

*Rare Plant Monitoring and Restoration on Long Pine Key,
Everglades National Park*

Annual Report
Cooperative Agreement #H5284-03-0044

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BACKGROUND

On August 28, 2003 The Institute for Regional Conservation (IRC) and Everglades National Park (ENP) signed cooperative agreement H5284-03-0044 “Rare Plant Monitoring and Restoration on Long Pine Key, Everglades National Park.” Scientific Research and Collecting Permit EVER-2003-SCI-0084 was issued on October 21, 2003 and field work commenced on that day. This report covers activities between August 28, 2003 and August 27, 2004.

SUMMARY OF ACTIVITIES FOR YEAR 1

- Field surveys of all historical locations in the Long Pine Key region were completed for 15 taxa listed as critically imperiled in Gann et al. (2002). Surveys were initiated for the remaining critically imperiled taxa.
- Field surveys for taxa listed as extirpated or historical in Gann et al. (2002) were completed.
- General site level data and field notes for all taxa found during the first year were entered into IRC’s Floristic Inventory of South Florida (FISF) Database.
- Rare plant habitat characterization and long term monitoring was initiated for 11 taxa with the installation of 28 vegetation plots.
- Data from vegetation plots was entered into an Excel spreadsheet.
- Augmentation and reintroduction needs of historical and extirpated taxa were assessed through meetings with Marie Selby Botanical Gardens (Selby) and Fairchild Tropical Botanic Garden (FTBG).

SUMMARY OF RESULTS FOR YEAR 1

- Thirty-nine historical locations for critically imperiled taxa on Long Pine Key were surveyed, resulting in the re-documentation of 50 rare plant stations.
- Five new stations for critically imperiled taxa reported by Tom Armentano, ENP, were confirmed.
- Surveys of historical and new locations resulted in the discovery of 26 new stations for critically imperiled taxa in the Long Pine Key area. This represents a 47% increase in the number of rare plant stations in the area.
- Two critically imperiled species classified by IRC as historical in ENP (*Thelypteris reticulata*, *T. serrata*) were rediscovered. In addition, *Thelypteris reticulata* was relocated in one of its natural habitats.
- *Ponthieva brittoniae*, a near endemic classified as historical in South Florida was rediscovered and a second, previously unknown, population was discovered.
- Surveys of 9 historical locations for the taxa currently considered to be historical or extirpated in South Florida did not result in the rediscovery of any of the taxa.
- Based upon data collected during Year 1, *Sideroxylon reclinatum* subsp. *austrofloridense* was down-ranked from critically imperiled to imperiled.
- A new native liana for the flora of North America, *Rhynchosia phaseoloides*, was identified from material observed by Woodmansee and Sadle prior to the initiation of this study. This species is now ranked as critically imperiled.
- A summary of survey results for Year 1 is provided (Table 1).

- In collaboration with FTBG and Selby, augmentation needs were assessed and recommendations developed for all study taxa in Long Pine Key (Table 2).

ACTIVITIES COMPLETED DURING YEAR 1

Task 1: surveys and mapping of critically imperiled species

Surveys were conducted at the following historical locations:

- Baker Hammock (*Oncidium ensatum*)
- Cadwalader Hammock (*Pecluma plumula*)
- Deer Hammock (*Hypelate trifoliata*, *Oncidium ensatum*)
- Deer Hammock Area (*Basiphyllaea corallicola*, *Spiranthes torta*)
- Dewhurst Hammock (*Pecluma plumula*)
- Fairchild Hammock (*Spiranthes costaricensis*)
- Grimshawe Hammock (*Oncidium ensatum*)
- Hole-in-the-Donut Area (*Thelypteris reticulata*, *Thelypteris serrata*)
- Long Pine Key, Gate 6 (*Helenium flexuosum*)
- Long Pine Key, Gate 8 (*Helenium flexuosum*)
- Osteen Hammock (*Adiantum melanoleucum*, *Eltroplectris calcarata*, *Lomariopsis kunzeana*, *Oncidium ensatum*, *Passiflora sexflora* and *Spiranthes costaricensis*)
- Osteen Hammock Area (*Sporobolus compositus* var. *clandestinus*)
- Palma Vista Hammock #2 (*Bourreria cassinifolia*, *Eltroplectris calcarata*, *Oncidium ensatum*, *Spiranthes costaricensis*)
- Pay-fee Hammock (*Eltroplectris calcarata*)
- Pfleuger Hammock (*Anemia wrightii*)
- Pine Block A (*Digitaria pauciflora*)
- Pine Block B (*Basiphyllaea corallicola*, *Hypelate trifoliata*)
- Pine Block C (*Digitaria pauciflora*)
- Pine Block D (*Digitaria pauciflora*)
- Pine Block E (*Helenium flexuosum*, *Ponthieva brittoniae*)
- Pine Block H (*Basiphyllaea corallicola*, *Bourreria cassinifolia*, *Desmodium lineatum* and *Digitaria pauciflora*)
- Pine Block I (*Basiphyllaea corallicola*, *Digitaria pauciflora*)
- Pine Block J (*Basiphyllaea corallicola* and *Desmodium lineatum*)
- Pine Island (*Thelypteris reticulata*, *Thelypteris serrata*)
- Redd Hammock (*Eltroplectris calcarata* and *Oncidium ensatum*)
- Robertson Hammock (*Oncidium ensatum*)
- Royal Palm Hammock (*Galeandra beyrichii*, *Oncidium ensatum*, *Passiflora sexflora*, *Spiranthes costaricensis*, *Thelypteris reticulata*, *Thelypteris serrata*)
- Say Hammock (*Oncidium ensatum*)
- Turkey Hammock (*Oncidium ensatum*)
- Warren Hammock (*Anemia wrightii*)

