxonomy: Dicotyledon; Euphorbiaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to Florida and southern Alabama. Wunderlin (1998) reports it as occasional in Florida in the peninsula and in the central and western panhandle.
South Florida Distribution: Charlotte, Collier, and Lee counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Norton, 1900; Small, 1933a; Godfrey & Wooten, 1981; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *Galarhoeus inundatus* (Torr. ex Chapm.) Small.

Historical Context in South Florida: O.E. Frye first collected Florida pineland spurge in 1946 at an unspecified locality in Charlotte County (s.n., FLAS). This collection was made in a "pine slough – man made." John Beckner collected it in flatwoods in eastern Charlotte County in 1968 (2265, FLAS). In 1996, Gann and Bradley observed it at Fred C. Babcock-Cecil M. Webb

Wildlife Management Area, several miles to the west of Beckner's station, but this station needs to be vouchered.

Ray Garrett made a collection in Collier County in 1951 northeast of Naples (s.n., FLAS). In 1985, Elliott Brown collected it in Lee County in North Fort Myers (s.n., USF). This station was located to the north of the clubhouse in Tamiami Village, a station that has almost certainly been destroyed. The Tamiami Village Flatwoods Site, which is located just to the north of Tamiami Village, may contain habitat for this species.

Major Threats: Drainage of flatwoods habitat; fire suppression; exotic pest plant invasions.

Preliminary recommendations:

- Voucher plants at Fred C. Babcock-Cecil M. Webb Wildlife Management Area.
- Survey Tamiami Village Flatwoods Site.
- Map and monitor known stations on a regular basis.
- Acquire Tamiami Village Flatwoods Site.

Evolvulus grisebachii Peter
Grisebach's Dwarf Morningglory

South Florida Status: Critically imperiled. One occurrence at National Key Deer Refuge and adjacent private properties.
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida and Cuba.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Pine rocklands.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Ooststroom, 1934; Ward, 1968b; Long & Lakela, 1976; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *Evolvulus wrightii* House.

Historical Context in South Florida: John Loomis Blodgett first collected Grisebach's dwarf morningglory between 1838 and 1853 on Big Pine Key in Monroe County (s.n., NY). It has never been

vouchered for any other islands in South Florida. Numerous collections have been made on Big Pine (e.g., Small 3809, NY; Killip 31449, US; Avery et al. 1745, USF; Brumbach 9669, FSU), but few give good data on where plants were found. Grisebach's dwarf morningglory seems to be restricted to the vicinity of Key Deer Boulevard and Watson Boulevard, near the Blue Hole, including private property and property owned by the National Key Deer Refuge. The authors have observed plants there as recently as 2001.

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

Comments: *Ward (1968b) reported this species from Puerto Rico, apparently in error. The status of this species in Cuba is unknown.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Acquire private properties with Grisebach's dwarf morningglory and incorporate into National Key Deer Refuge.
- Conduct conservation biology and conservation horticulture studies.
- Determine status in Cuba.

Gratiola pilosa Michx.
Shaggy Hedgehyssop

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Scrophulariaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Glades, Martin, and Palm Beach counties.
South Florida Habitats: Flatwoods, depression marshes, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has a color photo.

References: Chapman, 1883; Small, 1933a; Pennell, 1935; Long & Lakela, 1976; Godfrey & Wooten, 1981; Tobe et al., 1998; Wunderlin, 1998
Synonyms: *Tragiola pilosa* (Michx.) Small & Pennell ex Pennell; *Tragiola pilosa* var. *epilis* (Pennell) Small & Pennell ex Pennell.

Historical Context in South Florida: Leonard J. Brass first collected shaggy hedgehyssop in 1945 in Palmdale in Glades County (15456, US), in the vicinity of what is now Fisheating Creek Wildlife Management Area. John Popenoe made the next collection in 1981 at Jonathan Dickinson State Park in Martin County (1937, FTG), where it is assumed to be present. While the label states that it was a "weed in moist area" it was most likely persisting in an area where its habitat had been cleared, or it recruited from a nearby natural area. Popenoe also collected it in Palm Beach County in 1983 along the Loxahatchee River (2352, USF), in what is now Jonathan Dickinson State Park.

There are a number of additional reports of this species that should be verified. It has been reported for Palm Beach County at Royal Palm Beach Pines Natural Area (Farnsworth, 1995c) and Pal-Mar (Bradley et al., 1997b). It also has been reported for the Dupuis Reserve (Woodbury, no date), which is located in both Palm Beach and Martin counties.

Major Threats: 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:
- Survey Dupuis Reserve, Fisheating Creek Wildlife Management Area, Pal-Mar, and Royal Palm Beach Pines Natural Area.
- Map and monitor known stations on a regular basis.

Gymnopogon ambiguus (Michx.) Britton et al.
Bearded Skeleton Grass

South Florida Status: Critically imperiled. One occurrence in one conservation area and two non-conservation areas in the Richmond Pine Rocklands (Larry and Penny Thompson Park, former U.S. Naval Observatory site, & U.S. Coast Guard Communication Station).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States and the West Indies. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Miami-Dade and Palm Beach counties.
South Florida Habitats: Pine rocklands and probably mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Chapman, 1883; Small, 1933a; Hitchcock & Chase, 1950; Smith, 1971; Hall, 1978; Wunderlin, 1998.
Synonyms: *G. racemosus* P. Beauv.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected bearded skeleton grass in 1903 in between Cutler and Camp Longview in Miami-Dade County (921, NY; s.n., US). Camp Longview was historically located to the west of present day Florida City. Alvah A. Eaton also made a collection, probably on the same date, between "Miami and Jenkins Camp" (192, US). He probably was collecting with Small and Carter at the time.

The next collection from Miami-Dade County was made in 1979 by Alan H. Herndon near Camp Choee (277, USF), a Girl Scout camp in Perrine across the Florida's Turnpike from the Richmond Pine Rocklands. George N. Avery observed one plant at Camp Choee in 1980 (Avery's Notes, 23 August 1980). Also in 1980, Avery and Herndon observed one plant at Larry and Penny Thompson Park in the Richmond Pine Rocklands (Avery's Notes, 19 January 1980). Bradley and Woodmansee observed this station in 2000.

Fewer than 10 plants were seen. In 1996, Bradley and Gann observed bearded skeleton grass at what was the U.S. Naval Observatory, also in the Richmond Pine Rocklands (Bradley & Gann, 1996), a site that now is owned by the University of Miami. Fewer than 10 plants were observed. In 2000, Bradley and Woodmansee observed it at the U.S. Coast Guard Communications Station, also in the Richmond Pine Rocklands (Bradley et al., 2000a). Fewer than 10 plants were observed. All of these stations are considered to be the same occurrence.

In 1979, Avery made a collection in the Redland area at the Camp Owaissa Bauer Addition (2184, USF). He saw only "2 little clumps" (Avery's Notes, 31 October 1979). Bradley has surveyed this station several times, but has not seen this species there.

C.V. Piper made a collection of bearded skeleton grass in 1917 at "Annie" in Palm Beach County (s.n., US).

Major Threats: Habitat destruction in the Richmond Pine Rocklands and at Camp Choee; fire suppression; exotic pest plant invasions.

Comments: *All collections in South Florida have been made during October and November, when surveys should be conducted.*

Preliminary recommendations:

- Survey Camp Choee.
- Map and monitor known stations on a regular basis.
- Develop conservation agreements with the Girl Scouts of America, the University of Miami, and the U.S. Coast Guard to restore and manage viable populations of bearded skeleton grass at their respective sites. Provide technical assistance to help manage these populations.

Helenium flexuosum Raf.
Purplehead Sneezeweed

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Everglades National Park) and one non-conservation area (Notre Dame Pineland).
Taxonomy: Dicotyledon; Asteraceae.

Habit: Perennial terrestrial herb.
Distribution: Native to the eastern and central United States. Wunderlin (1998) lists it as occasional in Florida from the northern counties south to the central peninsula and Miami-Dade County.
South Florida Distribution: Miami-Dade County, where it is disjunct from the nearest populations in Polk County.
South Florida Habitats: Pine rocklands.
Protection Status: Not listed by any agency.
Identification: There are six species of *Helenium* in Florida. This species is a branched perennial with reddish disk flowers (Wunderlin, 1998).
References: Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: *H. floridanum* Fernald; *H. nudiflorum* Nutt.

Historical Context in South Florida: John Kunkel Small and Percy Wilson first collected purplehead sneezeweed in 1904 in a pineland near Camp Longview (1675, NY; 1803, NY). This station was located to the west of present-day Florida City. In 1959, Frank C. Craighead first collected purplehead sneezeweed on Long Pine Key in Everglades National Park (s.n., NY; s.n., USF). This station was vouchered again by George N. Avery in 1976 (1219, FTG), by Alan Herndon in 1980 (363, FTG), and by Rick and Jean Seavey in 1985 (99, FTG). The authors have observed plants on Long Pine Key as recently as 2000.

Only two other collections of this species are known from South Florida. Harold N. Moldenke made a collection in Goulds in 1930 (539, NY). In 1998, Bradley collected a specimen at the privately owned Notre Dame Pineland (1824, FTG), which is located to the west of the Homestead Air Reserve Base.

Major Threats: Habitat destruction at Notre Dame Pineland; fire suppression; exotic pest plant invasions.

Comments: *This species seems to grow only in periodically inundated pine rocklands, a habitat that has been eliminated outside of Everglades National Park. The population at Notre Dame Pineland may be declining due to a drop in the water table, while the population in Everglades National Park could be affected by changes in water delivery from the Everglades restoration.*

The plants in South Florida lack ray flowers.

Preliminary recommendations:

- Survey pine rocklands in the Goulds area, including Andrew Dodge Memorial Pineland, Black Creek Forest, Goulds Pineland, and Institute for Regional Conservation Preserve.
- Map and monitor known stations on a regular basis.
- Acquire Notre Dame Pineland.
- Conduct research to determine the effects of the Everglades restoration on purplehead sneezeweed.

Helianthus radula (Pursh) Torr. & A. Gray
Stiff Sunflower

South Florida Status: Critically imperiled. One occurrence at Big Cypress National Preserve.
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports this as frequent nearly throughout Florida.
South Florida Distribution: Collier County, where it is disjunct from Hardee and Okeechobee counties.
South Florida Habitats: Mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Taylor, 1992; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: William G. Atwater first collected stiff sunflower in 1958 “5 miles e. of Miles City” in Collier County (C-7, FLAS). This station is probably the same as that vouchered in the Bear Island area of Big Cypress National Preserve by Bradley in 1997 (662, FTG), and by Jordan Muss in 1998 (s.n., USF). Bradley and Woodmansee observed plants there as recently as 2001.

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:
- Map and monitor known stations on a regular basis.

Hexalectris spicata (Walt.) Barnhart
Spiked Crested Coralroot

South Florida Status: Critically imperiled. One occurrence at J.N. "Ding" Darling National Wildlife Refuge.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial saprophytic herb.
Distribution: Native to the southeastern United States, west to Arizona and New Mexico. Wunderlin (1998) reports it as occasional in Florida from the peninsula west to the central panhandle.
South Florida Distribution: Lee County.
South Florida Habitats: Hammocks.
Protection Status: Listed as endangered by FDACS.
Identification: Luer (1972) has illustrations and color photos; Taylor (1998) has a color photo.
References: Small, 1933a; Correll, 1950; Luer, 1972, Wunderlin, 1998; Coile, 2000.
Synonyms: *H. aphylla* (Nutt.) Raf. Ex S. Watson & S.M. Coult.

Historical Context in South Florida: William C. Brumbach first collected spiked crested coralroot in 1977 on Captiva Island (9261, USF). Joyce W. Gann and G. Donald Gann observed flowering plants on Captiva Island in 1982 (Avery's Notes, 29 May 1982). These plants were found on the edge of a clearing in partial shade (G. Donald Gann, personal communication, 19 February 2001). This island has undergone extensive residential and commercial development since the early 1980s and it is doubtful that any plants remain on Captiva Island.

Bruce F. Hansen and JoAnn Hansen collected spiked crested coralroot on neighboring Sanibel Island in 1979 (5692, USF), at the J.N. "Ding" Darling National Wildlife Refuge. It is assumed to be present there. William C. Brumbach made another collection on private property on western Sanibel Island in 1980 (9561, NY, USF). It is unknown whether or not this population is extant.

Major Threats: Exotic pest plant invasions; poaching.

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:
- Map and monitor known stations on a regular basis.

Hibiscus coccineus Walter
Scarlet Rosemallow

South Florida Status: Critically imperiled. One occurrence at Corkscrew Swamp Sanctuary.
Taxonomy: Dicotyledon; Malvaceae.
Habit: Shrub.
Distribution: Native to Florida, southern Georgia, and Alabama. Wunderlin (1998) reports it as occasional in Florida from the peninsula to the central and western panhandle.
South Florida Distribution: Collier County, where it is disjunct from Hillsborough and Polk counties.
South Florida Habitats: Cypress swamps.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Nelson (1996) has a color photo; Tobe et al. (1998) has color photos.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Taylor, 1992; Nelson, 1996; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *H. semilobatus* Chapm.

Historical Context in South Florida: M. Menzel and D. Wise first collected scarlet rosemallow in 1972 at Corkscrew Swamp Sanctuary in Collier County (72-19, FSU; 72-20, FSU). Gann and Tiffany Troxler Gann observed it at this station in 1999.

A specimen also exists that has been attributed to Broward County. Wise collected the specimen in 1972 (72-6, FSU), one day before he collected *H. coccineus* with Menzel at Corkscrew. We have seen no other reports from Broward County, and believe that this is a mislabeled specimen actually collected at Corkscrew Swamp Sanctuary.

Roger L. Hammer recently discovered a population of scarlet rosemallow in the Big Cypress Swamp that appears to have escaped from cultivated plants (personal communication, 13 June 2001).

Major Threats: Exotic pest plant invasions, especially Old World climbing fern (*Lygodium microphyllum*).

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Control Old World climbing fern and other exotic pest plants that may threaten scarlet rosemallow.

Huperzia dichotoma (Jacq.) Trevis.
Hanging Clubmoss

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Pteridophyte; Lycopodiaceae.
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; epiphytic on pond apple (*Annona glabra*) and pop ash (*Fraxinus caroliniana*).
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Tobe et al. (1998) has photos and an illustration; Nelson (2000) has a color photo; Wunderlin & Hansen (2000) has illustrations; the IRC Website has a color photo.
References: Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Austin, 1981; Nauman, 1986a; Flora of North America Editorial Committee, 1993; Tobe et al., 1998; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.

Synonyms: *Lycopodium dichotomum* Jacq.; *Phlegmariurus dichotomus* (Jacq.) W.H. Wagner.

Historical Context in South Florida: Charles A. Mosier and J.B. McFarlin first collected hanging clubmoss in 1934 in the Fakahatchee Strand (Mosier s.n., NY; McFarlin & Mosier 7357, NY), within what is now Fakahatchee Strand Preserve State Park. Clifton E. Nauman and others vouchered it again without a date (322, USF), presumably before 1980. Other observers include C. Eugene Delchamps, Roger L. Hammer, and George N. Avery (Avery's Notes, 17 November 1968, 11 November 1976, and 18 July 1979). Hammer, Alan Cressler and Don Keller observed three plants in 1988 (R.L. Hammer, personal communication, 8 February 2001). Cressler, Bradley, and Carol Lippincott observed three plants in 1995. The Fakahatchee station remains the only known station in Florida. Florida Park Service biologist Mike Owen estimates that there are fewer than 10 plants in Fakahatchee Strand Preserve State Park.

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

Preliminary recommendations:

- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten hanging clubmoss.
- Conduct conservation biology and conservation horticulture studies.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting population at Fakahatchee Strand Preserve State Park.

Ilex ambigua (Michx.) Torr.
Carolina Holly

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.

Taxonomy: Dicotyledon; Aquifoliaceae.

Habit: Shrub or small tree.
Distribution: Native to the southeastern coastal plain and piedmont. Wunderlin (1998) reports it as common in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Lee and Martin counties.
South Florida Habitats: Mesic hammocks, flatwoods, and floodplain forests.
Protection Status: Not listed by any agency.
Identification: Nelson (1994) has a color photo; Nelson (1996) has an illustration.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Wunderlin & Poppleton, 1977; Little, 1978; Godfrey, 1988; Nelson, 1994; Nelson, 1996; Wunderlin, 1998.
Synonyms: *I. buswellii* Small; *I. caroliniana* (Raf.) Trel.

Historical Context in South Florida: Walter M. Buswell first collected Carolina holly in 1923 at Fort Myers (s.n., USF). After that, it was collected on a number of occasions in the Fort Myers area, up until 1920, when Harold N. Moldenke made the last collection (991, NY). In 1923, Buswell also collected it along the Caloosahatchee River east of Fort Myers (s.n., NY). Small designated this as the type specimen of a new species, *I. buswellii*, which is now considered conspecific with *I. ambigua.* Buswell also collected it at this station in 1929 (s.n., NY). Carolina holly was not vouchered again in Lee County until George N. Avery collected it at Koreshan State Historic Site in 1973 (1475, FTG). Gann and Florida Park Service biologists R. "Bobby" Hattaway and Sally Braem searched for this species during a brief survey in 2001, but were unable to locate any plants. It is possible that construction of a parking lot destroyed the plants, but more survey work should be conducted at Koreshan.

In 1987, Roy O. Woodbury made the first collection in Martin County at Jonathan Dickinson State Park (s.n., FTG). Woodbury also collected it at several private properties in Martin County: south of Palm City in 1989 (M-1083, FTG) and in 1990 (M-1084, FTG); north of Palm City in 1989 (s.n., FTG); west of Stuart in 1990 (M-1085; M-1086, FTG); and, "SR 713" in 1992 (1068, FTG). The latter station possibly refers to State Road 714, which runs west of Palm City. While plants are presumably extant at

Jonathan Dickinson State Park, it is not known whether or not plants at the other stations remain.

Major Threats: Exotic pest plant invasions; habitat destruction.

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 Koreshan State Historic Site and Woodbury's Martin County stations.
- Map and monitor known stations on a regular basis.

Kosteletzkya depressa (L.) O.J. Blanch. et al.
White Fenrose

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Dicotyledon; Malvaceae.
Habit: Short-lived sub-shrub.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Monroe County mainland.
South Florida Habitats: Salt marshes, coastal berms, and open buttonwood forests.
Protection Status: Listed as endangered by FDACS.
Identification: It can be distinguished from *K. virginica* by having white flowers less than 1 cm long, rather than having pink flowers 2-4 cm long (Wunderlin, 1998).
References: Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Wunderlin, 1998; Coile, 2000.
Synonyms: *K. pentasperma* (Bertero ex DC.) Griseb.

Historical Context in South Florida: John Kunkel Small and others first collected white fenrose in 1921 "between Flamingo and Coot Bay" (10306, NY, US). Small and others collected it again in the Flamingo region in 1922 (10688, NY). It was not collected again until 1954, when Frank C. Craighead collected it at "Alligator Creek" (s.n., Everglades National Park herbarium). Since then, it has been collected in the Flamingo area by Craighead in 1962 (s.n., USF), by George N. Avery in 1966 (297, USF), and by

Richard G. Reimus in 1993 (149, FTG). Gann and Bradley have observed plants in the Flamingo region as recently as 2001.

Major Threats: Exotic pest plant invasions, especially Brazilian-pepper (*Schinus terebinthifolius*) and latherleaf (*Colubrina asiatica*); sea-level rise.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Control Brazilian-pepper and latherleaf in the Flamingo/Cape Sable area of Everglades National Park.
- Review for listing by FNAI.

Leptochloa uninervia (J. Presl) Hitchc. & Chase
Mexican Sprangletop

South Florida Status: Critically imperiled. One occurrence at Frog Pond/L-31 N Transition Lands. Other occurrences of waif populations may be present in southern Miami-Dade County.
Taxonomy: Monocotyledon; Poaceae.
Habit: Annual terrestrial herb.
Distribution: Native to the United States, Mexico, and South America. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Lee, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Rocky glades, salt marshes, and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Small, 1933a; Hitchcock & Chase, 1950; Hall, 1978; Correll & Correll, 1982; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *Diplachne uninervia* (J. Presl.) Parodi.

Historical Context in South Florida: Robert Kral first collected Mexican sprangletop in 1957 at J.W. Corbett Wildlife Management Area in Palm Beach County (5707, FSU). This collection was made in an abandoned tomato field, and may not represent a native population. In 1964, Robert K. Godfrey collected it along the Caloosahatchee River in Fort Myers in tidal flats adjacent to a mangrove swamp (65429, FSU). In 1971, Stephen D. Koch

collected it again in Lee County in a cleared area on the north side of the Caloosahatchee River in North Fort Myers (7122, FSU). It was reported to be locally abundant.

George N. Avery collected Mexican sprangletop first in Miami-Dade County in 1976 in "rocky glades west of Homestead" (1691, USF). This station is now protected in a remote area of Everglades National Park four to five miles from its eastern boundary (1691, USF). In 1997, Bradley collected it at the Frog Pond/L-31 N Transition Area (1186, FTG), an area of farm fields and rocky glades managed by the South Florida Water Management District. This collection was made at the edge of a farm field, although it may have historically occurred at the site in rocky glades. Bradley also collected the species in 1997 in a tree farm in marl soil northeast of the Homestead Air Reserve Base (1259, FTG). The species may have historically occurred in marl prairies in the area.

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. It has weedy tendencies in many of the sites where it has been collected, and it is uncertain whether or not it was historically native at some of these localities.*

Preliminary recommendations:
- Survey Avery station in Everglades National Park.
- Map and monitor known stations on a regular basis.

Leptochloa virgata (L.) P. Beauv.
Tropical Sprangletop

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Fakahatchee Strand Preserve State Park) and one non-conservation area (Pelican Marsh).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Peninsular Florida, southern Texas, the West Indies, Central America, and South America. Wunderlin (1998) reports it as rare in Florida in Seminole, Collier, and Miami-Dade counties.

South Florida Distribution: Collier, Miami-Dade, and the Monroe County Keys.
South Florida Habitats: Freshwater marshes, rockland hammocks, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Chapman, 1883*;* Small, 1933a; Hitchcock & Chase, 1950; Long & Lakela, 1976; Hall, 1978; Correll & Correll, 1982; Tobe et al., 1998; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *L. domingensis* (Jacq.) Trin.; *Diplachne domingensis* (Jacq.) Chapm.

Historical Context in South Florida: Tropical sprangletop may have been collected first by Joseph H. Simpson in 1892, but his label states only "Southern Florida" (s.n., NY, US). While not definitely from the range of this manual, Simpson did make other collections in the Florida Keys and Marco Island during the same month. Alvah A. Eaton made the first definite collection from South Florida in 1903 at the town of Newport on Key Largo (432, US). Additional collections were made on Key Largo in 1909 by John Kunkel Small and Joel J. Carter (2850, NY), in 1925 by Small (11640, NY), and in 1928 by Paul Weatherwax (1164, US). Both of Small's collections state that plants were found in "Hammocks" while the Weatherwax collection was made on a roadside. Weatherwax also stated that the species was "Probably Introduced."

Harold N. Moldenke first collected tropical sprangletop in Miami-Dade County in 1930 in "dry sandy soil along roadside" in the Black Point area (5543, NY). Frank C. Craighead made the next collection in 1961 in Everglades National Park (s.n., USF). The exact location of this collection is unknown. The only data provided on the specimen states "Concrete bridge," possibly referring to the Taylor Slough bridge on the main park road.

In 1961, William G. Atwater made a collection of tropical sprangletop in a roadside ditch northwest of Copeland in Collier County (2030, USF). This collection was probably from what is now Fakahatchee Strand Preserve State Park. In 1999, Bruce F. Hansen collected it nearby at the edge of the Fakahatchee Strand Preserve State Park along SR 26, north of Jerome (12888, USF).

Tropical sprangletop has also been reported for the Fakahatchee (Austin et al., 1990). It was also collected further north in Collier County at Pelican Marsh just east of Naples Park by Kristi Pierce in 1998 (s.n., USF). This collection was made from "Open marsh." This station is presumed to be extant, but it needs to be surveyed.

Major Threats: Habitat destruction at Pelican Marsh station; exotic pest plant invasions; hydrological modifications; fire suppression; wild hog damage.

Comments: This species has also been reported in Florida from Seminole County. It is unknown if this occurrence is extant or even if it was a native occurrence.

Preliminary recommendations:
- Survey Pelican Marsh.
- Map and monitor known stations on a regular basis.

Licaria triandra (Sw.) Kosterm.
Gulf Licaria

South Florida Status: Critically imperiled. One occurrence at Simpson Park.
Taxonomy: Dicotyledon; Lauraceae.
Habit: Tree.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS and as historical by FNAI.
Identification: Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Long & Lakela, 1976; Little, 1978; Tomlinson, 1980; Nelson, 1994; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *Misanteca triandra* (Sw.) Mez.

Historical Context in South Florida: John Kunkel Small first collected Gulf licaria in 1904 in Brickell Hammock in Miami (2241, NY). It has been collected numerous times in Brickell Hammock by a number of botanists. Today it is only extant at Simpson Hammock Park, where it was observed as early as 1965 by

George N. Avery (Avery's Notes, 11 November 1965). The authors have observed plants at this station as recently as 2000. Fewer than 10 trees are present, although there are dozens, if not hundreds, of seedlings present (R.L. Hammer, personal communication, 13 June 2001). Fairchild Tropical Garden has germplasm of Gulf licaria (M. Collins, personal communication, 3 July 2001), but it is not entirely clear if these plants are of Florida provenance.

Major Threats: Exotic pest plant invasions; management error; stochastic events (e.g., hurricanes).

Comments: *A number of local botanists have this species in cultivation from seeds collected in Brickell Hammock or from their progeny.*

Preliminary recommendations:

- Map and monitor plants at Simpson Park.
- Consider introductions to other sites within historical Brickell Hammock, including Alice Wainwright Park and Vizcaya Museum and Gardens.
- Review listing by FNAI.

Liparis nervosa (Thunb.) Lindl.
Pantropical Widelip Orchid

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habitat: Perennial terrestrial herb.
Distribution: Native to peninsular Florida, the West Indies, Mexico, Central America, South America, and the Old World. Wunderlin (1998) reports it as rare in Florida in Collier, Hernando, and Hillsborough counties.
South Florida Distribution: Collier County.
South Florida Habitats: Strand swamps.
Protection Status: Listed as endangered by FDACS.
Identification: Luer (1972) has illustrations and color photos; the IRC Website has a color photo.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Godfrey & Wooten, 1979; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.

Synonyms: *L. elata* Lindl.

Historical Context in South Florida: James Layne first discovered pantropical widelip orchid in 1903 (s.n., AMES; Ames, 1904b), in what is now Fakahatchee Strand Preserve State Park. Other collections were made there in 1937 by Walter M. Buswell (s.n., USF) and in 1963 by J.A. Lassiter and Rita Lassiter (16, USF). Numerous botanists, including the authors, have observed this population over the years. Gann and Woodmansee also observed this population in 2000 on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are between 1,000 and 10,000 plants in the Fakahatchee Strand. Pantropical widelip orchid also has been reported for Big Cypress National Preserve based upon a 1956 specimen (Black & Black, 1980), but we have not been able to verify this occurrence. A 1988 collection said to have been from Everglades National Park cannot be verified, and is treated here as a false record.

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

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Review for listing by FNAI.

Ludwigia palustris (L.) Elliott
Marsh Seedbox

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Onagraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to temperate North America, Eurasia, and Africa. Wunderlin (1998) reports it as frequent in Florida from the northern counties to the central peninsula.
South Florida Distribution: Charlotte and Martin counties.
South Florida Habitats: Floodplain forests and flatwoods.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1981) has an illustration.

References: Small, 1933a*;* Godfrey & Wooten, 1981; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *Isnardia palustris* L.

Historical Context in South Florida: O.E. Frye first collected marsh seedbox in 1946 in Charlotte County (s.n., FLAS). No specific locality data was given. In 1977, John Popenoe made the first collection in Martin County at Jonathan Dickinson State Park (1025, FTG). Donovan S. Correll and others also collected it there twice in 1978 (19899, FTG; 49911, FTG, NY). All of these collections were made near the Loxahatchee River in floodplain forests or flatwoods. Marsh seedbox has been reported for the Dupuis Reserve (Woodbury, no date), which is located in Martin and Palm Beach counties, but this report needs to be verified.

Major Threats: Exotic pest plant invasions; wild hog damage; 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.
- Map and monitor known stations on a regular basis.

Ludwigia virgata Michx.
Savannah Primrosewillow

South Florida Status: Critically imperiled. One occurrence at Pal-Mar.
Taxonomy: Dicotyledon; Onagraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent in Florida in the northern and central peninsula.
South Florida Distribution: Palm Beach County.
South Florida Habitats: Wet flatwoods.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.

References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Bradley and Woodmansee first collected Savannah primrosewillow in 1997 in wet flatwoods at Pal-Mar in Palm Beach County (699, FTG). Fewer than 10 plants were observed. It has been reported for Dupuis Reserve (Woodbury, no date), which is located nearby in Martin and Palm Beach counties, and Snake Creek/Miramar Pineland Natural Area in Broward County (Broward County Parks & University of Florida, 1998k), but these reports need to be verified.

Major Threats: Drainage of wet flatwoods habitat; 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. It is extremely similar to* L. maritima*, and has been erroneously reported for several stations in South Florida.*

Preliminary recommendations:
- Survey Dupuis Reserve, Pal-Mar Natural Area, un-acquired portions of the Pal-Mar CARL Site, and Snake Creek/Miramar Pineland Natural Area.
- Map and monitor known stations on a regular basis.

Lythrum flagellare Shuttlew. ex Chapm.
Florida Loosestrife

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Fred C. Babcock-Cecil M. Webb Wildlife Management Area) and one non-conservation area (a roadside swale next to Tamiami Village in North Fort Myers).
Taxonomy: Dicotyledon; Lythraceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as occasional in Florida in the central peninsula.
South Florida Distribution: Charlotte, Collier, Glades, Hendry, and Lee counties.

South Florida Habitats: Creek bottoms, marshes, and wet disturbed sites.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification: It can be distinguished from the other three species of *Lythrum* in Florida by having the uppermost leaves alternate, and usually being decumbent (Wunderlin, 1998).
References: Chapman, 1883; Small, 1933a; Graham, 1975; Long & Lakela, 1976; Godfrey & Wooten, 1981; Tobe et al., 1998; Wunderlin, 1998; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small first collected Florida loosestrife in 1917 near Fort Shackleford in Hendry County (8342, FSU, NY). This station is located in what is now the Big Cypress Seminole Indian Reservation. In 1964, Leonard J. Brass made a collection at Rainy Slough near Tasmania in Glades County, where it was reported to be common (33208, USF). Bradley visited this station in 2000, but most of the vegetation was desiccated and no plants were observed. In 1965, Olga Lakela made a collection north of Immokalee in Collier County (28712, FSU). The next year, Lakela collected it a second time north of Immokalee (29805, US, USF). In 1986, Elliott Brown made a collection in Lee County in a roadside swale along US 41 adjacent to Tamiami Village in North Fort Myers (s.n., USF). Gann and Tiffany Troxler Gann found this small station in 2000. It is only a matter of time before this population is destroyed. It is possible that some plants are present at the Tamiami Village Flatwoods Site immediately to the north of Tamiami Village.

Gann and Bradley collected Florida loosestrife at the Fred C. Babcock-Cecil M. Webb Wildlife Management Area in Charlotte County in 1996 (688, USF). A few plants were found growing in the headwaters of a small creek. Florida loosestrife has been reported from the Dupuis Reserve (Woodbury, no date; Gann et al., 1998), which is located in Martin and Palm Beach counties, but these reports need to be verified.

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

Preliminary recommendations:

- Survey Big Cypress Seminole Indian Reservation, Immokalee area, Tamiami Village Flatwoods Site, and Tasmania area.
- Map and monitor known stations on a regular basis.
- Consider translocation of Tamiami Village population to a more secure location.
- Acquire Tamiami Village Flatwoods Site.

Mitchella repens L.
Partridgeberry

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Rubiaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Martin County.
South Florida Habitats: Floodplain forests.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Nelson (1996) has a color photo; Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Nelson, 1996; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: John Popenoe collected partridgeberry in 1978 along the banks of the Loxahatchee River in Jonathan Dickinson State Park (1195, FTG). A small population persists there (R.E. Roberts, personal communication, 16 May 2001).

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:

- Map and monitor plants at Jonathan Dickinson State Park.

Najas wrightiana A. Braun
Wright's Waternymph

South Florida Status: Critically imperiled. One occurrence in the Big Cypress National Preserve.
Taxonomy: Monocotyledon; Najadaceae.
Habit: Annual aquatic herb.
Distribution: South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Collier and Broward counties, and the Monroe County mainland.
South Florida Habitats: Brackish creeks, cypress swamps, and canals.
Protection Status: Not listed by any agency.
Identification: Distinguished from other species of *Najas* in South Florida by having leaves with small but conspicuous marginal teeth, tapering leaf bases, and fruits that are glossy and finely reticulate (Wunderlin 1998).
References: Long & Lakela, 1976; Godfrey & Wooten, 1979; Correll & Correll, 1982; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: *N. flexilis* (Willd.) Rostk. & W. Schmidt, misapplied.

Historical Context in South Florida: Olga Lakela first collected Wright's waternymph in 1964 in a cypress swamp off Turner River Road east of Ochopee in Collier County (27796, USF). Lakela and F. Almeda made the next collection in 1968 about 16 miles to the west at "Remuda Ranch Estates" (31526, USF), a development now known as Port of the Islands. Haynes and Wentz (1974) reported the species as new to the United States based upon this collection. The collection was made in "road embankments along canals marginal to cypress swamps." In 1978, George N. Avery made a collection in a cypress strand along Loop Road in Big Cypress National Preserve (1972, FTG). In 1980, Renee Beymer made a collection in Halfway Creek at the Old Wooten's Indian Village (s.n., Big Cypress National Preserve Herbarium).

Durbin Tabb made a single collection in Broward County in 1978 at Indian Trace, a development in the northern part of the county

close to Water Conservation Area 2A (s.n., FTG). This collection was made in a canal, and it is not certain if it represents a native population.

Major Threats: Exotic pest plant invasions, hydrological modifications, off road vehicles.

Comments: *Haynes (in Flora of North America Editorial Committee, 2000) considered this to be introduced in Florida. Other authors, such as Godfrey and Wooten (1979) and Wunderlin (1998) consider it to be native.*

Preliminary recommendations:

- Survey Water Conservation Area 2A in Everglades and Francis S. Taylor Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Nothoscordum bivalve (L.) Britton
Crowpoison

South Florida Status: Critically imperiled. One occurrence at Six Mile Cypress Slough Preserve.
Taxonomy: Monocotyledon; Amaryllidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States. Wunderlin (1998) reports it as occasional in Florida from the northern counties to the central peninsula.
South Florida Distribution: Lee County, where it is disjunct from the nearest populations in Brevard County.
South Florida Habitats: Mesic flatwoods and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo.
References: Small, 1933a; Bell & Taylor, 1982; Taylor, 1992; Wunderlin, 1998.
Synonyms: *Allium bivalve* (L.) Kuntze.

Historical Context in South Florida: Paul C. Standley first collected crowpoison in 1916 near Fort Myers (2822, US). It was subsequently collected by Richard P. Wunderlin and others in 1980 in Fort Myers (8851, USF) and by Elliott Brown in 1984 north

of the sewer plant at Tamiami Village in North Fort Myers (s.n., USF). Plants could still be present at the Tamiami Village Flatwoods Site just north of Tamiami Village. In 1997, Bradley and Woodmansee found plants at the Six Mile Cypress Slough Preserve (773, FTG; 784, FTG, USF), which is located southeast of Fort Myers.

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:
- Survey Tamiami Village Flatwoods Site.
- Map and monitor known stations on a regular basis.
- Acquire Tamiami Village Flatwoods Site.

