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Report M-548

A Preliminary Report on Rare Plant Species in the Flora of National Park Service Areas of South Florida



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Lloyd L. Loope and George N. Avery

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South Florida Research Center
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A Preliminary Report on Rare Plant Species in the Flora
of National Park Service Areas of South Florida

Lloyd L. Loope and George N. Avery

INTRODUCTION

Aims of this report

South Florida has a remarkable flora, quite distinctive within the United States for its strong tropical affinities. A large number of West Indian species occur in the United States only here, and a considerable number of plant species are endemic to South Florida. Major modifications have occurred and are occurring in South Florida ecosystems and some species have already been extirpated. A large portion of the southern tip of Florida and its islands is under the jurisdiction of the U.S. National Park Service - Everglades National Park, Big Cypress National Preserve, Biscayne National Monument, and Fort Jefferson National Monument. Even these areas have been significantly modified from pristine ecological conditions and parts of the areas are currently subjected to active manipulation (prescribed burning, control of exotic plants, scheduled water releases) designed to preserve ecosystems in as natural a condition as possible.

The Endangered Species Act of 1973 requires Federal agencies to give special consideration to rare biota. This is largely compatible with the mandate of the National Park Service (NPS) to manage ecosystems to maintain or restore as natural a condition as possible (Houston, 1971), but future conflicts of species management vs. ecosystem management are a possibility. As yet no plant species of South Florida have been given protected status under the Endangered Species Act.

This report is intended to bring together information concerning the rare species in the flora of South Florida National Park Service areas. This information is important to fulfill the following purposes: 1) to provide an adequate background for management of the resources of South Florida parks by the National Park Service, particularly for programs of fire management and backcountry management; (2) to summarize our current knowledge as a means of stimulating observations of others on distribution and ecology of rare plants of the area; 3) to identify species for which populations should be monitored to assess changes resulting from fire management or other causes; and 4) to assist South Florida-wide efforts in botanical preservation (i.e., to identify which species do or do not receive secure protection within NPS areas). The preliminary nature of the report should be emphasized. It is intended to provide an account of our current state of knowledge with the hope that it will stimulate others to contribute ideas and information needed to allow a comprehensive analysis.

Problems in the preservation of rare plant species of South Florida

The systematic drainage of South Florida, which started in the early 1900's and continues at present, and expanding urbanization have been the primary factors contributing to habitat destruction. The impact of drainage has been multiplied by

devastating fires which burn during drought periods, resulting in direct destruction of plants and removal of accumulations of organic substrates. J. K. Small witnessed the changes taking place in the early decades of the century and published a book entitled "From Eden to Sahara: Florida's Tragedy" (Small, 1929), lamenting the destructive trends. After 1930, the destruction accelerated, with Florida's population increasing from less than 1.5 million in 1930 to over 8 million at present. The pine forest of the Miami Rock Ridge, rich in endemic and rare plant species, has been one of the most severely affected habitats. Robertson and Kushlan (1974) report that comparison of aerial photographs of 1940 and 1972 indicated that urban and agricultural development removed nearly 90 percent of the pine forest south of Sunset Drive (South Miami), excluding about 25 km² of pineland within Everglades National Park, mostly during the 1950's and 1960's. This destruction of pinelands has continued in the 1970's, so that very little remains outside Everglades National Park.

Although South Florida parks are largely free of drainage structures, agriculture, and urbanization, the security of rare plants within their boundaries is far from assured for the following reasons (in order of probable severity of the threat):

1. Threat from wildfire - That fire is a major natural force in the South Florida environment has been well documented by Robertson (1953, 1955). Nearly half of the fires recorded in Everglades National Park in the past 25 years have been attributed to ignition by lightning (Everglades National Park, 1978). Several thousand years ago aboriginal populations undoubtedly began augmenting ignitions and extending the fire season into the dry season (November-April) when few lightning strikes occur. Many South Florida plant species, including many rare species, are dependent upon recurrent fire for survival. In fire-dependent habitats (pine forest and Muhlenbergia prairie, for example), species which are not adapted to fire were presumably eliminated long ago. Nevertheless, fire is still a major threat to South Florida's rare flora primarily because of modification of the natural water regime. Drainage outside parks has lowered water levels within parks to an unknown extent. Fires during drought periods since drainage began are believed to be burning organic matter which may have accumulated over decades or centuries. Plant communities which may not have been subjected to severe fires in the past (hammocks, cypress strands) are now threatened by fire. Another significant aspect of the fire problem is that fuel accumulations which build up when fires are suppressed can result in more severe future fires to which the native biota, even in fire-adapted communities, may not be adapted.

In spite of modern fire fighting technology, little can be done to control large fires once they are burning. The best approach under the circumstances, the one which has been adopted by the National Park Service, is fire management which utilizes prescribed burning and other managed fires to reduce fuels and reduce the threat of the holocaust fire, as well as to maintain certain fire-dependent communities. This complex subject is treated in the Fire Management Plan for Everglades National Park (Everglades N.P., 1978). A Fire Management Plan is also being developed for the newly established Big Cypress National Preserve.

2. Threat from illegal collecting pressure - Second only to the threat of wildfire is the threat from collectors, both "serious" and "casual." In the early days of Everglades National Park and before the park was established, a relatively small number of very knowledgeable and often unscrupulous collectors systematically removed large numbers of rare plants from the park area. To a much reduced extent, this phenomenon probably continues today. Because of easy accessibility by off-road vehicles, the problem of collector pressure is undoubtedly presently greater in Big Cypress National Preserve.

Dr. Frank Craighead made many observations concerning the impact of plant collectors in the 1950's and 1960's. He aptly stated the problem in a memorandum to the Chief Ranger of Everglades National Park (Craighead, 1966), giving many examples: "The people who are taking these plants know the various species they want. They also know where to look for them, and they know the park area much better than do the park employees." A minority among less knowledgeable visitors are also a threat and can sooner or later be expected to remove showy or interesting-looking orchids or other plants which they see. Education of the public may help, but it is a doubtful solution to the problem. Craighead (1966) gave an account of an instance of NPS negligence in the case of the rare hand fern (Ophioglossum palmatum) known in Everglades National Park from only one site. "When the trail was constructed into Mahogany Hammock, I advised against approaching the colony of this hand fern, but the construction was carried out within a few feet of the fern and a label pointing to it erected. Some three months after construction of the trail, the entire colony was taken." Dr. Craighead gave many other examples of the attrition of rare plants growing near trails.

3. Threat from hurricanes - Hurricanes are an extremely potent force in destruction of rare plants, particularly epiphytes. According to Craighead (1963) and Craighead and Gilbert (1962), Hurricane Donna of September 9-10, 1960, destroyed over 90 percent of the epiphytes within the mangrove zone of Everglades National Park. Great losses of epiphytes also occurred in the Long Pine Key hammocks, where defoliation of the forest canopy exposed remnant epiphytes to damaging full sunlight.

Hurricanes are, of course, natural phenomena. Hurricanes of the intensity of the 1960 hurricane are thought to be rare, perhaps occurring at a specific site in South Florida once in a century or less frequently. Less severe hurricanes will undoubtedly continue to result in major losses of rare plants, which in combination with man-caused losses will be disastrous for both coastal and inland species. Hurricanes also have probably provided a major means of dispersal for propagules which have resulted in establishment of many of the West Indian plant species in the South Florida environment.

4. Threat from invasion by exotic species - Austin (1978) reports that over 170 species of exotic plants have become naturalized in Southeastern Florida. A small percentage of these plants are extremely aggressive in competition with the native flora and clearly have the potential for displacing rare native plant species in South Florida park areas. The particularly aggressive species

include: Schinus terebinthifolius (Brazilian pepper), Casuarina equisetifolia and C. glauca (Australian pine), Melaleuca quinquenervia (cajeput), and Colubrina asiatica.

Schinus is very aggressive in invading native pineland vegetation of the Miami Rock Ridge and threatens to take over as the understory of all remnant pine forest areas which are not prescribed burned regularly, thereby shading out pineland understory species. In Everglades National Park, prescribed burning has so far largely, but not completely, succeeded in excluding Schinus from pine forests. An abundant seed source for Schinus exists on abandoned farmland and other disturbed land throughout Dade County, including the "Hole-in-the-Donut" area of Everglades National Park, where the NPS is attempting to reduce Schinus invasion of abandoned farmland through encouraging establishment of native hardwood species.

Casuarina invades many types of sites. Control efforts in Everglades National Park have thus far been concentrated in coastal areas because of concern for nesting habitat of the officially "threatened" sea turtle (Caretta caretta). Large concentrations of Casuarina remain in the extreme southeastern portion of Everglades N.P., where hammocks dominated by buttonwood and other tropical hardwoods are being invaded. A major effort at control of Casuarina in this area was instituted in the spring of 1978. Continued priority should probably be given to this project particularly because of the presence in some of these hammocks of Vanilla barbellata and other rare species. An inventory of the rare plant species of this area should be made as soon as possible. Casuarina control is also underway on several islands of Biscayne National Monument.