- Winkley Hammock (*Oncidium ensatum*)
- Wright Hammock and adjacent pinelands (*Bourreria cassinifolia*, *Oncidium ensatum* and *Ponthieva brittoniae*)

During Year 1 surveys, all critically imperiled species historically known from the above locations were relocated with the following exceptions:

- Osteen Hammock Area (*Sporobolus compositus* var. *clandestinus*)
- Pay-fee Hammock (*Eltroplectris calcarata*)
- Pine Block H (*Basiphyllaea corallicola*)
- Pine Block I (*Basiphyllaea corallicola*)
- Royal Palm Hammock (*Thelypteris serrata*, *Passiflora sexflora*)
- Say Hammock (*Oncidium ensatum*)

It seems likely that additional surveys will lead to the rediscovery of *Basiphyllaea corallicola* in adjacent Pine Blocks I and H, particularly after fire. This species is reported to flower at irregular intervals and may not have been visible at the time of the survey. In addition, the area where plants were last seen currently has a dense herbaceous layer, making relocation more difficult. *Sporobolus compositus* var. *clandestinus* is also likely to be relocated with resurveys in the roadway where it was originally found. On the other hand, it seems unlikely that additional surveys would lead to the rediscovery of *Eltroplectris calcarata* in Pay-Fee Hammock or *Oncidium ensatum* in Say Hammock, at least in the near term. These locations were more discreet and more thoroughly surveyed and both species were readily found in all other documented locations. Habitat alteration and exotic species invasions may have led to the extirpation of *Thelypteris serrata* and *Passiflora sexflora* in Royal Palm Hammock, however, either species may still occur in difficult to access areas of that hammock. Further surveys are recommended.

Five new stations reported by Tom Armentano were confirmed:

- Frampton Hammock (*Eltroplectris calcarata*, *Oncidium ensatum*)
- Pilsbry Hammock (*Eltroplectris calcarata*)
- Torre Hammock (*Hypelate trifoliata*)
- Wild Lime Hammock (*Oncidium ensatum*)

As the result of new surveys, the following new stations were discovered for critically imperiled plants:

- East boundary cypress dome (*Thelypteris reticulata*)
- Fairchild Hammock (*Eltroplectris calcarata*)
- Grimshawe Hammock (*Eltroplectris calcarata*)
- Mystery Hammock (*Oncidium ensatum*)
- Osteen Hammock (*Rhynchosia phaseoloides*)
- Palma Vista Hammock #1 (*Eltroplectris calcarata*, *Oncidium ensatum*)
- Palma Vista Hammock #2 (*Rhynchosia phaseoloides*)
- Pine Block A (*Hypelate trifoliata*, *Ponthieva brittoniae* and *Basiphyllaea corallicola*)
- Pine Block B (*Ponthieva brittoniae*)
- Pine Block D (*Helenium flexuosum*)
- Pine Block E (*Digitaria pauciflora*)

- Pine Block F (*Basiphyllaea corallicola*)
- Pine Block H (*Helenium flexuosum*)
- Pine Block I1 (*Digitaria pauciflora*)
- Pine Block I2 (*Desmodium lineatum*)
- Rattlesnake Hammock (*Eltroplectris calcarata*, *Oncidium ensatum* and *Spiranthes costaricensis*)
- Torre Hammock (*Oncidium ensatum*)
- an unnamed hammock near the Pineland Trail in Pine Block D (*Oncidium ensatum*)
- an unnamed hammock near Pine Glades Lake (*Oncidium ensatum*)
- Winkley Hammock (*Eltroplectris calcarata*, *Spiranthes costaricensis*)
- Wright Hammock area (*Basiphyllaea corallicola*)

At the completion of Year 1, all historical locations in the Long Pine Key area for the following critically imperiled species have been surveyed:

