

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 Matthaues 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; Lioigier & 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 monoclonus* 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 Slough 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 State 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. Saulea 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 Alice 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; Saulea, 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; Seabrook 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 Seabranh 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.), 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. amoenum* Aiton; *V. arkansanum* Ashe; *V. ashei* Reade; *V. australe* Small; *V. elliotii* Chapm.; *V. fuscatum* Aiton; *V. virgatum* Aiton; *Cyanococcus amoenus* (Aiton) Small; *Cyanococcus elliotii* (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, & Seabranche 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 Seabranche 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; Halpatokee 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 Halpatokee 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; Halpatokee 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 Halpaticokee 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.