Melaleuca, generally regarded as the most serious exotic plant problem in South Florida, is not at present a problem in South Florida parks except for Big Cypress National Preserve, where considerable threat to native vegetation seems to occur. No Melaleuca invasion of rare plant habitats has yet been observed, but further examination of the problem is needed.

Colubrina asiatica is apparently a rather recent invader of coastal forests bordering Florida Bay in southern Everglades N.P. and on Elliott and Adams Keys of Biscayne N.M. The ecology of Colubrina is far from being well understood, but preliminary indications are that it poses a serious threat to coastal hammock and buttonwood forest habitats. This could ultimately result in a significant threat to several rare plant species of coastal forests (Cordia sebestena and Cereus gracilis var. simpsonii, are examples).

In at least one instance, rare plant species are threatened by exotic animals. On Elliott Key of Biscayne National Monument, the introduced Mexican red-bellied squirrel (Sciurus aureogaster) is suspected of damage to two rare species of thatch palms (Thrinax morrisii and Thrinax radiata (Tilman, 1978, personal communication). Initially, the black rat (Rattus rattus) was suspected of being a primary or contributing agent of damage, but this possibility has been discarded because of absence of damage of Thrinax on nearby Totten Key, where the Rattus population equals or exceeds that on

Elliott Key, but where squirrels are absent. The animals remove the apical buds, killing the palms. Three-fourths of the Thrinax morrisii plants on Elliott Key have been affected.

5. Threat from National Park Service fire management program - Even though the NPS fire management program is intended to enhance preservation of ecosystems and biota, the potential exists for damage to rare plant populations from action taken within the framework of the Fire Management Plan, including prescribed burning and observation of wildfires. Examples of past criticism include concern about impact of a 1975 fire upon the fern, Sphenomeris clavata in Block A of Long Pine Key (apparently unjustified, since Sphenomeris continues to thrive at its old site) and concern that an earlier fire severely damaged the Hypelate trifoliata population. It is suggested that the following measures be instituted by the NPS to reduce chances for negative impacts upon rare plant species from the fire management program:
 - a) Continue the practice of prescribed burning only when soil moisture levels are relatively high. This protects hammocks and probably tends to "buffer" plant underground parts against high soil temperatures.
 - b) Continue to experiment with making individual ignitions in the vicinity of hammocks and rare plant concentrations aimed at removal of fuel from such areas before an intense headfire burns them (Taylor, personal communication).
 - c) Complete floristic inventory, with emphasis given to areas of intensive fire management. Compile information on maps which will be reviewed by fire management personnel prior to each prescribed burn in consultation with the plant ecologist and fire ecologist.
 - d) Institute a program of monitoring fire impacts on rare plant populations. Work on this aspect was started during the summer of 1978.
 - e) Continue to improve our understanding of fire's natural role and impact within South Florida ecosystems.

PRELIMINARY LIST OF RARE PLANT SPECIES

Basis for the list

The list below includes the following species known by the authors to occur in South Florida areas managed by the U.S. National Park Service (Everglades National Park = ENP, Big Cypress National Preserve = BICY, Biscayne National Monument = BISC, and Fort Jefferson National Monument = FOJE):

- 1) Those which occur on the list prepared by the Smithsonian Institution (1974) for the U.S. Congress, entitled "Report on rare and endangered species of the United States."
- 2) Those which occur on the list of plants prepared by the Florida Committee on Rare and Endangered Plants and Animals (1976).
- 3) Species endemic to South Florida (defined as the area south of the Caloosahatchee River, Lake Okeechobee, and the St. Lucie Canal), as determined by a review by Avery and Loope (1979).
- 4) Other species which might be considered rare.

Nomenclature for the list partially follows that in Long and Lakela (1971), but diverges in cases where Avery has noted that recent taxonomic revisions and monographs and usage by specialists indicate that nomenclature used by Long and Lakela is inappropriate. Voucher specimens for most taxa listed are included in the Everglades National Park herbarium.

Major sources of information for the list and distributional information are as follows: G. N. Avery's field notes and experience; herbarium of Everglades National Park; Long and Lakela (1971); Avery and Loope (1979); Loope et al. (1979); Black and Black (1978) and personal communication; Craighead (1963); Luer (1972); Little (1976); Little (1978); and D. F. Austin, personal communication. Assistance was given by members of the research staff at the South Florida Research Center in Everglades National Park.

Explanation of symbols used in conjunction with list

Symbols used in the chart accompanying the list are interpreted as follows:

"Level of Concern"

For Smithsonian List (Smithsonian Institution, 1974), T = Threatened ("those species of plants that are likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges"), and E = Endangered ("those species of plants in danger of extinction throughout all or a significant portion of their ranges").

For list of Florida Committee (1976), E = Endangered, T = Threatened, R = Rare and RE = Recently Extirpated

An attempt is made to roughly assess the level of concern for species in this report by assigning numbers on a 1-5 scale, with the following interpretation assigned to each number:

- 1 - Species of highest concern. These are very rare species of which a) populations have been reduced by development outside parks, by past collecting within or outside parks, and/or by fire damage; or b) populations occupy habitats which require active ecosystem manipulation to restore and perpetuate processes which have been acting on South Florida native vegetation for millenia (primarily fire).
- 2 - Species which have apparently always been extremely rare in South Florida (often the result of chance dispersal from farther south in the American tropics, where they may be relatively common) and subject to natural disasters.
- 3 - Species which have a very restricted range in the United States. Formerly common within range, but have been reduced (by fire damage, collectors, lowering of water tables, etc.).
- 4 - Species which have a very restricted range in the United States, but which are still at least moderately common within range. Active management (usually prescribed burning) should suffice to perpetuate populations at safe levels for the foreseeable future.
- 5 - Species which have a very restricted range in the United States, but which are still at least moderately common within range. Populations should be rather stable for the foreseeable future without active management by the National Park Service.

"Appropriate Management Action"

Management recommendations at this stage can only be a first approximation. Symbols under this heading in the chart are to be interpreted as follows:

- V1 - Normal visitor use should be channeled away from sites of populations of this species.
- V2 - Special emphasis upon proper education of visitors and enforcement of park regulations may suffice to allow adequate protection.
- F1 - High priority should be given to fuel reduction and suppression programs to reduce chances of destruction of populations by fire.
- F2 - Preservation requires periodic burning of immediate habitat.
- I - Emphasis should be given to precisely locating populations of this species to enable adequate protection.
- M1 - Monitoring of populations has been initiated in 1978.

- M2 - Monitoring of populations is needed for assuring adequate protection.
- R - High priority should be given to experimental efforts at reintroduction of the species to habitats where it was initially more abundant than at present.
- N1 - No particular management problem occurs. Populations are secure without massive habitat destruction.
- N2 - No particular management problem occurs, but populations are vulnerable to hurricanes.

| Species (Family) | Level of Concern | | Habitat, Status, and Location in South Florida Parks | Range and Status Outside South Florida Parks | Appropriate Management Actions | |
|-----------------------------------------------------------------------|---------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------|
| | Smithsonian List | Florida Committee Report | | | | |
| <i>Psilotum nudum</i> (L.) Beauv. (Psilotaceae) Whisk Fern | | 5 | Present in ENP and BICY, generally in hammocks. Plants scattered and sometimes in unexpected habitats (e.g., successional <i>Myrica</i> forest on abandoned farmland of ENP). | Heavy collection pressure, but still present in many areas. Southeastern U.S., pantropical. | V2 | |
| <i>Selaginella eatonii</i> Hieron. ex Small (Selaginellaceae) | | 2 | Very rare. Known from a few sites in limestone solution holes of pine lands and hammock edges, Long Pine Key, ENP. | Known from several other Dade Co. sites. Also in the Bahamas. | V1, F2?, N2 | |
| <i>Ophioglossum palmatum</i> L. (Ophioglossaceae) Hand Fern | T | E | 1 | Formerly present at Mahogany Hammock, ENP, but was eliminated following construction of boardwalk. Extremely rare on Sabal palmetto in BICY. Extremely susceptible to fire damage and removal by collectors. | Very rare, but present at a few sites in Florida. Also present scattered over wide area of New World and Old World Tropics. | V1, F1 |
| <i>Trichomanes holopterum</i> Kunze (Hymenophyllaceae) | | 2 | Known in U.S. from only one area in BICY, where it grows on rotten logs. | West Indies | ? | |
| <i>Anemia wrightii</i> Bak (Schizaeaceae) | | 2 | Recently found in one small area within ENP, on the margin of Taylor Slough. | Known from a band of hammocks along "Context Road," W of Homestead, Fla., just outside boundaries of ENP. Also in the Bahamas and Cuba. | 1 | |
| <i>Vittaria lineata</i> (L.) Sm. (Vittariaceae) Shoestring Fern | | 3 | Grows only on Sabal palmetto, in ENP and BICY. Locally common. | Found in Florida up to Georgia border. Throughout American Tropics. | V2, F2 | |