- *Adiantum melanoleucum*
- *Anemia wrightii*
- *Basiphyllaea corallicola*
- *Bouffieria cassinifolia*
- *Desmodium lineatum*
- *Hypelate trifoliata*
- *Lomariopsis kunzeana*
- *Oncidium ensatum*
- *Passiflora sexflora*
- *Pecluma plumula*
- *Ponthieva brittoniae*
- *Rhynchosia phaseoloides*
- *Spiranthes torta*
- *Thelypteris reticulata*
- *Thelypteris serrata*

The following historical locations for critically imperiled taxa were not surveyed during Year 1:

- Atoll Hammock (*Spiranthes costaricensis*)
- Avery Hammock (*Spiranthes costaricensis*)
- Hammock #120 (*Eltroplectris calcarata*, *Spiranthes costaricensis*)
- Pine Block H, W. edge of 3rd glade (*Digitaria pauciflora*)
- Long Pine Key, Glade 2 ½ (*Digitaria pauciflora*)
- Long Pine Key, Hole-in-the-donut, Glade 6 (*Digitaria pauciflora*)
- Mosier Hammock (*Eltroplectris calcarata*, *Galeandra beyrichii*)
- Sawmill Road (*Helenium flexuosum*)

Surveys for plants ranked as critically imperiled in South Florida and extirpated or historical in the Long Pine Key region of ENP were also conducted during Year 1:

- ENP east boundary west of Mowry Drive (*Dalea carthagenensis* var. *floridana*)
- Roadside and canal bank, 14 miles southwest of Paradise Key (*Dalea carthagenensis* var. *floridana*)
- Royal Palm Hammock (*Oncidium undulatum*, *Schizaea pennula* and *Trichomanes punctatum* subsp. *floridanum*)

The following location for plants ranked as critically imperiled in South Florida and extirpated or historical in ENP was not surveyed during Year 1:

- Pinelands around Mosier Hammock (*Croton lobatus*)

Two species ranked as historical or extirpated in ENP and critically imperiled in South Florida have been rediscovered in ENP as the result of this project. *Thelypteris reticulata* and *Thelypteris serrata* were both relocated in disturbed habitat dominated by *Schinus terebinthifolius* and *Ardisia elliptica*. In addition, *Thelypteris reticulata* was observed in two other locations. Previous reports of a cultivated plant growing at the edge of a solution hole along Gumbo Limbo Trail were confirmed; in addition, new recruits from this plant were observed. Plants were also found growing in a tree island along the eastern park boundary, a situation that likely represent one of the historical habitats for both *T. reticulata* and *T. serrata* before widespread hydrological modifications.

As discussed in Gann et al. (2002), the two historical collections of *Dalea carthagenensis* var. *floridana* from ENP indicate that the species may never have been established in the park. The site 14 miles southwest of Paradise Key is thought to be the junction of Old Ingraham Highway and Main Park Road, and the species may have been temporarily established on fill. The second station for this species, the ENP east boundary west of Mowry Drive, was surveyed via the canal road on the adjacent Water Management Area property and no plants were located. However, it is still possible that *D. carthagenensis* var. *floridana* is present in the park.

The one remaining historical location to be surveyed for taxa ranked as critically imperiled in South Florida and extirpated or historical in ENP is the pineland adjacent to Mosier Hammock for *Croton lobatus*. However, this species is ephemeral and appears immediately after fire. Surveys must wait until that area has burned.

Field notes and location data have been entered for all surveys undertaken during Year 1. In addition, photocopy of field notes are included (Appendix 1).

Task 2: surveys for historical and extirpated species

Surveys were conducted at the following locations during Year 1:

- Deer Hammock (*Brassia caudata*, *Macradenia lutescens*)
- Osteen Hammock (*Brassia caudata*, *Macradenia lutescens*)
- Palma Vista Hammock #2 (*Govenia utriculata*, *Prescotia oligantha*, *Tillandsia fasciculata* var. *clavispicata*)

- Royal Palm Hammock (*Macradenia lutescens*)
- Turkey Hammock (*Brassia caudata*, *Macradenia lutescens*)
- Winkley Hammock (*Brassia caudata*, *Macradenia lutescens*)

At the inception of this project, *Ponthieva brittoniae* was ranked as historical in South Florida. This species was rediscovered at or near one of its historical locations in a pine rockland near Winkley Hammock. Plants at this station had not been observed since 1987 despite frequent searches in the area by the authors and others. In addition to the population near Winkley Hammock, another population was discovered in the southern portion of Pine Blocks A and B. Each population contains over 100 plants and is separated by approximately 3 km. These individuals represent the only known plants in the United States (Sadle, et al. in prep.) As the result of this discovery, survey information about this species is included under Task 1 in this report. No other species ranked as historical or extirpated in South Florida were relocated during this project.