Nymphaea mexicana Zucc.
Yellow Waterlily

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Arthur R. Marshall Loxahatchee National Wildlife Refuge) and one non-conservation area (Lake Okeechobee).
Taxonomy: Dicotyledon; Nymphaeaceae.
Habit: Perennial aquatic herb.
Distribution: Native to the southern United States and Mexico. Wunderlin (1998) reports it as occasional in Florida from the peninsula and from Wakulla County.
South Florida Distribution: Collier, Glades, Lee, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Lakes, rivers, and canals.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Conard, 1905; Small, 1933a; Wood, 1959; Long & Lakela, 1976; Ward, 1977; Godfrey & Wooten, 1981; Bell & Taylor, 1982; Taylor, 1992; Flora of North America Editorial Committee, 1997; Tobe et al., 1998; Wunderlin, 1998.

Synonyms: *N. flava* Leitn.; *Castalia flava* (Leitn. ex A. Gray) Greene.

Historical Context in South Florida: Abram P. Garber first collected yellow waterlily in 1877 on the "Upper Miami River" (3141, NY). Garber also made a collection somewhere along Prairie Creek in 1877 (s.n., FLAS, US). Prairie Creek runs through Charlotte County, where it empties into Charlotte Harbor, but much of it is in De Soto County. It is possible that Garber's collection was from De Soto County.

In 1913, John Kunkel Small and George K. Small collected yellow waterlily in Lake Okeechobee near Torrey Island in Palm Beach County (4154, NY). In 1997, Bradley and Woodmansee also made a collection in Lake Okeechobee, but in Glades County at the mouth of Fisheating Creek (417, FTG). Daniel F. Austin (1974) reported yellow waterlily for the Arthur R. Marshall Loxahatchee National Wildlife Refuge in Palm Beach County. It is presumably extant there, but needs to be vouchered.

L. Eleanor Scull made a collection in Collier County in 1937 in a pond at a golf course in Naples (s.n., FLAS), where it may have been introduced. Yellow waterlily also has been collected on Sanibel Island in Lee County, but it may be introduced there as well. In 1972, William C. Brumbach collected it where it had "escaped to a canal" (7886, NY). John Popenoe also observed it on Sanibel in 1973 in a ditch (Avery's Notes, 11 October 1973). In 1980, yellow waterlily was collected in "a small pool" in a developed portion of North Fort Myers in Lee County by John Beckner and Walter Pagels (2443, USF). It is not clear whether or not it was cultivated or introduced at this station, or if it was persisting from a former natural occurrence. Yellow waterlily is reported from Corkscrew Swamp Sanctuary (Judd, 1994), which is located in both Collier and Lee counties, but this station needs to be verified.

A specimen that was collected by Olga Lakela (29674, USF) is labeled "Hugh Taylor Birch State Park. ...Primary hammock with extensions of subtropical flora." This is most likely a labeling error.

Major Threats: Manipulations of water levels in Lake Okeechobee; off-target damage from exotic pest plant control programs.

Preliminary recommendations:

- Survey Arthur R. Marshall Loxahatchee National Wildlife Refuge and Corkscrew Swamp Sanctuary.
- Map and monitor known stations on a regular basis.

Nyssa sylvatica Marshall var. ***biflora*** (Walter) Sarg**.** **Swamp Tupelo**

South Florida Status: Critically imperiled. One occurrence at Caloosahatchee Regional Park.
Taxonomy: Dicotyledon; Nyssaceae.
Habit: Tree.
Distribution: Native to the southeastern United States. Wunderlin (1998) reports it as frequent in Florida from the northern counties to the central peninsula.
South Florida Distribution: Glades and Lee counties.
South Florida Habitats: Riverside swamp forests.
Protection Status: Not listed by any agency.
Identification: Nelson (1994) has a color photo; Tobe et al. (1998) has an illustration and color photos.
References: Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Godfrey, 1988; Burckhalter, 1992; Nelson, 1994; Nelson, 1996; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *N. biflora* Walter; *N. ursina* Small.

Historical Context in South Florida: Leonard J. Brass first collected swamp tupelo in 1945 at "Hailpen Gully," somewhere along Fisheating Creek in Glades County (14808, ARCH, GH). It may be extant in the newly established Fisheating Creek Wildlife Management Area.

It is present at the Caloosahatchee Regional Park in Lee County. In 2000, Lee County biologist Roger Clark showed a single tree to Gann and Lee County biologist Rob Irving, although additional trees are known from another area of the park (R. Clark, personal communication, 13 January 2001). This station needs to be vouchered. Swamp tulepo is also reported for the Koreshan State

Historic Site in Lee County (Florida Park Service District 4, 1994d), but this report is thought to be in error, or represent cultivated plants. Judd (1994) reported it for Corkscrew Swamp Sanctuary, which is located in Lee and Collier counties, but this report needs to be verified.

Major Threats: Hydrological modifications; 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 Caloosahatchee Regional Park.
- Survey Corkscrew Swamp Sanctuary, Fisheating Creek Wildlife Management Area, and Koreshan State Historic Site.
- Map and monitor known stations on a regular basis.

Oncidium ensatum Lindl.
Florida Dancinglady Orchid

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, Mexico, and Central America.
South Florida Distribution: Collier and Miami-Dade counties, and the Monroe County mainland.
South Florida Habitats: Rockland hammocks, coastal berms, and 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; Correll & Correll, 1982; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *O. floridanum* Ames; *O. sphacelatum* Lindl., misapplied.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected Florida dancinglady orchid in 1903 between Cutler and Black Point in Miami-Dade County (980, NY). Small and Percy Wilson collected it again near Black Point in 1904 (s.n., NY, US). There is a Small specimen at New York Botanical Garden that is labeled from the Black Creek area (12670, NY), but it appears that this specimen was actually collected near Flamingo in Monroe County in Everglades National Park. There are no verifiable collections or observations of Florida dancinglady orchid from the Black Point area after 1904.

Alvah A. Eaton collected one specimen near Brown's Homestead in the Redland area of Miami-Dade County in 1903 (Ames, 1904a). Small made two other collections from hammocks on the Miami Rock Ridge, the first from Hattie Bauer Hammock in 1915 (2966, NY), most of which is now a Miami-Dade County conservation area, and the second from Horton Hammock, a hammock of uncertain locality, in 1916 (7274, NY).

Eaton also made a collection on Paradise Key in 1903 (Ames, 1904a), in what is now Everglades National Park. Small made the first collection on nearby Long Pine Key in 1909 (2945, NY), and it has been vouchered and observed for a number of hammocks in and around Long Pine Key and Paradise Key. Small collected it again in 1916 (7254, NY), and Olga Lakela collected it with Frank C. Craighead in 1963 (s.n., USF). George N. Avery observed it in eight hammocks on Long Pine Key from 1967-1978 (Avery's Notes). Roger L. Hammer estimates that there are fewer than 100 plants on Long Pine Key today (personal communication, 19 February 2001). Eaton also collected it at Coot Bay near Flamingo in Everglades National Park in 1905 (1372, AMES). It was collected in that same area by Small in 1925 (12668, NY), but has not been seen there since that time.

Eaton also collected Florida dancinglady orchid in the Fakahatchee Strand in 1904 (1114, AMES). Luer (1972) reported plants from the area, but it is not certain whether or not this station was in what is now Fakahatchee Strand Preserve State Park, the Florida Panther National Wildlife Refuge, or a private property. Austin et al. (1979, 1990), reported it for Fakahatchee Strand Preserve State Park, but this record was based upon Luer (1972).

It has not been seen in this area in many years, despite much botanical activity.

Sauleda and Adams (1989) reported Florida dancinglady orchid for the Big Cypress Swamp in both Collier and Monroe counties, and cited the Monument Road area in Big Cypress National Preserve as a locality where it was historically abundant. They further stated that changes in water flow in the Big Cypress swamp had led to its virtual demise there. No recent observations from Big Cypress National Preserve are known.

Major Threats: Poaching; exotic pest plant invasions; wild and prescribed fires during the dry season in Everglades National Park.

Comments: *This is one of the species that may be affected by the Everglades restoration. More water delivery south of main park road could have benefits for Florida dancinglady orchid, which requires moist organic soils and high humidity levels.*

Preliminary recommendations:

- Survey Florida Panther National Wildlife Refuge.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Consider reintroducing Florida dancinglady orchid to other sites within its historical range, including Hattie Bauer Hammock.
- Conduct research to determine the effects of the Everglades restoration on Florida dancinglady orchid.

Oncidium undulatum (Sw.) Salisb.
Mule-ear Orchid

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Miami-Dade County and the Monroe County mainland.
South Florida Habitats: Coastal berms and rockland hammocks.

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; the IRC Website has a color photo.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *O. luridum* Lindl., misapplied; *O. luridum* var. *guttatum* Lindl., misapplied.

Historical Context in South Florida: Alvah A. Eaton first collected mule-ear orchid in 1903 on Paradise Key in the Long Pine Key area of what is now Everglades National Park (Ames, 1904a). It was reported as scarce and subsequently was not collected there. Eaton also made a collection near Flamingo in 1905 (1328, AMES). John Kunkel Small and others collected more plants in the Flamingo area in 1923 (10881, NY), as did Harold N. Moldenke in 1930 (835a, NY), and Walter M. Buswell in 1943 (s.n., FLAS, USF) and 1945 (s.n., USF). Gann, Bradley and many others have observed plants in this region of the park in both Miami-Dade and Monroe counties. Roger L. Hammer estimates that there are fewer than 500 plants in Everglades National Park today (personal communication, 19 February 2001).

Mule-ear orchid was apparently collected first outside of Everglades National Park by John Kunkel Small and J.B. DeWinkeler in 1920 in a hammock at Buena Vista (9620, FLAS), north of present-day downtown Miami. No other plants from that area were vouchered or observed, but L. Eleanor Scull collected a second specimen labeled from “below Miami” in 1938 (s.n., FLAS). The locality data for both of these specimens is suspect, and both of these records could refer to plants originally collected in what is now Everglades National Park.

Hammer discovered a single plant in Fuchs Hammock just north of Homestead in 1977, a station visited that same year by George N. Avery and the members of the Native Plant Workshop (Avery’s Notes, 30 August 1977, 7 September 1977). This plant was poached by April 1978 (Avery’s Notes, 22 April 1978), before it came into flower (R.L. Hammer, personal communication, 19 February 2001). According to Chuck McCartney, Fred J. Fuchs,

Sr. probably placed this plant into Fuchs Hammock following his purchase of the hammock with the intention of turning it into an Orchid Jungle-like tourist attraction (personal communication, 21 February 2001).

Major Threats: Poaching; exotic pest plant invasions, especially Brazilian-pepper (*Schinus terebinthifolius*) and latherleaf (*Colubrina asiatica*); sea-level rise.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Brazilian-pepper and latherleaf in the Flamingo/Cape Sable area of Everglades National Park.
- Consider reintroducing mule-ear orchid to Paradise Key.
- Conduct research to determine the effects of sea-level rise on mule-ear orchid.

Ophioglossum nudicaule L. f.
Slender Adder's-tongue

South Florida Status: Critically imperiled. One occurrence in Royal Palm Beach Pines Natural Area.
Taxonomy: Pteridophyte; Ophioglossaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to North America, the West Indies, Mexico, Central America, South America, and the Old World. Wunderlin (1998) reports it as occasional in Florida from the central panhandle to the peninsula.
South Florida Distribution: Broward, Charlotte, Lee, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Flatwoods, Indian middens, and presumably pine rocklands.
Protection Status: Not listed by any agency.
Identification: Nelson (2000) has an illustration; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1931b; Clausen 1938; Small, 1938; Lakela & Long, 1976; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *O. dendroneuron* E.P. St. John; *O. mononeuron* E.P. St. John; *O. nudicaule* var. *minus* R.T. Clausen; *O. nudicaule* var.

tenerum (Mett. ex Prantl) R.T. Clausen; *O. pumilio* E.P. St. John; *O. tenerum* Mett. ex Prantl.; *O. vulgatum* L. var. *nudicaule* (L. f.) D.C. Eaton.

Historical Context in South Florida: Abram P. Garber first collected slender adder's-tongue in 1878 in Miami (2259, MO), presumably in moist pinelands near the Miami River. In 1903, Alvah A. Eaton made a single collection from an Indian mound in Fort Lauderdale (s.n., GH). It was collected once in the vicinity of Fort Myers by Jeanette P. Standley in 1916 (354, FLAS, NY), and C.R. Jackson made a single collection from Charlotte County about three miles north of Punta Gorda in 1949 (s.n., FTG).

David Black first collected slender adder's-tongue in Palm Beach County in 1978 (317, FTG). The specimen was collected on a drained pond bottom on a private site that has most likely been developed (personal communication, 24 January 2001). Richard Moyroud also made a collection in Hypoluxo in a cleared pineland in 1986 (s.n., FTG). In 1996, Black found plants of slender adder's-tongue at Royal Palm Beach Pines Natural Area, which he photographed (personal communication, 24 January 2001). He has not seen plants there recently, but thinks that the plants might be underground most of the time, or that they may respond to disturbance. We are presuming that these plants are extant, but this station needs to be vouchered.

Major Threats: Exotic pest plant invasions.

Comments: *Slender adder's-tongue seems to be quite ephemeral in South Florida.*

Preliminary recommendations:
- Voucher plants at Royal Palm Beach Pines Natural Area.
- Map and monitor known stations on a regular basis.

Opuntia cubensis Britton & Rose
Bullsuckers

South Florida Status: Critically imperiled. One occurrence at National Key Deer Refuge.
Taxonomy: Dicotyledon; Cactaceae.

Habit: Perennial terrestrial succulent herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Coastal rock barrens.
Protection Status: Not listed by any agency.
Identification: Benson (1982) has a black and white photo of plants from Big Pine Key.
References: Small, 1933a; Britton & Rose, 1937; Long & Lakela, 1976; Benson, 1982; Wunderlin, 1998.
Synonyms: *O. ochrocentra* Small ex Britton & Rose.

Historical Context in South Florida: John Kunkel Small and others first collected bullsuckers in 1921(s.n., NY) and 1922 (s.n., NY) on the southern end of Big Pine Key in Monroe County. These collections were presumably made in the vicinity of Cactus Hammock, which is now located within the boundaries of the National Key Deer Refuge. Ellsworth P. Killip collected it at the same location in 1935 (31423, US). It also was reported for Big Pine Key by Dickson et al. (1953) and by Franklin (1968). Austin et al. (1980a) listed it for National Key Deer Refuge. The last collections were made by Lyman D. Benson, probably in the 1970s (15368a, POM; 16576, POM) and are cited by Benson (1982). We have not seen these specimens. In 1982, Benson stated that bullsuckers was nearly extinct on the southeastern end of Big Pine Key, due to road building. In 2001, Bradley and Woodmansee observed a few plants at the Cactus Hammock station, but this station needs to be vouchered.

Major threats: Exotic pest plant invasions; damage from *Cactoblastis cactorum* larvae; sea-level rise.

Comments: *Members of the genus* Opuntia *in South Florida are affected by the larvae of the exotic moth* Cactoblastis cactorum.

Preliminary recommendations:

- Voucher plants at Cactus Hammock.
- Map and monitor known stations on a regular basis.
- Protect plants from the larvae of *Cactoblastis cactorum*.
- Review for listing by FDACS and FNAI.

Panicum abscissum Swallen
Cut-throat Grass

South Florida Status: Critically imperiled. One occurrence at Yamato Scrub Natural Area.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as rare in the central peninsula.
South Florida Distribution: Palm Beach County. Reported for Glades County (Jue et al., 2001).
South Florida Habitats: Scrubby flatwoods.
Protection Status: Listed as endangered by FDACS and as rare by FNAI.
Identification: Hitchcock & Chase (1950) has an illustration; Tobe et al. (1998) has photos and illustrations.
References: Hitchcock & Chase, 1950; Hall, 1978; Tobe et al., 1998; Wunderlin, 1998; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Cut-throat grass was collected first in 1993 by Donald R. Richardson in north Boca Raton in Palm Beach County (s.n., USF). It has been reported from several additional locations very close by, primarily along Military Trail, from Clint Moore Road south to Potomac Road. Most of these stations have been destroyed. Farnsworth (1998) discovered cut-throat grass at the Yamato Scrub Natural Area where it is extant. Bradley and Woodmansee observed this station in 1998. Fewer than 100 plants were seen. Cut–throat grass has been reported for the Fisheating Creek Conservation Easement in Glades County (Jue et al., 2001), but this report needs to be verified.

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

Comments: *Cut-throat grass is an unusual scrubby flatwoods plant in that it requires constant moisture delivered along a seepage gradient. It may be declining, where it occurs, because*

of drainage and lowering of the water table. It is also very specific to certain soils.

Preliminary recommendations:

- Voucher plants at Yamato Scrub Natural Area.
- Survey Fisheating Creek Conservation Easement.
- Map known stations at least every three years.
- Monitor known stations at least every year.
- Conduct conservation biology and conservation horticulture studies.

Pecluma plumula (Humb. & Bonpl. ex Willd.) M.G. Price **Plume Polypody**

South Florida Status: Critically imperiled. Two occurrences in Everglades National Park.
Taxonomy: Pteridophyte; Polypodiaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to peninsular Florida, the West Indies, Mexico, Central America, and South America. Wunderlin (1998) reports it as frequent in peninsular Florida.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Rockland hammocks and mesic hammocks.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification: Chafin (2000) has a color photo; Nelson (2000) has color photos; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1931b; Small, 1938; Evans, 1968; Lakela & Long, 1976; Long & Lakela, 1976; Correll & Correll 1982; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Polypodium plumula* Humb. & Bonpl. ex Willd.

Historical Context in South Florida: C.L. Pollard first collected plume polypody in 1898 on Key Largo (203, US), but it has not been collected or observed there since that time. Pollard (1899)

wrote that only a single plant was found on a dead tree trunk near the village of Aiken.

John Kunkel Small made the next collection in 1919 in Miami-Dade County in a hammock about 20 miles southwest of Royal Palm Hammock (9179, NY), in what is now Everglades National Park. Nellie C. Knappen (1929) also collected it there in 1928 (s.n., US). Volunteer botanist Rick Seavey has observed what appears to be the same station in a hammock southeast of Mahogany Hammock (personal communication, 24 January 2001). He estimates that fewer than 100 plants are present. Plume polypody also has been collected on Long Pine Key in Everglades National Park, beginning with a Walter M. Buswell collection in 1938 (s.n., FTG). Frank C. Craighead also collected it there in 1961 (s.n., FTG). Carol Lippincott discovered a population in a hammock on Long Pine Key, which she later showed to Rick Seavey (R. Seavey, personal communication, 24 January 2001). Seavey estimates that there are about 10 plants in that hammock.

Major Threats: Poaching; exotic pest plant invasions.

Comments: *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, an increase in water delivery into the area north of Long Pine Key and south of Mahogany Hammock could flood out the supporting trees and cause the extirpation of plume polypody.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Conduct research to determine the effects of the Everglades restoration on plume polypody.

Peperomia rotundifolia (L.) Kunth
Yerba Linda

South Florida Status: Critically imperiled. One occurrence at Big Cypress National Preserve.
Taxonomy: Dicotyledon; Piperaceae.
Habit: Perennial epiphytic herb.

Distribution: Native to South Florida, the West Indies, Central America, South America, Africa, and Madagascar.
South Florida Distribution: Collier County.
South Florida Habitats: Strand swamps.
Protection Status: Not listed by any agency. Approved for listing by FDACS by the Florida Endangered Plant Advisory Council.
Identification: It is distinguished from other species of *Peperomia* in Florida by having succulent orbicular to round elliptic to subovate leaves to 12 mm long and 10 mm wide**.** The IRC Website has a color photo
References: Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: National Park Service biologist Tony Pernas discovered yerba linda in 1999 in the Loop Road area of Big Cypress National Preserve. Bradley, Pernas, and Amy Ferriter vouchered this station later in 1999 (2005, FTG, USF). Plants were observed to be abundant around a small pond in the center of a strand swamp on four trees of pop ash (*Fraxinus caroliniana*) and two trees of cocoplum (*Chrysobalanus icaco*).

Major Threats: Poaching; exotic pest plants; hydrological modification.

Comments: *This species was discovered after the publication of Wunderlin (1998).*

Preliminary recommendations:
- Map and monitor plants at Big Cypress National Preserve on a regular basis.
- Protect from poaching.
- List by FDACS. Review for listing by FNAI.

***Peperomia* species A** (Unidentified)

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Dicotyledon; Piperaceae.
Habit: Perennial epiphytic herb.
Distribution: Unknown.

South Florida Distribution: Collier County in the Fakahatchee Strand.
South Florida Habitats: Strand swamps.
Protection Status: Not listed by any agency.
Identification: N/A.
References: N/A.
Synonyms: N/A.

Historical Context in South Florida: In April 2000, Roger L. Hammer and Don Keller found a species of *Peperomia* that was unfamiliar to them in Collier County in the Fakahatchee Strand Preserve State Park. A few weeks later Hammer showed these plants to Bradley. Fewer than 50 plants were found on several trees in a small area of strand swamp. The species has not been identified. Fruiting specimens need to be collected and sent to an expert for identification.

Major Threats: Poaching; exotic pest plant invasions.

Preliminary recommendations:
- Voucher fertile specimen and determine identity.
- Continue ongoing surveys at Fakahatchee Strand Preserve State Park.
- Map and monitor plants at Fakahatchee Strand Preserve State Park on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten this species.
- Based upon determination, review for listing by FDACS and FNAI.

Phoebanthus grandiflorus (Torr. & A. Gray) S.F. Blake
Florida False Sunflower

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as frequent in Florida in the peninsula.

South Florida Distribution: Martin County.
South Florida Habitats: Scrub.
Protection Status: Not listed by any agency.
Identification: Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Wunderlin, 1998.
Synonyms: *Helianthella grandiflora* Torr. & A. Gray.

Historical Context in South Florida: Roy O. Woodbury first collected Florida false sunflower in 1989 at Jonathan Dickinson State Park in 1989 (s.n., FTG). The species was reported as being "rare on north side of park in pine scrub, moist to dry." It is assumed to be extant there. Other reports of this species have been made for Loxahatchee Slough Natural Area in Palm Beach County (Farnsworth, 1994c) and for Corkscrew Regional Ecosystem Watershed in Collier County (Hilsenbeck, 1997). These reports are doubtful, due to a lack of appropriate habitat.

Major Threats: Fire suppression; exotic pest plant invasions.

Preliminary recommendations:
- Map and monitor known stations on a regular basis.

Phoradendron rubrum (L.) Griseb.
Mahogany Mistletoe

South Florida Status: Critically imperiled. One occurrence at Dagny Johnson Key Largo Hammocks Botanical State Park.
Taxonomy: Dicotyledon; Viscaceae.
Habit: Perennial parasitic herb.
Distribution: Native to South Florida, the Bahamas, and Cuba.
South Florida Distribution: Monroe County Keys. Reported, but unverified, for Miami-Dade County.
South Florida Habitats: Rockland hammocks. It grows parasitically only on West Indian mahogany (*Swietenia mahagoni*).
Protection Status: Listed as endangered by FDACS and critically imperiled by FNAI.
Identification: The IRC Website has a color photo.
References: Cooley, 1963; Long & Lakela, 1976; Ward, 1978; Correll & Correll, 1982; Kellogg, 1986; Campbell, 1995; Nelson, 1996; Wunderlin, 1998; Coile, 2000; Gann, 2000.

Synonyms: None.

Historical Context in South Florida: J.M. Crevasse first collected mahogany mistletoe in 1941 on Key Largo from an unspecified station (s.n., FLAS). S.J. Lynch collected it again in 1944 on the "south end" of Key Largo (s.n., FLAS), but it has not been documented there since that time. Ray Garrett collected a specimen at an unspecified station on Key Largo in 1953 (s.n., FLAS).

In 1963, Frank C. Craighead discovered plants in a hammock south of Dispatch Slough and east of Old State Road 905 on North Key Largo (s.n., FLAS, FTG, USF). This station was observed first by Craighead during an aerial survey flown at 50 feet above the trees (Cooley, 1963) and corresponds to hammock L1/10b in Weiner (1980). George N. Avery searched for these plants without luck. Subsequently the hammock burned during a dry period. The plants at that station were assumed extirpated by the mid-1960s (Avery's Notes).

Crafton Clift found the next station in 1976 in Crossroads Hammock (hammock L1/9 in Weiner 1980). There were several plants on one tree. Avery and Clift collected a specimen of these plants in May of that year (1243, FLAS), and material from these plants was accessioned at Fairchild Tropical Garden. By 1977, extensive logging was occurring in this hammock. Arthur H. Weiner and Karen Achor did not observe mahogany mistletoe during their survey of the hammock in June of that year (Weiner 1980). However, Avery and Florida Park Service biologist Renate H. Skinner collected branches of the Crossroads Hammocks host tree around 1980 after it had been poached (R.H. Skinner, personal communication, 18 April 2001).

Josef Nemec discovered the next station on the edge of Avery Hammock (hammock L1/6 in Weiner 1980) along Dispatch Slough in March 1998. Gann and Florida Park Service biologist Janice A. Duquesnel verified this station in April 1999. More than 20 plants were growing on three trees. The smallest host tree died during late April or early May 1999. The Florida Park Service has mapped the three mahogany trees known to have hosted mahogany mistletoe, and is currently monitoring the two remaining

trees on a monthly basis. Gann, Duquesnel and others have conducted extensive surveys in Dagny Johnson Key Largo Hammocks Botanical State Park, but have been unable to locate additional plants. Gann (2000) recommended that the Florida Park Service consider augmenting mahogany mistletoe at Key Largo Hammock State Botanical Site, and this project was initiated in 2001.

The report of mistletoe from Miami-Dade County is based upon George Cooley's report of Craighead's observations flying over islands in what is now Biscayne National Park (Cooley, 1963). Craighead stated, "The mistletoe is here [Sands Key and Old Rhodes Key] also from what I could make out in flying over." These sightings were never verified on the ground. Surveys in 2001 by the authors have failed to locate any plants in Biscayne National Park.

Mahogany mistletoe is cultivated at Fairchild Tropical Garden, and techniques for establishing mistletoe on mahogany have been published by Rob Campbell (Campbell, 1995). Germplasm from the Crossroads Hammock station is maintained at Fairchild Tropical Garden (Accession #76-288).

Major Threats: Stochastic extinction (e.g., hurricane, severe drought); exotic pest plant invasions.

Other Comments: *Although Ward (1978) reports that mahogany mistletoe grows on other hardwoods in the Bahamas, Correll & Correll (1982) states that it is specific to* Swietenia*. With the exception of the occurrence at Avery Hammock, all records have indicated that mahogany mistletoe grows on large mahogany trees. It is important to note that the relatively small host tree that died in 1999 was unable to support mistletoe during a prolonged hot, dry period. Craighead (in Cooley 1963) reported that mahogany mistletoe eventually kills even large mahogany trees. It most easily can be seen during the dry season when West Indian mahogany drops its leaves.*

Preliminary recommendations:

- Continue surveys in Biscayne National Park.
- Continue mapping host trees on an annual basis.
- Continue monitoring plants on a monthly basis.

- Continue efforts to augment plants at Dagny Johnson Key Largo Hammocks Botanical State Park.
- Consider reintroducing mahogany mistletoe to other rockland hammocks on Key Largo outside of Dagny Johnson Key Largo Hammocks Botanical State Park, including Dove Creek Hammocks.
- Consider collecting and accessioning new germplasm from Avery Hammock station to augment existing *ex situ* material at Fairchild Tropical Garden.

Pilosocereus bahamensis (Britton) Byles & G.D. Rowley **Bahama Tree Cactus**

South Florida Status: Critically imperiled. One occurrence at John Pennekamp Coral Reef State Park.
Taxonomy: Dicotyledon; Cactaceae.
Habit: Tree.
Distribution: Native to South Florida and the Bahamas.
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: This species is difficult to distinguish from *P. robinii*, and is considered by some (e.g. Anderson, 2001) to be conspecific with it (as *P. polygonus* (Lam.) Byles & G.D. Rowley). Britton & Rose (1937) has descriptions of *P. bahamensis* and the other South Florida taxa of *Pilosocereus*. Also, see *P. robinii* in Part 3 of this chapter. The IRC Website has a color photo
References: Britton & Rose, 1937; Correll & Correll, 1982; Adams & Lima, 1994b; Wunderlin, 1998; Coile, 2000.
Synonyms: *Cereus bahamensis* (Britton) Vaupel; *Cephalocereus bahamensis* Britton.

Historical Context in South Florida: Bahama tree cactus is known from a single clonal plant growing in a rockland hammock surrounded by a mangrove swamp in John Pennekamp Coral Reef State Park. Joseph O'Brien discovered this station in 1992 (s.n., FTG). Gann and Florida Park Service biologists Janice A. Duquesnel and James G. Duquesnel observed it in 1999. Gann took a geographical coordinate of the station. Some stems had been recently vandalized.

Major Threats: Vandalism; poaching; exotic pest plant invasions; stochastic extinction (e.g., hurricanes).

Comments: Wunderlin (1998) did not include P. bahamensis because no specimen was seen. Wunderlin & Hansen (2001) includes this species in the South Florida flora.

Preliminary recommendations:

- Map outline of plants on an annual basis.
- Monitor plants on a quarterly basis.
- Protect from poaching and vandalism.
- Establish an *ex situ* collection in case the plants are poached or vandalized.

Pleurothallis gelida Lindl.
Flor de Llanten

South Florida Status: Critically imperiled. One occurrence at 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 imperiled by FNAI.
Identification: Luer (1972) has illustrations and color photos; Chafin (2000) has illustrations and a color photo.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Alvah A. Eaton first collected flor de llanten in 1905 (1401, NY), presumably in what is now Fakahatchee Strand Preserve State Park. In 1968, a plant was collected there by C. Eugene Delchamps and accessioned by Fairchild Tropical Garden (Accession #68-186; Avery's Notes, 17 November 1968). George N. Avery, Roger L. Hammer, and many

others have observed this species over the years. Gann and Woodmansee observed plants in the Fakahatchee in 2000 on a field trip led by Florida Park Service biologist Mike Owen. Owen estimates that there are fewer than 100 plants in the Fakahatchee Strand (personal communication, 22 January 2001).

Frank C. Craighead attempted to introduce flor de llanten into the Long Pine Key area of Everglades National Park (Botanical Notes of Frank C. Craighead). George N. Avery, Maxie Simmons, and Glen Simmons observed a single plant in Deer Hammock in 1976. Avery discovered this plant dead following the freeze of January 19-20, 1977 (Avery's Notes, 11 May 1976, 25 February 1977). There is no indication that flor de llanten was ever native to Everglades National Park.

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

Preliminary recommendations:

- Continue ongoing surveys at Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Control Old World climbing fern and other exotic pest plants that threaten flor de llanten.
- Consider augmenting population at Fakahatchee Strand Preserve State Park.
- Review FNAI rank.

Polygonella gracilis Meisn.
Tall Jointweed

South Florida Status: Critically imperiled. One occurrence at Don Pedro Island State Park and adjoining private property.
Taxonomy: Dicotyledon; Polygonaceae.
Habit: Annual terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Broward, Charlotte, Collier, and Miami-Dade counties.

South Florida Habitats: Scrub, scrubby flatwoods, mesic flatwoods, and sandy pockets in pine rocklands.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Taylor, 1992; Nelson, 1996; Wunderlin, 1998.
Synonyms: *Delopyrum filiforme* Small; *Delopyrum gracile* (Meisn.) Small.

Historical Context in South Florida: Ferdinand Rugel first collected tall jointweed in 1846 in Miami (s.n., NY), presumably in sandy pine rocklands near the Miami River. Additional collections from Miami-Dade County were made in 1912 by John Kunkel Small between Miami and Coconut Grove (4089, NY), in 1929 by Harold N. Moldenke in northern Miami-Dade at Buena Vista (308a, NY), and in 1934 in Miami by Walter M. Buswell (s.n., FTG), probably between downtown Miami and Coral Gables. In 1903, Small and Joel J. Carter made the first collection in Broward County at Fort Lauderdale (1167, NY). Additional collections from the Fort Lauderdale area were made by Buswell in 1934 (s.n., FTG) and 1941 (s.n., FTG). Buckley & Hendrickson (1983a) reported tall jointweed for the Fort Lauderdale Executive Airport Gopher Tortoise Preserve, but this report needs to be verified. George N. Avery collected tall jointweed in Collier County on Horr's Island, adjacent to Marco Island, in 1970 (s.n., FTG). Bradley and Joseph O'Brien observed it there in 1996, but the island was undergoing rapid development. It is doubtfully extant on the island.

In 1979, Bruce F. Hansen and Donald R. Richardson collected tall jointweed near Cape Haze in Charlotte County (6838, USF). In 2000, Gann located the Hansen and Richardson station. The colony was split into two by State Road 775. The western side is now a mainland base for Don Pedro Island State Park. The eastern side was private property that was in the process of being developed. The Don Pedro Island State Park station needs to be vouchered.

Major Threats: Habitat destruction; 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 Don Pedro Island State Park.
- Survey Fort Lauderdale Executive Airport Gopher Tortoise Preserve.
- Map and monitor known stations on a regular basis.
- Consider restoring pine rocklands near the Miami River and reintroducing tall jointweed.

Polygonum setaceum Baldwin
Bog Smartweed

South Florida Status: Critically imperiled. One occurrence at Nicodemus Slough.
Taxonomy: Dicotyledon; Polygonaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Throughout except for Martin County and the Florida Keys.
South Florida Habitats: Lake margins, cypress swamps, swales, and disturbed wet areas.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1981) has an illustration.
References: Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1981; Nelson, 1996; Wunderlin, 1998.
Synonyms: *Persicaria setacea* (Baldwin) Small.

Historical Context in South Florida: Although bog smartweed has been collected nearly throughout South Florida, few recent records are known. John Kunkel Small and George K. Small made the first collection in 1913 on the shores of Observation Island in Lake Okeechobee in Glades County (4406, NY). The authors conducted a series of surveys on Observation Island and other islands in Lake Okeechobee in 1997, but failed to locate any plants. In 1960, bog smartweed was collected by William P. Adams “ca 6 miles south of Brighton,” a station about nine miles northwest of Lake Okeechobee. In 1997, Bradley and

Woodmansee collected bog smartweed at Nicodemus Slough (444, FTG), a conservation area located just west of Lake Okeechobee in Glades County.

In 1915, Small and others made a collection near Royal Palm Hammock in Miami-Dade County (6642, NY), presumably in or near Taylor Slough in what is now Everglades National Park. In 1916, Small made a collection in the Everglades west of Coconut Grove (8054, NY), an area that has been completely developed. In 1918, Small made a collection in "Everglades along Tamiami Trail" (8836, NY), followed by Olga Lakela, who made an additional collection along Tamiami Trail in 1963 (26210, USF). The exact locations of the Tamiami Trail collections are not known, but it seems likely that bog smartweed was collected in or near the Shark River Slough in what is now Everglades National Park. Alan H. Herndon made an additional collection from Miami-Dade County in 1985 in the Redland area at a disturbed site covered with nursery trash (1231, NY). It does not appear that this collection represented a native population.

In 1925, Hugh O'Neill collected bog smartweed at the Belle Glade Experimental Station in Palm Beach County (s.n., FLAS). It was collected just east of this station in 1944 by "Tisdale, Townsend, & West" at the edge of a canal (s.n., FLAS). In 1947, John H. Davis, Jr. made the only known collection in Broward County "in Everglades" along US 27 at 26 Mile Bend (s.n., FLAS). This collection was made in either Water Conservation Area 2A or 3A. Bradley and Woodmansee conducted surveys of Water Conservation Area 2A in 1997, but did not observe bog smartweed. In 1947, Davis made a collection in the "Loxahatchee area" of Palm Beach County (s.n., FLAS). However, Austin (1974) did not report bog smartweed for Arthur R. Marshall Loxahatchee National Wildlife Refuge. Robert K. Godfrey and Grady W. Reinert made a collection in 1961 near Port Charlotte in Charlotte County (60959, FSU).