| Species (Family) | Level of Concern | | Habitat, Status, and Location in South Florida Parks | Range and Status Outside South Florida Parks | Appropriate Management Actions |
|-----------------------------------------------------------------------|-------------------------------|----------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| | Smithsonian List Committee | This Report | | | |
| <u>Polypodium plumula</u> Humb. & Bonpl. ex Willd. (Polypodiaceae) | | 2 | Has been collected in one hammock in ENP, but not seen recently. | Rare, known from Florida peninsula up to Alachua Co. Throughout tropical America. | N2, |
| <u>Polypodium heterophyllum</u> L. (Polypodiaceae) Vine Fern | | 4 | Locally common in hammocks of NW portion of ENP and SW portion of BICY. | Very rare in eastern Dade Co. hammocks (currently known from only one). Present in Collier and Monroe (Key Largo) Counties outside park.) Also in tropical America. | F1 |
| <u>Coniophlebium triseriale</u> (Sw.) W. Berry (Polypodiaceae) | | 2 | Reported once from Ten Thousand Islands area, ENP. Precise location not known. | Site in Ten Thousand Islands is only report for this species in U.S. Also in tropical America. | |
| <u>Neprolepis biserrata</u> Schott (Davalliaceae) Boston Fern | | 3 | Known from one hammock of Long Pine Key, ENP. ENP Herbarium has one specimen from BICY. | Rare in Fla. Still present in a few scattered locations in Dade and Broward counties. Widely distributed in the tropics. | V2, F1, 1 |
| <u>Acrostichum aureum</u> L. (Pteridiaceae) | R | 5 | Present under mangroves in brackish areas of ENP and BISC. | Known from coastal areas of Dade and Monroe Counties. Also in West Indies, Mexico, South America. Panropical. | N2 |
| <u>Adiantum melanoleucum</u> Willd. (Pteridiaceae) | R | 1 | Very rare. Known only from a few solution holes of one hammock of Long Pine Key, ENP. | Also in the West Indies | V1, F1, R |
| <u>Adiantum tenerum</u> Sw. (Pteridiaceae) | | 1 | Present in a few hammocks of Long Pine Key, ENP. | Small populations left in a few of the south Dade Co. hammocks. Also in Neotropics. | V1, F1, R |

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|-------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| | Smithsonian List | Florida Committee Report | | | |
| <u>Sphenomeris clavata</u> (L.) Maxon (Pteridiaceae) | | 1 | Very rare. Known from several very restricted sites in solution holes in limestone, Long Pine Key, ENP. | Present in U.S. only at a few other Dade and Monroe Co. sites. Also in West Indies. | VI, F2 - Appears to be a species largely restricted to solution holes on hammock edges, requiring a moderate open canopy. |
| <u>Asplenium serratum</u> L. (Aspleniaceae) Bird Nest Fern | | E 1 | Rare in cypress strands of BICY. | Present in U.S. only in a few locations in Florida. Also in Neotropics. | VI, F1 |
| <u>Asplenium platyneuron</u> (L.) Dakes (Aspleniaceae) | | | Present in one hammock of ENP, in rocky glades area. Probably the southernmost station for this plant. | Common throughout eastern U.S. | F1 |
| <u>Ctenitis sloanei</u> (Poepp.) Morton (Aspladiaceae) | | 2 | Known from one hammock near Pinecrest in BICY. | Rare and scattered in hammocks of southern Florida. Also in West Indies, elsewhere in tropical America. | F1 |
| <u>Thelypteris reptans</u> (J. F. Gmel.) (Aspladiaceae) | | 4 | In solution holes in some of the Long Pine Key hammocks, ENP. | Peninsular Florida and Greater Antilles. | VI, I |
| <u>Thelypteris reticulata</u> (L.) Proctor (= <u>Menisium reticulatum</u> (L.) Sw.) (Aspladiaceae) | | 2 | Present in easternmost part of ENP, and probably scattered in BICY. | Rare in Dade and Collier counties. American tropics. | VI, I |

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|------------------------------------------------------------------------------------------|--------------------------|----------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------|
| | Smith- sonian List | Florida Committee | This Report | | | |
| <u>Tectaria lobata</u> (Poir.) Morton (Aspidaceae) | | | 1 | Uncommon. Present in solution holes in a few of the Long Pine Key hammocks of ENP. | Found in U.S. only in hammocks of Dade Co. Also present in the Bahamas and Cuba. | VI, I |
| <u>Lomariopsis kunzeana</u> (Presl ex Underw.) Holtt. (Lomariopsidaceae) | | | 1 | Known from one Long Pine Key hammock, ENP. | Very small populations known from two Dade Co. hammocks. | VI, F1, R |
| <u>Zamia pumila</u> L. (Cycadaceae) Coontie | E | T | 3 | Locally fairly common in pinelands of Long Pine Key, ENP. Not recorded from pinelands of BICY. | Fairly common in the few remnant pinelands of Dade Co. Occurs over a wide area of Florida. Also in West Indies. | F2 |
| <u>Digitaria pauciflora</u> Hitchc. (Poaceae) | | | 2 | Apparently not collected often but recently found to be present in low pinelands and transverse glades of Long Pine Key, ENP. | Endemic to South Florida. The original collection was from somewhere near Everglades City. | NI, I |
| <u>Imperata brasiliensis</u> Trin. (Poaceae) | | | 4 | Uncommon in pinelands of Long Pine Key, ENP in sites where pockets of shallow soil are present. Also on Cape Sable. | Not common, pinelands of South Florida. Also in Mexico and other parts of tropical America. | F2 |
| <u>Eriochloa michauxii</u> (Poir.) Hitchc. var. <u>simpsonii</u> Hitchc. (Poaceae) | T | | 2 | Presumably present in prairies in western parts of ENP and BICY. | Scattered distribution on Florida's west coast | I |
| <u>Andropogon cabanisii</u> Hack. (Poaceae) | | | 4 | Widespread and abundant in pinelands of Long Pine Key, ENP. | Endemic to central and South Florida Rare in Dade Co. outside ENP. Status elsewhere not known to authors. | F2 |

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|-------------------------------------------------------------------------------------|------------------|--------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| | Smithsonian List | Florida Committee Report | This Report | | | |
| <u>Schizachyrium gracile</u> (Spreng.) Nash (Poaceae) | | | 4 | Widespread and common in pinelands of Long Pine Key, ENP. | Common in pinelands of Dade County and Lower Florida Keys. Also in West Indies. | F2 |
| <u>Schizachyrium rhizomatium</u> (Swallen) Gould (Poaceae) | | | 5 | Abundant over wide areas of ENP and BICY in "rocky glades," prairies, and pinelands. | Endemic to South Florida. Abundant in "east Everglades," and still present in remnant pinelands of the Miami area. | N1 |
| <u>Tripsacum floridanum</u> Porter ex Vasey (Poaceae) | | | 4 | Frequent in pinelands of Long Pine Key of ENP. | Endemic to limestone ridge pinelands of Dade County. Present in some remnant pinelands outside ENP. | F2 |
| <u>Pseudophoenix sargentii</u> Wendl. ex Sarg. (Palmae) Sargent's Palm | | | 1 | Native population in U.S. has been reduced to about 15 individuals on Elliott Key of BISC. | Introduced to several other Florida Keys. Native to Bahamas, Cuba, Hispaniola, Dominica, SE Mexico, British Honduras. | This species may require disturbance for regeneration. Populations should be watched for damage by exotic mammals. |
| <u>Roystonea elata</u> (Bart.) F. Harper (Palmae) Florida Royal Palm | | | 1 | Very rare in hammocks of ENP (Paradise Key, Small Hammock, Johnson Mound). Formerly present at Seven Palm Lake. | Large numbers exist in natural habitat in South Florida only in Fakahatchee Strand. Present in Collier-Seminole State Park and northern Deep Lake Strand (just outside BICY boundary). Common in cultivation in South Florida. Species also present in Cuba, Puerto Rico. | This species is reproducing poorly in ENP. Reason is not known. Disturbance may be required for regeneration. |
| <u>Accelorrhaphis wrightii</u> (Griseb. & Wendl.) Wendl. ex Becc. (Palmae) | | | 5 | Common in SW portion of ENP and present northward in W portion of park within zone of saline influence. Rare in SE portion of ENP. | Abundant in Fakahatchee Strand. Present in Collier-Seminole State Park and vicinity. Cuba, Bahamas, and Belize. | N1 |

| Species (Family) | Level of Concern | | Habitat, Status, and Location in South Florida Parks | Range and Status Outside South Florida Parks | Appropriate Management Actions |
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| | Smithsonian List | Florida Committee Report | | | |
| <u>Thrinax radiata</u> Lodd. ex Schult. (Palmae) Thatch Palm | T | 3 | Small populations scattered along south shore of ENP from Cape Sable to Fan Palm Hammock, and on Florida Bay Keys. Also present in BISC. | Common on upper Florida Keys, uncommon on lower. West Indies and Central America | Severe damage by the exotic red-bellied squirrel has occurred on Elliott Key of BISC. M1 |
| <u>Thrinax morrisii</u> H. Wendl. (Palmae) Brittle Thatch Palm | T | 1 | Present in some quantity in BISC. | Common in pinelands and thickets of lower Florida Keys, less common in upper. West Indies, Bahama Islands. | Severe damage by the exotic Mexican red-bellied squirrel has occurred on Elliott Key of BISC. M1 |
| <u>Coccothrinax argentata</u> (Jacq.) Bailey (Palmae) Silver Palm | T | 3 | Uncommon in pinelands of Long Pine Key, ENP. Present in BISC. | Common in the few remnant pineland sites outside ENP in Dade Co. Common in pinelands of lower Florida Keys. Also in Broward Co., Fla. Present in Bahama Islands and West Indies. | F2, M1 |
| <u>Tillandsia valenzuelana</u> A. Richard (Bromeliaceae) Soft-leaved Wild Pine | | 5 | Locally common in hammocks and cypress swamps of ENP and BICY. Also present in mangrove zone of ENP. Not yet recorded for BISC. | Ranges widely but becoming depleted in South Florida. Also in West Indies, Central and South America. | V2, F1 |
| <u>Tillandsia utriculata</u> L. (Bromeliaceae) Giant Wild Pine | | 5 | Widespread and common in ENP and BICY. Also recorded for BISC. | Widespread in South Florida. Also in West Indies, Central and South America. | V2, F1 |
| <u>Tillandsia pruinosa</u> Sw. (Bromeliaceae) Hoary Air Plant | T | 1 | Present locally in cypress and pond apple areas of BICY. | Sparingly present in Collier Co., Fla. Also in West Indies and elsewhere in tropical America. | V1, F1 |

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| <u>Tillandsia polystachia</u> (L.) L. (Bromeliaceae) Reddish Wild Pine | | | 3 | Locally common in dwarf mangrove areas of ENP (Craighead, 1963). One of the less common bromeliads in cypress areas of BICY. | Becoming rare in South Florida outside parks. Also West Indies, Central and South America. | V2, F1 |
| <u>Tillandsia flexuosa</u> Sw. (Bromeliaceae) Banded Wild Pine | | | T 3 | Present in hammocks of Long Pine Key and in mangrove zone of ENP. Also in BICY and BISC. | Widely distributed in South Florida, but nowhere common. Also present elsewhere in tropical America. | V2, F1 |
| <u>Tillandsia circinnata</u> Schlecht. (Bromeliaceae) Twisted Air Plant | | | 5 | Locally common in ENP, especially in coastal areas. Also in BISC and BICY. | Widespread in South Florida, but declining outside parks. Also West Indies, Mexico. | V2, F1 |
| <u>Tillandsia balbisiana</u> Schultes (Bromeliaceae) Reflexed Wild Pine | | | 5 | Very common in a variety of habitats, especially hammocks and cypress in ENP and BICY. Also present in BISC. | Widespread and locally common in South Florida. Also in West Indies, Central and South America. | V2, F1 |
| <u>Catopsis berteroniana</u> (Schultes) Mez ex D.C. (Bromeliaceae) | | | R 3 | Locally common in hammocks, pineyards, and primarily mangrove zone of ENP. Present in at least one cypress strand of BICY (Black and Black, personal communication). | Only in South Florida in U.S. Uncommon outside ENP. Also in tropical America. | V2 |
| <u>Catopsis floribunda</u> L. B. Sm. (Bromeliaceae) | | | 1 | Rare in ENP, possibly confined to one small area of Long Pine Key. | Present in Fakahatchee Strand. Only in South Florida in U.S. Also in tropical America. | V1, F1 |
| <u>Catopsis nutans</u> (Sw.) Griseb. (Bromeliaceae) | | | E 2 | Not presently known from BICY, but may be present there. | Present in Fakahatchee Strand. Only in South Florida in U.S. Also in tropical America. | V1, I |

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| <u>Guzmania monostachia</u> (L.) Rusby ex Mez (Bromeliaceae) | | E | 1 | Present in one of the Long Pine Key hammocks, ENP. Locally common in portion of a cypress strand of BICY (Black and Black, personal communication). | Present only in South Florida in U.S. Locally common in Fakahatchee Strand, W of BICY. Also in West Indies, South America. | V1, F1, 1 |
| <u>Hymenocallis palmeri</u> Wats. (Amaryllidaceae) | | | 5 | Locally uncommon in wet prairies of ENP. Present in prairies of BICY. | Endemic to South Florida. In wet prairies throughout but nowhere common. | N1 |
| <u>Hymenocallis latifolia</u> (Mill.) Roem. (Amaryllidaceae) | T | | 5 | Uncommon on shores and keys of Florida Bay in ENP, and on shores and in hammocks of BISC and FOJE. | Endemic to South Florida, north to Broward Co. and Lee Co. | N1 |
| <u>Burmannia flava</u> Mart. (Burmanniaceae) | | | 2 | Possibly present in BICY | Known from Fakahatchee strand. | 1 |
| <u>Vanilla phaeantha</u> Reichenb. f. (Orchidaceae) | | | 3 | In hammocks on north shore of Florida Bay in ENP. Probably in some cypress areas of BICY. | Known from Fakahatchee strand, West Indies. | 1, N |
| <u>Vanilla barbellata</u> Reichenb. f. (Orchidaceae) | | T | 3 | Fairly common in buttonwood hammocks of SE portion of ENP, W to Cape Sable (buttonwood zone), and along mangrove belt of western ENP. | Only in S. Fla. in U.S. and rare outside ENP. Also in Cuba and Bahamas. | Habitat threatened by invasion of <u>Casuarina</u> . |
| <u>Spiranthes costaricensis</u> Reichenb. f. (Orchidaceae) | | | 2 | Reported by Luer (1972) as having been discovered in single ENP hammock in 1953, in humus along margins of solution holes. Appears to have been lost. | Only known from single ENP site in South Florida. Also in Central and South America. | |

| Species (Family) | Level of Concern | | Habitat, Status, and Location | Range and Status Outside South Florida Parks | Management Actions |
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| <u>Spiranthes polyantha</u> Reichenb. f. (Orchidaceae) | | This Report | Reported by Luer (1972) as having been first discovered in U.S. on Elliott Key (BISC) in 1915. No location known there at present. | Has been found at several sites in central and northern Florida. Also in Mexico, West Indies. | Appropriate |
| <u>Erythroides querceticola</u> (Lindl.) Ames (Orchidaceae) | | 2 | Presently known in one ENP hammock (Fairchild, Block H of Long Pine Key) and in Hammock #36 NE of Pinecrest in BICY. | Present in Florida, S. Mississippi, SE Texas, West Indies, Central and South America. | Not a showy or conspicuous orchid. F1 |
| <u>Platanthera nivea</u> (Nutt.) Luer (Orchidaceae) | | 5 | Occurs locally in "Loop" area of BICY between Oasis and Roberts Lake Strand. | Reaches S limit of its range in BICY. Range extends to Texas and New Jersey. | NI |
| <u>Habenaria quinqueseta</u> (Michx.) A. A. Eaton var. <u>quinqueseta</u> (Orchidaceae) | | 3 | Present sparingly in pinelands of Long Pine Key, ENP. Also present, but rare in hammocks of Pinecrest area, BICY. | Native to SE U.S., Florida to SE Texas and South Carolina. Rare in pinelands of south Dade Co. and on Big Pine Key, Monroe Co. | NI |
| <u>Encyclia tampense</u> (Lindl.) Small (Orchidaceae) Butterfly Orchid | | 3 | Very common in hammocks, mangrove zone, and cypress forests of ENP and BICY. Present in BISC. Has been greatly reduced locally by fire and probably by collecting. | Most abundant orchid in South Florida, although declining. Present in peninsular Florida and Bahamas. | V2, F1 |
| <u>Encyclia cochleata</u> (L.) Dressler (Orchidaceae) Clamshell Orchid | | 3 | Present in many hammocks of Long Pine Key, ENP. Also in cypress strands of BICY. | Moderately common in South Florida. Not found elsewhere in U.S. Also present in West Indies, Mexico, Central America, Colombia, and Venezuela. | V1, F1 |

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| <u>Encyclia boothiana</u> (Lindl.) Dressler (Orchidaceae) Dollar Orchid | T | E | 1 | Rare in mangrove zone of ENP, especially on burtonwood. | Also known from Key Largo, but not elsewhere in U.S. Also present in West Indies, Mexico, Guatemala, Belize. | V1, R |
| <u>Epidendrum anceps</u> Jacq. (Orchidaceae) Brown Epidendrum | | | 3 | Locally common in cypress strands in BICY and possibly present in ENP as well. | Fairly common in Fakahatchee Strand and vicinity, but not present in U.S. outside Florida. Also present in West Indies, Mexico, Central and South America. | 1 |
| <u>Epidendrum difforme</u> Jacq. (Orchidaceae) Umbellid Epidendrum | | | 2 | Recorded from BICY from hammock near L-28 Tieback Canal (Black and Black, 1978) and probably present elsewhere in BICY. | Fairly common in South Florida, but not present elsewhere in U.S. Also present in West Indies, Mexico, Central and South America. | 1 |
| <u>Epidendrum nocturnum</u> Jacq. (Orchidaceae) Night-blooming Epidendrum | | T | 3 | Fairly common in Long Pine Key hammocks of ENP and in cypress forests of BICY. | Widespread but becoming rare, in South Florida. Not present elsewhere in U.S. Also present in West Indies, Mexico, Central and South America. | V1, F1 |
| <u>Epidendrum acunae</u> Dressler (Orchidaceae) | | | 2 | Very rare. Believed to occur in one locality in cypress strand in BICY. | Formerly known in U.S. only from Fakahatchee Strand. Also present in Cuba, Central America. | 1 |
| <u>Epidendrum rigidum</u> Jacq. (Orchidaceae) Matted Epidendrum | | | 3 | Moderately common in Long Pine Key hammocks of ENP and in cypress forests of BICY. | One of the commonest orchids of South Florida, but declining. Not present elsewhere in U.S. Also present in West Indies, Mexico, Central and South America. | V2, F1 |