In 1964, Daniel B. Ward made a collection of bog smartweed at Pinecrest in Big Cypress National Preserve in Monroe County (3966, FLAS). In 1967, Olga Lakela made another collection in the same general area of Big Cypress National Preserve, this time south of Tamiami Trail and east of Monroe Station in Collier County (30654, USF). However, Black & Black (1980) did not

report this species for the park. William C. Brumbach made two additional collections in 1967 and 1968 on Sanibel Island in Lee County (5744, FLAS; 6484, FLAS).

Major Threats: Development; 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. However, it may be more common than is indicated here. It may simply be misidentified as other* Polygonum *species.*

Preliminary recommendations:

- Survey the Pinecrest/Loop Road area of Big Cypress National Preserve, the Taylor Slough and Shark River Slough areas of Everglades National Park, and Water Conservation Area 3A in the Everglades and Francis S. Taylor Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Pseudophoenix sargentii H. Wendl. ex Sarg.
Sargent's Cherry Palm

South Florida Status: Critically imperiled. One occurrence at Biscayne National Park.
Taxonomy: Monocotyledon; Arecaceae.
Habit: Tree.
Distribution: Native to South Florida, the West Indies, Mexico, and Central America.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Rockland hammocks and coastal berms.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: *Pseudophoenix* is one of two native palm genera having pinnate leaves, the other genus being *Roystonea. Pseudophoenix* is distinguished from *Roystonea* in being of much smaller stature, and by having an inflorescence that emerges from among the leaves rather than below it (Wunderlin, 1998). Scurlock (1987) has color photos.

References: Small, 1933a; Ledin et al., 1959; Read, 1968; Long & Lakela, 1976; Ward, 1976; Little, 1978; Scurlock, 1987; Lippincott, 1992a; Nelson, 1994; Lippincott, 1995; Wunderlin, 1998, Coile, 2000; Flora of North America Editorial Committee, 2000.
Synonyms: *P. vinifera* (Mart.) Becc., misapplied.

Historical Context in South Florida: Commodore Ralph Munroe discovered Sargent's cherry palm in 1886 on Long Key in Monroe County (Munroe, 1930; Read, 1968), and Allan H. Curtiss vouchered it there in 1896 (5637, GH, NY, US). Also in 1886, Charles S. Sargent and Allan H. Curtiss discovered it on Elliott Key in Miami-Dade County (s.n., NY), where a total of six individuals were observed (Read, 1968). In 1923, a single tree was found on Sands Key by Wirth Munroe, which was vouchered by John Kunkel Small and John B. DeWinkeler (10770, GH; Ledin et al. 1959; Read, 1968). Excellent and detailed histories of the species in South Florida are provided by Ledin et al. (1959), Read (1968), and Lippincott (1992a, 1995). As reported by Read, as many as 200 individuals were found at a single time on Long Key and as many as 150 on Elliott Key.

John Kunkel Small (1922) reported Sargent's cherry palm from Upper Matecumbe Key, but the plants were transplants from Long Key.

A photograph taken by Clifton Adams in the herbarium of the Smithsonian Institution shows a single mature plant surrounded by native vegetation on Lower Matecumbe Key. A letter accompanying the photograph was written by David Fairchild to O.F. Cook. The letter described the photograph as having been taken in 1931, and indicates that Fairchild also saw the plant. We have not seen a discussion of this station elsewhere (e.g. Read, 1968), and cannot be certain that it was not a cultivated plant.

Unfortunately, Sargent's cherry palm became highly desirable as a landscape plant and plant collectors plundered the populations on Elliott Key and Long Key (Lippincott, 1992a). Other plants were destroyed on Elliott Key by settlers clearing land for pineapples and other fruit crops (Lippincott, 1992a). By 1966, George N. Avery was unable to locate any plants on Long Key, where he had

previously found the species (Botanical Notes of George N. Avery, 1 August 1966). A subsequent survey in 1990 by Fairchild Tropical Garden biologist Carol Lippincott and Florida Park Service biologist James G. Duquesnel was also in vain (Lippincott, 1992a).

While plants on Long Key were extirpated, a small population persisted on Elliott Key. Surveys by Biscayne National Park staff in the 1970s and 1980s resulted in the location of 29 plants (Lippincott, 1992a). By 1990, additional surveys by the staffs of the National Park Service, Fairchild Tropical Garden, and the Florida Park Service had recorded 47 plants (Lippincott, 1992a). In August 1992 Hurricane Andrew killed 19 of the tallest plants on Elliott Key (Lippincott, 1995), reducing the population to 28 plants.

Fairchild Tropical Garden maintains a collection of germplasm from South Florida, and has done extensive horticultural work on this species. In addition, Fairchild has worked with the National Park Service and the Florida Park Service to augment the population on Elliott Key and reintroduce a population on Long Key. Lippincott (1992a, 1995) gives excellent accounts of these translocation efforts. Fairchild Tropical Garden and Florida Park Service staffs continue to map and monitor both wild and translocated plants at both sites.

Major Threats: Poaching; exotic pest plant invasions.

Comments: *An unpublished paper written by R. Bruce Ledin disputes the nativity of this species. We have seen no evidence to suggest that Sargent's cherry palm was introduced.*

Preliminary recommendations:

- Continue mapping and monitoring of wild plants on Elliott Key.
- Continue augmentation project on Elliott Key.
- Continue reintroduction project on Long Key.

Quercus x*rolfsii* Small
Rolfs' Oak

South Florida Status: Critically imperiled. One occurrence at County Line Scrub, Miami-Dade County.

Taxonomy: Dicotyledon; Fagaceae.
Habit: Shrub.
Distribution: Endemic to peninsular Florida.
South Florida Distribution: Broward and Miami-Dade counties.
South Florida Habitats: Scrubby flatwoods.
Protection Status: Not listed by any agency.
Identification: This hybrid is not included in any modern keys. Small (1933) has a key of 42 species and hybrids of the southeastern United States.
References: Small, 1905; Small, 1933a; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected Rolfs' oak in 1903 near Fort Lauderdale in Broward County (1244, NY). Small (1905) described it as a new species based upon this collection. Small collected it again in Fort Lauderdale in 1904 (s.n., FTG). While it has not been collected again in Broward County, Gann and Bradley collected it in extreme northern Miami-Dade County in 1996 at County Line Scrub (815, FTG), a scrubby flatwoods conservation area managed by Miami-Dade County.

Rolfs' oak has recently been reported for Rookery Bay National Estuarine Research Reserve in Collier County (Burch, 1998), but this report needs to be verified.

Major Threats: Fire suppression; exotic pest plant invasions.

Comments: *This is a hybrid between* Q. chapmanii *and* Q. minima*. Other collections have been made in Clay, Highlands, and Orange counties (Wunderlin & Hansen, 2001).*

Preliminary recommendations:
- Map and monitor known stations on a regular basis.
- Survey Rookery Bay National Estuarine Research Reserve.
- Review for listing by FNAI.

Rhipsalis baccifera (J.S. Mill.) Stearn
Mistletoe Cactus

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Dicotyledon; Cactaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida, the West Indies, Central America, and South America. It is also found in Tropical Africa and Sri Lanka.
South Florida Distribution: Miami-Dade County, and possibly the Monroe County mainland. Persisting or escaped from cultivation elsewhere.
South Florida Habitats: Coastal berms and rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Benson (1982) has a photo; the IRC Website has a color photo.
References: Small, 1933a; Small, 1935; Britton & Rose, 1937; Long & Lakela, 1976; Benson, 1982; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *Rhipsalis cassutha* Gaertn.

Historical Context in South Florida: Charles A. Mosier first collected mistletoe cactus in 1923 in "Wallensteins Hammock, west of Kendall" in Miami-Dade County (s.n., NY, US). The exact location of this hammock is unknown, but this collection could have been in the vicinity of what is now Kendall Indian Hammocks Park.

Apparently, John Beckner and Roy O. Woodbury discovered mistletoe cactus in the Flamingo area of Everglades National Park in the 1950s (Ward, 1978). Frank C. Craighead collected the earliest known specimen from that region in 1958 (s.n., Everglades National Park herbarium). This collection was made at "Crocodile Point near Snake Bight." Craighead's unpublished notes indicate that this station was just a little south of West Lake. An additional specimen (photograph only) was collected by Lyman Benson in 1965 from "Snakebight Road, four mi. east of Flamingo" (16579, RSA). While this road is in Monroe County, he may have

actually been at Craighead's station east of the county line in Miami-Dade County. Around 1990, Rob Campbell discovered a single plant on a dead buttonwood tree on West Lake (Campbell, 1990), close to Craighead's station. John Ogden and Carol Lippincott vouchered this station in 1991 (46, FTG). Roger Hammer was present also on this trip (R.L. Hammer, personal communication, 10 August 2001). This is the only native population of mistletoe cactus known to exist in South Florida.

Fairchild Tropical Garden has a collection of germplasm from the West Lake plant (Accession #91-601). Mistletoe cactus is widely cultivated in peninsular Florida, and reports from stations other than Kendall and Everglades National Park are thought to represent plants persisting from cultivation, or perhaps naturalized populations from cultivated plants (e.g., Kral 49266, GH; Kral 70796, GH).

Major Threats: Poaching; stochastic events (e.g., hurricanes).

Preliminary recommendations:

- Survey Flamingo area of Everglades National Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Maintain *ex situ* collection of germplasm.
- Consider introducing a population to Kendall Indian Hammocks Park.

Rhynchospora baldwinii A. Gray
Baldwin's Beaksedge

South Florida Status: Critically imperiled. One occurrence at Pal-Mar & Pal-Mar CARL Site.
Taxonomy: Monocotyledon; Cyperaceae.
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: Charlotte, Lee, and Martin counties.
South Florida Habitats: Wet flatwoods.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration.

References: Chapman, 1883; Small, 1933a; Gale, 1944; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Robert Kral first collected Baldwin's beaksedge in 1958, twelve miles east of Punta Gorda in Charlotte County (6535, USF). This collection was probably made inside of, or very close to, Fred C. Babcock-Cecil M. Webb Wildlife Management Area. In 1991, Steven L. Orzell and Edwin L. Bridges collected Baldwin's beaksedge in Martin County at the Pal-Mar CARL Site (16813, FTG). In 1997, Gann and Bradley collected it nearby in Palm Beach County at Pal-Mar, a South Florida Water Management District conservation area (1033, FTG; 1048, FTG). These two stations are considered to be the same occurrence.

Orzell and Bridges also made a collection in 1992 at the Westinghouse L & L property in the vicinity of Estero Bay State Buffer Preserve in Lee County (19402, USF). This property has been developed, but plants may be present at one or more mitigation sites (R. Irving, personal communication, 6 August 2001).

Major Threats: Drainage of wet flatwoods habitat; 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:

- Survey Estero Bay State Buffer Preserve, Fred C. Babcock-Cecil M. Webb Wildlife Management Area, Pal-Mar Natural Area, and the Westinghouse L & L property.
- Map and monitor known stations on a regular basis.
- Continue acquisitions of unprotected portions of the Pal-Mar CARL Site.

Rhynchospora fernaldii Gale
Fernald's Beaksedge

South Florida Status: Critically imperiled. One occurrence at Six Mile Cypress Slough Preserve.
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to Florida, Georgia, and Alabama. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Charlotte, Collier, Glades, and Lee counties.
South Florida Habitats: Mesic flatwoods and probably dry prairie.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.
References: Gale, 1944; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Mary Francis Baker first collected Fernald's beaksedge in 1917 in Alva (s.n., US), a town that is located in the vicinity of Caloosahatchee Regional Park in Lee County. In 1992, Steven L. Orzell and Edwin L. Bridges made a collection at the Westinghouse L & L property (19408, USF), in the vicinity of Estero Bay State Buffer Reserve. This property has been developed, but plants may be present in one or more mitigation sites (R. Irving, personal communication, 6 August 2001). In 1997, Bradley and Woodmansee collected Fernald's beaksedge at the Six Mile Cypress Slough Preserve near Fort Myers (795, FTG).

In 1942, John H. Davis made a collection in a "Serenoa prairie" east of Palmdale in Glades County (s.n., FLAS), in or near what is now Fisheating Creek Wildlife Management Area. In 1964, Olga Lakela made the only collection in Collier County along the Lake Trafford Road in Immokalee (27455, USF). In 1990, Orzell and Bridges made a collection in Charlotte County north of El Jobean (14876, USF), near what is now Charlotte Harbor State Buffer Preserve.

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:

- Survey Caloosahatchee Regional Park, Charlotte Harbor State Buffer Preserve, the El Jobean station, Estero Bay State Buffer Reserve, the Westinghouse L & L property, and Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Rorippa floridana Al-Shehbaz & Rollins
Florida Watercress

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Dicotyledon; Brassicaceae.
Distribution: Endemic to Florida. Wunderlin (1998) reports it as frequent in Florida from the western panhandle to the peninsula.
South Florida Distribution: Collier and Miami-Dade counties.
South Florida Habitats: Strand swamps and riverbanks.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Small, 1933a; Rollins, 1993; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *Cardamine curvisiliqua* Shuttlew. ex Chapm.; *Nasturtium microphyllum* Boenn. ex Rchb., misapplied.

Historical Context in South Florida: Abram P. Garber first collected Florida watercress in 1877 along the Miami River (73, FLAS), a station that was subsequently destroyed. In 1960, William G. Atwater collected Florida watercress northwest of Copeland in the Fakahatchee Strand (M-175, FLAS), presumably in what is now Fakahatchee Strand Preserve State Park. Other collections were made in the Fakahatchee in 1969 by George N. Avery (2059, FLAS), in 1979 by Walter S. Judd (2163, FLAS), and in 1985 by Alan Herndon (1182, FLAS). Florida watercress is assumed to be extant in Fakahatchee Strand Preserve State Park.

Major Threats: Exotic pest plant invasions; hydrological modifications.

Preliminary recommendations:
- Map and monitor plants at Fakahatchee Strand Preserve State Park on a regular basis.

Schizachyrium niveum (Swallen) Gould
Pinescrub bluestem

South Florida Status: Critically imperiled. One occurrence at Seabranch Preserve State Park.
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as rare in central Florida.
South Florida Distribution: Martin County, but still not vouchered.
South Florida Habitats: Scrub.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Hitchcock & Chase (1950) has an illustration; Chafin (2000) has illustrations and a color photo.
References: Hitchcock & Chase, 1950; Hall, 1978; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *Andropogon niveus* Swallen.

Historical Context in South Florida: Bradley and Woodmansee first observed pinescrub bluestem in 1998 at Seabranch Preserve State Park in Martin County (Bradley et al., 1999), but this station needs to be vouchered. Fewer than 100 plants were observed.

Major Threats: Exotic pest plant invasions; fire suppression.

Comments: *In a study of scrub sites throughout Martin County in 1998 (Bradley et al., 1999), this species only was seen at Seabranch Preserve State Park.*

Preliminary recommendations:
- Voucher plants at Seabranch Preserve State Park.

- Map and monitor known stations on a regular basis.

Schizaea pennula Sw.
Ray Fern

South Florida Status: Critically imperiled. One occurrence at Arthur R. Marshall Loxahatchee National Wildlife Refuge.
Taxonomy: Pteridophyte; Schizaeaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, central Florida in Pinellas County, the West Indies, Central America, and South America.
South Florida Distribution: Miami-Dade and Palm Beach counties.
South Florida Habitats: Moist organic soils in Everglades tree islands and wet rockland hammocks.
Protection Status: Listed as endangered by FDACS and critically imperiled by FNAI.
Identification: Nelson (2000) has a color photo; Wunderlin & Hansen (2000) has an illustration.
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; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *S. germanii* (Fée) Prantl; *Actinostachys germanii* Fée; *Actinostachys pennula* (Sw.) Hook.

Historical Context in South Florida: Alvah A. Eaton first collected ray fern in 1904 in "intangled growth" along the Miami River (996, USF). Eaton (1906) reported that it was very scarce at that location. It was reported again in 1914 in Royal Palm Hammock in Everglades National Park (Small, 1938), but apparently it never was vouchered there.

Taylor R. Alexander rediscovered ray fern in 1972 on tree islands (bayheads) in Arthur R. Marshall Loxahatchee National Wildlife Refuge in Palm Beach County (Alexander, 1974). This population is extant and was last observed by Bradley and Woodmansee in 2000. It is estimated that fewer than 1,000 plants are present in the Loxahatchee National Wildlife Refuge.

Major Threats: Exotic pest plant invasions, specifically by Old World climbing fern (*Lygodium microphyllum*) which is rapidly invading tree islands in Loxahatchee National Wildlife Refuge and has been found in association with ray fern by Bradley and Woodmansee; off-target damage from exotic species control efforts; hydrological modifications; wildfire.

Comments: *This is one of the species that may be affected by the Everglades restoration.*

Preliminary recommendations:

- Survey tree islands in Arthur R. Marshall National Wildlife Refuge.
- Map individual tree islands known to contain ray fern at least every three years.
- Monitor individual tree islands at least every year.
- Control Old World climbing fern (*Lygodium microphyllum*) and other exotic pest plants without causing off-target damage to ray fern.
- Consider establishing an *ex situ* collection of germplasm.
- Conduct research to determine the effects of the Everglades restoration on ray fern.

Schoenocaulon dubium (Michx.) Small
Florida Feathershank

South Florida Status: Critically imperiled. One occurrence in Jonathan Dickinson State Park.
Taxonomy: Monocotyledon; Liliaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as occasional in peninsular Florida.
South Florida Distribution: Broward, Martin, and Palm Beach counties.
South Florida Habitats: Flatwoods and scrub.
Protection Status: Not listed by any agency.
Identification: Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Frame, 1990; Taylor, 1998; Wunderlin, 1998.
Synonyms: *Schoenocaulon gracile* A. Gray.

Historical Context in South Florida: Roy O. Woodbury and Walter M. Buswell first collected Florida feathershank in 1942 in the vicinity of Pompano Beach in northern Broward County (s.n., FTG). Ann Buckley and Ted Hendrickson collected it in 1984 in the same general area of Broward County in Deerfield Beach (33, FTG). Both of these stations probably have been destroyed. In 1977, Daniel F. Austin made a collection at Jonathan Dickinson State Park in Martin County (s.n., FAU), followed by John Popenoe in 1980 (1907, USF). In 1997, Bradley and Woodmansee collected it along the Loxahatchee River Corridor in the Palm Beach County portion of Jonathan Dickinson State Park (94, FTG). Florida feathershank 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: Fire suppression; exotic pest plant invasions.

Preliminary recommendations:

- Survey Dupuis Reserve.
- Map and monitor known stations on a regular basis.

Scleria ciliata Michx. *var.* ***pauciflora*** (Muhl. ex Willd.) Kük. **Fewflower Nutrush**

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Fred C. Babcock-Cecil M. Webb Wildlife Management Area) and one non-conservation area (Pal-Mar CARL Site).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: The eastern United States, Cuba, Mexico, and Central America. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Charlotte, Collier, Lee, and Martin counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Distinguished from other varieties of *S. ciliata* by having achene bodies that are ridged or papillate instead of reticulate, 1-2 mm long, and 6 tubercles (Wunderlin, 1998).

References: Chapman, 1883; Small, 1933a; Core, 1936; Fairey, 1967; Fairey, 1969; Long & Lakela, 1976; Godfrey & Wooten, 1979; Kessler, 1987; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *S. pauciflora* Muhl. ex Willd.; *S. pauciflora* var. *caroliniana* (Willd.) A.W. Wood.

Historical Context in South Florida: Leonard J. Brass first collected fewflower nutrush in 1964 in Collier County northeast of Naples in the Golden Gate Estates area (33362, USF). This station has probably been destroyed. In 1990, Steven L. Orzell and Edwin L. Bridges made a collection about 0.5 miles east of Estero Bay near Bonita Springs in Lee County (15197, FTG, USF), in or near what is now Estero Bay State Buffer Preserve. Orzell and Bridges made another collection in 1991 at the Pal-Mar CARL Site in Martin County (16851, FTG). It has also been reported for Jonathan Dickinson State Park in Martin County (Florida Park Service District 5, no date), but this report needs to be verified. Gann and Bradley collected it in 1995 at the Fred C. Babcock-Cecil M. Webb Wildlife Management Area in Charlotte County (53, FTG).

Major Threats: Fire suppression; exotic pest plant invasions.

Preliminary recommendations:

- Survey Estero Bay State Buffer Preserve and Jonathan Dickinson State Park.
- Map and monitor known stations on a regular basis.
- Continue CARL acquisitions to expand Estero Bay State Buffer Preserve and Pal-Mar.

Scutellaria arenicola Small
Florida Scrub Skullcap

South Florida Status: Critically imperiled. One occurrence at Collier-Seminole State Park.
Taxonomy: Dicotyledon; Lamiaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as frequent in the peninsula.
South Florida Distribution: Collier and Lee counties.
South Florida Habitats: Flatwoods.

Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo.
References: Small, 1933a; Epling, 1942; Godfrey & Wooten, 1981; Taylor, 1992; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Albert S. Hitchcock first collected Florida scrub skullcap in 1900 in Fort Myers (277, NY). Alvah A. Eaton made another collection there in 1904 (1153, AMES). Epling (1942) cited an additional specimen by Eaton, probably in 1905 (1410), but we have not located this specimen. Jeanette P. Standley also collected Florida scrub skullcap in Lee County in the Mullock Creek area in 1917 (440, US). This station is in the vicinity of what is now Estero Bay State Buffer Preserve. In 1982, George N. Avery collected Florida scrub skullcap at Collier-Seminole State Park (2350, FTG). J. Weber also collected it there in 1991 (CS0026, USF).

Major Threats: Fire suppression; exotic pest plant invasions.

Preliminary recommendations:
- Survey Estero Bay State Buffer Preserve.
- Map and monitor known stations on a regular basis.

Spiranthes costaricensis Rchb. f.
Costa Rican Lady's-tresses

South Florida Status: Critically imperiled. One occurrence at Everglades National Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the West Indies, and Central 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: Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Coile, 2000.
Synonyms: *Beloglottis costaricensis* (Rchb. f.) Schltr.

Historical Context in South Florida: John Beckner discovered Costa Rican lady's-tresses in 1953 in or around Long Pine Key in Everglades National Park (Luer, 1972). It was collected on Long Pine Key by George N. Avery in 1980 (2215, FTG), and by Richard G. Reimus and Chuck McCartney in 1991 (s.n., FTG). Avery observed Costa Rican lady's-tresses in five hammocks in the vicinity of Long Pine Key from 1980 to 1983 (Avery's Notes, 1980-1983). It can still be found in at least four hammocks in Everglades National Park (Hammer, 2001). Avery reported one other station of Costa Rican lady's-tresses in 1982 (Avery's Notes, 19 February 1982, 22 December 1982). He found plants growing at Camp Owaissa Bauer, a Miami-Dade County park. About ten plants were present in 1982 (Avery's Notes, 1982), and Chuck McCartney photographed plants there in 1983 (personal communication, 21 February 2001). No subsequent reports from that station have been made despite numerous attempts to find these plants by Roger L. Hammer (Hammer, 2001) and others.

Major Threats: Exotic pest plant invasions; poaching.

Preliminary recommendations:

- Continue surveys at Camp Owaissa Bauer.
- Map and monitor known stations on a regular basis.

Sporobolus compositus (Poir.) Merr. var. ***clandestinus*** (Biehler) Wipff & S.D. Jones **Hidden Dropseed**

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Everglades National Park), and one non-conservation area (Navy Wells #2).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as occasional in Florida from the northern counties south to Hillsborough County.
South Florida Distribution: Miami-Dade County, where it is disjunct from the nearest populations in Hillsborough County.
South Florida Habitats: Pine rocklands.
Protection Status: Not listed by any agency.

Identification: Hitchcock & Chase (1950) has an illustration.
References: Small, 1933a; Hitchcock & Chase 1950; Hall, 1978; Wunderlin, 1998.
Synonyms: *S. clandestinus* (Biehler) Hitchc.

Historical Context in South Florida: Alvah A. Eaton first collected hidden dropseed in 1903 on "Border of prairies, South of Cutler" (225, US). It was rediscovered, unwittingly, in 1982 when George N. Avery collected an undetermined grass on Long Pine Key in Everglades National Park (2351, FTG). It remained unidentified until Bradley discovered a population of an unknown grass at a private pine rockland fragment known as Navy Wells #2 in 1997 (729, FTG). Bradley, who had seen Avery's unidentified specimen, recognized that it was the same. He called the specimens to the attention of Gerald "Stinger" Guala, keeper of the Fairchild Tropical Garden herbarium, who correctly identified them. In 2000, Bradley and Gann observed the colony discovered by Avery in Everglades National Park. The plants at this station are growing along the side of a firebreak road at the edge of a pine rockland.

Major Threats: Habitat destruction at Navy Wells #2; road maintenance on Long Pine Key; fire suppression; exotic pest plant invasions; management error.

Preliminary recommendations:
- Map and monitor known stations on a regular basis.
- Acquire Navy Wells #2.

Stylisma abdita T. Myint
Showy Dawnflower

South Florida Status: Critically imperiled. One occurrence in one conservation area (Rookery Bay National Estuarine Research Reserve) and fragmented occurrences on several private properties in Collier County.
Taxonomy: Dicotyledon; Convolvulaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to Florida. Wunderlin (1998) records it as rare in peninsular Florida.
South Florida Distribution: Collier and Lee counties.

South Florida Habitats: Scrub.
Protection Status: Listed as endangered by FDACS and as imperiled to rare by FNAI.
Identification: There are five species of *Stylisma* in Florida. *S. abdita* is distinguished by having leaves that are less than 2 cm long, rather than over 2 cm long (Wunderlin 1998).
References: Myint, 1966; Long & Lakela, 1976; Austin & Burch, 1992; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Alan R. Smith and Tin Myint first collected showy dawnflower in 1961 (627, FLAS) in Naples. Myint (1966) subsequently described the species. Showy dawnflower was overlooked in Collier County until Jim Burch began making collections in the late 1980s and early 1990s in both Collier and Lee counties. The status of the species in southwest Florida was reported by Austin & Burch (1992). Burch collected it on Marco Island in 1990 (213, Collier County Natural Resources Division Herbarium), the Naples area many times from 1987 (s.n., FAU) to 1991 (423, Collier County Natural Resources Division Herbarium), and the Pelican Bay area many times in 1990 and 1991 (e.g. s.n., USF). Burch made the first collection in Lee County in 1987 in Bonita Springs (s.n., FAU). Burch made another collection in Bonita Springs in 1990 (s.n., FAU). In 2001 Burch found plants at the Rookery Bay National Estuarine Research Reserve (personal communication, 14 January 2002).

While showy dawnflower has been collected or observed on many sites in Collier and Lee counties in the last 15 years, Burch believes that most plants have either been destroyed or will be destroyed in the near future. Burch estimates that between 12 and 15 scrub fragments may remain with the species in Collier County, and it may no longer be extant in Lee County (personal communication, 14 January 2002).

Major Threats: Habitat destruction at private stations.

Preliminary recommendations:
- Survey scrub sites in Collier County and southern Lee County.
- Map and monitor known stations on a regular basis.

Tephrosia angustissima Shuttlew. ex Chapm. *var. curtissii* (Small ex Rydb.) Isely
Curtiss' Hoarypea

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Hollywood North Beach Regional Park) and one non-conservation area (Lummus Park).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as occasional in the central peninsula.
South Florida Distribution: Broward, Hendry, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Coastal strand and, probably, flatwoods.
Protection Status: Listed as endangered by FDACS (as *T. angustissima*) and as critically imperiled by FNAI.
Identification: *T. angustissima* is distinguished from other species of *Tephrosia* in Florida by having a glabrous style (Wunderlin, 1998). The variety *curtissii* is distinguished from other varieties of *T. angustissima* by being minutely strigose and having leaflets 2-8 times longer than wide (Wunderlin, 1998).
References: Chapman, 1883; Small, 1933a; Shinners, 1962b; Long & Lakela, 1976; Austin, 1980; Isely, 1982; Isely, 1990; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *T. curtissii* (Small ex Rydb.) Shinners; *T. leptostachya* DC., misapplied; *T. seminole* Shinners; *Cracca curtissii* Small ex Rydb.

Historical Context in South Florida: Allan H. Curtiss first collected Curtiss' hoarypea in 1895 on beach ridges near the Jupiter Inlet in northern Palm Beach County (5561, FLAS, NY). Austin et al. (1980b) reported it for South Beach Park and Red Reef Park in Boca Raton based upon surveys conducted in 1979. Between 100 and 200 plants were observed at South Beach Park, while only four plants were observed at Red Reef Park. Curtiss' hoarypea is not thought to be currently present at either site. Austin has searched for plants at South Beach Park, but has not been able to find any specimens (personal communication, 10 March 2001). In 1984, Jerry Derenthal collected a specimen near

both of these sites, at Spanish River Park (1, FAU), where its status is unknown.

In 1986, Ted Hendrickson and Ann Buckley collected Curtiss' hoarypea at Hollywood North Beach Regional Park in Broward County (501, FTG). Gann and Bradley observed this occurrence in 1995. Plants were growing along a roadside in a disturbed coastal strand. While this site is considered a conservation area (Jue et al., 2001), it is used primarily for beach access.

In 1999, Gary Hunt reported to Bradley that he knew of a population of Curtiss' hoarypea at Lummus Park on Miami Beach. Hunt had known of this station for several years. Bradley observed this station in 1999 (2039, FTG). Fewer than 100 plants were growing in open sand behind beach dunes. Lummus Park is a recreational park with a renourished beach and a very narrow restored beach dune system.

In 1919, Perley Poore Sheehan made a single collection of Curtiss' hoarypea in Hendry County at Godden's Mission, now in the Big Cypress Seminole Indian Reservation (848, NY). It was this specimen that Shinners (1962b) used as the type for his *T. seminole*, a species that later was placed into synonymy under *T. angustissima* var. *curtissii*.

Major Threats: Habitat destruction at Hollywood North Beach Regional Park and Lummus Park; exotic pest plant invasions, especially beach naupaka (*Scaevola sericea*); coastal erosion; trampling.

Preliminary recommendations:

- Survey Red Reef Park, South Beach Park, and Spanish River Park.
- Map and monitor known stations on a regular basis.
- Develop conservation agreement with the City of Miami to restore and maintain a viable population of Curtiss' hoarypea.
- Control beach naupaka and other exotic pest plants that threaten Curtiss' hoarypea.
- Study feasibility of reintroducing Curtiss' hoarypea to other stations within its historical range.

Tephrosia chrysophylla Pursh
Scurf Hoarypea

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent in Florida from the northern counties to the central peninsula.
South Florida Distribution: Lee, Martin, and Miami-Dade counties.
South Florida Habitats: Flatwoods and pine rocklands.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo.
References: Chapman, 1883; Small, 1933a; Wood, 1949; Isely, 1990; Taylor, 1992; Wunderlin, 1998.
Synonyms: *Cracca carpenteri* Rydb.; *Cracca chapmanii* (Vail) Small; *Cracca chrysophylla* (Pursh) Kuntze.

Historical Context in South Florida: Albert S. Hitchcock collected scurf hoarypea first in 1900 in Fort Myers in Lee County (81, NY). Walter M. Buswell collected it again in Fort Myers in 1930 (s.n., FTG). In 1948, Roy O. Woodbury made the only collection in Miami-Dade County at Cutler (s.n., FTG), in the vicinity of Deering Estate at Cutler and Ludlam Pineland Tract. In 1978, John Popenoe collected scurf hoarypea at Jonathan Dickinson State Park in Martin County (778, FTG), where it is assumed to be extant.

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:
- Map and monitor known stations on a regular basis.
- Consider restoring pine rocklands near the Miami River and introducing scurf hoarypea.

Tephrosia hispidula (Michx.) Pers.
Sprawling Hoarypea

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain and piedmont. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Lee and Martin counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Distinguished from other species of *Tephrosia* in South Florida by having petioles equaling to or shorter than the length of the lowest leaflets, racemes not foliose, fruits short villous, and upper stem and leaf rachis with spreading trichomes (Wunderlin, 1998). Wunderlin (1998) has a key to the seven species of *Tephrosia* in Florida.
References: Chapman, 1883; Small, 1933a; Wood, 1949; Isely, 1990; Wunderlin, 1998.
Synonyms: *Cracca hispidula* (Michx.) Kuntze.

Historical Context in South Florida: Edgar T. Wherry first collected sprawling hoarypea in 1930 south of Fort Myers in Lee County (s.n., PH). It has been reported for Corkscrew Swamp Sanctuary (Judd, 1994), which is located in both Lee and Collier counties, but this report needs to be verified. In 1976, John Popenoe collected sprawling hoarypea at Jonathan Dickinson State Park in Martin County (648, FTG). Roy O. Woodbury collected it there again in 1989 (s.n., FTG, USF), where it is assumed to be extant. It has been reported for the Loxahatchee Slough Natural Area (Farnsworth, 1994c), but this station needs to be verified.

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:

- Survey Corkscrew Swamp Sanctuary and Loxahatchee Slough Natural Area.
- Map and monitor known stations on a regular basis.

Thelypteris grandis A.R. Sm.
Stately Maiden Fern

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Pteridophyte; Thelypteridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Collier County.
South Florida Habitats: Strand swamps.
Protection Status: Listed as endangered by FDACS.
Identification: Nelson (2000) has color photos; the IRC Website has a color photo.
References: 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: Clifton E. Nauman and Daniel F. Austin first collected stately maiden fern in 1978 in Fakahatchee Strand Preserve State Park (557, USF). Nauman and others made additional collections in 1980 (s.n., USF) and 1981 (1418, USF). Florida Park Service biologist Mike Owen estimates that there are fewer than 100 plants in the Fakahatchee Strand (personal communication, 25 January 2001).

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

Preliminary recommendations:

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

- Control Old World climbing fern (*Lygodium microphyllum*) and other exotic pest plants that threaten stately maiden fern.
- Review for listing by FNAI.

Thelypteris serrata (Cav.) Alston
Toothed Lattice-vein Fern

South Florida Status: Critically imperiled. Two occurrences in Jonathan Dickinson State Park.
Taxonomy: Pteridophyte; Thelypteridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to peninsular Florida, the West Indies, Mexico, Central America, and South America. Wunderlin (1998) reports it as occasional in Florida in the central and southern peninsula.
South Florida Distribution: Martin, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Hydric hammocks, rockland hammocks, and riverine swamps.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: *Thelypteris serrata* and *T. reticulata* are very close in appearance and are dissimilar from other species of *Thelypteris* in South Florida. Of the two, *T. serrata* has significantly narrower pinnae (up to 3.5 cm vs. up to 6 cm wide in *T. reticulata*). Chafin (2000) has illustrations and a color photo; Nelson (2000) has a color photo.
References: Small, 1931b; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Liogier & Martorell, 2000; Chafin, 2000; Coile, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Meniscium serratum* Cav.

Historical Context in South Florida: J.W. Harshberger first collected toothed lattice-vein fern in 1912 on the southern shore of Lake Okeechobee (1937, NY), probably in northwestern Palm Beach County. This station has been long destroyed, and no plants have been collected or observed in that area since that time. A second station in Palm Beach County represents a large population along the Loxahatchee River in both Palm Beach and Martin counties, now within Jonathan Dickinson State Park. This

population was first vouchered by John Popenoe in 1972 (s.n., FTG). Popenoe vouchered this population again in 1981 (2177, FTG), and Bradley and Woodmansee collected the most recent specimen in 1997 (52, FTG). Fewer than 3,000 plants are thought to be present in the park. Woodmansee, Sandra Vardaman, and Gwen Burzycki discovered an additional station at the South Fork St. Lucie River site in Jonathan Dickinson State Park in Martin County in 2000 (588b, FTG). The Loxahatchee River station and the South Fork of the St. Lucie River stations are considered to be separate occurrences.

Thomas Darling, Jr. made the first collection in Miami-Dade County in 1959 near the intersection of Quail Roost Drive and S.W. 154 Avenue (s.n., US), apparently along the edge of an old transverse glade. This same station was apparently vouchered again by Frank C. Craighead in 1960 (s.n., FLAS), and subsequently observed by John Popenoe (Avery's Notes, 19 February 1968). Avery visited this station in 1975, but only was able to locate plants of the closely related *T. reticulata* (Avery's Notes, 3 April 1975). Gann attempted to locate this site in the late 1990s, but it had apparently been destroyed for agriculture.