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| <u>Polystachya concreta</u> (Jacq.) Garay & Sweet (Orchidaceae) | | 3 | Fairly common in hammocks of Long Pine Key of ENP. Uncommon in hammocks of mangrove zone, ENP. Uncommon in cypress strands of BICY. | Moderately common over much of South Florida, but not found elsewhere in U.S. Also in West Indies, Mexico, Central and South America, Africa, South Asia, Indonesia, and Philippines. | V2, F1 |
| <u>Cyrtopodium punctatum</u> (L.) Lindl. (Orchidaceae) | | 1 | Extremely rare in hammocks of Long Pine Key of ENP and sparingly present in mangrove forests on the north shore of Florida Bay. Uncommon, but widespread, in cypress forests of BICY. | Present in U.S. only in South Florida, primarily in vicinity of Big Cypress swamp. Also in West Indies, Mexico, Central, and South America. | V1 |
| Cow Horn Orchid | | | | | |
| <u>Govenia utriculata</u> Lindl. (Orchidaceae) | | 2 | Discovered in 1957 in one hammock of ENP in Long Pine Key area. Not seen recently. | Not present elsewhere in U.S. Also present in West Indies, Central, and South America. | |
| <u>Galandra beyrichii</u> Reichenb. f. (Orchidaceae) | | 2 | In ENP, known only from trailside in one Long Pine Key hammock. Plant apparently may lie dormant for several years. | Present in several tropical hardwood hammocks of Dade Co. Also in West Indies, South America. | V1? (yet only known site in ENP is adjacent to surfaced trail); F1 |
| <u>Maxillaria crassifolia</u> (Lindl.) Reichenb. f. (Orchidaceae) | | E 1 | Rather abundant at one locality in BICY, where it is epiphytic on pond apple. | Otherwise known (Luer, 1972) in U.S. only from Fakahatchee Strand. Also in West Indies, Central and South America. | V1, F1 |
| <u>Brassia caudata</u> (L.) Lindl. (Orchidaceae) | | RE 1 | Until recently was known from one hammock (Block A) of Long Pine Key. The last remaining known individual in the wild was killed by the freeze of January 1977. Persists in cultivation in limited numbers. | Present until 1920's in Nixon-Lewis Hammock near Homestead. Never elsewhere in U.S. than Dade Co. Also in West Indies, Central and South America. | R |
| Spider Orchid | | | | | |

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| <u>Oncidium ensatum</u> Lindl. (= <u>O. floridanum</u> Ames) (Orchidaceae) | | 1 | Infrequent in hammocks of Long Pine Key in ENP. | Present in U.S. only in South Florida, north to Collier Co. Also in Bahamas. | V2 (V1?), F1 |
| <u>Oncidium altissimum</u> (Jacq.) Sw. (= <u>O. luridum</u> Lindl.) (Orchidaceae) Mule-ear orchid | | 1 | Main habitat in U.S. is in mangrove zone of ENP. | Present in U.S. only in South Florida, north to Collier County. Also in West Indies, Mexico, Central and South America. | V1 |
| <u>Oncidium carthagenense</u> (Jacq.) Sw. (Orchidaceae) | RE | 2 | Collected near Coot Bay (ENP) in 1915 by J. K. Small and not seen in U.S. since. | Present in West Indies, Mexico, Central and South America. | |
| <u>Macradenia lutescens</u> R. Brown (Orchidaceae) Trinidad Macradenia | | 1 | Present until recently (Luer, 1972) in a hammock of ENP. May be extinct in the U.S. | Not known in U.S. outside ENP. Formerly present at several other Dade Co. sites. Also occurs in West Indies, South America. | R, although gene pool may already be lost and species does thrive in cultivation. |
| <u>Lonopsis utricularioides</u> Lindl. (Orchidaceae) | | 3 | Locally common in cypress strands and associated communities (pond apple and pop ash ponds) in BICY. Also present in mangrove forests of western ENP. | Present in U.S. only in South Florida, where it grows primarily in Collier Co. Also in West Indies, Central America, South America. | V1, F1 |
| <u>Pleurothallis gelida</u> Lindl. (Orchidaceae) | | | Known in ENP from single collection in ENP Herbarium from "cypress slough, west side of park." | Uncommon in Fakahatchee Strand. Present in tropical America. | |
| <u>Polytriza lindenii</u> (Lindl.) Cogn. ex Urban (Orchidaceae) Ghost Orchid | | 3 | Present in cypress strands of BICY. | Present in Fakahatchee strand, Bahamas and Cuba. | V1, F1 |

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| <u>Peperomia floridana</u> Small (Piperaceae) | | 3 | Present in a few hammocks on Long Pine Key ENP. Also in cypress strands within BICY. | Fakahatchee, Dade hammocks, Broward. F1, V2 Endemic to south Florida. (Note: Recent oral communications claim that this is a synonym of <u>P. obtusifolia</u>) | |
| <u>Peperomia obtusifolia</u> (L.) Dierr. (Piperaceae) | R | 4 | Present in only a few of the Long Pine Key hammocks of ENP, and formerly known from the Flamingo area. | Present in some Dade Co. hammocks but not in others. Also in the Fakahatchee Strand. Wide ranging in tropical America. | F1, V2 |
| <u>Schoepfia chrysophyloides</u> (A. Rich.) Planchon (Olacaceae) Gulf Graytwig | | 5 | Uncommon in hammocks of Long Pine Key and in hammocks N of Long Pine Key, ENP. Present in numerous hammocks of Pinecrest area of BICY (Black and Black, 1978). | Present in U.S. only in Florida, from Upper Keys N to Volusia and Pinellas Cos. Rare outside ENP. | F1 |
| <u>Aristolochia pentandra</u> (Jacq.) (Aristolochiaceae) | | 2 | Very rare on Elliott and Sands Keys, BISC. | Also in West Indies. | N2 |
| <u>Okenia hypogaea</u> Schlect. & Cham. (Nyctaginaceae) | E | 2 | Present on one key on the Gulf in Ten Thousand Islands, ENP. | Rare on beaches, Key Biscayne to Jupiter, east coast of Florida. Also in Mexico. | |
| <u>Clematis baldwinii</u> T. & G. (Ranunculaceae) | | | Rare in pinelands of Long Pine Key, ENP. Appears to be an annual species which initiates life cycle with germination following fire. | Endemic to Florida. Present in pinelands of Dade Co. Status elsewhere unknown to authors. | F2 |
| <u>Prunus myrtifolia</u> (L.) Urb. (Rosaceae) West Indian Cherry | | 3 | Locally fairly common in hammocks of Long Pine Key, ENP. Not known from hammocks of BICY (Black and Black, 1978). | Rare in hammocks of Dade County. Absent from Florida Keys. Also in West Indies. | F1, M2 |

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| <u>Licania michauxii</u> Prance (Chrysobalanaceae) Gopher Apple | | 4 | Uncommon in east end of Long Pine Key, ENP. | Uncommon in various pinelands of Dade Co. and on the lower Florida Keys. Ranges north to Georgia and Mississippi. Common in central Florida. | F2, M1 |
| <u>Acacia pinetorum</u> Hermann (Leguminosae) Pineland Acacia | | 3 | Present sparingly in pinelands and glades of Long Pine Key, ENP. | In pineland and scrub from Lee and Dade counties to the lower Florida Keys. Also in West Indies. | F2, M2 |
| <u>Rhynchosia cinerea</u> Nash (Leguminosae) | T | 3 | Rare in pinelands of Long Pine Key, ENP. | Present in pinelands of Lower Florida Keys and in Florida north to Lake Co. Endemic to Florida. | F2 |
| <u>Rhynchosia swartzii</u> (Vail) Urban (Leguminosae) | | 2 | Probably present on the Keys of BISC, but not seen recently. | Rare in hammocks of Florida Keys. Also in Bahama Islands and Cuba. | I, N1 |
| <u>Cassia deeringiana</u> (Small & Penn.) Macbr. (Leguminosae) | | 4 | Widespread and common in pinelands of Long Pine Key, ENP. | Endemic to Florida. Found in south Florida, west central Florida, and the panhandle. | F2, M1 |
| <u>Desmodium lineatum</u> DC. (Leguminosae) | | 3 | Rare and local in pinelands of Long Pine Key, ENP. | Known from several remnant pinelands of Dade Co. outside ENP. Ranges north in sandy pinelands to Maryland and Louisiana. | F2, M1 |
| <u>Tephrosia florida</u> (F. G. Dierr.) C. E. Wood (Leguminosae) | | 3 | Rare and local in pinelands of Long Pine Key, ENP. | N to Louisiana and North Carolina. Known from a few pinelands of South Dade Co. | F2 |

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| <u>Aeschynomene pratensis</u> Small var. <u>pratensis</u> (Leguminosae) | | 5 | Present in Taylor Slough and Shark Valley in ENP. | Endemic to South Florida. Known from Broward Co. and is probably present in the three conservation areas of southeast Florida. | NI |
| <u>Indigofera keyensis</u> Small (Leguminosae) | | 5 | No ENP specimen in ENP herbarium, but reported from area near Flamingo. | Endemic to South Florida. Present in Upper and Middle Florida Keys. | NI |
| <u>Stylosanthes calcicola</u> Small (Leguminosae) | | 4 | Uncommon in pinelands and pineland-glade margins of Long Pine Key, ENP. | Formerly considered endemic to South Florida. Present in pinelands and pineland-glade margins of Dade Co. and lower Florida Keys. Recently found on Grand Bahama Island. | F2 |
| <u>Galactia pinetorum</u> Small (Leguminosae) | | 3 | Uncommon in pinelands of Long Pine Key, ENP. | Endemic to South Florida. Present in pinelands of Dade Co. Taxonomic status uncertain. | F2, M2 |
| <u>Linum carteri</u> Small var. <u>smallii</u> Rogers (Linaceae) | E | 3? | Present in eastern part of ENP (entrance area and Long Pine Key). Also known from Monument Road area of BICY. | Endemic to South Florida. Confined to Dade Co. | I, NI, seems to thrive in disturbed habitats (roadsides, levees, etc.) |
| <u>Guaiacum sanctum</u> L. (Zygophyllaceae) <u>Lignum-Vitae</u> | T | 1 | Locally present on Totten and Old Rhodes Key in BISC. | Uncommon and local in Upper Florida Keys. Also West Indies and Central America. | V2 |
| <u>Alvarada amorphoides</u> Liebm. (Simarubaceae) Mexican Alvarada | | 1 | Uncommon in pinelands of Block A, western Long Pine Key, ENP. | Occurs in a few hammocks of South Dade Co. Very rare. Also in Bahamas, Cuba, and Central America to Nicaragua. | F1?, F2, M1 |

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| <u><i>Polygala boykinii</i></u> Nutt. var. <u><i>sparsifolia</i></u> Wheelock (Polygalaceae) | T | | 3 | Locally common in pinelands of Long Pine Key, ENP. This may be the only area occupied by this taxon on the U.S. mainland. | Formerly believed to be a South Florida endemic, but now known to exist also in Bahamas where it is widespread. Also present in pinelands of lower Florida Keys. | F2 |
| <u><i>Croton humilis</i></u> L. (Euphorbiaceae) | | | 2 | Rare on dry limestone outcrops on hammock margins in BICY north of Pinecrest. Presently known only from BICY in Florida. | Formerly present on Big Pine Key, but now extirpated. Present in South Florida, South Texas, Mexico. | F2 |
| <u><i>Stillingia sylvatica</i></u> L. ssp. <u><i>tenuis</i></u> (Small) Rogers (Euphorbiaceae) | T | | 4 | Uncommon in pinelands of Long Pine Key, ENP. Has been collected in Collier Co. and is probably present in BICY. | Also present at pinelands sites of Dade County outside ENP. Endemic to Dade and Collier counties. | F2 |
| <u><i>Hippomane mancinella</i></u> L. (Euphorbiaceae) Manchineel | | T | 3 | Locally common in hammocks within man-grove zone of SW portion of ENP. Rare in BISC. | Very rare or absent in Dade Co. outside ENP. Moderately rare in Florida Keys as a result of use for timber and deliberate destruction because of poisonous properties. Widespread in American tropics. | NI |
| <u><i>Ateramnus lucidus</i></u> (Sw.) Rothm. (= <u><i>Gymnanthes lucida</i></u>) (Euphorbiaceae) Crabwood | | | 5 | Abundant on islands of BISC. A dominant tree species of old-growth hammock forest of Totten Key. Very rare in hammocks of Long Pine Key, ENP. | Common in upper Florida Keys, but very rare on mainland (Long Pine Key may be only locality). Also in West Indies, Mexico, Central America. | F1 |
| <u><i>Poinsettia pinetorum</i></u> Small (Euphorbiaceae) | | | 4 | Widespread and fairly common in pinelands of Long Pine Key, ENP. | Endemic to South Florida. Very limited distribution outside ENP, but known to be present in several Dade Co. limestone pinelands outside ENP. | F2, M1 |

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| <u>Drypetes lateriflora</u> (Sw.) Krug & Urb. (Euphorbiaceae) Guiana-plum | | 3 | Present in a few hammocks of Long Pine Key in ENP and in a few hammocks north of Pinecrest and in Bear Island area of BICY. Also present in hammocks in BISC. | Rare from Florida Keys N to Broward Co., Fla. Also in West Indies, southern Mexico, Central America. | F1 |
| <u>Chamaesyce garberi</u> (Engelm. ex Chapm.) Small (Euphorbiaceae) | E | 1 | Rare in Block A of pinelands of Long Pine Key of ENP. Also present in prairie areas of Cape Sable. This taxon may now be confined to ENP. | Recorded for Florida Keys but not seen there recently. Endemic to South Florida. | F2 |
| <u>Chamaesyce cumulicola</u> Small (Euphorbiaceae) | T | | Not reported from Ten Thousand Islands of ENP, but probably exists there. Formerly collected on Elliott Key of BISC, but not known from there at present. | Endemic to South Florida. Still present on the shores of Collier Co., but seems to be gone from its former range in Dade Co. | I, R (BISC) |
| <u>Chamaesyce pinetorum</u> Small (Euphorbiaceae) | | 4 | Widespread and common in pinelands of Long Pine Key, ENP. | Endemic to South Florida. Seems to be confined to limestone pinelands of South Dade Co. Still present in pinelands outside ENP. | F2, M1 |
| <u>Chamaesyce conferta</u> Small (Euphorbiaceae) | | 4 | Present on Long Pine Key, ENP, where distribution is spotty. Also present in Pinecrest, BICY. | Endemic to South Florida. Rare in pinelands of Dade Co. Can become weedy in disturbed sites adjacent to its normal habitat. | F2 |
| <u>Chamaesyce porteri</u> Small var. <u>porteri</u> (Euphorbiaceae) | T | 4 | Common in pinelands of Long Pine Key. Recently discovered in Lostman's Pines area of BICY, where it is rare. | Rare outside ENP in Dade Co. pinelands. Endemic to South Florida. | F2, M1 |

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| <i>Phyllanthus pentaphyllus</i> C. Wright ex Griseb. var. <i>floridanus</i> Webster (Euphorbiaceae) | T | 4 | Abundant and ubiquitous in pinelands of Long Pine Key, ENP. | Endemic to South Florida. Confined to limestone pinelands of South Dade Co. and lower Florida Keys. | F2, M1 |
| <i>Tragia saxicola</i> Small (Euphorbiaceae) | T | 4 | Very common in pinelands of Long Pine Key, ENP. | Endemic to South Florida. Confined to limestone pinelands of South Dade Co. and lower Florida Keys. | F2, M1 |
| <i>Argythamnia blodgettii</i> (Torr.) Chapm. (Euphorbiaceae) | T | 1 | Rare and localized in a portion of Block A, of pineland, Long Pine Key, ENP. | Endemic to South Florida. Known from a few pinelands of South Dade Co. and lower Florida Keys. | F2, M1 |
| <i>Ilex krugiana</i> Loes. (Aquifoliaceae) Tawnyberry Holly | T | 3 | Uncommon in pinelands and hammocks of Long Pine Key, ENP. Seems to be most common in pineland Block J. Apparently not present in BICY (Black and Black, 1978). | Very rare outside ENP in U.S. Present in at least one pineland area (Camp Owissa Bauer) of South Dade Co. and also in a few of the Dade Co. hammocks. Also in West Indies. | M1, probably fire sensitive, but persists in burned pinelands. |
| <i>Calyptranthes zuzygium</i> (L.) Sw. (Myrtaceae) Myrtle-of-the-River | | 1 | Very rare, but locally common in Paradise Key and present in Mahogany Hammock of ENP. | Present in upper Florida Keys. Also in West Indies. | F1 |
| <i>Calyptranthes pallens</i> Griseb. (Myrtaceae) | | 5 | Fairly common in hammocks of saline zone in SE ENP. Uncommon in hammocks of Long Pine Key and in hammocks of rocky glades N of Long Pine Key, ENP. Uncommon in hammocks of BICY and BISC. | Widespread, but seldom common in South Florida, including Florida Keys. Also in Mexico, West Indies. | F1 |