The remaining verifiable stations for toothed lattice-vein fern are all in Everglades National Park in and around Royal Palm Hammock near the park's main entrance. Craighead made the first collection in the park in 1960 in a cypress head without definite locality (s.n., FLAS). Pam Krauss collected the next specimen in April 1979, in the understory of an abandoned agricultural field just east of Pine Island (567, FTG). The overstory was Brazilian-pepper (*Schinus terebinthifolius*). George N. Avery visited this station in June 1979, and observed several plants (Avery's Notes, 8 June 1979). He revisited the station in 1983 with Roland Eves, who took photographs of the plants at that station (Avery's Notes, 2 April 1983). This station needs to be surveyed and nearby habitats explored for plants growing in more natural conditions**.**

Major Threats: Exotic pest plant invasions; hydrological modifications; habitat modifications (clearing of Brazilian-pepper in Everglades National Park without protecting or translocating populations of toothed lattice-vein fern); poaching.

Comments: *John Kunkel Small apparently never saw live plants of* T. serrata. *The only plants he was aware of*, *through 1938*, *were the plants collected along Lake Okeechobee. Gann and Bradley observed plants along the Fisheating Creek in Highlands County in 1996, in the vicinity of what is now Fisheating Creek Wildlife Management Area.*

Preliminary recommendations:

- Survey Everglades National Park in the vicinity of Pine Island and Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- If plants are found in disturbed areas in Everglades National Park, consider translocating to a more natural habitat (e.g., cypress dome) in the vicinity of Pine Island.

Trichomanes holopterum Kunze
Entire-winged Bristle Fern

South Florida Status: Critically imperiled. One occurrence at Big Cypress National Preserve.
Taxonomy: Pteridophyte; Hymenophyllaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Collier County, and the Monroe County mainland.
South Florida Habitats: Strand swamps and cypress swamps; epiphytic on cypress (*Taxodium*) trunks, decaying logs, and stumps.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Chafin (2000) has a photo; Nelson (2000) has a color photo; the IRC Website has a color photo.
References: Delchamps, 1966; Lakela & Long, 1976; Long & Lakela, 1976; Nauman, 1986b; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000, Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: None.

Historical Context in South Florida: Richard and Rhoda Stone first observed entire-winged bristle fern in 1964 in what is now Big Cypress National Preserve (Delchamps, 1966). C. Eugene Delchamps vouchered it that same year near Monroe Station (s.n., FLAS). It was collected again in the same general area in both Collier and Monroe counties by Daniel B. Ward (5307, FLAS), Robert W. Long (1688, USF), and George N. Avery (957, FTG). Clifton E. Nauman and John Popenoe made the last collection in 1986 (1783, FTG). Bradley and Gil Nelson observed this population in 1998. Fewer than 100 plants were present, but many more plants could be present in nearby areas. This area needs to be thoroughly surveyed and mapped.

Major Threats: Hydrological modifications; exotic pest plant invasions; recreational off-road vehicle use; wild hog damage.

Comments: *Wunderlin and Hansen (2000) states that mature sporophytes are uncommon, but that gametophyte colonies are relatively common and extensive.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.

Trichostigma octandrum (L.) H. Walter
Hoopvine

South Florida Status: Critically imperiled. One occurrence in Everglades and Francis S. Taylor Wildlife Management Area.
Taxonomy: Dicotyledon; Phytolaccaceae.
Habit: Herbaceous vine.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Broward and Collier counties, and the Monroe County Keys.
South Florida Habitats: Shell mounds, rockland hammocks, and bayheads.
Protection Status: Listed as endangered by FDACS.
Identification: Correll & Correll (1982) has an illustration.
References: Small, 1933a; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000, Austin, 2001.
Synonyms: None.

Historical Context in South Florida: Joseph H. Simpson first collected hoopvine in 1891 on Chokoloskee Island (238, US), presumably in a hammock on a shell mound. It was collected there again in 1916 by John Kunkel Small (7718, NY), in 1969 by George N. Avery (739, FTG), and in 1982 by Donovan S. Correll (53231, FTG, NY, USF). The last remnants of natural areas on that island have been developed, and it almost certainly is extirpated there. In 1921, Small and Paul Matthaus collected hoopvine in a rockland hammock on Pumpkin Key in Monroe County (9904, FLAS, NY). Small (1923) writes of the discovery of hoopvine at that location. Avery collected it there again in 1970 (739A, FTG). Portions of this private island were later developed, and it may be extirpated there, but this station should be surveyed. In 1930, Harold N. Moldenke made a collection in Miami in "low swampy ground along roadside" (3703, NY). This is the only collection known from Miami-Dade County, and it is uncertain where this specimen was collected. Black & Black (1980) reported hoopvine for Big Cypress National Preserve based upon a personal communication with George N. Avery. Avery's notes make no mention of observing hoopvine in the Big Cypress, but hoopvine was reported again in 1982 for Hammock C in the Pinecrest region of site (Gunderson & Loope, 1982b), an area that Avery helped to inventory.

An additional mainland station was discovered in 2000 by Michael R. Anderson in Water Conservation Area 3A in Broward County (s.n., USF, FLAS; Austin, 2001), part of the Everglades and Francis S. Taylor Wildlife Management Area. The plants were found growing on four tree islands dominated by *Acer rubrum.* This is apparently the only extant occurrence in Florida. Fewer than 50 plants are thought to be present at this station (M.R. Anderson, personal communication, 23 February 2001).

Threats: Exotic pest plant invasions; manipulation of water levels in Water Conservation Area 3A.

Comments: *This is one of the species that may be affected by the Everglades restoration.*

Preliminary recommendations:

- Survey the Pinecrest Region of Big Cypress National Preserve and Pumpkin Key.
- Map and monitor known stations on a regular basis.
- Acquire Pumpkin Key.
- Consider restoring shell mounds hammocks on Chokoloskee Island and reintroducing hoopvine.
- Conduct research to determine the effects of the Everglades restoration on hoopvine.
- Review for listing by FNAI.

Tropidia polystachya (Sw.) Ames
Young Palm Orchid

South Florida Status: Critically imperiled. One occurrence at Alice Wainwright Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the West Indies, Mexico, 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 extirpated by FNAI.
Identification: Luer (1972) has illustrations and color photos.
References: Ames, 1904a; Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Coile, 2000.
Synonyms: *Tropidia eatonii* Ames.

Historical Context in South Florida: Ferdinand Rugel first collected young palm orchid in 1846 in Miami (s.n., US), presumably in Brickell Hammock, which was located just south of present-day downtown Miami. Allan H. Curtiss vouchered it again in Brickell Hammock in 1897 (5949, AMES), followed by Alvah A. Eaton in 1903 (s.n., AMES, NY) and 1905 (1185, AMES), and by John Kunkel Small in 1906 (2565a, NY). Brickell Hammock has been devastated by development, and only small fragments remain. Young palm orchid is still known from a remnant of Brickell Hammock at Alice Wainwright Park, which is managed by the City of Miami. In 1975, Roger L. Hammer found a few plants

there, which were subsequently observed by George N. Avery (Avery's Notes, 12 March 1975). In 1980, the City of Miami built a nature trail right through the colony, but City of Miami naturalist Ralph Beaudry reported that 10-12 plants remained after the trail had been completed (Avery's Notes, 29 April 1980). In 1989, Hammer and Carol Lippincott surveyed the site and counted six plants (Hammer, 1997). After Hurricane Andrew in 1992, it was thought that young palm orchid was extirpated in South Florida, but in 1998 Chuck McCartney observed three plants at Alice Wainwright Park (Hammer, 2001). Since that time, Hammer has discovered a fourth plant (Hammer, 2001), and a small colony is thought to persist there.

In 1904, Alvah A. Eaton collected young palm orchid in Castellow Hammock, now part of Castellow Hammock Park, reporting "a few plants only" (Ames, 1904a). Despite a great deal of botanical activity in this hammock, no other plants have been reported. In 1915, Small and Charles A. Mosier made a collection in Brogdon Hammock (6326, NY), a hammock of uncertain locality that has probably been destroyed. In 1922, Small and others collected young palm orchid at Warwick Hammock (10732, NY), which is located along Old Cutler Road to the north of what is now Deering Estate at Cutler. This hammock was subsequently subdivided and developed for single-family residences. Gann surveyed hammock fragments in this subdivision in 1995, but did not find any plants of young palm orchid.

Major Threats: Management error; exotic pest plant invasions; vandalism; poaching.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Protect from poaching and vandalism.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting population at Alice Wainwright Park.
- Consider introducing young palm orchid to other sites within its historical range, including Bill Sadowski Park, Castellow Hammock Park, Deering Estate at Cutler, Simpson Park, and Vizcaya Museum and Gardens.
- Review FNAI rank.

Vaccinium arboreum Marshall
Sparkleberry

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Hickey Creek Mitigation Park Wildlife and Environmental Area), and in one non-conservation area (FDOT property on Alligator Creek in Charlotte County).
Taxonomy: Dicotyledon; Ericaceae.
Habit: Tree.
Distribution: Native to the southeastern coastal plain and piedmont. Wunderlin (1998) reports it as frequent in Florida from the northern counties to the central peninsula.
South Florida Distribution: Charlotte, Hendry, Lee and Martin counties.
South Florida Habitats: Mesic hammocks and scrub.
Protection Status: Not listed by any agency.
Identification: Nelson (1994) has an illustration; Nelson (1996) has an illustration and a color photo; Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Godfrey, 1988; Nelson, 1994; Nelson, 1996; Wunderlin, 1998.
Synonyms: *Batadendron arboreum* (Marshall) Nutt.

Historical Context in South Florida: Albert S. Hitchcock first collected sparkleberry in 1900 in Alva in Lee County (192, NY), in the vicinity of what is now Caloosahatchee Regional Park. In 1930, Harold N. Moldenke made a collection in the same general area east of Owanita (1015, NY). It was reported near Owanita at Hickey Creek Mitigation Park Wildlife and Environmental Area (Florida Game and Fresh Water Fish Commission and Lee County, 1994), and was observed there by Gann and Lee County biologists Roger Clark and Rob Irving in 2001. This station needs to be vouchered. Walter M. Buswell made an additional collection near Fort Myers in 1931 (s.n., NY). Robin Huck also made a collection in 1986 at a private scrub site east of Bonita Springs (4074, FLAS). The species also is reported for the Koreshan State Historic Site (Florida Park Service District 4, 1994d) but this report has not been confirmed.

In 1957, the only collection from Hendry County was made by Leonard J. Brass at Fort Denaud in a hammock on the bank of the Caloosahatchee River (29028, ARCH).

In 1965, Olga Lakela made a collection in Charlotte County in a "Hammock along creek and berm in white sand scrub, FL 31," probably north of Bermont. In 1996, Gann and Bradley found sparkleberry in a mesic hammock along Alligator Creek just off I-75 at the Alligator Creek Pignut Hickory Site**,** which is owned by the Florida Department of Transportation. Bradley vouchered this station in 1998 (1289, FTG). Fewer than 100 plants are known to exist here.

Bruce E. Tatje made a single collection in Martin County in 1977, along State Road 714 west of Palm City (s.n., FAU). Sparkleberry also has been reported for the J.W. Corbett Wildlife Management Area in Palm Beach County by Cox (1988) and by Robson & Cox (1988). Since no specimens have been located from Palm Beach County, these reports should be verified.

Major Threats: Development; 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 Hickey Creek Mitigation Park Wildlife and Environmental Area.
- Survey Caloosahatchee Regional Park, J.W. Corbett Wildlife Management Area, Koreshan State Historic Site, and the Bonita Beach station.
- Designate and manage Alligator Creek Pignut Hickory Site as a conservation area.
- Map and monitor known stations on a regular basis.

Vanilla phaeantha Rchb. f.
Leafy Vanilla

South Florida Status: Critically imperiled. One occurrence at Fakahatchee Strand Preserve State Park.
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial vine.

Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Collier County.
South Florida Habitats: Strand swamps.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification: This is one of three leafy vanilla orchids in South Florida. Besides *V. phaeantha*, *V. inodora* is native (see above), and *V. mexicana*, the commercial vanilla, is exotic. Luer (1972) has illustrations and color photos of all three species.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Alvah A. Eaton first collected leafy vanilla in 1904 in the Fakahatchee Strand (1129, NY), now part of Fakahatchee Strand Preserve State Park. It has been observed there by a number of botanists. Florida Park Service biologist Mike Owen estimates that there are about 1,000 plants in the Fakahatchee Strand (personal communication, 7 February 2001). Leafy vanilla also has been reported for Big Cypress National Preserve (Black & Black, 1980), but this report needs to be verified.

The Everglades National Park records (Avery & Loope, 1980b, 1983; Reimus 1996, 1999) are based upon plants translocated from the Fakahatchee Strand by Craighead (Hammer, 2001). None of these plants are thought to be extant, and there is no indication that leafy vanilla was ever part of the flora of Everglades National Park.

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

Preliminary recommendations:

- Continue ongoing surveys in Fakahatchee Strand Preserve State Park.
- Survey Big Cypress National Preserve.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

- Control Old World climbing fern (*Lygodium microphyllum*) and other exotic pest plants that threaten leafy vanilla.
- Review FNAI listing.

Xyris platylepis Chapm.
Tall Yelloweyedgrass

South Florida Status: Critically imperiled. One occurrence at Jonathan Dickinson State Park.
Taxonomy: Monocotyledon; Xyridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as common nearly throughout Florida.
South Florida Distribution: Collier, Glades, Lee, and Martin counties.
South Florida Habitats: Flatwoods and pond margins.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1883; Small, 1933a; Kral, 1960b; Kral, 1966b; Long & Lakela, 1976; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: None.

Historical Context in South Florida: Albert S. Hitchcock first collected tall yelloweyedgrass in 1900 in Fort Myers (359, NY, US). It has been reported for Corkscrew Swamp Sanctuary (Judd, 1994), which is located in both Lee and Collier counties, but this report needs to be verified. In 1962, Leonard J. Brass collected tall yelloweyedgrass along the Hall Branch of Fisheating Creek in Glades County (32915, USF), in or near the newly acquired Fisheating Creek Wildlife Management Area. In 1964, Olga Lakela made a collection in a swampy ditch along Lake Trafford Road west of Immokalee in Collier County (27465, USF). In 1995, Edwin L. Bridges and Randy L. Mears made a collection in Jonathan Dickinson State Park in Martin County (23971, FTG, USF). It also 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.

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

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 Corkscrew Swamp Sanctuary, Dupuis Reserve, and Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Rare Plants of South Florida:

Their History, Conservation, and Restoration

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The Institute for Regional Conservation

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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.

Rare Plants of South Florida:

Their History, Conservation, and Restoration

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The Institute for Regional Conservation

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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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Nemastylis floridana Small
Celestial Lily

South Florida Status: Critically imperiled. One occurrence in five conservation areas (Dupuis Reserve, J.W. Corbett Wildlife Management Area, Loxahatchee Slough Natural Area, Royal Palm Beach Pines Natural Area, & Pal-Mar).
Taxonomy: Monocotyledon; Iridaceae.
Habit: Perennial terrestrial herb.
Distribution: Endemic to Florida. Wunderlin (1998) reports it as occasional in Florida from Flagler County south to Broward County.
South Florida Distribution: Broward, Palm Beach, and Martin counties.
South Florida Habitats: Wet flatwoods.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Small, 1931a; Small, 1933a; Goldblatt, 1975; Ward, 1978; Bell & Taylor, 1982; Taylor, 1992; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: "Thompson & Lawson" made the first collection of celestial lily in 1971 near Holmberg Road in the Parkland area of Broward County (17, FAU). Grace B. Iverson collected it again in the same general area in 1977 (s.n., FAU). This entire area has been developed, and celestial lily is doubtfully extant in Broward County.

Anne Cox made the next collections in 1981 in the Palm Beach Gardens area of northern Palm Beach County (22, FAU; 49, FAU). While this station may be extirpated, several collections have been made in or near Pal-Mar, a conservation area managed by South Florida Water Management District that is located in northern Palm Beach and southern Martin counties. Roy O. Woodbury made the first collection from this area in 1990, probably in what is now Pal-Mar in Martin County (M-1081, FTG). In 1997, Bradley and Woodmansee made several collections at Pal-Mar in Palm Beach County (698, FTG, USF; 701, FTG) and in Martin County (744, FTG, USF). Bradley and Woodmansee also observed plants nearby at the J.W. Corbett Wildlife Management Area in 1998 and 2000, and the authors observed plants at Dupuis Reserve in 2000. Both of these stations need to be vouchered. Celestial lily has been reported for the Loxahatchee Slough Natural Area (Farnsworth, 1994c) and for Royal Palm Beach Pines Natural Area (Black, 1996) in Palm Beach County. Both of these stations are presumed to be extant, but need to be vouchered. Although Royal Palm Beach Pines site is somewhat separated from the other stations, it seems reasonable to assume that there is one large population in northern Palm Beach and southern Martin counties. Additional plants are almost certainly on non-conservation lands in the area. One additional collection is known from the Stuart area in Martin County, where Woodbury made a collection in 1989 (M-1082, FTG). No recent observations from that area are known.

Major Threats: Drainage of wet flatwoods habitat; fire suppression; exotic pest plant invasions; wild hog damage.

Comments: *This species is very difficult to see when it is not flowering. Flowering takes place only in September and October in the late afternoon from about 4:00 to 6:00 PM, making this species very difficult to observe in the field (Small, 1931). Mackiernan & Norman (1979) studied the reproductive biology of this species at a site in Volusia County.*

Preliminary recommendations:

- Voucher plants at Dupuis Reserve, J.W. Corbett Wildlife Management Area, Loxahatchee Slough Natural Area, and Royal Palm Beach Pines Natural Area.
- Survey Pal-Mar Natural Area and un-acquired portions of the Pal-Mar CARL Site.

- Map and monitor known stations on a regular basis.

Opuntia corallicola (Small) Werderm.
Semaphore Pricklypear

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Biscayne National Park; Torchwood Hammock Preserve).
Taxonomy: Dicotyledon; Cactaceae.
Habit: Shrub or small tree.
Distribution: Endemic to South Florida.
South Florida Distribution: Miami-Dade County and the Monroe County Keys.
South Florida Habitats: Low buttonwood transition areas between rockland hammocks and mangrove swamps, and possibly other habitats such as openings in rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI. Currently under review for listing by USFWS (2001).
Identification: Scurlock (1987) has color photos; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Small, 1933a; Britton & Rose, 1937; Long & Lakela, 1976; Benson, 1982; Scurlock, 1987; Austin et al., 1998; Wunderlin, 1998; Bradley & Gann, 1999b; Chafin, 2000; Coile, 2000.
Synonyms: *O. spinosissima* Mill., misapplied; *Consolea corallicola* Small.

Historical Context in South Florida: John Kunkel Small and others discovered semaphore pricklypear in 1919 on Big Pine Key (s.n., NY). In 1930, Small described it as a new species, *Consolea corallicola* (Small, 1930a). In 1963, George N. Avery observed it on Long Beach on Big Pine Key in what is now National Key Deer Refuge (Avery's Notes, 30 October 1963). It apparently was eradicated from Big Pine Key in the 1960s by a combination of road building and poaching (Bradley & Gann, 1999b). It was found sometime before 1965 on Little Torch Key by Clarence Webb and Oley Olsen (Avery's Notes, 24 November 1965). Plants were vouchered there by Robert W. Long in 1967 (2497, USF) and T. Ann Williams in 1986 (s.n., FTG). Nine plants

remain on that island at The Nature Conservancy's Torchwood Hammock Preserve (C. Bergh, personal communication, 20 February 2001). This population is now being augmented (C. Bergh, personal communication, 10 January 2002).

Small (1930, 1933a) reported plants from Key Largo. We have been unable to locate specimens to verify this report. In 2001, Bradley, Woodmansee, and Biscayne National Park biologist Toby Obenauer made a discovery of a new population to the north of Key Largo on a small island in Biscayne National Park.

Attempts are underway to translocate this species to several sites: National Key Deer Refuge on Big Pine Key, Spoonbill Sound Hammocks, Florida Keys Wildlife and Environmental Area on Cudjoe Key, Dagny Johnson Key Largo Hammocks State Botanical Site on Key Largo, Little Torch Hammocks, Florida Keys Wildlife and Environmental Area on Little Torch Key, and Ramrod Hammocks, Florida Keys Wildlife and Environmental Area on Ramrod Key. Another introduction project has been reported for No Name Key and Upper Sugarloaf Key (C. Bergh, personal communication, 11 January 2002). Organizations involved in these introductions include Fairchild Tropical Garden, Florida Park Service, The Nature Conservancy, and University of South Florida. Other plants are cultivated as landscape plants in South Florida, but no introduced populations are known.

Opuntia species in South Florida are susceptible to infestation by the larvae of an exotic moth, *Cactoblastis cactorum*. The plants at Torchwood Hammock were caged for a time to prevent infestation, but these cages were removed immediately prior to Hurricane Georges in 1998. Rather than replacing the cages, the plants are monitored weekly by volunteers in order to detect early infestations.

The reproductive biology of semaphore pricklypear has been studied by Negron-Ortiz (1998). Negron-Ortiz reported that fruit abortion was high and viable seed set was very low possibly because of meiotic problems resulting from polyploidy.

Major Threats: Damage from *Cactoblastis cactorum* larvae; poaching; stochastic events such as hurricanes; sea-level rise.

Comments: Wunderlin (1998) lists this as *O. spinosissima*, a species of Jamaica. We follow Austin et al. (1998), who treats our species as a South Florida endemic.

Preliminary recommendations:

- Voucher plants at Biscayne National Park.
- Map plants in Biscayne National Park.
- Monitor plants in Biscayne National Park on an annual basis.
- Continue mapping and monitoring at Torchwood Hammock Preserve.
- Protect from poaching.
- Protect from *Cactoblastis cactorum*.
- Continue ongoing efforts to reintroduce semaphore cactus to Big Pine Key.
- Continue ongoing efforts to introduce semaphore cactus to other sites within its historical range in the Florida Keys.
- Encourage USFWS to list *Opuntia corallicola*.

Opuntia triacanthos (Willd.) Sweet
Jumping Cactus

South Florida Status: Critically imperiled. Four occurrences in two conservation areas and three non-conservation areas (privately owned Big Munson Island; Long Key State Park & privately owned Long Key Layton Coastal Rock Barren; National Key Deer Refuge; privately owned Valhalla Rock Barren).
Taxonomy: Dicotyledon; Cactaceae.
Habit: Shrub.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Coastal rock barrens and edges of rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Benson (1982) has a black and white photo; the IRC Website has a color photo.
References: Small, 1933a; Britton & Rose, 1937; Long & Lakela, 1976; Benson, 1982; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *O. abjecta* Small ex Britton & Rose.

Historical Context in South Florida: John Kunkel Small and Paul Matthaus discovered jumping cactus in 1921 in or around Cactus Hammock on Big Pine Key (s.n., NY). A number of other collections from this station have been made since that time: by P. Bartsch in 1919 (s.n., US); by Small in 1922 (s.n., NY); by G.S. Miller in 1935 (1710, US); and by Ellsworth P. Killip in 1936 (31712, US), 1951 (41332, US), and 1952 (41708, US). George N. Avery observed this station in 1966 (Avery's Notes, 12 May 1966). T. Ann Williams observed plants there from the 1970s to the 1990s (personal communication, 7 March 2001). Williams returned in 2001 and observed between 50 and 100 plants (personal communication, 19 March 2001). Bradley and Woodmansee also observed this station in 2001. Fairchild Tropical Garden biologists Meghan Fellows and Jennifer Possley began mapping this population in 2001.

Conrad Byrd found an additional station in or before 1966 on Long Key in an area that now is part of Long Key State Park (Avery's Notes, 28 March 1966). A population remains there and was observed as recently as 2000 by Gann, Bradley, and Florida Park Service biologist Janice A. Duquesnel. It is estimated that there are fewer than 100 plants extant there today. A second station was reported for Long Key at the privately owned Long Key Layton Coastal Rock Barren (National Audubon Society, 1992). Bradley and Wayne Hoffman observed this station in 1998. It is estimated that there are fewer than 100 plants at this station. Both Long Key stations need to be vouchered.

Byrd also reported to Avery in 1966 that he had found a population on Crawl Key (Avery's Notes, 28 March 1966). This occurrence is extant at the privately owned Valhalla Rock Barren, which is located adjacent to Curry Hammock State Park. Bradley and Woodmansee observed this station as recently as 2001. There are a few hundred plants at this station, which needs to be vouchered.

Kruer (1992) reported an additional station at Big Munson Island. T. Ann Williams reports that she observed plants there in 1987 (personal communication, 7 March 2001). Bradley, Fellows, and Possley observed a few plants there in 2001. This station needs to be vouchered.

Major Threats: Habitat destruction at Long Key Layton Coastal Rock Barren and Valhalla Rock Barren Site; infestation by the exotic moth, damage from *Cactoblastis cactorum* larvae; exotic pest plant invasions; poaching; sea-level rise.

Preliminary recommendations:

- Voucher plants at Long Key State Park, Long Key Layton Coastal Rock Barren, and Valhalla Rock Barren Site.
- Take photographic voucher at Big Munson Island.
- Map and monitor known stations on a regular basis.
- Acquire Long Key Layton Coastal Rock Barren and Valhalla Rock Barren Site.
- Develop conservation agreement with Boy Scouts of America to manage a viable population of jumping cactus on Big Munson Island, and provide technical assistance.
- Protect from poaching.
- Protect from *Cactoblastis cactorum.*

Panicum verrucosum Muhl.
Warty Panicum

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (J.W. Corbett Wildlife Management Area & Pal-Mar; Jonathan Dickinson State Park).
Taxonomy: Monocotyledon; Poaceae.
Habit: Annual terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Martin and Palm Beach counties.
South Florida Habitats: Flatwoods, marshes, and pond margins.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration; Tobe et al. (1998) has photos and illustrations.
References: Chapman, 1883; Small, 1933a; Hitchcock & Chase, 1950; Long & Lakela, 1976; Hall, 1978; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: John Popenoe first collected warty panicum in 1975 at Jonathan Dickinson State Park in Martin County (348, FTG). This station was vouchered again by Popenoe in 1977 (941, FTG), and is assumed to be extant.

In 1997, Gann and Bradley made a collection in Palm Beach County at Pal-Mar (1035, FTG), a conservation area managed by South Florida Water Management District. Fewer than 10 plants were seen on the edge of a dirt road adjacent to mesic flatwoods. In 2000, it was observed by Bradley and Woodmansee at J.W. Corbett Wildlife Management Area in Palm Beach County, but this station needs to be vouchered. It has been reported for Dupuis Reserve (Woodbury, no date), which is adjacent to Pal-Mar in Palm Beach and Martin counties, but this station needs to be verified. The Dupuis Reserve, J.W. Corbett Wildlife Management Area, and Pal-Mar stations are considered to be the same occurrence.

Warty panicum also has been reported for Corkscrew Regional Ecosystem Watershed (Hilsenbeck, 1997), which is located in Collier and Lee counties. This stations needs to be verified.

Major Threats: Exotic pest plant invasions; fire suppression.

Comments: *This is a temperate species at the southern end of its range. According to David W. Hall, it is frequently weedy in wetlands and is very common to the north of our area (personal communication, 9 March 2001).*

Preliminary recommendations:

- Voucher plants at J.W. Corbett Wildlife Management Area.
- Survey Corkscrew Regional Ecosystem Watershed, Dupuis Reserve, Pal-Mar Natural Area, and Pal-Mar CARL Site.
- Map and monitor known stations on a regular basis.

Passiflora sexflora Juss.
Goatsfoot

South Florida Status: Critically imperiled. Five occurrences in four conservation areas (Camp Owaissa Bauer; Castellow Hammock Park; Fuchs Hammock Preserve; Hattie Bauer

Hammock) and one non-conservation area (a portion of privately owned Krome Hammock).
Taxonomy: Dicotyledon; Passifloraceae.
Habit: Perennial vine.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDCAS and as imperiled by FNAI.
Identification: Chafin (2000) has illustrations and color photos; the IRC Website has a color photo.
References: Small, 1933a; Killip, 1938; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected goatsfoot in 1903 between Cutler and Camp Longview in Miami-Dade County (791, NY). Camp Longview was historically located to the west of present-day Florida City. Small (1905) reported the discovery of this species in the United States. Also in 1903, Alvah A. Eaton collected it in "Castellow & Ross hammock" in the Redland area of Miami-Dade County. Castellow Hammock and portions of Ross Hammock are now protected in Castellow Hammock Park. It was observed there by the authors in 1997 (Gann et al. 26, FTG). Roger L. Hammer observed goatsfoot nearby in Cox Hammock during a survey of the Monkey Jungle, but it may no longer be extant there (personal communication, 13 June 2001).

Goatsfoot has been recorded for a number of other hammocks in the Redland area. In 1903, Eaton collected it in Hattie Bauer Hammock (688, F), most of which is now a Miami-Dade County conservation area. Roger L. Hammer has also observed it there (Hammer, 1992b). In 1904, Nathaniel L. Britton collected it at Caldwell Hammock (264, NY), now Silver Palm Hammock, a Miami-Dade County conservation area. No recent reports from that hammock are known. Small and Charles A. Mosier collected it in Sykes Hammock, now Fuchs Hammock Preserve, in 1915 (5484, NY). It was observed at this station in 1966 by George N. Avery (Avery's Notes, 2 November 1966) and by Bradley in 1999.

In 1915, Small and Mosier also collected it at Nixon-Lewis Hammock (5889, NY). This station was vouchered by Harold N. Moldenke in 1930 (550, NY) and by Avery in 1966 (294, USF). This station has been almost completely destroyed and goatsfoot is believed to be extirpated there. In 1915, Small and Mosier also collected it at Goodburn Hammock (5906, NY), a hammock of uncertain location. In 1965, Avery observed goatsfoot in Timms Hammock, located in Camp Owaissa Bauer (Avery's Notes, 20 March 1965), a station that was vouchered in 1998 by Bradley (1306, FTG). In 2000, Woodmansee collected it at a privately owned property in Krome Hammock, which is being managed as a conservation area (590, FTG). Krome Hammock has been subdivided into several properties containing hammock fragments and goatsfoot may be present on some additional properties.

Goatsfoot has been reported a number of times for Everglades National Park (Avery & Loope, 1980b; Avery & Loope, 1983; Reimus, 1996; Reimus, 1999), but these reports need to be verified.

Major Threats: Exotic pest plant invasions.

Comments: *This species is often most prolific at hammock edges and in canopy gaps, and is somewhat ephemeral following hurricanes and other disturbances.*

Preliminary recommendations:

- Survey Cox Hammock, Everglades National Park, and Krome Hammock.
- Map and monitor known stations on a regular basis.
- Develop conservation agreement with property owners in Krome Hammock, and provide technical assistance.
- Review FNAI rank.

Pavonia paludicola Nicolson ex Fryxell
Swampbush

South Florida Status: Critically imperiled. Two occurrences in five conservation areas (Biscayne National Park, Black Point Park, Chapman Field Park, & R. Hardy Matheson Preserve; Everglades National Park).

Taxonomy: Dicotyledon; Malvaceae.

Habit: Shrub.
Distribution: Native to South Florida, the West Indies, Central America, and South America.
South Florida Distribution: Collier and Miami-Dade counties, and the Monroe County mainland.
South Florida Habitats: Stream banks near the coast and mangrove swamp forests.
Protection Status: Listed as endangered by FDCAS.
Identification: Nelson (1996) has a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Correll & Correll, 1982; Nelson, 1996; Wunderlin, 1998; Fryxell, 1999; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *P. racemosa* Sw.; *P. spicata* Cav.; *Malache scabra* Vogel.

Historical Context in South Florida: Edward Palmer first collected swampbush in 1874 on the shores of Biscayne Bay in Miami-Dade County (s.n., NY, US). Abram P. Garber made the next collection in the Miami area in 1877 (s.n., FLAS, NY). In 1895, Allan H. Curtiss made a collection on the shore of Arch Creek (5462, NY, FLAS). He also collected it there at an unspecified earlier date (386, NY). John Kunkel Small and George K. Small collected it in the same area in 1913 (4598, FLAS, FSU, NY).

In 1906, Small and Joel J. Carter made a collection at Cutler (s.n., NY), probably at Addison Hammock where Small collected it again in 1916 (7483, NY). This station is now preserved as the Deering Estate at Cutler, but no recent records have been seen from that site. Bradley searched for plants at this station in 2000 without success. Frank C. Craighead and John Popenoe collected swampbush in 1964 at "Jennings Hammock," (s.n., FLAS, FTG, USF). This station was from the edge of what is R. Hardy Matheson Preserve (J. Popenoe, personal communication, 14 January 2002). This station also was observed in 1966 by George N. Avery (Avery's Notes, 21 September 1966), and collected there by Avery in 1967 (s.n., FLAS). It was collected in the R. Hardy Matheson Preserve in 1964 by Robert W. Read (1101, FTG). Bradley also vouchered it there in 1998 (1411, FTG).

Swampbush was found in the Black Point area of Miami-Dade County in 1976 by David and Sally Black (Avery's Notes, 2 December 1976). Don Keller later located this station, which Bradley vouchered within Black Point Park and Marina in 1999 (1981, FTG). Roessler (1995) reported swampbush for Chapman Field Park, which is located between R. Hardy Matheson Park and Black Point Park. This occurrence is assumed to be extant, but needs to be vouchered. In 2001, the authors discovered swampbush in a mangrove swamp on the mainland portion of Biscayne National Park near Black Point Park. This station needs to be vouchered. It appears that historically there was a single population from Snapper Creek Hammock south to at least the Black Point area. Although these stations are now somewhat fragmented, we treat them here as a single occurrence.

Joseph H. Simpson first collected swampbush in Monroe County in 1891 on Lostmans Key (171, NY, US), now within the western coast of Everglades National Park. In 1936, John H. Davis, Jr. collected it on the Broad River (s.n., FLAS), which is located about eight miles southeast of Lostmans Key. In 1966, Craighead collected it along the Rogers River (s.n., FTG), which is located between Lostmans Key and the Broad River. Roger L. Hammer observed the Rogers River occurrence in 1999 (personal communication, 13 June 2001). George N. Avery and John Popenoe made an additional collection on the Turner River in southern Collier County in 1972 (1133, FLAS, FTG). There is probably one population extending from the Turner River area in the north south to at least the Broad River.

Major Threats: Exotic pest plant invasions.

Comments: *There could be a substantial number of plants in Everglades National Park, and swampbush could be down ranked to imperiled in South Florida in the future.*

Preliminary recommendations:

- Voucher plants at Biscayne National Park and Chapman Field Park.
- Map and monitor known stations on a regular basis.
- Assess appropriateness and study feasibility of reintroducing swampbush to other sites within historical range, including the Deering Estate at Cutler.

- Review for listing by FNAI.

Peperomia humilis A. Dietr.
Low Peperomia

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Everglades National Park; Fakahatchee Strand Preserve State Park; Jonathan Dickinson State Park).
Taxonomy: Dicotyledon; Piperaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to peninsular Florida, the West Indies, Central America, and South America. Wunderlin (1998) reports as rare in the peninsula.
South Florida Distribution: Collier, Martin, and Miami-Dade counties, and the Monroe County mainland.
South Florida Habitats: Coastal berms, strand swamps, and mesic hammocks.
Protection Status: Listed as endangered by FDACS and as imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Flora of North America Editorial Committee, 1997; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *P. leptostachya* Hook. & Arn., misapplied; *Micropiper humile* (A. Dietr.) Small; *Micropiper leptostachyon* (Nutt.) Small.

Historical Context in South Florida: Alvah A. Eaton first collected low peperomia in 1905 at Flamingo on the Monroe County mainland (s.n., NY), in what is now Everglades National Park. John Kunkel Small and John B. DeWinkeler made the next collection in 1922 in the same region near West Lake in Miami-Dade County (s.n., NY). Other collections from the Flamingo area include those by Small and others in 1921 (10331, NY), by J.M. Crevasse in 1941 (s.n., FLAS), by Frank C. Craighead in 1954 (s.n., Everglades National Park herbarium), and by Rick and Jean Seavey in 1987 (961, Everglades National Park Herbarium). Craighead also translocated some plants of unknown origin to Everglades National Park (Botanical Notes of F.C. Craighead), presumably to the Flamingo area. Roger L. Hammer observed

and photographed several large populations in Coot Bay Hammock in 2000 (personal communication, 13 June 2001).

William G. Atwater made a collection in Collier County in 1959 in the Fakahatchee Strand (M-155, FLAS), in what is now Fakahatchee Strand Preserve State Park. Bradley observed this station in 1995. In 1977, John Popenoe collected plants in Martin County along the Loxahatchee River in Jonathan Dickinson State Park (1039, FLAS), where it is assumed to be extant.

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

Comments: *Boufford (in Flora of North America Editorial Committee, 1997) inexplicably listed this as naturalized in Florida.*

Preliminary recommendations:

- Survey West Lake area in Everglades National Park.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

Phanopyrum gymnocarpon (Elliott) Nash
Savannah Panicum

South Florida Status: Critically imperiled. Two occurrences in one conservation area (Fakahatchee Strand Preserve State Park) and one non-conservation area (Big Cypress Seminole Indian Reservation).
Taxonomy: Monocotyledon; Poaceae.
Habit: Annual terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier, Hendry, and Lee counties.
South Florida Habitats: Strand swamps.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration; Godfrey & Wooten (1979) has an illustration.
References: Chapman, 1883; Small, 1933a; Hitchcock & Chase, 1950; Long & Lakela, 1976; Hall, 1978; Godfrey & Wooten, 1979; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *Panicum gymnocarpon* Elliott.

Historical Context in South Florida: Frank C. Craighead first collected Savannah panicum in 1963 in the Fakahatchee Strand (s.n., USF), in what is now Fakahatchee Strand Preserve State Park. It also was observed in the Fakahatchee Strand on two occasions by George N. Avery, once in 1968 and once in 1972 (Avery's Notes, 17 November 1968, 26 March 1972). He reported it "growing thickly in and around ponds." Austin et al. (1990) also reported it for the Fakahatchee, and it is presumably extant there.

Susan Dubois made a collection in Lee County in 1978 north of the Caloosahatchee River and east of Cypress Creek (78-12-41, USF). This is in the vicinity of Caloosahatchee Regional Park. Nigel Morris collected Savannah panicum in 1989 on the Big Cypress Seminole Reservation in Hendry County (A-1, FLAS). He states that it was abundant there. This station is assumed to be extant. It was reported for Dupuis Reserve (Woodbury, no date), but this report needs to be verified.

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 flowers spring through fall, when surveys should be conducted.*

Preliminary recommendations:

- Survey Caloosahatchee Regional Park and Dupuis Reserve.
- Map and monitor known stations on a regular basis.

Phoradendron leucarpum (Raf.) Reveal & M.C. Johnst. **Oak Mistletoe**

South Florida Status: Critically imperiled. Three occurrences in four conservation areas (Big Cypress National Preserve; Corkscrew Swamp Sanctuary & Corkscrew Regional Ecosystem Watershed; Six Mile Cypress Slough Preserve).
Taxonomy: Dicotyledon; Viscaceae.
Habit: Perennial parasitic herb.
Distribution: Native to North America, including Mexico. Wunderlin (1998) reports it as frequent nearly throughout Florida.

South Florida Distribution: Collier, Lee, and Hendry counties.
South Florida Habitats: Cypress swamps.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Nelson (1996) has an illustration; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Bell & Taylor, 1982; Nelson, 1996; Wunderlin, 1998.
Synonyms: *P. eatonii* Trel.; *P. flavescens* (Pursh) Nutt., misapplied; *P. macrotomum* Trel.; *P. serotinum* (Raf.) M.C. Johnst.; *P. serotinum* var. *macrotomum* (Trel.) M.C. Johnst.

Historical Context in South Florida: Alvah A. Eaton first collected oak mistletoe in 1905 at "Deep Lake" (1310, NY, MO). This station may refer to Big Cypress National Preserve or, more likely, the Fakahatchee Strand. George N. Avery and others observed oak mistletoe in the Fakahatchee Strand in 1965 (Avery's Notes, 6 June 1965), in what is now Fakahatchee Strand Preserve State Park. Only one plant was found, so this occurrence is treated as historical.

Oak mistletoe also has been collected in the northeastern corner of Big Cypress National Preserve. William Rabenau discovered plants in the Rabenau Camp area, and showed these plants to Chuck McCartney in 1979. Bradley vouchered this station in 1998 (1636, FTG). An additional collection is known from a privately owned site in Collier County. Daniel B. Ward and others collected it about 10 miles southeast of Immokalee in 1965 (5270, USF). Oak mistletoe has been reported for Corkscrew Swamp Sanctuary (Judd, 1994) and Corkscrew Regional Ecosystem Watershed (Hilsenbeck, 1997), both of which are located in the vicinity of Immokalee. These occurrences are assumed to be extant, but need to be vouchered.

In 1916, Paul C. Standley made the first collection outside of Collier County in the Fort Myers area (12631, US). G.M. Lummis also collected oak mistletoe in Fort Myers in 1921 (s.n., US). In 1997, Bradley and Woodmansee vouchered plants at the Six Mile Cypress Slough Preserve near Fort Myers (168, FTG). The authors observed a few hundred plants in the strand swamp. Oak mistletoe also was collected in Hendry County by Richard P.

Wunderlin and others in 1980, about 15.5 miles east of Immokalee (8855, USF).

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. The specimen collected by Eaton at Deep Lake was described as a new species by Trelease,* P. eatonii*.*

Preliminary recommendations:

- Voucher plants at Corkscrew Swamp Sanctuary and Corkscrew Regional Ecosystem Watershed.
- Survey Ward and Wunderlin stations in Collier and Hendry counties, and Fakahatchee Strand Preserve State Park.
- Map and monitor known stations on a regular basis.

Picramnia pentandra Sw.
Bitterbush

South Florida Status: Critically imperiled. Five occurrences in five conservation areas and adjacent non-conservation areas (Alice Wainwright Park; Sewell Park; Simpson Park; The Barnacle State Historic Site; Vizcaya Museum and Gardens).
Taxonomy: Dicotyledon; Simaroubaceae.
Habit: Shrub or small tree.
Distribution: Native to South Florida, 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: Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Little, 1978; Tomlinson, 1980; Correll & Correll, 1982; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Abram P. Garber first collected bitterbush in 1877 in Miami (s.n., NY), presumably in Brickell Hammock. Allan H. Curtiss made another collection on an unspecified date in the 1880s. This collection also probably was from Brickell Hammock (441, NY). Many botanists have collected specimens from Brickell Hammock since that time. It is extant in several fragments of Brickell Hammock, including Alice Wainwright Park, Simpson Park, and Vizcaya Museum and Gardens, as well as at Sewell Park to the west of Brickell Hammock. It is often a common understory shrub at these sites and is commonly found on adjacent private properties.

The natural range of this species in southern Florida has been obscured by its use in landscaping and its habit of spreading from areas where it has been planted. Its natural range is known, with certainty, to end two to three miles to the south of the southern limits of Brickell Hammock in the Coconut Grove area, where it is present at The Barnacle State Historic Park, a site that needs to be vouchered. It was vouchered in Coconut Grove at the Kampong by Richard A. Howard in 1968 (17076, GH) and William T. Gillis in 1969 (8084, FTG).

A number of specimens of this species from farther south and west in Miami-Dade County represent locations where bitterbush has been planted and escaped: Camp Owaissa Bauer (Thomas 4919, NY), the Deering Estate at Cutler (Correll et al. 47064, FTG, NY), Fairchild Tropical Garden (Thomas 4914, NY), Florida International University (Mahr 7, FTG), the Homestead area (Craighead s.n., FTG; Lakela 54800, USF), and USDA Tropical Research and Education Center (Bradley 643, FTG). It also has been reported for Everglades National Park (Reimus, 1999), where it has escaped from cultivation.

Major threats: Exotic pest plant invasions.

Comments: *This species has been reported for the Florida Keys by Small (1913), Sargent (1922), and Long & Lakela (1976). We have been unable to find specimens to substantiate these reports.*

Preliminary recommendations:

- Voucher plants at The Barnacle State Historic Park.
- Map and monitor known stations on a regular basis.

Pilosocereus robinii (Lem.) Byles & G.D. Rowley
Keys Tree Cactus

South Florida Status: Critically imperiled. Four occurrences in two conservation areas and three non-conservation areas (Long Key State Park & privately owned Layton Hammock; National Key Deer Refuge; privately-owned Teatable Hammock; privately-owned hammock on Lower Matecumbe Key).
Taxonomy: Dicotyledon; Cactaceae.
Habit: Tree.
Distribution: Native to South Florida and Cuba.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by the USFWS, 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: Chapman, 1883; Small, 1933a; Britton & Rose, 1937; Long & Lakela, 1976; Little, 1978; Avery & Loope, 1980a; Benson, 1982; Scurlock, 1987; Adams & Lima, 1994a; Adams & Lima, 1994b; Wunderlin, 1998; Chafin, 2000; Coile, 2000; USFWS, 2000.
Synonyms: *P. robinii* var. *deeringii* (Small) Kartesz & Gandhi; *Cephalocereus deeringii* Small; *Cephalocereus keyensis* Britton & Rose; *Cephalocereus robinii* (Lem.) Britt. & Rose; *Cereus robinii* (Lem.) L.D. Benson; *Cereus robinii* (Lem.) L.D. Benson var. *keyensis* L.D. Benson, *nom. nud*.; *Cereus robinii* (Lem.) L.D. Benson var. *deeringii* (Small) L.D. Benson; *Cereus monoclonos* D.C., misapplied.

Historical Context in South Florida: Reverend Alva Bennett first collected Keys tree cactus in 1834 or 1835 on the island of Key West (s.n., NY). A collection was made by Allan H. Curtiss in 1885 without locality data (s.n., NY), but this also may have been from Key West (Adams and Lima, 1994). It was collected also on Key West by John Kunkel Small in 1913 (4880, NY) and in 1917 (s.n., NY). By this time, the hammocks where it grew nearly were destroyed. In 1915, Small found only two plants on the island

(Small, 1916a). It was probably extirpated there a very short time thereafter.

Albert S. Hitchcock found Keys tree cactus next in 1906 at Windley Key, then called “Umbrella Key” (Benson, 1982). This station was vouchered by John Kunkel Small in 1916 (s.n., NY) and in 1917 (Benson, 1982). Keys tree cactus is no longer present on the island, and may have been destroyed by the construction of stone quarries.

In 1916, Small also collected Keys tree cactus on Lower Matecumbe Key (7790, NY). A small population of eight plants was reported from a private site on Lower Matecumbe Key (Adams and Lima, 1994), which is assumed to be extant. This station is near the Klopp Tract, Lignumvitae Key Botanical State Park.

In 1919, Small and Britton collected Keys tree cactus on Upper Matecumbe Key (9321, NY). More recently, eleven plants were reported to occur in privately owned Teatable Hammock by Adams and Lima (1994). This occurrence was observed by Bradley in 1999.

In 1919, Small made a collection in Cactus Hammock on Big Pine Key, now part of the National Key Deer Refuge. This population is extant and is the largest population in existence today. Adams and Lima counted 565 plants at this station in 1994, and studied the life history of plants at that station. Fairchild Tropical Garden biologists Meghan Fellows and Jennifer Possley began mapping this population in 2001.

Three additional stations within one occurrence are known from Long Key. Two of these stations are in Long Key State Park, while a larger portion of the population is in privately owned North Layton Hammock. The Long Key occurrence was observed, at least by 1965, by Conrad Byrd (Avery’s Notes, 19 March 1965). Adams and Lima (1994) reported a population of 40 plants on this island. Gann and Florida Park Service biologist Janice A. Duquesnel observed the Long Key State Park plants in 2000. Fewer than 10 plants were observed. All of the Long Key stations need to be vouchered.

Small (1917) also reported that plants were present on Boca Chica Key, but we have seen no specimens documenting this. There is no evidence that Small saw the plants himself.

Fairchild Tropical Garden maintains an ex situ collection of Florida germplasm of Keys tree cactus.

Major Threats: Habitat destruction; poaching; exotic pest plant invasions.

Comments: *In Cuba, this species may be known from only a single population (Adams & Lima, 1994a).*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Acquire North Layton Hammock, Teatable Hammock, privately owned hammock on Lower Matecumbe Key.
- Protect from poaching.
- Reintroduce to Windley Key at Windley Key Fossil Reef Geological State Park.
- Consider restoring rockland hammock on Key West and reintroducing Keys tree cactus.

Pinguicula lutea Walter
Yellow Butterwort

South Florida Status: Four occurrences in five conservation areas (Bessemer; Corkscrew Regional Ecosystem Watershed & Corkscrew Swamp Sanctuary; Jonathan Dickinson State Park; Royal Palm Beach Pines Natural Area).
Taxonomy: Dicotyledon; Lentibulariaceae.
Habit: Perennial terrestrial forb.
Distribution: Native to the Coastal Plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Broward, Charlotte, Collier, Glades, Lee, Martin, and Palm Beach 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; Tobe et al. (1998) has a color photo.
References: Chapman (1884); Small (1933a); Wood & Godfrey (1957); Casper (1966); Long & Lakela (1976); Godfrey & Wooten

(1981); Bell & Taylor (1982); Taylor (1992); Tobe et al. (1998); Wunderlin (1998).
Synonyms: None.

Historical Context in South Florida: Ethel Z. Bailey first collected yellow butterwort in 1931 west of Fort Lauderdale (s.n., BH). In 1939, Erdman West collected it in Charlotte County, just northeast of Murdock (s.n., FLAS), a station that would have been very close to the Sarasota County line. This area has been completely developed. Yellow butterwort was collected in the vicinity of Fort Myers by Jeanette P. Standley in 1916 (290, MO) and by William A. Murrill in 1941 (s.n., FLAS). It also was collected in Lee County at Coconut by Harold N. Moldenke in 1930 (698, MO). It is currently known from the Corkscrew Regional Ecosystem Watershed (Hilsenbeck, 1997), which is located in both Lee and Collier counties. It was collected in the vicinity of this site by Olga Lakela in 1965, near the town of Corkscrew off State Road 82 in 1965 (28118, USF). It also was collected in Collier County by Robert W. Long near Lake Trafford in 1967 (2380, USF). A specimen was collected by Daniel B. Ward and others west of Palmdale in Glades County (3-10, FLAS), near what is now the Fisheating Creek Wildlife Management Area.

Conrad Roth made first collection in Martin County in 1948 at Stuart (s.n., FTG). In 1969, William L. McCart vouchered it at Jonathan Dickinson State Park in Martin County (10540, FAU, FLAS). It was also vouchered there by Donovan S. Correll and John Popenoe in 1976 (480523, FTG). David and Sally Black collected it at a site west of Palm City in 1980 (830, FTG), but this site probably has been developed. It was also found at Bessemer, a Martin County preserve, by Woodmansee and Sandra Vardaman in 1999. A collection made by Walter M. Buswell in 1941 from “Indiantown to Jupiter” (s.n., FTG) may be from either Martin or Palm Beach counties. Yellow butterwort also has been reported for Dupuis Reserve (Woodbury, no date) and Royal Palm Beach Pines Natural Area (Farnsworth, 1995c; Black, 1996). The Royal Palm Beach Pines Natural Area station is assumed to be extant, but the Dupuis Reserve report needs to be verified.

Major Threats: fire suppression, exotic pest plant invasions.

Preliminary recommendations:

- Survey Dupuis Reserve and Fisheating Creek Wildlife Management Area.
- Voucher plants at Bessemer, Corkscrew Regional Ecosystem Watershed, and Royal Palm Beach Pines.
- Map and monitor known stations on a regular basis.

Pisonia rotundata Griseb.
Smooth Devilsclaws

South Florida Status: Critically imperiled. Five occurrences in two conservation areas and adjoining private properties (Big Pine Key in National Key Deer Refuge and adjoining private properties; Cudjoe Key in National Key Deer Refuge; Sugarloaf Key in National Key Deer Refuge; No Name Key in National Key Deer Refuge and adjoining private properties; Middle Torch Hammocks Anderson, Lipchak, 3112 Parcels, Florida Key Wildlife and Environmental Area).
Taxonomy: Dicotyledon; Nyctaginaceae.
Habit: Shrub to small tree.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Pine rocklands and rockland hammock margins.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has color photos; Nelson (1994) has an illustration; Nelson (1996) has a color photo; Tobe et al. (1998) has illustrations and color photos; Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Little, 1978; Tomlinson, 1980; Correll & Correll, 1982; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Tobe et al., 1998; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: John Loomis Blodgett first collected smooth devilsclaws between 1838 and 1853 on Big Pine Key (s.n., NY). Since that time, numerous collections have been made on that island, where the largest population still exists within the National Key Deer Refuge. The authors have observed it

there as recently as 2001. In 1881, Allan H. Curtiss made a collection nearby on No Name Key (2338, NY, US). It was collected there by Joseph H. Simpson in 1891 (148, US), and in 1958 by W.L. Stern and K.L. Chambers (329, NY). It was reported by Weiner (1980) for three different hammocks on this island. Gann observed plants there in 2000 within the National Key Deer Refuge, although plants are assumed to be present on adjacent privately owned properties.

In 1963, George N. Avery observed plants on Ramrod Key, north of "Ramrod Shores" (Avery's Notes, 24 March 1963). We are not familiar with this location. Smooth devilsclaws has been reported to occur on Sugarloaf Key by Weiner (1980) and Scurlock (1987). This occurrence is within the National Key Deer Refuge and is presumably extant. Weiner (1980) also reported occurrences in two hammocks on Cudjoe Key, presumably within the National Key Deer Refuge.

In addition, Weiner (1980) reported an occurrence on Middle Torch Key. In 2000, Bradley and Woodmansee observed this occurrence within Middle Torch Hammocks Anderson, Lipchak, 3112 Parcels, Florida Keys Wildlife and Environmental Area. Fewer than 100 plants were seen. This station needs to be vouchered.

A collection made by John Kunkel Small in 1912 on "Long Island" (3889, NY) is a bit puzzling. It may refer to Long Key, but no other reports are known from the middle or upper Keys. This may be a labeling error.

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

Preliminary recommendations:

- Voucher plants at Middle Torch Hammocks.
- Survey Ramrod Key.
- Map and monitor known stations on a regular basis.
- Acquire privately owned lands on Big Pine Key and No Name Key with populations of smooth devilsclaws and add to National Key Deer Refuge.

Pogonia ophioglossoides (L.) Ker Gawl.
Rose Pogonia

South Florida Status: Critically imperiled. Three occurrences in seven conservation areas (Danforth; Jonathan Dickinson State Park; Dupuis Reserve, J.W. Corbett Wildlife Management Area, Loxahatchee Slough Natural Area, Pal-Mar, & Pal-Mar Natural Area).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern North America. Wunderlin (1998) reports it as frequent in Florida from the northern counties south to the central peninsula.
South Florida Distribution: Lee, Martin, and Palm Beach counties.
South Florida Habitats: Wet flatwoods.
Protection Status: Listed as threatened by FDACS.
Identification: Luer (1972) has illustrations and color photos; Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo; Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Correll, 1950; Luer, 1972; Godfrey & Wooten, 1979; Bell & Taylor, 1982; Taylor, 1992; Wunderlin, 1998; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Harold N. Moldenke first collected rose pogonia in 1930 at Coconut, southwest of Estero in Lee County (966, NY), perhaps in what is now Estero Bay State Buffer Preserve.

In 1962, Olga Lakela made a single collection in pine flatwoods south of Salerno in eastern Martin County (24972, USF). In 2000, Woodmansee and Martin County biologist Sandra Vardaman vouchered rose pogonia nearby at Danforth (486, FTG), a Martin County conservation area. Fewer than 100 plants are thought to be present there. John Popenoe (1981) also reported it for Martin County in Jonathan Dickinson State Park. Florida Park Service biologist Richard E. Roberts observed it there in the late 1990s (personal communication, 5 January 2001). Chuck McCartney reports that he observes rose pogonia every spring when he visits

the park, and that plants are relatively numerous, especially around seasonal ponds (personal communication, 21 February 2001). It may also be present in flatwoods at other sites in Martin County, and more thorough searches should be conducted.

Rose pogonia also has been observed several times in northwestern Palm Beach County and southwestern Martin County. Steve Farnsworth reported it for the Pal-Mar Natural Area (Farnsworth, 1993a) and nearby at Loxahatchee Slough Natural Area (Farnsworth, 1994c). In 1998, Bradley vouchered plants at Pal-Mar (1629, FTG), which is contiguous with Pal-Mar Natural Area. Plants are assumed to be present at all three stations, although the Pal-Mar and Loxahatchee Slough Natural Area stations need to be vouchered. David Black also observed it at J.W. Corbett Wildlife Management Area in March 2001 (personal communication, 18 March 2001), but this station needs to be vouchered. It also has been reported at Dupuis Reserve in western Martin and Palm Beach counties (Woodbury, no date), but this station needs to be verified.

Major Threats: Drainage of wet flatwoods habitat; 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. It flowers in the spring, when surveys should be conducted.*

Preliminary recommendations:

- Voucher plants at Dupuis Reserve, J.W. Corbett Wildlife Management Area, Loxahatchee Sough Natural Area, and Pal-Mar Natural Area.
- Survey Estero Bay State Buffer Preserve.
- Map and monitor known stations on a regular basis.

Polygala polygama Walter
Racemed Milkwort

South Florida Status: Critically imperiled. One occurrence at Juno Dunes Natural Area & Jupiter Ridge Natural Area.
Taxonomy: Dicotyledon; Polygalaceae.
Habit: Perennial terrestrial herb.

Distribution: Native to eastern North America. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Broward, Collier, Glades, Lee, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Mesic flatwoods.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1992) has a color photo.
References: Chapman, 1883; Small, 1933a; James, 1957b; Long & Lakela, 1976; Bell & Taylor, 1982; Taylor, 1992; Wunderlin, 1998.
Synonyms: *P. aboriginum* Small.

Historical Context in South Florida: Abram P. Garber first collected racemed milkwort in 1877 in Miami (s.n., FLAS, NY), presumably in sandy pine rocklands near the Miami River. Alvah A. Eaton also collected it near Miami in 1903 (646, NY). Nathaniel L. Britton made the only collection of this species in Broward County at Deerfield in 1904 (5, NY). In 1960, Daniel B. Ward and others made a collection in Glades County west of Palmdale (s.n., FLAS). Racemed milkwort also was reported from the Palmdale area (Christman, 1988) at a site called "Palmdale SE." Both of these collections are in the vicinity of the newly acquired Fisheating Creek Wildlife Management Area.

In 1969, William L. McCart made a collection in Lee County at Koreshan State Historic Site (10635, FLAS). Only one plant was seen and it was collected. In 2000, Gann and Florida Park Service biologists R. "Bobby" Hattaway and Sally Braem conducted a brief survey for this species at Koreshan. No plants were seen, but this site needs additional survey work. In 1983, Chuck McCartney collected racemed milkwort in 1983 on private property within the boundaries of Big Cypress National Preserve (Avery 2550, FLAS).

Several un-vouchered stations have been observed or reported from Palm Beach County. It was reported for Frenchman's Forest Natural Area (Farnsworth, 1996a) and Juno Dunes Natural Area (Farnsworth, 1997). In 1997, Bradley and Woodmansee observed plants at Juno Dunes Natural Area, and Gann and Bradley observed plants at Jupiter Ridge Natural Area. Extensive surveys

of Frenchman's Forest Natural Area by Gann and Bradley failed to locate any plants.

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 Juno Dune Natural Area and Jupiter Ridge Natural Area.
- Survey Fisheating Creek Wildlife Management Area, Koreshan State Historic Site, and the vicinity of the McCartney station in Big Cypress National Preserve. Continue surveys at Frenchman's Forest Natural Area.
- Map and monitor known stations on a regular basis.
- Consider restoring sandy pine rocklands near the Miami River and reintroducing racemed milkwort.

Quercus inopina Ashe
Scrub Oak

South Florida Status: Critically imperiled. One occurrence in two conservation areas and adjacent private properties (Savannas Preserve State Park & Tilton).
Taxonomy: Dicotyledon; Fagaceae.
Habit: Tree.
Distribution: Endemic to peninsular Florida. Wunderlin (1998) reports it as occasional in Florida in the northern and central peninsula.
South Florida Distribution: Martin County.
South Florida Habitats: Scrub.
Protection Status: Not listed by any agency.
Identification: Nelson (1994) has a color photo; Nelson (1996) has a color photo.
References: Nelson, 1994; Nelson, 1996; Flora of North America Editorial Committee, 1997; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Sally Black first collected scrub oak in 1988 at a private property north of Stuart in Martin

County (1145, FLAS, USF). Although this parcel was developed as the Pineapple Plantation, plants should still be present in a mitigation site (S. Black, personal communication, 2 March 2001). In 1996, scrub oak was found nearby at the Savannas Preserve State Park Hawk's Bluff Parcel in Martin County and vouchered there by Gann and Bradley (827, FTG). In 1999, Woodmansee vouchered plants at Tilton, a Martin County conservation area (383, FTG). Additional plants are probably present on other properties in northern Martin County.

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

Preliminary recommendations:

- Survey Pineapple Plantation in northern Martin County.
- Map and monitor known stations on a regular basis.

Quercus laevis Walter
Turkey Oak

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Jonathan Dickinson State Park; Estero Bay State Buffer Preserve) and adjacent private properties.
Taxonomy: Dicotyledon; Fagaceae.
Habit: Tree.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Collier, Lee, and Martin counties. Reported from, but not vouchered in, Palm Beach County.
South Florida Habitats: Sandhills.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Nelson (1994) has an illustration; Taylor (1998) has a color photo; the IRC Website has a color photo.
References: Small, 1933a; Long & Lakela, 1976; Bell & Taylor, 1982; Godfrey, 1988; Nelson, 1994; Flora of North America Editorial Committee, 1997; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Paul C. Standley first collected turkey oak in 1927 in Naples (52540, US). In 1982, John

Popenoe made a collection in the Pelican Bay area (2220, FTG), about six miles north of Naples. This station has probably been destroyed. James N. Burch observed plants in northwestern Collier County around 1990 at what is now the Audubon Country Club, but he is not sure if any plants remain at the site (personal communication, 6 August 2001). He recently observed plants about 1-2 kilometers north of this station along Bonita Beach Road in southwestern Lee County. Fewer than 10 trees remain in an area that will probably be developed soon. Vanasse & Daylor, LLP (2001) report turkey oak for Estero Bay State Buffer Preserve, where it is assumed to be extant.

In 1950, Carol H. Beck collected turkey oak at Jonathan Dickinson State Park in Martin County (s.n., FLAS). William L. McCart also vouchered this station in 1969 (10521, FAU, FLAS), as did John Popenoe in 1974 (292, FTG). The authors have observed plants there on several occasions. An additional station in Martin County was vouchered in 1975 by Jack McLaughlin at a Boy Scout camp in Tequesta (s.n., FAU). It is unknown if this station is extant. According to Sally Black, turkey oak is present on several private properties outside of Jonathan Dickinson State Park in Martin and Palm Beach counties (personal communication, February, 2001).

Major Threats: Habitat destruction; 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. The low turkey oak sandhills at Jonathan Dickinson State Park also provide important habitat for the federally endangered tiny polygala (*Polygala smallii*).*

Preliminary recommendations:

- Voucher plants at plants along Bonita Beach Road and at Estero Bay State Buffer Preserve.
- Survey Audubon Country Club site, Bonita Beach Road site, Pelican Bay area, and Tequesta Boy Scout station.
- Map and monitor known stations on a regular basis.

Rhynchosia swartzii (Vail) Urb.
Swartz's Snoutbean

South Florida Status: Critically imperiled. Three occurrences in six conservation areas (Biscayne National Park; Crocodile Lake National Wildlife Refuge, Dagny Johnson Key Largo Hammocks Botanical State Park, & John Pennekamp Coral Reef State Park; Key Largo Ansama Parcel, Florida Keys Wildlife and Environmental Area & Dove Creek Hammocks, Florida Keys Wildlife and Environmental Area).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Vine.
Distribution: Native to South Florida and the West Indies.
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 critically imperiled by FNAI.
Identification: Unlike other trifoliate *Rhynchosia* in South Florida, *R. swartzii* has red seeds (Wunderlin, 1998).
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Grear, 1978; Correll & Correll, 1982; Isely, 1990; Wunderlin, 1998; Coile, 2000.
Synonyms: *R. caribaea* D.C., misapplied; *Dolicholus swartzii* Vail.

Historical Context in South Florida: Swartz's snoutbean was collected first on the island of Key West by either John Loomis Blodgett between 1838 and 1853 (s.n., NY) or by Ferdinand Rugel in 1846 (137, FLAS, NY). These remain the only known collections from the lower Florida Keys.

In 1906, John Kunkel Small and Joel J. Carter collected Swartz's snoutbean on Elliott Key in Miami-Dade County (2550, NY), which is now part of Biscayne National Park. It has been observed there by the authors as recently as 2001. Small and Charles A. Mosier also collected it in 1915 on Adams Key (5728, NY), also in Biscayne National Park, but surveys by Gann and Bradley in 2001 failed to locate any plants.

Swartz's snoutbean has been collected a few miles to the south on Key Largo by many botanists. The first to collect it were Small and Carter in 1909 (2958, NY), on the southern portion of the island. Bradley and Woodmansee observed it in Dove Creek Hammocks in the Florida Wildlife and Environmental Area on southern Key Largo in 2000. In 2001, Bradley and Woodmansee also observed one plant at the Key Largo Ansama Parcel, Florida Keys Wildlife and Environmental Area. Both of these stations need to be vouchered. All other reports are from the northern portions of Key Largo, from about two miles south of the junction of US 1 and State Road 905, to the northern tip of the island. It was collected first on northern Key Largo by E.F. Ford in 1961 (s.n., FLAS). It has been observed as recently as 2000 by Bradley and Woodmansee at Crocodile Lake National Wildlife Refuge, and by Gann and Florida Park Service biologist Janice A. Duquesnel at Dagny Johnson Key Largo Hammocks Botanical State Park and John Pennekamp Coral Reef State Park. The populations in these three sites are all considered as one occurrence. Bradley vouchered plants at Dagny Johnson Key Largo Hammocks Botanical State Park in 1995 (475, FTG), and Bradley and Woodmansee vouchered plants at Crocodile Lake National Wildlife Refuge in 2000 (1248, FTG). Plants at John Pennekamp Coral Reef State Park still need to be vouchered.

There is a single report from privately owned Teatable Hammock on Upper Matecumbe Key (Weiner, 1980 as amended).

Only one record is known from the mainland. George N. Avery found Swartz's snoutbean in 1976 in "Lower Loveland Hammock" in southern Miami-Dade County (1667, USF). According to his description of this location, it appears that this station is now called Grant Hammock, which is privately owned. The western half of this hammock has been mostly destroyed, but it appears that Avery found plants at the eastern edge of the hammock.

Major Threats: Exotic pest plant invasions; management error.

Comments: *This species often grows at the edges of hammocks, thus it is susceptible to trimming or herbicide treatment of forest edges.*

Preliminary recommendations:

- Voucher plants at Dove Creek Hammocks, John Pennekamp Coral Reef State Park, and Key Largo Ansama Parcel.
- Survey Grant Hammock. Continue surveys on Adams Key.
- Map and monitor known stations on a regular basis.
- Consider reintroduction to Key West at Little Hamaca Park, and to other locations within its historical range.

Rhynchospora breviseta (Gale) Channell
Shortbristle Beaksedge

South Florida Status: Critically imperiled. Three occurrences in three conservation areas and one adjacent non-conservation area (Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Jonathan Dickinson State Park; Pal-Mar & Pal-Mar CARL Site).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain and the West Indies. Wunderlin (1998) reports it as occasional in Florida from the western panhandle to the central peninsula.
South Florida Distribution: Charlotte, Martin, and Palm Beach counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.
References: Gale, 1944; Godfrey & Wooten, 1979; Wunderlin, 1998.
Synonyms: *R. oligantha* A. Gray var. *breviseta* Gale.

Historical Context in South Florida: O.E. Frye first collected shortbristle beaksedge in 1946 at an unspecified locality in Charlotte County (s.n., FLAS). In 1996, Gann and Bradley collected it at Fred C. Babcock-Cecil M. Webb Wildlife Management Area (637, FTG).

David and Sally Black made a collection in 1983 at the Royal Palm Beach Acreage in Palm Beach County (1063, FTG). This site is thought to have been destroyed. In 1991, Steven L. Orzell and Edwin L. Bridges made a collection at the Pal-Mar CARL Site in Martin County (16814, FTG). In 1997, Gann and Bradley

collected it at the Pal-Mar conservation area in Palm Beach County (1047, FTG). Shortbristle beaksedge also has been reported for Dupuis Reserve (Woodbury, no date), which is located in both Martin and Palm Beach counties adjacent to Pal-Mar and the Pal-Mar CARL Site, but this report needs to be verified. These three stations are considered to be the same occurrence.

Shortbristle beaksedge 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 this station needs to be vouchered.

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

Preliminary recommendations:

- Voucher plants at Jonathan Dickinson State Park.
- Survey Dupuis Reserve and Pal-Mar Natural Area.
- Map and monitor known stations on a regular basis.
- Acquire the unprotected portions of the Pal-Mar CARL Site.

Rhynchospora harperi Small
Harper's Beaksedge

South Florida Status: Critically imperiled. Three occurrences in four conservation areas and one adjacent non-conservation area (Corkscrew Regional Ecosystem Watershed; Jonathan Dickinson State Park; J.W. Corbett Wildlife Management Area, Pal-Mar, & Pal-Mar CARL Site).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional from the western panhandle to the central peninsula.
South Florida Distribution: Charlotte, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Depression marshes, wet flatwoods, and cypress domes.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration.

References: Small, 1933a; Gale, 1944; Godfrey & Wooten, 1979; Kral, 1996; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Robert Kral first collected Harper's beaksedge in 1973 on the south side of Stuart in Martin County (51780, VDB). In 1994, Kral made another collection on a private property west of Port Salerno (83706, NY).

In 1991, Steven L. Orzell and Edwin L. Bridges collected Harper's beaksedge in Martin County at the Pal-Mar CARL Site (16822, USF). In 1997, Bradley and Woodmansee collected it nearby in Palm Beach County at Pal-Mar (695, FTG), a conservation area managed by the South Florida Water Management District. In 1991, Orzell and Bridges also collected it nearby at the J.W. Corbett Wildlife Management Area in Palm Beach County (16856, USF). All of these sites are considered to be the same occurrence. In 1997, Bradley and Woodmansee collected Harper's beaksedge in Palm Beach County along the Loxahatchee River in Jonathan Dickinson Sate Park (742, FTG).

In 1991, Bridges and Orzell also made a collection in Charlotte County at a property owned by the Harper Brothers (18142, FTG). Loran Anderson (1997) observed Harper's beaksedge at the Flint Pen Strand in Lee County, now part of the Corkscrew Regional Ecosystem Watershed, which is located in both Lee and Collier counties. This station needs to be vouchered.

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 plants at Corkscrew Regional Ecosystem Watershed.
- Survey Harper Brothers property and Pal-Mar Natural Area.
- Map and monitor known stations on a regular basis.
- Acquire unprotected portions of the Pal-Mar CARL Site.

Rhynchospora rariflora (Michx.) Elliott
Fewflower Beaksedge

South Florida Status: Critically imperiled. Two occurrences in four conservation areas and one adjacent non-conservation area (Jonathan Dickinson State Park & Riverbend Park; Loxahatchee Slough Natural Area, Pal-Mar & Pal-Mar CARL Site).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States, the West Indies, and Central America. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Charlotte, Collier, Glades, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Mesic and wet flatwoods.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has an illustration.
References: Chapman, 1883; Small, 1933a; Gale, 1944; 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 fewflower beaksedge in 1946 at an unspecified locality in Charlotte County (s.n., FLAS). In 1958, Robert Kral collected it six miles north of Fort Myers in Lee County (7582, USF), presumably in what is now North Fort Myers. In 1965, Olga Lakela made a collection north of Immokalee in Collier County (29202, USF). Leland M. Baltzell collected it in 1975 in Glades County northwest of Palmdale (7323, FLAS), in the vicinity of what is now the Fisheating Creek Wildlife Management Area.