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| <u>Eugenia confusa</u> DC. (Myrtaceae) Red Stopper | | 5 | Small populations known on islands of BISC. One of the major species of old-growth hammock forest on Totten Key. | Present in Brickell Hammock in Miami, Matheson Hammock and several other hammocks of East Dade Co. and on Key Largo in Monroe Co. Also in West Indies. | NI |
| <u>Myrcianthes fragrans</u> (Sw.) McVaugh var. <u>simpsonii</u> (Small) R. W. Long (Myrtaceae) Simpson's Stopper | | 5 | Locally common in hammocks of Long Pine Key, ENP and in hammocks N of Long Pine Key. Also common in most of the tropical hammocks in BICY. | Endemic to South Florida. (According to Little (1976), it is restricted to Dade Co. and is rare and local.) | F1? Appears to have been stimulated by fire in some hammocks, but absent from adjacent pinelands. |
| <u>Ludwigia spathulifolia</u> Small (Onagraceae) | | 2 | Present in Taylor Slough of ENP. | Known from Dade and Lee counties. Endemic to South Florida. Taxonomy and distribution poorly understood. | 1 |
| <u>Jacquinia keyensis</u> Mez (Theophrastaceae) Joe Wood | | 3 | Scattered plants on Long Pine Key, and on Florida Bay Keys, and in shore hammocks of the mainland, all in ENP. Present throughout the keys of BISC. | Ranges north on west coast of Fla. to Charlotte Co. Present in West Indies. Threatened: Fla. Law, 1978. | F2 in pinelands; M1 |
| <u>Bumelia reclinata</u> (Michx.) Vent. (Sapotaceae) | | 4 | Common in transverse glades on Long Pine Key, ENP. Present in BICY. | Ranges through Florida and to Georgia and Louisiana. | NI |
| <u>Manilkara bahamensis</u> (Baik.) Lam. & Meuse (Sapotaceae) | | 5 | Locally present along Florida Bay shore in ENP. Present in hammocks of BISC. | Locally common in Florida Keys. Also in Bahama Islands, West Indies. | NI |

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| <u>Crossopetalum rhacomia</u> <u>Crantz</u> (Celastraceae) | 1 | | Rare in pinelands of Long Pine Key, ENP. Rare in hammocks of BISC. | Known from a few pinelands of Dade Co. outside ENP. Also reported from several areas near the coast in Collier Co. More common on the Florida Keys than on the mainland. West Indies. | M1, a species of hammock margins, probably unable to withstand repeated severe fire, but requiring open canopy. |
| <u>Maytenus phyllanthoides</u> <u>Benth.</u> (Celastraceae) | 2 | | Uncommon in BISC. Probably present on the Fla. Bay keys of ENP. Habitat is hammocks, dunes. | Rare in Florida Keys. Also present on W coast of Florida N to Levy Co. Also in south Texas, southern California and Mexico. | N1 |
| <u>Schaefferia frutescens</u> <u>Jacq.</u> (Celastraceae) | 2 | | Uncommon in BISC. | Rare in Florida Keys and coastal areas of SE Dade Co. Also in Bahama Islands, West Indies, elsewhere in tropical America. | N1 |
| <u>Hypelate trifoliata</u> Sw. (Sapindaceae) White Ironwood | T | 1 | Uncommon and very localized in pinelands and hammocks of western Long Pine Key, ENP. | Very rare in Florida Keys and perhaps near Homestead in Dade Co. Also West Indies. | F1, F2, M1, appears to require open canopy of pinelands, but sensitive to severe fire. I-range in BISC unknown. |
| <u>Colubrina cubensis</u> <u>(Jacq.) Brongn.</u> var. <u>floridana</u> M. C. Johnston. (Rhamnaceae) | | 1 | Uncommon in pinelands of western Long Pine Key, ENP. | Very rare in South Dade Co. outside ENP. Present in Nixon-Lewis hammock near Homestead. Var. <u>floridana</u> occurs in South Florida and Andros Island of Bahamas. Other varieties present in Cuba and Hispaniola. | M1, appears to require open canopy of pinelands or hammock edges, but probably sensitive to severe fire. |

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| <u>Colubrina arborescens</u> (Mill.) Sarg. (Rhamnaceae) Coffee Colubrina | | 3 | Uncommon in pinelands of Long Pine Key, ENP. Fairly common in hammocks within mangrove zone of ENP. Rare in hammocks north of Pinecrest in BICY. Reported for Sands Key, BISC. | Present in coastal hammocks of South Florida and Florida Keys. Also in West Indies, Mexico, Central America. | MI, I - range in BISC not known. |
| <u>Colubrina elliptica</u> (Sw.) Briz. & Stern (Rhamnaceae) Soldierwood | | 2 | May be present on islands of BISC. Recorded from vicinity of Key Largo Ranger Station, ENP. | Present in U.S. only in upper Florida Keys. West Indies. | I - range in BISC unknown. |
| <u>Reynosa septentrionalis</u> Urban (Rhamnaceae) Darling Plum | | 5 | Fairly common on islands of BISC. Possibly present on the shores and keys of Fla. Bay, ENP. | Locally common in Florida Keys in a wide variety of vegetation types on mainland. Also in Bahama Islands. | NI, I - range in ENP unknown. |
| <u>Vitis shuttleworthii</u> House (Vitaceae) Calusa Grape | | ? | Recorded from vicinity of Donut Lake near Paradise Key, ENP, and from roadside scrub on Long Pine Key. | Apparently somewhat rare in South Florida. Endemic to Florida. Status elsewhere not known to authors. | Habitat is successional vegetation. |
| <u>Gossypium hirsutum</u> L. (Malvaceae) Wild Cotton | E | 3 | Locally present in coastal hammocks and on Florida Bay keys of ENP. | Rare on Florida Keys. Tropical America. | NI - Survived many years of attempted eradication. |
| <u>Pavonia spicata</u> Cav. (Malvaceae) Mangrove Mallow | | 2 | Uncommon in mangrove zone of western ENP. | Mangrove zone of South Florida, tropical America. Occurs outside ENP in SE Dade Co. | NI |

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| <u>Canella winterana</u> (L.) Gaertn. (Cannellaceae) | | | 5 | Present in hammocks within mangrove zone of SW portion of ENP. Fairly common on islands of BISC. | Present in U.S. in hammocks of Florida Keys and SW portion of ENP. Also in West Indies and elsewhere in tropical America. | N1 |
| <u>Hibiscus grandiflorus</u> Michx. (Malvaceae) | | | 3 | Present in solution holes of transverse glades of Long Pine Key, ENP. Also present in BICY. | Rare in "East Glades" area of Dade Co.; more common there before drainage. Ranges N on coastal plain to Mississippi and Georgia. | N1 |
| <u>Passiflora sexiflora</u> Juss. (Passifloraceae) | | | 1 | Known from Paradise Key, ENP, but not seen recently. | Known from Castellow and Nixon-Lewis Hammocks, north of Homestead. Also in Mexico, West Indies, elsewhere in tropical America. | F1, R |
| <u>Rhipsalis bacillifera</u> (J. S. Mill) Stearn (Cactaceae) | | RE | 2 | Formerly found sparingly in mangrove forests of Flamingo - Cape Sable region, ENP. Seems to have been destroyed by hurricanes of 1960 and 1965. | Also in Mexico, West Indies, other parts of tropical America, tropical Africa, and Ceylon (only cactus native in Old World). | R |
| <u>Cereus gracilis</u> Mill var. <u>stimpsonii</u> (Small) L. Benson (Cactaceae) | E | T | 3 | Locally fairly common in forests of saline zone adjacent to Florida Bay, ENP. Present sparingly on islands of BISC. | Uncommon in coastal hammocks of South Florida and Florida Keys. | V2 |
| <u>Diospyros virginiana</u> L. (Ebenaceae) Persimmon | | | 5 | Rare in pinelands and hammocks of Long Pine Key, ENP. Common in hammocks N of Pinecrest in BICY. | Present on Key Biscayne and in a few hammocks near Homestead. Species ranges N to Connecticut and Iowa. Included here only because it is rare at its southern limit in ENP. | F1, but persists in pinelands. |

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| <i>Forestiera segregata</i> (Jacq.) Krug & Urb. var. <i>pinetorum</i> (Small) M. C. Johnston. (Dileaceae) | E | 3 | Moderately common in portions of pinelands of Long Pine Key, ENP. | Endemic to South Florida. Present in remnant Dade Co. pinelands. | F2, M1 |
| <i>Leiphalimos parasitica</i> Schlecht & Cham. (Gentianaceae) | | 3 | Apparently moderately rare, but very inconspicuous in hammocks of Long Pine Key, ENP. | Plants saprophytic on leaf mold in hammocks in South Florida and Florida Keys. Very inconspicuous. Also in West Indies. | F1 |
| <i>Vallesia antillana</i> Woodson (Apocynaceae) | | 5 | Uncommon in hammocks of mangrove zone in southern portion of ENP, W to Cape Sable. Also recorded from BISC. | Present in Florida Keys. Also elsewhere in West Indies. | N1 |
| <i>Cynanchum bahamense</i> (Griseb.) Gillis (Asclepiadaceae) | | 2 | Very rare in BISC. | Present on a few of the Florida Keys. Also Bahamas and Cuba. | I, N2 |
| <i>Ipomoea microdactyla</i> Griseb. (Convolvulaceae) | | 3 | Widespread, but rare, in pinelands of Long Pine Key, ENP. | In U.S., confined to pinelands of South Dade Co. Occurs in at least one pineland (Camp Owissa Bauer) outside ENP. Also West Indies. | F2, M1 |
| <i>Ipomoea tenuissima</i> Choisy (Convolvulaceae) | | 4 | Locally fairly common in pinelands of Long Pine Key, ENP. | Apparently restricted to pinelands of South Florida. Also in West Indies. | F2, M1 |
| <i>Jacquemontia curtisii</i> Peter ex Hall. f. (Convolvulaceae) Pineland Morning-Glory | T | 4 | Common in pinelands of Long Pine Key, ENP. Present in pinelands of BICY. | Endemic to South Florida. Present in pinelands of South Dade Co. as well as in "rocky glades" areas. Also in pinelands of Collier and Hendry Cos. | F2, M1 |