In 1991, fewflower beaksedge was collected by Steven L. Orzell and Edwin L. Bridges at Pal-Mar CARL Site in Martin County (16847, FTG). In 1997, Bradley and Woodmansee collected it nearby in Palm Beach County at Pal-Mar (223, FTG), a conservation area managed by South Florida Water Management District. It also has been reported for Dupuis Reserve (Woodbury, no date), and Loxahatchee Slough Natural Area (Farnsworth, 1994c), both of which are in the vicinity of the Pal-Mar CARL Site

and Pal-Mar. Fewflower beaksedge is assumed to be extant at Loxahatchee Slough Natural Area, but needs to be vouchered. The Dupuis Reserve record needs to be verified. All four of these sites are considered to be the same occurrence.

In 1997, Bradley and Woodmansee also collected it along the Loxahatchee River at Riverbend Park, which is managed by Palm Beach County (606, FTG). It also has been reported at 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, and to be part of the same occurrence as that at Riverbend Park.

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

Preliminary recommendations:

- Voucher plants at Jonathan Dickinson State Park and Loxahatchee Slough Natural Area.
- Survey Dupuis Reserve, Fisheating Creek Wildlife Management Area, and Pal-Mar Natural Area.
- Map and monitor known stations on a regular basis.
- Acquire unprotected portions of Pal-Mar CARL Site.

Rhynchospora wrightiana Boeck.
Wright's Beaksedge

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Jonathan Dickinson State Park; Pal-Mar).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain, Cuba, and Puerto Rico. Wunderlin (1998) reports it as occasional in Florida from the northern counties to the central peninsula.
South Florida Distribution: Martin and Palm Beach counties.
South Florida Habitats: Depression marshes and flatwoods.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.
References: Small, 1933a; Gale, 1944; Godfrey & Wooten, 1979; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *R. brachychaeta* C. Wright.

Historical Context in South Florida: Loran C. Anderson first collected Wright's beaksedge in 1997 at Jonathan Dickinson State Park in Martin County (17550, FSU), although Popenoe (1981) had reported it there earlier. Also in 1997, Gann and Bradley collected it at Pal-Mar in Palm Beach County (1031, FTG). It is presumably present in other conservation areas in Martin and Palm Beach County.

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

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Survey appropriate habitat in Martin and Palm Beach counties.

Rubus cuneifolius Pursh
Sand Blackberry

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Caloosahatchee Regional Park; Fred C. Babcock-Cecil M. Webb Wildlife Management Area).
Taxonomy: Dicotyledon; Rosaceae.
Habit: Shrub.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as common nearly throughout Florida.
South Florida Distribution: Broward, Charlotte, Glades, Lee, and Palm Beach counties.
South Florida Habitats: Flatwoods and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Nelson (1996) has an illustration; Taylor (1998) has a color photo.
References: Bailey, 1932; Small, 1933a; Godfrey & Wooten, 1981; Nelson, 1996; Wunderlin, 1998.
Synonyms: *R. inferior* L.H. Bailey; *R. probabilis* L.H. Bailey.

Historical Context in South Florida: James B. McFarlin first collected sand blackberry in 1975 in Palmdale in Glades County (7274, FLAS). In 1975, Leland M. Baltzell collected it northwest of

Palmdale (7274, FLAS). Both of these stations are in the vicinity of what is now the Fisheating Creek Wildlife Management Area.

In 1981, John Popenoe collected sand blackberry west of Jupiter in Palm Beach County (1961, USF). It has been reported from other stations in Palm Beach County since then, including Loxahatchee Slough Natural Area (Farnsworth, 1994c), and Frenchman's Forest Natural Area (Farnsworth, 1996a). Gann and Bradley surveyed Frenchman's Forest in 1996, but did not observe any plants. Both of these occurrences need to be verified.

Ted Hendrickson and Ann Buckley collected sand blackberry in 1987 in Davie in Broward County (567, NY). This collection was made in a citrus grove. It is unclear whether or not the species' historical range extended into Broward County, or if this was an introduced population.

In 1996, Gann and Bradley observed sand blackberry at Fred C. Babcock-Cecil M. Webb Wildlife Management Area in Charlotte County, but this station needs to be vouchered. Gann and Lee County biologists Roger Clark and Rob Irving also observed sand blackberry in 2001 at the Caloosahatchee Regional Park in Lee County. This station also needs to be vouchered.

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.*

Preliminary recommendations:

- Voucher plants at Caloosahatchee Regional Park and Fred C. Babcock-Cecil M. Webb Wildlife Management Area.
- Survey Fisheating Creek Wildlife Management Area, Frenchman's Forest Natural Area, and Loxahatchee Slough Natural Area.
- Map and monitor known stations on a regular basis.

Sageretia minutiflora (Michx.) C. Mohr
Smallflower Mock Buckthorn

South Florida Status: Critically imperiled. Four occurrences in four conservation areas (Big Cypress National Preserve; Collier-

Seminole State Park; Corkscrew Swamp Sanctuary; Fakahatchee Strand Preserve State Park).
Taxonomy: Dicotyledon; Rhamnaceae.
Habit: Shrub or small tree.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Collier, Glades, and Hendry counties.
South Florida Habitats: Mesic hammocks.
Protection Status: Not listed by any agency.
Identification: Nelson (1996) has an illustration.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Nelson, 1996; Wunderlin, 1998.
Synonyms: *S. michauxii* Brongn.

Historical Context in South Florida: John Kunkel Small and John B. DeWinkeler first collected smallflower mock buckthorn in 1921 in a hammock in the Devil's Garden area of Hendry County (s.n., NY). It also was collected in this area in 1958 by William G. Atwater (M-75, FLAS), and in 1970 by George N. Avery at a property now called Camp Everglades Ranch (770, FLAS).

In 1921, Small collected smallflower mock buckthorn in Collier County in "prairies between Everglade and Deep Lake" (s.n., NY). This station was probably within what is now Fakahatchee Strand Preserve State Park, where it was recorded by Austin et al. (1990). It also was collected at "Deep Lake" in 1936 by Walter M. Buswell (s.n., FTG) and in 1949 by R. Bruce Ledin (s.n., FTG). Both of these stations are probably from the Fakahatchee Strand. It was reported for Collier-Seminole State Park (Beck, 1965; Florida Park Service District 4, 1994b), and has been observed there by Florida Park Service biologist R. "Bobby" Hattaway (personal communication, 12 January 2001). Hattaway estimates that there are fewer than 100 plants present in the park. This station needs to be vouchered. Smallflower mock buckthorn was collected within Big Cypress National Preserve in the Bear Island area at East Hinson Marsh in 1980 by David and Sally Black (1010, FTG), although Black & Black (1980) did not report small mock buckthorn for Big Cypress National Preserve. In 1970, Frank C. Craighead also made a collection at "Corkscrew" (s.n., FTG), presumably from Corkscrew Swamp Sanctuary, where it

was reported by Judd (1994). It is assumed to be extant there, but this station needs to be vouchered.

In 1945, Leonard J. Brass made a collection of smallflower mock buckthorn at Ortona in Glades County (15467, US).

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.*

Preliminary recommendations:

- Voucher plants at Collier-Seminole State Park, Corkscrew Swamp Sanctuary, and Fakahatchee Strand Preserve State Park.
- Survey Devil's Garden area of Hendry County, including Camp Everglades Ranch.
- Map and monitor known stations on a regular basis.

Sagittaria isoetiformis J.G. Sm.
Quillwort Arrowhead

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Jonathan Dickinson State Park; Kiplinger).
Taxonomy: Monocotyledon; Alismataceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Collier, Glades, Lee, and Martin counties.
South Florida Habitats: Depression marshes, ponds, cypress swamps, and wet disturbed sites.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1979) has an illustration.
References: Small, 1933a; Wooten, 1973; Long & Lakela, 1976; Godfrey & Wooten, 1979; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: None.

Historical Context in South Florida: Daniel B. Ward and others first collected quillwort arrowhead in 1960 near Palmdale in Glades County (1-13, FLAS), in the vicinity of what is now the Fisheating Creek Wildlife Management Area. In 1968, Olga Lakela made several collections in and north of Immokalee in Collier County (31331, USF; 31347, USF; 31651, USF). In 1973, William C. Brumbach made a collection in a wet roadside ditch on Sanibel Island in Lee County (8469, NY, US). Quillwort arrowhead is extant in Martin County at two locations: in 1988, Roy O. Woodbury collected it at Jonathan Dickinson State Park (s.n., FTG), and in 1999, Woodmansee made a collection at Kiplinger (299, FTG), a park managed by Martin County.

Major Threats: Drainage of wetland 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.*

Preliminary recommendations:

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

Salvia lyrata L.
Lyreleaf Sage

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Corkscrew Regional Ecosystem Watershed; Fred C. Babcock-Cecil M. Webb Wildlife Management Area).
Taxonomy: Dicotyledon; Lamiaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern United States. Wunderlin (1998) reports it as common nearly throughout Florida.
South Florida Distribution: Charlotte, Collier, Lee, and Martin, counties.
South Florida Habitats: Mesic hammocks, flatwoods, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Taylor (1998) has a color photo.

References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Bell & Taylor, 1982; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Albert S. Hitchcock first collected lyreleaf sage in 1900 in Fort Myers (276, NY). Additional collections from the Fort Myers area were made by Alvah A. Eaton in 1905 (1423, NY), by John P. Standley in 1916 (144, NY), and by Harold N. Moldenke in 1930 (916, NY). Elliott Brown made the last known collection in Lee County in 1985 along Pine Island Road in North Fort Myers (s.n., USF).

In 1964, Olga Lakela collected lyreleaf sage south of Punta Gorda in Charlotte County (27112, USF), as did Ruben P. Sauleda in 1980 (3398, USF). In 1996, Gann and Bradley collected it in a mesic hammock at the Fred C. Babcock-Cecil M. Webb Wildlife Management Area (661, FTG).

In 1968, Robert W. Long and others collected lyreleaf sage east of Lake Trafford (2745, USF), in the Immokalee area of Collier County. In 2000, Woodmansee observed it in the same area at the Corkscrew Regional Ecosystem Watershed, but this station needs to be vouchered.

In 1978, Clifton E. Nauman and Bruce E. Tatje made a collection near Barley Barber Swamp in northwestern Martin County (280, FAU). G. Donald Gann and Joyce W. Gann also collected it in Martin County in 1982 on Hutchinson Island (s.n., FTG). Both of the Martin County stations need to be surveyed.

Major Threats: 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 at Corkscrew Regional Ecosystem Watershed.
- Survey Barley Barber Swamp and Hutchinson Island.
- Map and monitor known stations on a regular basis.

Salvia riparia Kunth
Southern River Sage

South Florida Status: Critically imperiled. One occurrence at Koreshan State Historic Site & Mound Key Archaeological State Park.
Taxonomy: Dicotyledon; Lamiaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to peninsular Florida, the West Indies, Mexico, Central America, and South America. Wunderlin (1998) reports it as frequent in peninsular Florida.
South Florida Distribution: Broward, Glades, Lee, and Miami-Dade counties and the Monroe County mainland. It is probably introduced in Miami-Dade County.
South Florida Habitats: Shell mounds, mesic hammocks, and disturbed sites.
Protection Status: Not listed by any agency.
Identification: There are ten species of *Salvia* in Florida. Wunderlin (1998) has a key.
References: Chapman, 1883; Small, 1933a; Wunderlin, 1998.
Synonyms: *S. privoides* Benth.; *S. privoides* var. *garberi* (Chapm.) Chapm.

Historical Context in South Florida: William G. D'Arcy first collected southern river sage in 1967 in a "hammock on Indian Mounds" eight miles southwest of Lakeport in Glades County (1433, FLAS). In 1968, George N. Avery (530, FTG, USF) and William T. Gillis (7177, FTG) made collections in northwestern Miami-Dade County near Milton E. Thompson Park. This station probably represents an introduced waif population.

In 1964, Frank C. Craighead collected southern river sage at Estero in Lee County (s.n., FTG). In 1973, Susan Todd collected it nearby on Mound Key in Mound Key Archaeological State Park (725, USF). Gann and Florida Park Service biologists R. "Bobby" Hattaway and Sally Braem observed these plants in 2001. Hattaway discovered additional plants on the same day at Koreshan State Historic Site, but this station needs to be vouchered. Elliott Brown also made a collection in North Fort Myers in 1986 (s.n., USF).

Avery collected southern river sage in Broward County in 1976 at Cypress Creek Hammock (1693, USF), in what is now Fern Forest Nature Center. Donovan S. Correll and others also collected it there in 1977 (48487, NY), but this station needs to be surveyed. It also has been reported at several additional stations in Broward County, including Long Key/Flamingo Road Natural Area (Broward County Parks & University of Florida, 1998e), Pine Island Ridge Natural Area (Broward County Parks & University of Florida, 1998g), and Tall Cypress Natural Area (Broward County Parks & University of Florida, 1998l). All of these reports need to be verified.

In 1978, Avery made an additional collection with Lloyd L. Loope at Northwest Cape Sable in Everglades National Park (1835, FLAS). This collection is the basis for the misidentified *Salvia setosa* record for Everglades National Park (e.g., Avery & Loope, 1980b). This station needs to be surveyed.

Southern river sage also has been reported for Dupuis Reserve (Woodbury, no date), which is located in Palm Beach and Martin counties, but this record needs to be verified.

Major Threats: Exotic pest plant invasions.

Preliminary recommendations:

- Voucher plants at Koreshan State Historic Site.
- Survey Dupuis Reserve, Northwest Cape Sable area of Everglades National Park, Fern Forest Nature Center, Long Key/Flamingo Road Natural Area, Pine Island Ridge Natural Area, and Tall Cypress Natural Area.
- Map and monitor known stations on a regular basis.

Scirpus robustus Pursh
Saltmarsh Bulrush

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Collier-Seminole State Park; Everglades National Park) and one non-conservation area (ditch in Charlotte Harbor).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.

Distribution: Widely distributed in North America and tropical America. Wunderlin (1998) reports it as occasional in Florida from the western panhandle to the peninsula.
South Florida Distribution: Charlotte, Collier, Lee, and Palm Beach counties and the Monroe County mainland.
South Florida Habitats: Salt marshes and river banks.
Protection Status: Not listed by any agency.
Identification: There are 14 species of *Scirpus* in Florida. Wunderlin (1998) has a key. The IRC Website has a color photo
References: Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Correll & Correll, 1982; Wunderlin, 1998.
Synonyms: *S. maritimus* L. var. *macrostachyus* Michx.

Historical Context in South Florida: Saltmarsh bulrush was collected first in 1940 at Cape Sable in Everglades National Park by "Rude & Gist" (s.n., FLAS). John H. Davis, Jr. also collected it at Cape Sable in 1942 (s.n., FLAS). It is still reported to be present in the park (Reimus, 1996), and is assumed to be extant.

In 1954, Ellsworth P. Killip collected saltmarsh bulrush on Sanibel Island in Lee County (44255, US). W.C. Brumbach also collected it on Sanibel in 1972 (809, US). Allen G. Shuey made an additional collection from Lee County in 1981 along the Caloosahatchee River southwest of Fort Myers (2492, USF). In 1964, R.F. Christensen collected saltmarsh bulrush along the southwest branch of the Loxahatchee River in Palm Beach County (RC-46c, FSU). This station may now be part of the Loxahatchee River-Lake Worth Creek Aquatic Preserve, which should be surveyed. In 1967, Olga Lakela collected saltmarsh bulrush in Collier County along US 29 at the "Illinois Motel" (30760, USF). The location of this station is unknown. Florida Park Service biologist R. "Bobby" Hattaway has observed it at Collier-Seminole State Park (personal communication, 12 January 2001), but this station needs to be vouchered. Several hundred plants are present. Saltmarsh bulrush has also been reported for Estero Bay State Buffer Preserve (Vanasse & Daylor, LLP, 2001), but this report needs to be verified.

In 1969, Allen G. Burdett, Jr. made a collection in Charlotte Harbor in Charlotte County (s.n., USF). Gann and Tiffany Troxler Gann observed it at this same station in 2000. Fewer than 10 plants

were observed in a ditch in an abandoned lot along the Peace River.

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

Preliminary recommendations:

- Voucher plants at Collier-Seminole State Park.
- Survey Estero Bay State Buffer Preserve and Loxahatchee River-Lake Worth Creek Aquatic Preserve.
- Map and monitor known stations on a regular basis.

Scleria ciliata Michx. *var.* ***curtissii*** (Britton ex Small) J.W. Kessler **Curtiss' Nutrush**

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (Goulds Pineland; Larry and Penny Thompson Park; J.W. Corbett Wildlife Management Area) and one non-conservation (Natural Forest Community P-305).
Taxonomy: Monocotyledon; Cyperaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain and Cuba. Wunderlin (1998) reports it as rare in Florida in Collier, Duval, Miami-Dade, and Palm Beach counties.
South Florida Distribution: Collier, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Pine rocklands, mesic flatwoods, and coastal strand.
Protection Status: Not listed by any agency.
Identification: Distinguished from other varieties of *S. ciliata* by having achene bodies that are reticulate instead of ridged or papillate (Wunderlin, 1998).
References: Small, 1933a; Core, 1936; Fairey, 1967; Fairey, 1969; Long & Lakela, 1976; Kessler, 1987; Wunderlin, 1998.
Synonyms: *S. curtissii* Britton ex Small; *S. pauciflora* Muhl. ex Willd. var. *curtissii* (Britton ex Small) Fairey.

Historical Context in South Florida: Abram P. Garber first collected Curtiss' nutrush in 1877 in Miami (1423, NY), presumably in pine rocklands near the Miami River. Allan H.

Curtiss made the next collection in 1895 at "Hunting Ground, Biscayne Bay" (5497, NY). This station was south of the Miami River. In 1903, Alvah A. Eaton made a collection in the vicinity of Black Point in southern Miami-Dade County (267, GH). John Kunkel Small made an additional collection in 1912 at Camp Longview (3706, FLAS, NY, US), which was located west of Florida City in southern Miami-Dade County. The only recent collections known from Miami-Dade were made by Bradley: in 1995 at Larry and Penny Thompson Park in the Richmond Pine Rocklands (80, FTG); in 1997 at Natural Forest Community P-305 (851, FTG), a private pineland in southern Miami-Dade County; and in 1998 at Goulds Pineland (1811a, FTG), a conservation area managed by Miami-Dade County.

In 1966, Olga Lakela made a collection on Marco Island in Collier County (29508, FTG), a station that she vouchered again with F. Almeda in 1968 (31558, FLAS). Nearly all of Marco Island has been developed and this taxon probably no longer occurs there. In 1991, Steven L. Orzell and Edwin L. Bridges collected Curtiss' nutrush at the J.W. Corbett Wildlife Management Area in Palm Beach County (16897, FTG), where it is presumably extant.

Major Threats: Fire suppression; exotic pest plant invasions; off-road vehicle use at J.W. Corbett Wildlife Management Area.

Comments: *The Duval County specimen was collected by Allan H. Curtiss in 1894. Curtiss' nutrush may be extirpated there. This taxon may be more common in South Florida than is known.*

Preliminary recommendations:

- Determine status in Cuba and Duval County.
- 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 Natural Forest Community P-305.
- Review for listing by FNAI.

Sideroxylon reclinatum Michx. subsp. *austrofloridense* (Whetstone) Kartesz & Gandhi
Everglades Bully

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Everglades National Park; Larry and Penny Thompson Park; Pineridge Sanctuary).
Taxonomy: Dicotyledon; Sapotaceae.
Habit: Shrub.
Distribution: Endemic to Miami-Dade County.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Pine rocklands.
Protection Status: Not listed by any agency.
Identification: Distinguished from var. *reclinatum* by having the lower surface of the leaves persistently pubescent, instead of glabrous or only pubescent along the midvein (Wunderlin, 1998).
References: Whetstone, 1985; Wunderlin, 1998.
Synonyms: *Bumelia reclinata* (Michx.) Vent. var. *austrofloridensis* Whetstone.

Historical Context in South Florida: Nathaniel L. Britton first collected Everglades bully in 1904 at Camp Jackson (218, NY), which was located near the present day main entrance of Everglades National Park. It has been collected a number of times on Long Pine Key in Everglades National Park, the first time in 1904 by John Kunkel Small and Percy Wilson (1852, NY).

In 1915, Small and Charles Mosier collected a specimen in pinelands around Nixon-Lewis Hammock (6400, NY), a station just east of Everglades National Park. Although pinelands immediately adjacent to Nixon-Lewis Hammock have been destroyed, Everglades bully has been observed at two nearby stations in the immediate vicinity: privately owned Grant Hammock, where it was first observed by George N. Avery in 1967 (Avery's Notes, 5 January 1967), and Pine Ridge Sanctuary, where it was recorded by Terry and Barbara Glancy in 1991. Bradley and Loran C. Anderson observed plants at Pineridge Sanctuary in 2000, and Anderson collected a specimen. The Grant Hammock station needs to be surveyed.

In 2000, Bradley and Woodmansee observed plants at Larry and Penny Thompson Park in the Richmond Pine Rockland, but this occurrence needs to be vouchered.

Major Threats: Fire suppression; exotic pest plant invasions.

Comments: *This variety of* S. reclinatum *was not described until 1985 (Whetstone, 1985). This is one of the species that may be affected by the Everglades restoration.*

Preliminary recommendations:
- Voucher plants at Larry and Penny Thompson Park.
- Survey Grant Hammock.
- Map and monitor known stations on a regular basis.
- Conduct research to determine the effects of the Everglades restoration on Everglades bully.
- Review for listing by FNAI.

Solanum chenopodioides Lam.
Black Nightshade

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Cayo Costa State Park; Gasparilla Island State Park; Stump Pass Beach State Park).
Taxonomy: Dicotyledon; Solanaceae.
Habit: Perennial terrestrial herb.
Distribution: United States, the West Indies, Mexico, Central America, and South America. Wunderlin (1998) records it as common nearly throughout Florida.
South Florida Distribution: Charlotte, Glades, Hendry, Lee, Miami-Dade, and Palm Beach counties, and the Monroe County Keys.
South Florida Habitats: Hammocks, pine rocklands, and coastal uplands.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo.
References: Small, 1933a; D'Arcy, 1974; Long & Lakela, 1976; Taylor, 1992; Wunderlin, 1998.
Synonyms: *S. americanum* Mill. var. *baylisii* D'Arcy; *S. gracile* Link; *S. nigrescens* M. Martens & Galeotti, misapplied; *S. ottonis* Hylander.

Historical Context in South Florida: John Kunkel Small first collected black nightshade in 1915 at Humbugus Prairie, a station north of the Miami River in Miami-Dade County (5573, NY). In 1983, George N. Avery made a collection in a pine rockland in Miami-Dade County (2442, FTG). In 1917 Small collected black nightshade along the western shore of Lake Okeechobee between Fisheating Creek and the Three-Mile Canal in Glades County (8216, GH). E.P. Killip made a collection in 1951 on Big Pine Key in Monroe County (41582, US). George R. Cooley collected it in 1951, in the Devil's Garden Hammock in Hendry County (797, USF).

Cooley also made collections on Jupiter Island in Palm Beach County in 1956 (4800, USF) and on Sanibel Island in Lee County in 1967 (11850, USF). The next collection from Lee County was made in 1979 by Sandy Morrill and Jud Harvey on North Captiva Island (187, USF), perhaps in what is now Cayo Costa State Park. In 1990, "Phillips et al." collected it on Cayo Costa Island at Cayo Costa State Park (52, USF). In 1992 Andy Peters and Sally Braem collected it at Gasparilla Island State Park (GI0031, USF). S. Erickson vouchered plants in 1991 at Stump Pass Beach State Park (PC0039, USF). Gann observed fewer than 100 plants there in 2000.

Major Threats: Exotic pest plants invasions; sea-level rise; coastal erosion.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.

Solidago tortifolia Elliott
Twistedleaf Goldenrod

South Florida Status: Critically imperiled. Four occurrences in four conservation areas (Big Cypress National Preserve; Deering Estate at Cutler; Jonathan Dickinson State Park; J.W. Corbett Wildlife Management 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 peninsula.
South Florida Distribution: Collier, Glades, Lee, Martin, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Flatwoods and pine rocklands.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Taylor, 1992; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Alvan W. Chapman first collected twistedleaf goldenrod in the middle to late 1800s on "Robert's Key" in Collier County (s.n., US). This location appears to be part of Marco Island, most of which has been developed. In 1967, Olga Lakela made a collection in the vicinity of Lake Trafford in Immokalee in northern Collier County (30633, USF). Robert W. Long also collected it in this area the following year (2754, USF). It has been reported as uncommon in Big Cypress National Preserve (Black & Black, 1980). Plants are assumed to be extant there, but Big Cypress National Preserve needs to be vouchered.

John Kunkel Small and George V. Nash made the first collection in Miami-Dade County in 1901 in Coconut Grove (s.n., NY). Small made a number of other collections in Miami-Dade County from 1901 until 1918 (8808a, NY), from as far north as Humbugus Prairie north of the Miami River (5558, NY) to as far south as Silver Palm in the Redland area (7979, NY). Twistedleaf goldenrod was not collected again in Miami-Dade County until 1980, when M. Nee collected it "SW of Miami" in an area about to be developed (28609, NY). Ruben P. Sauleda made the next collection in 1980 in western Miami-Dade County along S.W. 56 Street (3356, USF). In 1995, Bradley collected twistedleaf goldenrod at Deering Estate at Cutler (422, FTG), where a small colony of fewer than 100 plants remains.

In 1917, Mary Francis Baker collected twistedleaf goldenrod at Alva in Lee County (141, US), in the vicinity of what is now Caloosahatchee Regional Park. It also was collected at Fort Myers in 1930 by John H. Davis, Jr. (s.n., FLAS) and in 1932 by

Walter M. Buswell (s.n., FLAS, NY). In 1947, R. Bruce Ledin made a collection near Olga just east of Fort Myers along the Caloosahatchee River. George Cooley collected twistedleaf goldenrod a single time in Glades County in 1952 at the Brighton Seminole Indian Reservation (1050, USF).

Roy O. Woodbury made a collection in 1989 at Jonathan Dickinson State Park in Martin County (s.n., FTG). In 1997, Bradley and Woodmansee observed it along the Loxahatchee River in Jonathan Dickinson State Park. Robert Kral made a collection in 1999 on Sewell's Point in Martin County (87982, NY). This collection was made on private land in an area of rapid development, and it is not known if these plants persist. In 1998, Bradley and Woodmansee observed this species at the J.W. Corbett Wildlife Management Area in Palm Beach County, but this station needs to be vouchered.

Major Threats: Fire suppression; exotic pest plant invasions; habitat destruction; recreational off-road vehicle use; 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 Big Cypress National Preserve and J.W. Corbett Wildlife Management Area.
- Survey Brighton Seminole Indian Reservation and Sewell's Point.
- Map and monitor known stations on a regular basis.

Spiranthes praecox (Walter) S. Watson
Greenvein Lady's-tresses

South Florida Status: Critically imperiled. Two occurrences in four conservation areas (Corkscrew Swamp Sanctuary; J.W. Corbett Wildlife Management Area, Loxahatchee Slough Natural Area, & Pal-Mar Natural Area).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as common nearly throughout Florida.

South Florida Distribution: Broward, Collier, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Wet flatwoods, wet prairies, and marshes.
Protection Status: Not listed by any agency.
Identification: Unlike other *Spiranthes* in South Florida, *S. praecox* has a white flower with green stripes on the white lip. However, Chuck McCartney (personal communication, 21 February 2001) reports that white-lipped forms lacking the green stripes also occur. Luer (1972) has illustrations and color photos; Bell & Taylor (1982) has a color photo; Taylor (1998) has a color photo; Tobe et al. (1998) has a photo and an illustration.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Godfrey & Wooten, 1979; Bell & Taylor, 1982; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *Ibidium praecox* (Walter) House.

Historical Context in South Florida: Oakes Ames first observed greenvein lady's-tresses in the vicinity of Naples in 1904 (Plimpton, 1979). In 1971, P. Genelle and G. Fleming collected a specimen near Naples at Corkscrew Swamp Sanctuary (531, USF). This station has been observed by Roger L. Hammer (Avery's Notes, 4 May 1978) and reported by Judd (1994). It has also been reported for Rookery Bay National Estuarine Research Reserve (Burch, 1998), but this report needs to be verified.

Greenvein lady's-tresses was collected in Lee County by Harold N. Moldenke in 1930 in a moist grassy ditch in Coconut, southwest of Estero Bay (5894, NY), in the vicinity of what is now Estero Bay State Buffer Preserve. Walter M. Buswell collected it once in Broward County west of Pompano in 1937 (s.n., USF).

In 1946, William G. Atwater made the first collection in Palm Beach County (565, FLAS). He collected greenvein lady's-tresses in what is now the J.W. Corbett Wildlife Management Area, a station that was vouchered again by J.S. Seifert in 1972 (s.n., FAU). It has been reported for three nearby conservation areas: Dupuis Reserve (Woodbury, no date), Loxahatchee Slough Natural Area (Farnsworth, 1994c), and Pal-Mar Natural Area (Farnsworth, 1993a). The Loxahatchee Slough Natural Area and Pal-Mar Natural Area stations are assumed to be extant, but need

to be vouchered. The Dupuis Reserve report needs to be verified. William L. McCart made an additional collection in this area in Martin County four miles southeast of Indiantown in 1968 (9764, FAU). Paul M. Cassen made a collection in northeastern Palm Beach County in 1970 on the south side of P.G.A. Boulevard, 3.5 miles west of I-95 (552, FLAS), an area that almost certainly has been developed. In 1986, Maggy Hurchalla made a collection of greenvein lady's-tresses in Martin County in the vicinity of what is now Rocky Point Hammock (s.n., FAU), a Martin County conservation area.

Greenvein lady's-tresses may have been recorded for Fakahatchee Strand Preserve State Park in error (Austin et al., 1979, 1990). This record appears to have been based upon Luer (1972), but a review of Luer does not indicate that greenvein lady's-tresses was definitely present in the Fakahatchee.

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. The South Florida collections were made from March through June, when surveys should be conducted.*

Preliminary recommendations:

- Voucher Loxahatchee Slough Natural Area, and Pal-Mar Natural Area.
- Survey Dupuis Reserve, Estero Bay State Buffer Preserve, Rocky Point Hammock, and Rookery Bay National Estuarine Research Reserve.
- Map and monitor known stations on a regular basis.

Spiranthes torta (Thunb.) Garay & H.R. Sweet
Southern Lady's-tresses

South Florida Status: Critically imperiled. Four occurrences in three conservation areas (Big Cypress National Preserve; Everglades National Park; National Key Deer Refuge) and one non-conservation area (Luis Martinez Army Reserve Center).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb.

Distribution: Native to South Florida, Bermuda, the West Indies, and Central America.
South Florida Distribution: Broward, Charlotte, Collier, Miami-Dade, and Palm Beach counties, and the Monroe County Keys.
South Florida Habitats: Pine rocklands, marl prairies, and flatwoods.
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. This species is very similar to *S. amesiana*. It is distinguished from *S. amesiana* by having an oblong lip with an obtuse apex rather than an ovate lip with an acute apex and glabrous basal calli rather than basal calli with long trichomes (Wunderlin, 1998).
References: Chapman, 1883; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Correll & Correll, 1982; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *S. tortilis* (Sw.) Rich.; *Ibidium tortile* (Sw.) House.

Historical Context in South Florida: John Kunkel Small and Percy Wilson first collected southern lady's-tresses in May 1904 in pinelands between Coconut Grove and the town of Cutler in Miami-Dade County (1558, NY). Small and Wilson made two other collections in May 1904, both near the present-day entrance to Everglades National Park. Apparently, the first was between Homestead and Camp Jackson (1922, NY), and the second near Camp Longview (1706, NY). In 1930, J. Fanum collected the first plants inside of what is now Everglades National Park on Long Pine Key (s.n., US). It also has been recently reported for Everglades National Park (Reimus, 1996, 1999). Roger L. Hammer observed six plants on Long Pine Key in 1998 (personal communication, 19 February 2001).

In 1915, three collections were made in pinelands near three hammocks in southern Miami-Dade County outside of what is now Everglades National Park. Small and Charles A. Mosier made the first collection near Nixon-Lewis Hammock (6402, NY), followed by Small and others near Castellow Hammock (6556, NY), and Small and others near Timms Hammock (4672, US). Pinelands around Nixon-Lewis Hammock have been completely obliterated by agricultural activities. Castellow Hammock is now part of

Castellow Hammock Park, but no pineland habitat is present there today. Pinelands still surround Timms Hammock and are protected within the Miami-Dade County park, Camp Owaissa Bauer.

In 1977, Donovan S. Correll and John Popenoe made a collection in a marl prairie near Goulds (48919, FTG). Bradley observed one plant there around 1995, but this station was later destroyed for a housing development. The last occurrence in Miami-Dade County to be discovered was in the Richmond Pine Rocklands. Bradley observed plants at Larry and Penny Thompson Park in 1993, but has been unable to find these plants again during subsequent visits. In 1995, Bradley found additional plants at the Luis Martinez Army Reserve Station, which is adjacent to Larry and Penny Thompson Park. Bradley first observed these plants in a marl prairie in July 1995, and made a voucher collection with Roger L. Hammer and Woodmansee that same month (52, FTG). Bradley observed around 25 plants there in 1999. This station is extant and was last observed in 2000 by Woodmansee, who saw just two plants. As with most terrestrial orchids, the number of flowering plants fluctuates each year, making it difficult to assess the size of the total population.

Roy O. Woodbury and Walter M. Buswell first collected southern lady's-tresses in the Florida Keys on Big Pine Key in 1941 (s.n., USF). This population also was vouchered by Ellsworth P. Killip several times in 1954 (44216, US; 44269, US; 44227, US) and by George N. Avery in 1964 (s.n., USF, FTG). Several stations have been collected and observed, including at least two within the present boundaries of the National Key Deer Refuge. It has been seen more recently there by Roger Hammer, who photographed a single plant in 1996 (personal communication, 19 February 2001).

Several one-time collections are known, the first from near the South New River Canal just west of present-day downtown Fort Lauderdale, where John Kunkel Small made a collection in 1913 (4443, NY). O.E. Frye collected it in a drained pine slough in Charlotte County in 1946 (s.n. FLAS). It also was collected in Palm Beach County in 1968 by P.M. Cassen (406 FLAS) from a private property along Okeechobee Road west of Florida's Turnpike. This station is about one mile south of the City of West Palm Beach Water Catchment Buffer. Finally, Chuck McCartney

made a collection in the Rabenau Camp area in Collier County in 1996 (57, SEL), inside of what is now Big Cypress National Preserve. This population is presumably extant.

Major Threats: Habitat destruction and degradation at Lewis Martinez Army Reserve Station; fire suppression; exotic pest plant invasions.

Comments: *The flowering time for this species is very brief, lasting only a couple of weeks in May or June.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Designate surplus property at the Luis Martinez U.S. Army Reserve Station as a conservation area.

Strumpfia maritima Jacq.
Pride-of-Big-Pine

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (National Key Deer Refuge; Sugarloaf Hammocks), and one non-conservation area (Grassy Key Pride-of-Big-Pine Site).
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, pine rocklands, and the rocky transition zone between pine rocklands and salt marshes.
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 plate; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Correll & Correll, 1982; Scurlock, 1987; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: John Loomis Blodgett first collected pride-of-Big-Pine between 1838 and 1853 on Big Pine Key (s.n., NY). It has been collected on Big Pine by numerous botanists since that time. At least one population exists in the National Key Deer Refuge at the edge of a pine rockland. This population has been vouchered a number of times (e.g., Orzell & Bridges 15968, FTG, USF). U.S. Fish and Wildlife Service biologist Tom Wilmers estimates that there are fewer than 100 plants at this station (personal communication, 16 February 2001).