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| <u>Bourreria cassinifolia</u> (A. Rich.) Griseb. (Boraginaceae) | | 1 | Very rare in pinelands of Long Pine Key, ENP. | Very rare in pinelands of South Dade Co. Present in several remnant pinelands outside ENP; also on Big Pine Key of Monroe Co. | F2, M1 |
| <u>Cordia globosa</u> (Jacq.) HBK. var. <u>humilis</u> (Jacq.) I. M. Johnston. (Boraginaceae) | | 5 | Locally common in hammocks of mangrove zone in ENP. Recorded from two hammocks (Turner River and near Pinecrest) from BICY. Not recorded from BISC. | Coastal hammocks of South Florida and Florida Keys. Also in West Indies. | N1 |
| <u>Cordia sebestena</u> L. (Boraginaceae) Geiger-tree | | 1 | Present in coastal hammocks along Florida Bay in ENP. Scattered plants on shores at BISC. | Present in U.S. only in Florida Keys and extreme S portion of Florida mainland. | N2?, V2 |
| <u>Mallotonia gnaphalodes</u> (L.) R. Brown (= <u>Tournefortia gnaphalodes</u>) (Boraginaceae) Sea-Lavender | T | 1 | Present on E coast of Elliott Key, BISC. Also FOJE (Garden Key). | Uncommon in coastal strand areas of South Florida and the Florida Keys. Also in West Indies. | N2?, V2 |
| <u>Tournefortia hirsutissima</u> L. (Boraginaceae) | | 5 | Known from Paradise Key, ENP. Present in hammocks in various parts of BICY. | Distribution in South Florida is limited to a few hammocks in South Dade Co. Also present elsewhere in tropical America. | F1 |
| <u>Lantana depressa</u> Small (= <u>L. ovalifolia</u> var. <u>reclinata</u>) (Verbenaceae) | | 4 | Locally fairly common in pinelands of Long Pine Key, ENP. | Endemic to South Florida. Confined to limestone pinelands of South Dade Co. | F2, M1 |

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| <u>Verbena maritima</u> Small (Verbenaceae) | | 1 | Rare in pinelands of Long Pine Key, ENP, mainly in "Pine Island" area. Also collected from hammock N of Pinecrest in BICY. | Endemic to Florida. Occurs along E Florida coast, N to Volusia Co. | F2 in pinelands |
| <u>Hyptis alata</u> (Raf.) Shimmers var. <u>stenophylla</u> Shimmers (Labiatae) | | 4 | This variety is probably the one present on Long Pine Key of ENP and in the surrounding glades. Probably also present in BICY. | Endemic to South Florida. Common in the south half of Dade Co., and recorded from Collier Co. | F2 |
| <u>Ocimum micranthum</u> Willd. (Labiatae) Wild Basil | | 2 | Rare and local. Known from limestone outcrops in one hammock of Long Pine Key, ENP and in several hammocks N of Pinecrest in BICY. | Present at widely separated places on hammock margins and glade margins in South Dade Co. and on the Fla. Keys. Also in West Indies, Mexico, and elsewhere in tropical America. | N1 |
| <u>Pinguicula pumila</u> Michx. var. <u>buxwellii</u> Moldenke (Lentibulariaceae) | | | Type specimen of variety is from the edge of BICY, and it may still be in BICY. | Endemic to South Florida, but local range unknown to authors. | 1 |
| <u>Utricularia resupinata</u> Greene (Lentibulariaceae) | | 5 | Scattered patches of plants on margins of lower Taylor Slough in ENP. More common in cypress prairie areas in BICY. | Not known to authors outside of South Florida parks. | N1 |
| <u>Stenandrium dulce</u> (Cav.) Nees var. <u>floridana</u> Gray (Acanthaceae) | | 4 | Widespread, but sparingly present in Muhlenbergia - dominated prairies and pinelands of ENP and BICY. | Endemic to Florida. Ranges north to Citrus and Osceola Cos. Usually noticed only when in bloom following fire. | F2 |

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| <u>Elytraria carolinensis</u> (J. F. Gmel.) Pers. var. <u>angusta</u> (Fern) Blake (Acanthaceae) | T | | 4 | Fairly common in transverse glades of Long Pine Key, ENP. Present in pinelands of BICY. | E endemic to South Florida. Present in low pinelands and glades of Dade Co. | F2 |
| <u>Dyschoriste oblongifolia</u> (Michx.) Kuntze var. <u>angusta</u> (Gray) R. W. Long (Acanthaceae) | | | 4 | Abundant and ubiquitous in pinelands of Long Pine Key, ENP. Also present in pinelands and prairies of BICY. | Virtually endemic to South Florida, although one station reported from Grand Bahama I. Fairly common in pinelands of Dade Co. and the Florida Keys. | F2, M1 |
| <u>Ruellia carolinensis</u> (J. F. Gmel.) Steud. var. <u>succulenta</u> (Small) R. W. Long (Acanthaceae) | | | 4 | Present in the transverse glades on Long Pine Key of ENP. | E endemic to South Florida. Range outside of ENP not well known. Present in glade at Larry and Penny Thompson Park in Dade Co. | F2 |
| <u>Borreria terminalis</u> Small (Rubiaceae) | | | 4 | Abundant in pinelands of Long Pine Key, ENP. Also present in rocky glades of ENP and in pinelands of BICY. | E endemic to South Florida. Present in pinelands of south Dade Co. and the Florida Keys. | F2, M1 |
| <u>Emodea littoralis</u> Sw. var. <u>littoralis</u> (Rubiaceae) | T | | 1 | Uncommon in beach dune communities along Florida Bay in ENP. | Confined in the U.S. to coastal areas of Florida, primarily South Florida. Also in West Indies. | NI |
| <u>Emodea littoralis</u> Sw. var. <u>angusta</u> (Small) R. W. Long (Rubiaceae) | T | | 1 | Not presently known from ENP, although Robertson recorded it at a site in pinelands of eastern Long Pine Key in the 1950's. | Very rare in pinelands of South Dade Co. Still present in several remnant pinelands (Navy Wells, Larry & Penny Thompson Park). Moderately common in pinelands of Lower Florida Keys. Also in West Indies. | F2 |

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| <u>Exostema caribaeum</u> (Jacq.) R. & S. (Rubiaceae) Princewood | | 2 | Rare in BISC (Elliott Key, Old Rhodes Key). | Present in U.S. only in Florida Keys where it is uncommon. Also in West Indies and from Mexico to Costa Rica. | NI - Formerly much used medicinally, but no collection pressure known at present. |
| <u>Melanthera parvifolia</u> Small (Compositae) | | 4 | Common in pinelands and glades of Long Pine Key area of ENP. | Endemic to South Florida. Pinelands of lower Florida Keys, Dade Co., and Broward Co. | F2, M1 |
| <u>Sachsisia polyccephala</u> Griseb. (Compositae) | | 4 | Widespread and common in pinelands of Long Pine Key, ENP. | Rare in remnant pinelands of South Dade Co. and lower Florida Keys. Also present in the Bahamas and Greater Antilles. | F2, M1 |
| <u>Ageratum littorale</u> Gray (Compositae) | | 5 | No ENP specimen in ENP herbarium, but reported from Flamingo area. | Endemic to South Florida. Locally common in Florida Keys. | NI |
| <u>Aster concolor</u> L. var. <u>simulatus</u> (Small) R. W. Long (Compositae) | | 2 | ENP Herbarium has specimen from pinelands at East boundary of ENP. Not seen recently in ENP by authors. | Endemic to South Florida pinelands. Rare, if still present at all, in remnant pinelands. Dade Co. only. | F2?, 1 |
| <u>Eupatorium frustistratum</u> B. L. Robinson (Compositae) | | 5 | Locally common in burtronwood zone of S and SW portion of ENP. | Endemic to South Florida. Present in a few of the upper Florida Keys. | NI - May be favored by periodic hurricanes which create favorable substrate. |

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| <u>Brickellia mosieri</u> (Small) Shimmers (= <u>Kuhnia eupatorioides</u> var. <u>floridana</u>) (Compositae) | T | 1 | Not presently known from ENP, but should be looked for in pinelands of Long Pine Key. | Endermic to South Florida. Very rare in limestone pinelands of South Dade Co. | Habitat in remnant pinelands outside ENP requires preservation and prescribed burning. |

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