Allan H. Curtiss made a collection in the late 1800s at "Shore of key in Sugar-loaf Sound" (1124, NY). Francis W. Pennell vouchered a station on Sugarloaf Key in 1917 (9593, US). In 2000, Bradley and Woodmansee observed several colonies on coastal berms in Upper Sugarloaf Hammocks, within the Florida Keys Wildlife and Environmental Area (1289, FTG; 1301, FTG). George N. Avery also observed some of these colonies in the 1960s (Avery's Notes). In 1909, John Kunkel Small and Joel J. Carter collected pride-of-Big-Pine on Grassy Key in 1909 (3115, NY). A population still occurs on Grassy Key at the privately owned Grassy Key Strumpfia Site. Bradley and Wayne Hoffman observed plants there in 1998.

Small made a single collection on Upper Matecumbe Key in 1912 (3913, NY) and Harold N. Moldenke made a single collection on Little Torch Key in 1930 (816, NY). No plants are thought to be extant on either island. Avery reported a number of other un-vouchered stations that either he or others observed (Botanical Notes of George N. Avery). In 1963, Frank C. Craighead reported to him that he had seen the species "years ago" on the east end of Bahia Honda Key and on Vaca Key. No recent reports from Bahia Honda Key are known, despite a significant amount of botanical activity. In 1963, Avery observed plants on the Saddlebunch Keys (Avery's Notes, 30 August 1963) and on the southern end of Cudjoe Key (Avery's Notes, 22 November 1963). Kruer (1992) also reported an occurrence on Cudjoe. In 1964, Avery observed plants in "deep lagoon hammock" on Summerland Key (Avery's Notes, 11 February 1964). Cudjoe Key, Saddlebunch Keys, Summerland Key, and Vaca Key should be surveyed.

Major Threats: Exotic pest plant invasions; habitat destruction at Grassy Key Strumpfia Site; sea-level rise; coastal erosion on Sugarloaf Key.

Preliminary recommendations:

- Survey Cudjoe Key, East Summerland Key, Saddlebunch Keys, and Vaca Key.
- Map and monitor known stations on a regular basis.
- Acquire Grassy Key Pride-of-Big-Pine Site.

Tephrosia spicata (Walter) Torr. & A. Gray
Spiked Hoarypea

South Florida Status: Critically imperiled. Four occurrences in three conservation areas and two non-conservation areas (Black Creek Forest & a nearby private property in Goulds; Fred C. Babcock-Cecil M. Webb Wildlife Management Area; Jonathan Dickinson State Park; Montgomery Botanical Center).
Taxonomy: Dicotyledon; Fabaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Broward, Charlotte, Collier, Lee, Martin, and Miami-Dade counties.
South Florida Habitats: Flatwoods, scrub, and pine rocklands.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo.
References: Chapman, 1883; Small, 1933a; Wood, 1949; Long & Lakela, 1976; Bell & Taylor, 1982; Isely, 1990; Wunderlin, 1998.
Synonyms: *Cracca flexuosa* (Vail) A. Heller; *Cracca spicata* (Walter) Kuntze.

Historical Context in South Florida: Abram P. Garber first collected spiked hoarypea in 1877 in Miami (4399, NY), presumably in sandy pine rocklands near the Miami River. Since that collection, it has been collected in Miami-Dade County from as far north as Buena Vista (Small & DeWinkeler 9173, NY) to as far south as the vicinity of Camp Longview (Small & Wilson 1623, NY). In Miami-Dade County, this species is currently known from only three sites. In 1947, it was collected in a pine rockland fragment at Fairchild Tropical Garden by C.E. Wood and I.D.

Clement (7219, US). In 1998, Bradley and Lynka Woodbury collected plants, at what is probably the same station adjacent to the Fairchild Tropical Garden Research Center, on property owned by the Montgomery Botanical Center (1969, FTG). This pineland fragment is currently not managed as a conservation area. Bradley also collected this species in 1994 in the Goulds area at Black Creek Forest (49, FTG), a conservation area managed by Miami-Dade County. Bradley also observed plants at a property owned by the Miami-Dade County Health Department (NFC H-287), a few blocks away around 1998, but this station needs to be vouchered.

Spiked hoarypea was collected in Fort Myers in Lee County in 1900 by Albert S. Hitchcock (82, NY). Jeanette P. Standley also collected it near Fort Myers in 1916 (167, NY). In 1930, Harold N. Moldenke made two collections in Broward County. The first was made west of Davie (455, NY). The second was made west of Pompano (457a, NY). Olga Lakela made a single collection in Collier County in 1967 in scrub about a mile east of Naples off State Road 864 (30928a, USF). In 1978, John Popenoe collected spiked hoarypea in Martin County at Jonathan Dickinson State Park (1276, FTG), where it is presumably extant. Gann and Bradley collected spiked hoarypea in 1996 at Fred C. Babcock-Cecil M. Webb Wildlife Management Area in Charlotte County (609, FTG, USF).

Major Threats: Habitat destruction at NFC H-287 and the Montgomery Botanical Center.

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 on NFC H-287.
- Designate NFC H-287 as a conservation area.
- Develop conservation agreement with Montgomery Botanical Center to manage a viable population of spiked hoarypea in pine rockland fragments at the Center.
- Map and monitor known stations on a regular basis.

Thelypteris hispidula (Decne.) C.F. Reed var. *versicolor* (R.P. St. John) Lellinger
Hairy Maiden Fern

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Enchanted Forest Park; Fakahatchee Strand Preserve State Park; Riverbend Park).
Taxonomy: Pteridophyte; Thelypteridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern United States and Cuba. Wunderlin (1998) reports it as frequent in Florida from the western panhandle to the peninsula.
South Florida Distribution: Collier, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Rockland hammocks, mesic hammocks, hydric hammocks, and freshwater tidal swamps.
Protection Status: Not listed by any agency.
Identification: Tobe et al. (1998) has a color photo and illustrations; Nelson (2000) has a color photo, as well as illustrations of pinnule venation of hairy maiden fern, together with easily confused species such as *T. kunthii* and *T. ovata*; the IRC Website has a color photo.
References: Small, 1938; Lakela & Long, 1976; Flora of North America Editorial Committee, 1993; Tobe et al., 1998; Wunderlin, 1998; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *T. macilenta* E.P. St. John; *T. quadrangularis* (Fée) Schelpe var. *versicolor* (R.P. St. John) A.R. Sm.; *T. versicolor* Robert P. St. John.

Historical Context in South Florida: Harold N. Moldenke first collected hairy maiden fern in 1930 in moist soil on a canal bank along the Tamiami Trail in Miami-Dade County (847, FLAS). Mary W. Diddell made two collections from hammocks in Miami-Dade County from imprecise locations in 1931 (s.n., FLAS) and 1932 (s.n., FLAS). Hairy maiden fern was not collected again in Miami-Dade County until 1999, when Woodmansee made a collection at Enchanted Forest Park in the city of North Miami (332, FTG). Woodmansee estimates that there are fewer than 100 plants present in a former freshwater tidal swamp along Arch Creek Canal.

In 1935, Robert P. St. John collected hairy maiden fern in the Fakahatchee Strand (471, FLAS), now in Fakahatchee Strand Preserve State Park. Austin et al. (1990) also reported it for the park. It is uncertain how many plants are present, but perhaps just a few dozen (D.F. Austin, personal communication, 20 January 2001). It was reported for the Gum Slough area of Big Cypress National Preserve, where George N. Avery reported seeing one plant in 1978 with Sally Black and Dennis Minsky (Avery's Notes, 1 November 1978). Black & Black (1980) reported it as rare in the park, but it is uncertain how many plants are present.

In 1999, Bradley, Gil Nelson, and Wilson Baker made a collection at Riverbend Park in Palm Beach County (1977, FTG, USF). Fewer than 10 plants were observed.

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

Preliminary recommendations:

- Survey Gum Slough area of Big Cypress National Preserve.
- Map and monitor known stations on a regular basis.

Thelypteris patens (Sw.) Small ex R.P. St. John
Grid-scale Maiden Fern

South Florida Status: Critically imperiled. One occurrence in two conservation areas (Bill Sadowski Park & Deering Estate at Cutler).
Taxonomy: Pteridophyte; Thelypteridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks.
Protection Status: Listed as endangered by FDACS.
Identification: Grid-scale maiden fern has a conspicuously erect stem. Nelson (2000) has three color photos; Chafin (2000) has both illustrations and color photos.
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: *Dryopteris stipularis* (Willd.) Maxon ex Underwood.

Historical Context in South Florida: Alvah A. Eaton first collected grid-scale maiden fern in 1905 at Ross Hammock (s.n., US), part of which is now located within Castellow Hammock Park. A single plant was observed (Eaton, 1906). Small (1938) reported that no additional plants were ever found.

Grid-scale maiden fern was not rediscovered until 1993, when Alan Cressler and Carol Lippincott found forty-one plants growing at Bill Sadowski Park in the Cutler area (s.n., FTG). Bradley re-vouchered this population in 1997 (692, FTG) and noted that about two-dozen plants were present. Bradley and Alíce Warren-Bradley discovered two plants at the Deering Estate at Cutler in 2000. Bradley observed these plants again in 2001. Both plants were still present, but this station needs to be vouchered.

Major Threats: Exotic pest plant invasions; poaching; long-term drainage on the Miami Rock Ridge.

Comments: *Small (1931) reported large stands of grid-scale maiden fern at Royal Palm Hammock, now within Everglades National Park, but later (1938) stated that earlier reports by him and others had been erroneous.*

Preliminary recommendations:

- Voucher plants at Deering Estate at Cutler.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Conduct conservation biology and conservation horticulture studies.
- Consider reintroducing grid-scale maiden fern to other sites within its historical range, including Castellow Hammock Park.
- Promote a higher regional water table on the Miami Rock Ridge.
- Review for listing by FNAI.

Thelypteris reticulata (L.) Proctor
Lattice-vein Fern

South Florida Status: Critically imperiled. Three occurrences in five conservation areas (Big Cypress National Preserve; Everglades National Park, Frog Pond/L-31 N Transition Lands, & Southern Glades; Fakahatchee Strand Preserve State Park).
Taxonomy: Pteridophyte; Thelypteridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Broward, Collier, Lee, and Miami-Dade counties.
South Florida Habitats: Strand swamps and rockland hammocks.
Protection Status: Listed as endangered by FDACS.
Identification: *T. reticulata* and *T. serrata* are very close in appearance and are dissimilar from other species of *Thelypteris* in South Florida. Of the two, *T. reticulata* has significantly wider pinnae (up to 6.0 cm wide vs. up to 3.5 cm wide in *T. serrata*). Chafin (2000) has an illustration; Nelson (2000) has color photos; 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; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *Meniscium reticulatum* (L.) Sw.

Historical Context in South Florida: J.E. Layne first collected lattice-vein fern in the spring of 1903 in the Fakahatchee Strand in Collier County (Eaton, 1906; Small, 1938) and Alvah A. Eaton collected it again in the fall of 1903 at the water works at Allapattah, near present-day downtown Miami (779, NY). Small (1938) stated that lattice-vein fern once had been “commonly distributed” in the southern part of the Everglades and in the Big Cypress Swamp, but that “vast areas of its habitats have been destroyed by fire.” The authors have not seen any John Kunkel Small specimens of lattice-vein fern at any of the herbaria sampled, so it is uncertain whether or not he personally observed any plants.

In 1963, Olga Lakela collected lattice-vein fern in a hammock in Everglades National Park (26774, USF), presumably in the vicinity of Royal Palm Hammock, where George N. Avery reported that C. Eugene Delchamps and Roland Eves observed it in 1975 (Avery's Notes, 2 February 1975). In 1976, Avery observed plants nearby at Pine Island in a disturbed "*Schinus-Psidium* thicket" where he recorded that lattice-vein fern was fairly common (Avery's Notes, 3 February 1976). Mary Ann Bolla had shown him this site. The authors all observed lattice-vein fern in the same general vicinity on the eastern edge of the Hole-In-The-Donut in 2000. Avery and other members of the Native Plant Workshop discovered an additional station in the same general vicinity in a hammock on the old Aerojet property (Avery's Notes, 20 June 1971). This is considered part of the same occurrence as that in Everglades National Park. Six to eight plants were observed, only one sporulating. Avery and the Native Plant Workshop revisited this station in 1975, but only one plant was observed during this visit (Avery's Notes, 23 March 1975). John Popenoe vouchered this station in 1976 (649, FTG), and Donovan S. Correll, Popenoe, and W.T. Stern re-vouchered it in 1979 (50470, FTG). It appears that this hammock is located in what is now the Southern Glades. This is probably the same station that Hilsenbeck et al. (1979) and Dade County Department of Environmental Resources Management (1993a) are referring to as habitat for lattice-vein fern in the East Everglades and C-111 Basin. Bradley discovered an additional station in the same area in 2000 at Frog Pond/L-31 N Transition Lands, a conservation area just east of the entrance to Everglades National Park. This station was also in a disturbed wetland, and needs to be vouchered.

In 1975, Avery reported an additional station in southern Miami-Dade County, in a guava thicket in an old transverse glade off Quail Roost Drive and S.W. 154 Avenue (Avery's Notes, 3 April 1975). This is the same station where *T. serrata* had been previously collected by Frank C. Craighead and others (see *T. serrata* in part two of this chapter). Gann searched for this station in the late 1990s, but it had apparently been destroyed. Don Keller also reports a station in a guava grove on southwest 392 Street west of Tower Road that was destroyed in 1988 (personal communication, 8 February 2001).

Outside of Miami-Dade County, Avery and Craighead made the first collection after that made by J.L. Layne in 1903, in 1972 in a cypress swamp on Halfway Creek near Estero in Lee County (1733, FTG). Rob Irving of the Lee County Division of Planning reports that much of the Halfway Creek watershed is still undeveloped, and that lattice-vein fern could still be present there (personal communication, 22 January 2001). Additional surveys in that area should be conducted. Donald R. Richardson (1977) also reported lattice-vein fern for Estancia Hammock in the Boca Raton area. Daniel F. Austin reports that part of this station has been set aside as a mitigation site, and that lattice-vein fern still could be present (personal communication, 20 January 2001). However, Austin feels that the probability is high that this station has suffered from mismanagement and invasions of Brazilian-pepper (*Schinus terebinthifolius*).

In 1978, Clifton E. Nauman and Austin collected lattice-vein fern in Fakahatchee Strand Preserve State Park in Collier County (548, USF). This station was re-vouchered by Nauman and others in 1979 (798, FTG). In 1999, Bradley, Tony Pernas, and Amy Ferriter discovered an additional station of lattice-vein fern in Gator Hook Strand in Big Cypress National Preserve (2006, FTG). Fewer than 1,000 plants were observed.

In 1984, Ted Hendrickson and Ann Buckley made one collection along the nature trail at Markham Park, a recreational facility in Broward County (135, FTG, USF). One plant was observed. This station needs to be surveyed.

Major Threats: Exotic pest plant invasions; hydrological modifications; habitat destruction; poaching.

Preliminary recommendations:

- Voucher plants at Frog Pond//L-31 N Transition Lands.
- Survey Estancia Hammock, Halfway Creek, Markham Park, and the Fakahatchee Strand in Florida Panther National Wildlife Refuge.
- Map and monitor known stations on a regular basis.
- Review for listing by FNAI.

Thelypteris sclerophylla (Poepp. ex Spreng.) C.V. Morton
Stiff Star-hair Fern

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Fuchs Hammock Preserve; Harden Hammock).
Taxonomy: Pteridophyte; Thelypteridaceae.
Habit: Perennial lithophytic herb.
Distribution: Native to South Florida and the West Indies.
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: Chafin (2000) has illustrations and a color photo; Nelson (2000) has a color photo; the IRC Website has a color photo.
References: 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: None.

Historical Context in South Florida: J.B. McFarlin first collected stiff star-hair fern in 1940 in Fuchs Hammock (s.n., US), now a Miami-Dade County conservation area. It was collected there again by Fred Fuchs, Sr. in 1950 (s.n., US), by Leonard J. Brass in 1961 (32821, ARCH), by Frank C. Craighead in 1964 (s.n., FTG), and by Robert W. Long and others in 1966 (15927, NY, USF). Roger L. Hammer observed this station in 2000 (personal communication, 31 January 2001). Fewer than 10 plants were present.

In 1966, Olga Lakela made a collection on Paradise Key in Everglades National Park (29546, USF), but this specimen may have been made from plants introduced by Frank C. Craighead. Stiff star-hair fern has not been included on any recent plant list for Everglades National Park (e.g., Avery & Loope, 1980b; Reimus, 1996).

Alan Cressler, Don Keller, and Carol Lippincott discovered the only other known station at Harden Hammock, a Miami-Dade County conservation area, in 1989 (D. Keller, personal communication, 8 February 2001). At least 10 plants were observed. Roger L. Hammer surveyed this station in 2001 and found only a single plant (personal communication, 26 January 2001). This station needs to be vouchered.

Major Threats: Exotic pest plant invasions; hydrological modifications (lowering of the water table); poaching.

Preliminary recommendations:

- Voucher plants at Harden Hammock.
- Map and monitor known stations on a regular basis.
- Protect from poaching.
- Consider establishing an *ex situ* collection of germplasm.
- Consider augmenting known populations at Fuchs Hammock Preserve and Harden Hammock.
- Promote a higher regional water table on the Miami Rock Ridge.

Tillandsia pruinosa Sw.
Fuzzywuzzy Airplant

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Big Cypress National Preserve; Collier-Seminole State Park; Fakahatchee Strand Preserve State Park).
Taxonomy: Monocotyledon; Bromeliaceae.
Habit: Perennial terrestrial epiphyte.
Distribution: Native to South Florida, the West Indies, Central America, and South America.
South Florida Distribution: Collier County.
South Florida Habitats: Strand swamps and shell mound hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Bell & Taylor (1982) has a color photo; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Long & Lakela, 1976; Smith & Downs, 1977; Bell & Taylor, 1982; Wunderlin, 1998; Flora of North America Editorial

Committee, 2000; Chafin, 2000; Coile 2000; Liogier & Martorell, 2000.
Synonyms: None.

Historical Context in South Florida: Although Ward (1978) gives credit to Fred Fuchs Jr. for discovering this species in the Fakahatchee Strand in 1956, it was actually collected first by Roy O. Woodbury in 1948 (s.n., US). It has been collected there by a number of botanists since that time, and was observed in Fakahatchee Strand Preserve State Park in 2000 by Gann and Woodmansee on a field trip organized by Florida Park Service biologist Mike Owen.

In 1982, George N. Avery observed fuzzywuzzy airplant at Collier-Seminole State Park (Avery's Notes, 5 June 1982), followed by Florida Park Service biologist R. "Bobby" Hattaway in 1996 (personal communication, 12 January 2001), but this station needs to be vouchered. Fewer than 100 plants are thought to be present.

Fuzzywuzzy airplant has been reported for Big Cypress National Preserve (Black & Black, 1980; Gunderson & Loope, 1982a), where it is assumed to be present, but it needs to be vouchered. It has been reported for Corkscrew Swamp Sanctuary (Judd, 1994) and Rookery Bay National Estuarine Research Reserve (Burch, 1998), but these stations need to be verified.

Major Threats: Poaching; exotic pest plant invasions.

Preliminary recommendations:

- Voucher plants at Big Cypress National Preserve and Collier Seminole State Park.
- Continue ongoing surveys at Fakahatchee Strand Preserve State Park.
- Survey Corkscrew Swamp Sanctuary and Rookery Bay National Estuarine Research Reserve.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

Tolumnia bahamensis
(Nash ex Britton & Millsp.) Braem
Variegated Orchid

South Florida Status: Critically imperiled. Two occurrences in two conservation areas and one non-conservation area (Jonathan Dickinson State Park & Jupiter Cemetery; Jupiter Ridge Natural Area).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial terrestrial herb. Sometimes epiphytic on Florida rosemary (*Ceratiola ericoides*).
Distribution: Native to South Florida and the Bahamas.
South Florida Distribution: Palm Beach and Martin counties.
South Florida Habitats: Coastal scrub.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Luer (1972) has illustrations and color prints.
References: Small, 1933a; Correll, 1950; Luer, 1972; Long & Lakela, 1976; Correll & Correll, 1982; Sauleda, 1986; Folsom, 1998; Wunderlin, 1998; Coile, 2000.
Synonyms: *Oncidium bahamense* Nash ex Britton & Millsp.; *Oncidium variegatum* (Sw.) Sw., misapplied.

Historical Context in South Florida: Variegated orchid was discovered in Florida in West Palm Beach in 1904 by Frank Idner, who sent two specimens to Oakes Ames (Correll, 1950). It was not seen again until 1926 (Correll, 1950). In 1969, W.W.G. Moir made another collection west of West Palm Beach (6a, AMES). It was found again in northeastern Palm Beach County about a mile west of Lake Worth in 1958 by two teenage brothers, Purkey and Johnny Davis (Baxter, 1958). The boys collected about 30 plants. A subsequent search was conducted by J.F. Baxter, R.E. Pinnell, P.F. Rolph, and the Davis family, but no additional plants were found. Subsequently, the site was developed. It also has been reported for Jupiter Ridge Natural Area in northeastern Palm Beach County (Farnsworth, 1994b), and a single plant is known to remain there (F. Griffiths, personal communication, 27 August 2001).

A number of observations and one collection have been made in the vicinity of the Jupiter Cemetery, which is located near the Palm Beach-Martin County line. This station was seen as early as 1971 by C. Eugene Delchamps and others (Avery's Notes, 1 April 1971). Bruce F. Hansen and others vouchered this station in 1980 (7102, USF), where it was reported to be a common epiphyte. Stan Folsom and Paul Martin Brown observed this occurrence in 1998 (Folsom, 1998).

The Jupiter Cemetery is immediately adjacent to scrub habitat in Jonathan Dickinson State Park. According to Ruben Sauleda (1986), he introduced variegated orchid to Jonathan Dickinson State Park in 1966, but an additional large population was later discovered in a remote area of the park that apparently was not introduced. Chuck McCartney and Woodmansee observed two plants in the park in 2000. There were apparently more plants at that station before it was logged. At least one other station in the park may have been extirpated due to poaching (C. McCartney, personal communication, 12 February 2001).

Two collections also were made in the vicinity of Hobe Sound in Martin County in the mid-1960s (Lassiter 43, USF; Vagner s.n., USF). Chuck McCartney also vouchered this station in 1988 (20, SEL). It is unknown whether or not this station is extant.

Major Threats: Poaching; fire suppression; exotic pest plant invasions.

Comments: *Sauleda & Adams (1989) argued that this species was introduced to Florida by Bahamian settlers in the vicinity of the Jupiter Cemetery, but the broad range of the species in Palm Beach and Martin counties*, *as well as the number of different stations collected*, *make this argument untenable. Craighead (1963) reported variegated orchid for Broward County, presumably in error.*

Preliminary recommendations:

- Take photographic voucher of plant at Jupiter Ridge Natural Area.
- Map and monitor known stations on a regular basis.
- Protect from poaching.

- Consider reintroducing variegated orchid to other sites within its historical range.

Trichomanes krausii Hook. & Grev.
Kraus' Bristle Fern

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (Castellow Hammock Park; Fuchs Hammock Preserve & Meissner Hammock Preserve).
Taxonomy: Pteridophyte; Hymenophyllaceae.
Habit: Perennial epiphytic herb.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Miami-Dade County.
South Florida Habitats: Rockland hammocks; epiphytic on roots and trunks of strangler fig (*Ficus aurea*), wild mastic (*Sideroxylon foetidissimum*), and other hardwood trees.
Protection Status: Listed as endangered by FDACS and as imperiled to critically imperiled by FNAI.
Identification: Chafin (2000) has illustrations and a color photo; Nelson (2000) has a color photo; Wunderlin & Hansen (2000) has illustrations; the IRC Website has a color photo.
References: Small, 1931b; Small, 1938; Wessels Boer, 1962; Lakela & Long, 1976; Long & Lakela, 1976; Nauman, 1986b; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: None.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter (1381, NY), and Alvah A. Eaton (s.n., US) made collections of Kraus' bristle fern in 1903. Eaton's collection was from a hammock 25 miles south of Cutler, probably in the vicinity of Camp Longview, which was located some three to four miles west of present-day Florida City. Small and Carter's collection only gave the locality as between Cutler and Camp Longview. In 1904, Small made an additional collection in Miami-Dade County without precise locality data (s.n., USF).

In 1906, Small made the first collection with precise locality data from "Caldwells Hammock near Silver Palm School" (2378, NY).

This hammock is present-day Silver Palm Hammock, a Miami-Dade County conservation area. No modern records of Kraus' bristle fern could be found for this hammock. Small and others vouchered several additional hammocks in 1915, including Goodburn Hammock (s.n., NY), Hattie Bauer Hammock (s.n., NY), Nixon-Lewis Hammock (5882, NY), Shields Hammock (s.n., NY), and Timms Hammock (s.n., NY). Small independently collected specimens at Timms Hammock in 1915 (5948, NY), and Nixon-Lewis Hammock in 1915 (s.n., NY) and 1916 (7411, NY, USF). Of these sites, Goodburn Hammock and Shields Hammock have been destroyed. Nixon-Lewis Hammock has been fragmented by road building and agriculture, and doubtfully contains any Kraus' bristle fern. Hattie Bauer Hammock is a Miami-Dade County conservation area, and Timms Hammock is contained within the Miami-Dade County park, Camp Owaissa Bauer. No modern observations of Kraus' bristle fern have been made at Hattie Bauer Hammock, and it appears to be extirpated there. Several observations were made in Timms Hammock. Fran C. Young, one of the early leaders of the Dade County Native Plant Workshop, showed George N. Avery several plants in Timms Hammock in 1966 (Avery's Notes, 4 August 1966). Avery and Young observed additional plants in Timms Hammock in 1968 (Avery's Notes, 24 September 1968). This station needs to be surveyed.

In 1916, Small made a collection at Fuchs Hammock (7418, NY), now a Miami-Dade County park. Other collections were made at Fuchs Hammock by Donovan S. Correll in 1936 (6093, NY), Frank C. Craighead and Monroe R. Birdsey in 1959 (s.n., FTG), P.B. Tomlinson in 1963 (29563, FTG), Robert W. Long in 1966 (1926, USF), David and Sally Black in 1976 (3, FTG), Alan Herndon in 1987 (1731, FTG), and Bradley in 1997 (859, FTG). In 1997, Bradley also vouchered plants at Meissner Hammock, which is located adjacent to Fuchs Hammock (937, FTG). The Meissner Hammock station is considered to be part of the same occurrence as the one at Fuchs Hammock.

In 1976, Avery (1283, FTG) and Sally and David Black (1, FTG) collected Kraus' bristle fern in Castellow Hammock at Castellow Hammock Park. Avery, the Blacks, and Daniel F. Austin also observed plants in Ross Hammock within Castellow Hammock Park in 1976 (Avery's Notes, 16 December 1976). Gann and

Bradley observed plants within Castellow Hammock Park in the late 1990s, and Roger L. Hammer observed plants there in 2001 (personal communication, 10 August 2001).

Plants also have been reported for Long Pine Key in Everglades National Park. Frank C. Craighead made a collection there in 1962 (s.n., 1962) and Olmsted et al. (1983) also reported plants there. However, according to Craighead's botanical notes, he was attempting to introduce bristle ferns into Everglades National Park, and Kraus' bristle fern does not appear to be native there. Craighead's collection appears to have been from a translocated plant.

Major Threats: Exotic pest plant invasions; long-term drainage on the Miami Rock Ridge.

Comments: *Kraus' bristle fern, as with other species* of Trichomanes*,* Tectaria *and other ferns have undoubtedly been negatively affected by widespread drainage on the Miami Rock Ridge. These species will have a precarious foothold in our area until the underlying aquifer can be recharged.*

Preliminary recommendations:

- Survey Timms Hammock in Camp Owaissa Bauer.
- Map and monitor known stations on a regular basis.
- Consider reintroducing Kraus' bristle fern to other sites within its historical range, including Hattie Bauer Hammock.
- Promote a higher regional water table on the Miami Rock Ridge.

Trichomanes punctatum Poir. subsp. ***floridanum*** Wess. Boer. **Florida Bristle Fern**

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (Castellow Hammock Park; Fuchs Hammock Preserve & Meissner Hammock).
Taxonomy: Pteridophyte; Hymenophyllaceae.
Habit: Perennial lithophytic herb.
Distribution: Endemic to Florida in Miami-Dade and Sumter counties.
South Florida Distribution: Miami-Dade County.

South Florida Habitats: Limestone sinkholes in rockland hammocks; lithophytic or epiphytic on moist limestone walls of sinkholes and on the bases of tree trunks.
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: Small, 1931b; Small, 1938; Lakela & Long, 1976; Long & Lakela, 1976; Nauman, 1986b; Flora of North America Editorial Committee, 1993; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *T. sphenoides* Kunze, misapplied.

Historical Context in South Florida: John Kunkel Small and George V. Nash first collected Florida bristle fern in 1901 at Snapper Creek Hammock (s.n., NY), in what may have been R. Hardy Matheson Preserve, Matheson Hammock Park, or a nearby private property. In 1915, Small collected it again in the same area with Charles A. Mosier (s.n., NY).

In 1903, Small made a collection without definite locality between Cutler and Camp Longview (1478, NY), which was located to the west of present-day Florida City. Also in 1903, Alvah A. Eaton made a collection from Castellow Hammock (263, GH), in what is now Castellow Hammock Park. In 1906, Small and Joel J. Carter made a collection at Ross Hammock (2379a, NY), a portion of which is located within Castellow Hammock Park. George N. Avery observed plants in Castellow Hammock in 1975 with C. Eugene Delchamps, and again in 1976 with Mary Ann Bolla (Avery's Notes, 13 July 1975, 24 September 1976). Gann and Bradley observed plants there in the late 1990s. Eaton collected Florida bristle fern in Silver Palm Hammock (s.n., GH), which is located about a mile east of Castellow Hammock. Don Keller reports seeing it there around 1980 (personal communication, 8 February 2001). Surveys by Gann and others have failed to locate any plants.

In 1909, Small and Carter made a single collection from Royal Palm Hammock in Everglades National Park (s.n., NY; s.n., US).

It was reported by Safford (1917), but no recent observations are known.

Small and others made collections from several additional hammocks in 1915: Hattie Bauer Hammock (s.n., FSU, NY), Nixon-Lewis Hammock (5882, US), Shields Hammock (s.n., NY), and Fuchs Hammock (5204, NY). Shields Hammock later was destroyed, and Nixon-Lewis Hammock has been mostly destroyed. Hattie Bauer Hammock is now a Miami-Dade County conservation area, while Fuchs Hammock is part of the Fuchs Hammock Preserve. Numerous collections have been made at Hattie Bauer Hammock (e.g. Small 7422, NY; D.S. Correll 6025, NY; and McFarlin s.n., FSU). Thomas Darling, Jr. made the last known collection there in 1960 (s.n., US). The Fuchs Hammock plants were vouchered again in 1954 by Leonard J. Brass (25192, ARCH), and observed by George N. Avery in 1971 and 1976 (Avery's Notes, 24 October 1971, 5 February 1976). Alan Cressler observed plants there in 1993, following Hurricane Andrew in 1992 (Cressler, 1993). In 1983, Avery observed plants at Meissner Hammock immediately adjacent to Fuchs Hammock (Avery's Notes, 28 January 1983). Bradley vouchered this population in 1997 (938, FTG). Small (1916) reported Florida bristle fern for Addison Hammock, now located within Deering Estate at Cutler, but it never was vouchered for the site, nor has it recently been observed.

Major Threats: Exotic pest plant invasions; lowering of the water table on the Miami Rock Ridge.

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Consider reintroducing Florida bristle fern to other sites within its historical range, including Everglades National Park.
- Promote a higher regional water table on the Miami Rock Ridge.
- Review for listing by USFWS.

Tridens flavus (L.) Hitchc. var. *flavus*
Tall Redtop

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (Deering Estate at Cutler; Jonathan Dickinson State Park & Riverbend Park).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the United States. Wunderlin (1998) reports it as common nearly throughout Florida.
South Florida Distribution: Broward, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Mesic and rockland hammocks, particularly on edges and in canopy gaps.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Small, 1933a; Hitchcock & Chase, 1950; Long & Lakela, 1976; Hall, 1978; Wunderlin, 1998.
Synonyms: *Triodia flava* (L.) Hitchc.

Historical Context in South Florida: Alvah A. Eaton first collected tall redtop in 1903 along the Little River in northern Miami-Dade County (482, US). In 1906, Albert S. Hitchcock made a collection in Miami (671, US), presumably from Brickell Hammock, followed by Agnes Chase in 1907 (3906, US). John Kunkel Small and George K. Small made the last collection from the Brickell area in 1913 (4731, NY). Small collected tall redtop at what is now Deering Estate at Cutler in 1916 (7983, US). It also was collected there by Anne F. Bellenger in 1967 (673, USF), George N. Avery in 1968 (491, USF), and Bradley in 1995 (61, FTG). Fewer than 100 plants exist along the edge of a rockland hammock. It also was reported for the USDA Subtropical Horticulture Research Station, north of the Deering Estate (Avery's Notes, 30 September 1975), but this population was probably introduced. A small stand was seen growing under a cultivated tree.

In 1930, Harold N. Moldenke made a collection in the Hollywood area of Broward County (798, NY). In 1997, Bradley and Woodmansee discovered tall redtop along the Loxahatchee River

in Palm Beach County. Plants were found both at Riverbend Park (141, FTG; 539, FTG), a conservation area managed by Palm Beach County, and in Jonathan Dickinson State Park. The Jonathan Dickinson State Park station needs to be vouchered. Plants were observed in hammocks and in disturbed areas on the edges of hammocks.

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

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

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Consider introducing tall redtop to other sites within its historical range, including Alice Wainwright Park, Simpson Park, and Vizcaya Museum and Gardens.

Triplasis americana P. Beauv.
Perennial Sandgrass

South Florida Status: Two occurrences in two conservation areas (County Line Scrub; Seabranch Preserve State Park).
Taxonomy: Monocotyledon; Poaceae.
Habit: Perennial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) records it as occasional in Florida from the northern counties south to the central peninsula and Broward County.
South Florida Distribution: Broward, Martin, and Miami-Dade counties.
South Florida Habitats: Scrub and scrubby flatwoods.
Protection Status: Not listed by any agency.
Identification: Hitchcock & Chase (1950) has an illustration.
References: Small, 1933a; Hitchcock & Chase, 1950; Hall, 1978; Wunderlin, 1998.
Synonyms: None.

Historical Context in South Florida: Ted Hendrickson first collected perennial sandgrass in 1989 in the Miramar area of Broward County (s.n., FTG). It has been reported for the same

area at Snake Creek/Miramar Pineland Natural Area (anonymous, 1995c), but this report should be verified. In 1996, Gann and Bradley collected a specimen near the Broward County line in Miami-Dade County at County Line Scrub, a Miami-Dade County Preserve (811, FTG). In 1998, Bradley and Woodmansee collected a specimen at Seabranch Preserve State Park in Martin County (1212, FTG).

Major Threats: Exotic pest plant invasions.

Comments: *This is an inconspicuous grass that may be overlooked. It may be more common than reported here.*

Preliminary recommendations:

- Map and monitor known stations on a regular basis.
- Survey Snake Creek/Miramar Pineland Natural Area.

Ulmus americana L.
American Elm

South Florida Status: Critically imperiled. Three occurrences in four conservation areas (Caloosahatchee Regional Park; Corkscrew Regional Ecosystem Watershed & Corkscrew Swamp Sanctuary; Six Mile Cypress Slough Preserve).
Taxonomy: Dicotyledon; Ulmaceae.
Habit: Tree.
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: Collier, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Strand swamps and mesic hammocks.
Protection Status: Not listed by any agency.
Identification: Nelson (1994) has an illustration; Tobe et al. (1998) has an illustration and color photos.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Godfrey, 1988; Nelson, 1994; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *U. americana* var. *floridana* (Chapm.) Little; *U. floridana* Chapm.

Historical Context in South Florida: Paul C. Standley first collected American elm in 1916 in the vicinity of Fort Myers (12989, US). In 1997, Bradley and Woodmansee collected this species at the Six Mile Cypress Slough Preserve just southeast of Fort Myers (182, FTG, USF). American elm was reported to occur at Caloosahatchee Regional Park (anonymous, no date.l), where it was observed in 2001 by Gann and Lee County biologists Roger Clark and Rob Irving. Several hundred plants are present there, but this station needs to be vouchered. It also is present at the Corkscrew Regional Ecosystem Watershed, which is located in both Lee and Collier counties. It was reported there by Hilsenbeck (1997) and observed there by Woodmansee in 2000, but this station needs to be vouchered. Dick Workman also collected it at the adjacent Corkscrew Swamp Sanctuary in Collier County in 1997 (s.n., USF).

In 1924, John Kunkel Small and others collected American elm in Palm Beach County along the eastern shore of Lake Okeechobee (11159, NY). This species was probably extirpated there by the almost complete destruction of hammocks along the eastern edge of the lake. Roy O. Woodbury collected American elm in 1988 in Martin County at Jonathan Dickinson State Park (s.n., FTG), but it has not been observed there in many years. Woodbury also made a collection in 1989 in "wet woods" five miles north of Indiantown (s.n., FTG). It is unknown whether or not this station, which is in the vicinity of the Barley Barber Swamp Sanctuary, is extant.

Major Threats: 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 at Caloosahatchee Regional Park and Corkscrew Regional Ecosystem Watershed.
- Survey Jonathan Dickinson State Park.
- Map and monitor known stations on a regular basis.

Utricularia juncea Vahl
Southern Bladderwort

South Florida Status: Critically imperiled. Three occurrences in three conservation areas and one non-conservation area (Loxahatchee Slough Natural Area & Pal-Mar CARL Site; Jonathan Dickinson State Park; Royal Palm Beach Pines Natural Area).
Taxonomy: Dicotyledon; Lentibulariaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern and central United States, the West Indies, Central America, and South America. Wunderlin (1998) reports it as occasional nearly throughout Florida.
South Florida Distribution: Martin, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1981) has an illustration.
References: Small, 1933a; Godfrey & Wooten, 1981; Wunderlin, 1998; Liogier & Martorell, 2000.
Synonyms: *Stomoisia juncea* (Vahl) Barnhart; *Stomoisia virgatula* Barnhart.

Historical Context in South Florida: John Kunkel Small and Joel J. Carter first collected southern bladderwort in 1906 at Long Prairie in Miami-Dade County (2703, NY). Long Prairie was historically located within present-day Homestead and Florida City, but it has been destroyed. Southern bladderwort also was collected in Miami-Dade County by John H. Davis Jr. along the Tamiami Trail near "Y road" in an area of scrub cypress (s.n., FLAS), presumably in the Pinecrest area of what is now Big Cypress National Preserve.

John Popenoe made the first collection in Martin County in 1976 at Jonathan Dickinson State Park (769, FTG), where it is presumably extant. In 1991, Steven L. Orzell and Edwin L. Bridges collected southern bladderwort at the Pal-Mar CARL Site in Martin County (18257, FTG, USF). Southern bladderwort also has been reported for Dupuis Reserve (Woodbury, no date), which is located in both Martin and Palm Beach counties in the vicinity of the Pal-Mar

CARL Site, and for Loxahatchee Slough Natural Area in Palm Beach County (Farnsworth, 1994c). The Loxahatchee Slough Natural Area station needs to be vouchered, while the Dupuis Reserve station needs to be verified. All three stations are considered to be the same occurrence. It also has been reported for Royal Palm Beach Pines Natural Area in Palm Beach County (Farnsworth, 1995c; Black, 1996), which is located to the south of the Loxahatchee Slough Natural Area. This station also needs to be vouchered.

Southern bladderwort also has been reported for Corkscrew Swamp Sanctuary (Avery's Notes, 27 October 1982; Judd, 1994), which is located in both Collier and Lee counties, but this report needs to be verified.

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

Comments: *Additional surveys may indicate that this species is more common than indicated here, and it may be down-ranked to imperiled in South Florida in the future.*

Preliminary recommendations:

- Voucher plants at Loxahatchee Slough Natural Area and Royal Palm Beach Pines Natural Area.
- Survey Corkscrew Swamp Sanctuary, Dupuis Reserve, Pal-Mar, and Pal-Mar Natural Area.
- Map and monitor known stations on a regular basis.

Vaccinium corymbosum L.
Highbush Blueberry

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Fakahatchee Strand Preserve State Park; Fisheating Creek Wildlife Management Area).
Taxonomy: Dicotyledon; Ericaceae.
Habit: Shrub.
Distribution: Native to eastern North America. Wunderlin (1998) reports it as frequent nearly throughout Florida.
South Florida Distribution: Collier and Glades counties.
South Florida Habitats: Hydric hammocks and floodplain forests.

Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Nelson (1994) has an illustration and a color photo; Nelson (1996) has a color photo; Tobe et al. (1998) has an illustration and color photos.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Godfrey, 1988; Taylor, 1992; Nelson, 1994; Nelson, 1996; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *V. amoeneum* Aiton; *V. arkansanum* Ashe; *V. ashei* Reade; *V. australe* Small; *V. elliottii* Chapm.; *V. fuscatum* Aiton; *V. virgatum* Aiton; *Cyanococcus amoenus* (Aiton) Small; *Cyanococcus elliottii* (Chapm.) Small; *Cyanococcus fuscatus* (Aiton) Small; *Cyanococcus holophyllus* Small; *Cyanococcus virgatus* (Aiton) Small.

Historical Context in South Florida: Frank C. Craighead first collected highbush blueberry in 1962 in the Fakahatchee Strand (s.n., FTG), within what is now Fakahatchee Strand Preserve State Park. It was found later there by Julie Jones in 1979 (Avery's Notes, 22 August 1979).

In 1979, John Popenoe made a collection near Palmdale in the vicinity of the Fisheating Creek Campground (1604, FTG, USF), which is now part of the Fisheating Creek Wildlife Management Area. Highbush blueberry is assumed to be extant there.

Major Threats: Exotic pest plants.

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:
- Map and monitor known stations on a regular basis.

Vallesia antillana Woodson
Pearlberry

South Florida Status: Critically imperiled. Five occurrences in four conservation areas (Biscayne National Park; National Key Deer Refuge on Big Pine Key; National Key Deer Refuge on Cudjoe Key; Dove Creek Hammocks & John Pennekamp Coral Reef State Park) and one non-conservation area (Boot Key).

Taxonomy: Dicotyledon; Apocynaceae.
Habit: Shrub or small tree.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Monroe County.
South Florida Habitats: Rockland hammocks and coastal berms.
Protection Status: Pearlberry is listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has a color photo; Nelson (1994) has a color photo; Nelson (1996) has a color photo; Chafin (2000) has illustrations and a color photo.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Tomlinson, 1980; Correll & Correll, 1982; Scurlock, 1987; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: *V. glabra* (Cav.) Link, misapplied; *V. chiococcoides* Kunth, misapplied**.**

Historical Context in South Florida: Allan H. Curtiss first collected pearlberry in 1896 on the island of Key West (5620, NY). Curtiss' collection is the only one known for Key West.

Pearlberry has been found on three islands in the lower Florida Keys. It was collected on Big Pine Key in Cactus Hammock, now part of the National Key Deer Refuge, in 1954 by George R. Cooley (6225, USF). A number of other botanists have made collections and observations in and around this hammock, where the species still occurs. The authors have observed plants at this station as recently as 2001. Hundreds of plants occur there, making this the largest known population of pearlberry in South Florida. In 1964, Frank C. Craighead and others made a collection nearby on Cudjoe Key (s.n., USF). Weiner (1980) also reported it for this island in a privately owned hammock (hammock L9/38b), now part of the National Key Deer Refuge. This station is assumed to be extant, and to be part of the same occurrence as that on Big Pine Key.

In 1965, George N. Avery observed several plants on a beach ridge on Sugarloaf Key (Avery's Notes, 1 July 1965). No other reports are known from Sugarloaf key.

One station was discovered in the middle Keys by Avery in 1962 on Boot Key (Avery's Notes, 17 February 1962). This station was observed in 1998 by Bradley, where it was a relatively common shrub in the understory on a coastal berm.

John Kunkel Small vouchered the first plant discovered in the upper Florida Keys in 1916 on Angelfish Key off of the northern tip of Key Largo (7305, US). This island is now part of the Ocean Reef Club and most of the hammock there has been destroyed. It is unlikely that this species persists in that location. Pearlberry also was reported just to the north of Angelfish Key on Palo Alto Key, now part of John Pennekamp Coral Reef State Park (Weiner, 1980), but this station needs to be surveyed. Pearlberry was reported by Carter et al. (1976) for Biscayne National Park, and reported again by Avery (1978c) and Hammer & Bradley (1998). In 2001, Gann and Bradley discovered pearlberry at Adams Key in Biscayne National Park. Only one plant was noted. Later in 2001, Gann and Bradley found two plants on Old Rhodes Key, also in Biscayne National Park. Geographic coordinates were recorded for both stations, but they need to be vouchered.

Frank C. Craighead collected pearlberry on Key Largo in 1956 (s.n., Everglades National Park herbarium) and in 1963 (s.n., FTG). Karen Achor found pearlberry on Key Largo in 1977 at a site that became "The Fishing Club" (Avery's Notes, 26 May 1977). Gann and Florida Park Service biologist Janice A. Duquesnel found one plant in John Pennekamp Coral Reef State Park on Key Largo in 1998. Geographical coordinates were recorded. Woodmansee found two plants in 2000 on Key Largo at Dove Creek Hammocks (510, FTG), in the Florida Keys Wildlife and Environmental Area. It was found on the nearby El Radabob Key in 1971 when George N. Avery observed it there (Avery's Notes, 10 June 1971). This site is now part of John Pennekamp Coral Reef State Park. Pearlberry is still present there, and was observed in 2000 by the authors and Florida Park Service biologists J.A. Duquesnel and James G. Duquesnel. Several dozen plants are thought to occur.

Pearlberry was collected on the mainland on three occasions by Craighead in Everglades National Park. He made one collection on "Cape Sable" in 1959 (s.n., Everglades National Park herbarium), and on East Cape Sable, probably the same station,

in 1961 (s.n., FTG). In 1955, he made a single collection on Monroe Lake Mound (s.n., Everglades National Park Herbarium). This location is presumably in the vicinity of Monroe Lake about 12 miles east of Flamingo in Miami-Dade County. Despite quite a bit of botanical activity in the area, no additional plants have been found. It is possible that this population was destroyed by Hurricane Donna in 1960.

Major Threats: Exotic pest plant invasions.

Preliminary recommendations:

- Voucher plants at Adams Key and Old Rhodes Key in Biscayne National Park.
- Survey Palo Alto Key in John Pennekamp Coral Reef State Park, and Elliott Key, Old Rhodes Key, Sands Key, and Totten Key in Biscayne National Park.
- Map and monitor known stations on a regular basis.
- Acquire Boot Key.

Vanilla inodora Schiede
Fuchs' Vanilla

South Florida Status: Critically imperiled. One occurrence in three conservation areas (Jimmy Graham Boat Ramp, Peck Lake Park, & Seabranch Preserve State Park).
Taxonomy: Monocotyledon; Orchidaceae.
Habit: Perennial vine.
Distribution: Native to South Florida, the West Indies, Mexico, Central America, and South America.
South Florida Distribution: Martin and Miami-Dade counties.
South Florida Habitats: Bayheads and baygalls.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: This is one of three leafy vanilla orchids in South Florida. Besides *V. inodora*, *V. phaeantha* Rchb. f. is native (see below), and *V. mexicana* Mill., the commercial vanilla, is exotic. Luer (1972) has illustrations and color photos of all three species; Chafin (2000) has an illustration of *V. inodora.*
References: Luer, 1972; Long & Lakela, 1976; Wunderlin, 1998; Chafin, 2000; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *V. mexicana* Mill., misapplied.

Historical Context in South Florida: Fred Fuchs, Sr. and Fred Fuchs, Jr. discovered Fuchs' vanilla in 1953 in a bayhead south of Homestead (Luer, 1972), apparently in what is now the Southern Glades. Plants were found in several hammocks within a radius of several miles, but orchid collectors eventually extirpated these plants. Frank C. Craighead vouchered this population in 1960 (s.n., FTG). Unfortunately, attempts to translocate this species met with failure, and all of the plants that were removed from the wild eventually died.

Donald R. Richardson, Ruben P. Sauleda, and Bruce F. Hansen rediscovered Fuchs' vanilla in 1980 in Martin County in a baygall south of Stuart (830, FTG; Hansen & Sauleda, 1985). This population is located within three conservation areas including Peck Lake Park, which is managed by Martin County, and Seabranch Preserve State Park, which is managed by the Florida Park Service. The authors have observed both stations. Woodmansee observed one plant at Peck Lake Park in 2000; this population appears to be suffering from poaching. Both stations need to be monitored as soon as possible. Fuchs' vanilla also has been reported in the same area at Jimmy Graham Boat Ramp, a park owned by Martin County (S. Vardaman, personal communication, 16 October 2000), where it is assumed to be extant.

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

Comments: *This species will almost certainly be extirpated in South Florida and the continental United States if something is not done immediately to stop poaching and reintroduce a more secure population in the southern Everglades.*

Preliminary recommendations:

- Take photographic voucher of plants at Jimmy Graham Boat Ramp.
- Map plants every year.
- Tag all individual plants. Monitor plants on a monthly basis.
- Protect from poaching.
- Establish an *ex situ* collection of germplasm.
- Consider augmenting population in Martin County.

- Consider reintroducing Fuchs' vanilla to Southern Glades.

Vernonia gigantea (Walter) Trel.
Giant Ironweed

South Florida Status: Critically imperiled. Four occurrences in four conservation areas (Cayo Costa State Park; Halpatiokee Regional Park; Jonathan Dickinson State Park; Twin Rivers).
Taxonomy: Dicotyledon; Asteraceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the eastern and central United States. Wunderlin (1998) reports it as common in Florida from the northern counties to the central peninsula.
South Florida Distribution: Lee and Martin counties.
South Florida Habitats: Hammocks and floodplain forests.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Tobe et al. (1998) has an illustration and color photos.
References: Chapman, 1883; Small, 1933a; Long & Lakela, 1976; Cronquist, 1980; Godfrey & Wooten, 1981; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *V. altissima* Nutt.; *V. gigantea* subsp. *ovalifolia* (Torr. & A. Gray) Urbatsch; *V. ovalifolia* Torr. & A. Gray.

Historical Context in South Florida: R. Bruce Ledin first collected giant ironweed in 1947 in a hammock in Martin County (s.n., FLAS), unfortunately without any additional locality data. The next collection was not made until 1999 when Woodmansee collected it at Twin Rivers, a Martin County conservation area (422, FTG). Woodmansee collected it at an additional station in 2000 at Halpatiokee Regional Park (555, FTG). 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 extant there, but this station needs to be vouchered. Giant ironweed was reported for Cayo Costa State Park in Lee County (Florida Park Service District 4, 1994a), and was observed there on Cayo Costa in 2001 by Gann and Florida Park Service biologist R. "Bobby" Hattaway. This station needs to be vouchered.

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. Small (1913) reported this species for Key West, Monroe County. This was an unusual report that was apparently made without any supporting voucher specimens. It is treated here as a false report.*

Preliminary recommendations:

- Voucher plants at Cayo Costa in Cayo Costa State Park.
- Map and monitor known stations on a regular basis.

Viola palmata L.
Early Blue Violet

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (Corkscrew Regional Ecosystem Watershed & Corkscrew Swamp Sanctuary; Royal Palm Beach Pines Natural Area.
Taxonomy: Dicotyledon; Violaceae.
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, Lee, and Palm Beach counties.
South Florida Habitats: Flatwoods.
Protection Status: Not listed by any agency.
Identification: Godfrey & Wooten (1981) has two illustrations of this species, as *V. esculenta* and *V. septemloba.*
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Wunderlin, 1998.
Synonyms: *V. chalcosperma* Brainerd; *V. esculenta* Elliott ex Greene; *V. palmata* var. *triloba* (Schwein.) Ging. ex DC.; *V. pedatifida* G. Don, misapplied; *V. sagittata* Aiton, misapplied; *V. septemloba* Leconte*; V. triloba* Schwein.; *V. triloba* var. *dilatata* (Elliott) Brainerd.

Historical Context in South Florida: William Kellogg first collected early blue violet in 1907 in Owanita in Lee County (s.n., GH), a station near what is now Hickey Creek Mitigation Park Wildlife and Environmental Area. It has been reported for

Corkscrew Swamp Sanctuary (Judd, 1994) and at Corkscrew Regional Ecosystem Watershed (Hilsenbeck, 1997), each of which is located in Lee and Collier counties. Early blue violet is assumed to be present at the latter two sites, but both need to be vouchered.

In 1924, Roland M. Harper collected early blue violet 15 miles west of Jupiter in Palm Beach County (s.n., GH), in the vicinity of what is now Pal-Mar and Pal-Mar Natural Area. Unfortunately, it has not been observed at either site. Early blue violet has been reported to occur at the Royal Palm Beach Pines Natural Area (Farnsworth, 1995c; Black, 1996), and it is assumed to be present there. This station needs to be vouchered.

Two historical collections are known from Charlotte County. O.E. Frye made a collection "In palmetto clumps" at an unspecified locality in 1946 (s.n., FLAS), and R.R. Smith and T. Myint made a collection just south of Bermont in 1961 (27, FLAS), in the vicinity of the Fred C. Babcock-Cecil M. Webb Wildlife Management Area.

Major Threats: Fire suppression; 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.*

Preliminary recommendations:

- Voucher plants at Corkscrew Regional Ecosystem Watershed, Corkscrew Swamp Sanctuary, and Royal Palm Beach Pines Natural Area.
- Survey Fred C. Babcock-Cecil M. Webb Wildlife Management Area, Hickey Creek Mitigation Park Wildlife and Environmental Area, Pal-Mar, and Pal-Mar.
- Map and monitor known stations on a regular basis.

Viola primulifolia L.
Primroseleaf Violet

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Bessemer; Danforth; Jonathan Dickinson State Park).
Taxonomy: Dicotyledon; Violaceae.
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: Flatwoods and wet hammocks.
Protection Status: Not listed by any agency.
Identification: Taylor (1992) has a color photo; Tobe et al. (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Godfrey & Wooten, 1981; Taylor, 1992; Tobe et al., 1998; Wunderlin, 1998.
Synonyms: *V. rugosa* Small.

Historical Context in South Florida: Paul C. Standley first collected primroseleaf violet in 1916 near Marco Island in Collier County (12755, US). In 1966, Olga Lakela made another collection on Marco Island (29526, USF). It was reported for Corkscrew Swamp Sanctuary (Judd, 1994), which is located in both Lee and Collier counties, but this report needs to be verified. In 1941, W.A. Murrill collected primroseleaf violet two miles southeast of Punta Gorda in Charlotte County (s.n., FLAS). In 1963, R.R. Smith and T. Myint made a collection north of Palm Beach Gardens in Palm Beach County (908, FLAS).

In 1999, Woodmansee collected primroseleaf violet at Bessemer (440, FTG), a conservation area in Martin County. In 2000, he also recorded it for Danforth, also a conservation area in Martin County, but this station needs to be vouchered. It also has been reported at Jonathan Dickinson State Park in Martin County (Florida Park Service District 5, no date). Woodmansee and Chuck McCartney observed primroseleaf violet along the Kitching Creek trail at Jonathan Dickinson State Park in 2000, but this station needs to be vouchered.

Major Threats: Hydrological modifications; 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 Danforth and Jonathan Dickinson State Park.
- Survey Corkscrew Swamp Sanctuary.
- Map and monitor known stations on a regular basis.

Wolffiella gladiata (Hegelm.) Hegelm.
Florida Mudmidget

South Florida Status: Critically imperiled. Five occurrences in five conservation areas (Arthur R. Marshall Loxahatchee National Wildlife Refuge; Bessemer; Corkscrew Swamp Sanctuary; Fakahatchee Strand Preserve State Park; Six Mile Cypress Slough Preserve).
Taxonomy: Monocotyledon; Lemnaceae.
Habit: Short-lived aquatic herb.
Distribution: Native to the United States and Mexico. Wunderlin (1998) reports it as frequent in Florida from the western panhandle to the peninsula.
South Florida Distribution: Collier, Lee, Martin, and Palm Beach counties.
South Florida Habitats: Cypress swamps and ditches.
Protection Status: Not listed by any agency.
Identification: There is an illustration in Godfrey & Wooten (1979).
References: Thompson, 1897; Small, 1933a; Long & Lakela, 1976; Godfrey & Wooten, 1979; Flora of North America Editorial Committee, 2000.
Synonyms: *W. floridana* (Donn. Sm.) C.H. Thompson; *Wolffia gladiata* Hegelm. var*. floridana* Donn. Sm.

Historical Context in South Florida: South Florida populations of Florida mudmidget are poorly represented in herbaria. We have seen a single collection made by P. Genell and G. Flemming in

1971 at Corkscrew Swamp Sanctuary in Collier County (581, USF). It was not recorded for this station by Judd (1994), although it was probably overlooked there.

It has been reported for the Fakahatchee Strand Preserve State Park (Austin et al., 1990), where it is assumed to be extant. Florida mudmidget was reported in 1974 for Palm Beach County at the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Austin, 1974). Bradley and Woodmansee observed this occurrence in 2000 in cypress swamps along the eastern edge of the refuge. In 1997, Bradley and Woodmansee observed it at the Six Mile Cypress Slough Preserve in Lee County. Woodmansee also observed it in 1999 at Bessemer, a conservation area in Martin County. All four of occurrences need to be vouchered.

Major Threats: Hydrological modifications; exotic pest plant invasions.

Comments: *This species is probably often overlooked because of its diminutive stature. It may be more common than is indicated, and could be down ranked to imperiled or rare in the future.*

Preliminary recommendations:

- Voucher plants at Arthur R. Marshall Loxahatchee National Wildlife Refuge, Bessemer, Fakahatchee Strand Preserve State Park, and Six Mile Cypress Slough Preserve.
- Map and monitor known stations on a regular basis.

Woodwardia areolata (L.) T. Moore
Netted Chain Fern

South Florida Status: Critically imperiled. Two occurrences in two conservation areas (Big Cypress National Preserve; Halpatiokee Regional Park).
Taxonomy: Pteridophyte; Blechnaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to eastern and central North America. Wunderlin (1998) reports it as common in Florida from the northern counties to the central peninsula.
South Florida Distribution: Glades, Lee, and Martin counties, and the Monroe County mainland.

South Florida Habitats: Freshwater swamps.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Tobe et al. (1998) has color photos and an illustration; Nelson (2000) has a color photo; the IRC Website has a color photo.
References: Chapman, 1883; Small, 1931b; Small, 1938; Lakela & Long, 1976; Bell & Taylor, 1982; Flora of North America Editorial Committee, 1993; Tobe et al., 1998; Wunderlin, 1998; Nelson, 2000; Wunderlin & Hansen, 2000.
Synonyms: *W. angustifolia* Sm.; *Lorinseria areolata* (L.) C. Presl.

Historical Context in South Florida: Alvah A. Eaton first collected netted chain fern in 1904 in a ditch in Fort Myers (1165, GH). He also reported it from along the Caloosahatchee River at Fort Myers (Eaton, 1906), where only sterile plants were observed. Netted chain fern was not observed again until 1960 when it was collected by a group of Daniel B. Ward's students from the University of Florida ½ mile west of Palmdale in Glades County (s.n., FLAS). This is in the vicinity of the newly acquired Fisheating Creek Wildlife Management Area. In 1998, Bradley and Gil Nelson made the first collection in Big Cypress National Preserve, just west of Loop Road and south of Monroe Station in Monroe County (1642, FTG). Fewer than 10 plants were observed growing in a strand swamp. In 1999, Woodmansee made a collection at Halpatiokee Regional Park in Martin County (403, FTG). Fewer than 10 plants were seen growing along a ditch leading into the south fork of the St. Lucie River. It has been reported for Dupuis Reserve (Woodbury, no date), which is located in both Martin and Palm Beach counties, but this station needs to be verified.

Major Threats: Hydrological modifications; exotic pest plant invasions; recreational off-road vehicle use; wild hog damage; poaching.

Comments: *This is a temperate species at the southern end of its range, and it always may have been uncommon in South Florida. Wunderlin (1998) erroneously reported this species for Miami-Dade County.*

Preliminary recommendations:

- Survey Dupuis Reserve and Fisheating Creek Wildlife Management Area.
- Map and monitor known stations on a regular basis.

Xyris fimbriata Elliott
Fringed Yelloweyedgrass

South Florida Status: Critically imperiled. Three occurrences in three conservation areas (Bessemer; Jonathan Dickinson State Park; Savannas Preserve State Park in Martin County).
Taxonomy: Monocotyledon; Xyridaceae.
Habit: Perennial terrestrial herb.
Distribution: Native to the southeastern coastal plain. Wunderlin (1998) reports it as frequent in Florida in the northern counties south to the central peninsula.
South Florida Distribution: Martin County.
South Florida Habitats: Depression marshes.
Protection Status: Not listed by any agency.
Identification: Bell & Taylor (1982) has a color photo; Tobe et al. (1998) has an illustration and a color photo.
References: Chapman, 1884; Small, 1933a; Godfrey & Wooten, 1979; Bell & Taylor, 1982; Tobe et al., 1998; Wunderlin, 1998; Flora of North America Editorial Committee, 2000.
Synonyms: None.

Historical Context in South Florida: Edwin L. Bridges and Randy L. Mears first collected fringed yelloweyedgrass in 1995 in a depression marsh at Jonathan Dickinson State Park in Martin County (23903, USF). Bradley observed this occurrence around 1998. Steven L. Orzell and Bridges also made a collection in 1995 in Martin County at Savannas Preserve State Park (23990, FTG). Fringed yelloweyedgrass was also collected in 2000 by Woodmansee at Bessemer (567, FTG), a conservation area in Martin County.

Major Threats: Drainage of depression marshes; exotic pest plant invasions; 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.*

Preliminary recommendations:
- Map and monitor known stations on a regular basis.

Zanthoxylum coriaceum A. Rich.
Biscayne Pricklyash

South Florida Status: Critically imperiled. Two occurrences in three conservation areas (Hugh Taylor Birch State Park; Crandon Park & Virginia Key and Marine Stadium).
Taxonomy: Dicotyledon; Rutaceae.
Habit: Shrub to small tree.
Distribution: Native to South Florida and the West Indies.
South Florida Distribution: Broward, Miami-Dade, and Palm Beach counties.
South Florida Habitats: Maritime hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Nelson (1996) has a color photo; Chafin (2000) has illustrations and a color photo; the IRC Website has a color photo.
References: Small, 1933a; Long & Lakela, 1976; Porter, 1976; Little, 1978; Tomlinson, 1980; Correll & Correll, 1982; Nelson, 1994; Nelson, 1996; Wunderlin, 1998; Chafin, 2000; Coile, 2000.
Synonyms: None.

Historical Context in South Florida: Abram P. Garber first collected Biscayne pricklyash in 1877 on Virginia Key in Miami-Dade County. George N. Avery observed plants on Virginia Key several times from 1967 to 1983 (Avery's Notes, 1967-1983). It still is present on the island at Virginia Key and Marine Stadium, which is managed by the City of Miami. Gann and Bradley observed plants there in 1999 with City of Miami naturalist Juan Fernandez. Gann and Fernandez also observed plants in 2001. In 1915, John Kunkel Small and Charles A. Mosier collected Biscayne pricklyash on "sand-dunes opposite Lemon City" (5819, US), a station about four to five miles north of the southern tip of Miami Beach. All maritime hammocks on this portion of Miami Beach have been destroyed. In 1965, John Popenoe collected

Biscayne pricklyash at Crandon Park on Key Biscayne (s.n., FTG). Frank C. Craighead also collected it there later that year (s.n., USF). The species is extant there and has been observed on several occasions by the authors.

Allan H. Curtiss first collected Biscayne pricklyash in Broward County in 1897 on a beach ridge in Fort Lauderdale in Broward County (5844, NY), probably in or near what is now Hugh Taylor Birch State Park. Olga Lakela and Robert W. Long collected it at the park (s.n., USF), presumably in the 1960s. Avery observed this station in 1967 (Avery's Notes, 10 April 1967). Buckley & Hendrickson (1983b) also reported it for the park. It was observed there as recently as 1999 by Gann and Florida Park Service biologist Janice A. Duquesnel. Fewer than 10 trees remain. A single collection of this species was made at Boynton Beach in Palm Beach County by Kenneth W. Loucks and Erdman West in 1930 (s.n., FLAS).

Fairchild Tropical Garden (FTG) has conducted conservation horticultural studies and has successfully propagated plants from seed. FTG and the Florida Park Service have initiated an introduction program at Bill Baggs Cape Florida State Park on Key Biscayne. FTG maintains a collection of South Florida germplasm.

Major Threats: Habitat destruction and exotic pest plant invasions.

Comments: *Biscayne pricklyash is dioecious.*

Preliminary recommendations:

- Voucher plants at Virginia Key and Marine Stadium.
- Map and monitor known stations on a regular basis.
- Continue introduction program at Bill Baggs Cape Florida State Park.
- Consider reintroduction to other sites within its historical range.

Zanthoxylum flavum Vahl
Yellowwood

South Florida Status: Critically imperiled. Three occurrences in two conservation areas (Bahia Honda State Park; Key West National Wildlife Refuge) and one non-conservation area (Key West Golf Course on Stock Island).
Taxonomy: Dicotyledon; Rutaceae.
Habit: Small tree.
Distribution: Native to South Florida, Bermuda, and the West Indies.
South Florida Distribution: Monroe County Keys.
South Florida Habitats: Coastal berms and rockland hammocks.
Protection Status: Listed as endangered by FDACS and as critically imperiled by FNAI.
Identification: Scurlock (1987) has a color photo.
References: Nuttall, 1849; Chapman, 1883; Sargent, 1891; Small, 1913; Small, 1933a; Long & Lakela, 1976; Porter, 1976; Little, 1978; Tomlinson, 1980; Correll & Correll, 1982; Scurlock (1987); Nelson, 1994; Wunderlin, 1998; Coile, 2000; Liogier & Martorell, 2000.
Synonyms: *Z. cribrosum* Spreng.*; Z. floridanum* Nutt.

Historical Context in South Florida: John Loomis Blodgett first collected yellowwood between 1838 and 1853 on the island of Key West (s.n., NY). He described the tree he vouchered as a "Large tree...growing near the sea – timber fine." Nuttall (1849) stated that Blodgett had reported yellowwood to be common on Key West. Sargent (1891) repeated this, but also stated that it was sought for its valuable wood. Blodgett appears to be the only person who ever collected it on Key West. In 1881, Allan H. Curtiss made a collection on Bahia Honda Key (433, NY, US). At present, there two trees at Bahia Honda State Park. Gann and Florida Park Service biologist Janice A. Duquesnel observed these trees in 2000. Sargent (1891) reported that it occurred on Boca Chica Key and the Marquesas Keys. While it has been extirpated on Boca Chica, the population at the Marquesas is extant on one island in Key West National Wildlife Refuge. Gann and Bradley vouchered it there in 1996 (465, FTG). Fewer than 100 plants are extant. In 1981, George N. Avery recorded several trees at the

Key West Golf Course on Stock Island (Avery 1679, FTG), but that number has been reduced to two remaining plants (J.A. Duquesnel, personal communication, 9 January 2002).

Fairchild Tropical Garden (FTG) and the Florida Park Service (FPS) have mapped plants at Bahia Honda State Park and at the Key West Golf Course, and are in the process of mapping all plants at Key West National Wildlife Refuge. When possible, the sex of individual trees is determined. FTG has conducted conservation horticultural studies and has successfully propagated plants from seed. FTG and FPS have initiated a formal augmentation program at Bahia Honda State Park. All translocated plants are mapped and are monitored on a regular basis. FTG maintains a collection of South Florida germplasm.

Major Threats: Destruction of plants; habitat destruction; exotic pest plant invasions.

Comments: *The Florida Keys represents the only native range of yellowwood in the continental United States. Logging of this species may have contributed to its demise in Florida, although habitat destruction was clearly the largest factor.*

Yellowwood is dioecious.

Preliminary recommendations:

- Complete mapping of plants at Key West National Wildlife Refuge.
- Map and monitor plants at Bahia Honda State Park and at Key West National Wildlife Refuge on a regular basis.
- Monitor plants at Key West Golf Course on a quarterly basis.
- Continue with augmentation program at Bahia Honda State Park.
- Assess appropriateness and study feasibility of introducing yellowwood to other sites within its historical range, including Little Hamaca Park on Key West.
- Assess appropriateness and study feasibility of the restoring rockland hammocks on Boca Chica Key, Key West, and Stock Island and reintroducing yellowwood.

Zornia bracteata J.F. Gmel.
Viperina

South Florida Status: Critically imperiled. Four occurrences in six conservation areas and three non-conservation areas (Coral Reef Park; Deering Estate at Cutler & Ludlam Pineland; Richmond Pine Rocklands at Larry and Penny Thomson Park, Miami Metrozoo, U.S. Air Force Property, University of Miami South Campus, and former U.S. Naval Observatory; Ron Ehman Park).
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: Miami-Dade County, where it is disjunct from Highlands County.
South Florida Habitats: Pine rocklands.
Protection Status: Not listed by any agency.
Identification: Taylor (1998) has a color photo.
References: Chapman, 1883; Small, 1933a; Mohlenbrock, 1961; Long & Lakela, 1976; Isely, 1990; Wunderlin, 1998.
Synonyms: *Z. tetraphylla* Michx.

Historical Context in South Florida: John Kunkel Small first collected viperina in 1915 in a pineland near Ross Hammock in Miami-Dade County (6534, NY; 6615, NY), in the vicinity of what is now Castellow Hammock Park. It was not collected again until 1968, when George N. Avery found plants at a pine rockland fragment near Chapman Field (484, USF). This station was mostly destroyed soon thereafter, but Avery did find a few plants in one small station in 1974 (Avery's Notes, 1974).

Viperina is known currently from six conservation areas in Miami-Dade County. Avery reported it for what is now the Deering Estate at Cutler as early as 1978 (Avery's Notes, 1 January 1978). Avery vouchered this station, recording on the herbarium label only that the station was south of Coral Gables (1806, FTG). Bradley observed this station as recently as 1999. Avery found it in 1979 at what is now Ludlam Pineland, a conservation area located just north of the Deering Estate. Bradley observed it there in the 1990s. Bradley and Woodmansee observed it there in 2000. The

Deering Estate at Cutler and Ludlam Pineland stations are considered to be the same occurrence.

In 1993, Bradley observed it at Larry and Penny Thompson Park in the Richmond Pine Rocklands, an occurrence observed again in 2000 by Bradley and Woodmansee. Bradley also observed it in the Richmond Pine Rocklands at Miami Metrozoo in 1993, where it is assumed to be extant. It also is known from three non-conservation areas within the Richmond Pine Rocklands. Bradley observed it at the U.S. Air Force Property in 1993, followed by Bradley and Woodmansee in 2000 (Bradley et al., 2000a). In 1996, Bradley and Gann observed it at the U.S. Naval Observatory, now owned by the University of Miami (Bradley & Gann, 1996). Woodmansee observed this station again in 2000 (Bradley et al., 2000a). In 2000, Bradley and Woodmansee observed it on the University of Miami South Campus (Bradley et al., 2000a). Geographic coordinates were recorded for all of the Richmond Pine Rocklands stations, but they all need to be vouchered.

In 1995, Bradley collected viperina at Coral Reef Park (92, FTG), a station that was vouchered again by Gann and Tiffany Troxler Gann in 1997 (25, FTG). Bradley also collected it at Ron Ehman Park in 1995 (100, FTG). Both of these stations are assumed to be extant.

Major Threats: Habitat destruction in the Richmond Pine Rocklands; 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 Air Force Property, Larry and Penny Thompson Park, Ludlam Pineland, Miami Metrozoo, University of Miami South Campus, and University of Miami's Naval Observatory property.
- Map and monitor known stations on a regular basis.