Plants of *Tillandsia fasciculata* observed in Palma Vista Hammock #2 and Turkey Hammock that were thought to possibly be *T. fasciculata* var. *clavispica* were later examined by bromeliad expert Harry Luther of Selby. These specimens were both determined to be *T. fasciculata* var. *densispica*. Although this taxon seems to be somewhat poorly defined, we agree with this determination and decided against obtaining herbarium loans of type material as indicated in the 2nd Quarterly report.

All known localities for the species listed as extirpated or historical in South Florida were surveyed during Year 1. Additional surveys for *Govenia utriculata* will be conducted in Palma Vista Hammock #2 in subsequent years to ensure that plants were not dormant when initial surveys were conducted. Additional surveys for other extirpated and historical species will be conducted in new localities concurrently with searches for other species.

Task 3: establishment of monitoring plots

Habitat characterization and long-term monitoring plots were installed for the following critically imperiled species: *Adiantum melanoleucum*, *Anemia wrightii*, *Basiphyllaea corallicola*, *Desmodium lineatum*, *Eltroplectris calcarata*, *Lomariopsis kunzeana*, *Oncidium ensatum*, *Passiflora sexflora*, *Pecluma plumula*, *Ponthieva brittoniae*, and *Rhynchosia phaseoloides*.

Five meter radius plots were centered on an individual of the taxon being studied. Each plot was visually divided into the following four vegetation classes: solution hole (< 0 m); herb (0-1 m); shrub (1-3 m); and canopy (>3 m). A list of all taxa occurring in each class was recorded. In addition, an estimate of percent cover was made for each species in each above-ground class. In the case of the solution hole class, the total percent coverage of solution holes was estimated for the entire plot. The estimated percent cover of the total area of solution holes for each species was then recorded.

Due to extremely limited numbers of extant individuals, one plot was established for *Passiflora sexflora*, one plot for *Adiantum melanoleucum* and two plots for *Lomariopsis kunzeana*. Three plots were established for each of the remaining species. Locations for plots were

selected in order to represent observed variability in community composition within the habitat of each species. Plot data is included in an attached Excel spreadsheet as well as a copy of the original field notes.

Task 4: assess augmentation needs

Two meetings were held to assess the augmentation needs and develop management recommendations for all species being studied. During the first meeting with FTBG collaborator Joyce Maschinski, each study species was discussed and initial recommendations were made. Recommendations developed during the first meeting were re-evaluated in a second meeting with collaborators from Selby. In addition, IRC and Selby staff as well as ENP botanist Craig Smith visited potential augmentation/reintroduction sites and discussed practical issues that may be encountered when initiating augmentations. A summary of recommendations is included (Table 2).

Task 5: reintroduction of extirpated plants

No action taken.

Additional actions and discoveries

While conducting surveys, *Sideroxylon reclinatum* subsp. *austrorloridense* was found to be relatively abundant in pineland-marl prairie ecotones on Long Pine Key. As a result, a decision was made to reevaluate the ranking of this species as critically imperiled. To estimate the population size of this species in ENP, three 1 km transects were run in ecotones between pine rockland and marl prairie, both north and south of Main Park Road. Plants were counted within 5m of either side of the transect line; 3194 plants were counted along the three transects. As a result, *S. reclinatum* subsp. *austrorloridense* has been re-ranked from critically imperiled to imperiled based on criteria published in Gann et al. (2002). However, this taxon is now a candidate for listing under the Endangered Species Act (USFWS, 2004), and we will continue to monitor the Long Pine Key population.

During surveys prior to the initiation of this project, Woodmansee and Sadle observed an unidentified liana in Osteen Hammock. An additional station was discovered in Palma Vista Hammock #2 during Year 1 of this project. Plants were observed in flower and fruit in Palma Vista Hammock #2 and identified as *Rhynchosia phaseoloides*, a new species for the flora of North America that is presumed to be native (Woodmansee, et al. In prep). Due to its small population size and limited range, it has been ranked as critically imperiled and will be included in the remainder of this project.

DATA SUBMITTED

Location data, population estimates and field notes from rare plant surveys are included with this report as an Access database in a table titled NPSLPKRarePlantSurveyResultsYear1. Initial plot survey data is included in an Excel spreadsheet titled NPSLPKplotstudyresultsYear1.

HERBARIUM SPECIMENS COLLECTED

The following herbarium specimens were collected for identification or documentation during the first year of this project:

Sadle 393 *Tillandsia fasciculata* var. *densispica*, **Sadle 394** *Desmodium lineatum*, **Sadle 395** *Tillandsia fasciculata* var. *densispica*, **Sadle 396** *Ponthieva brittoniae*, **Sadle 397** *Passiflora sexflora*, **Sadle 398** *Scleria ciliata* var. *ciliata*, **Sadle 408** *Rhynchospora grayi*, **Sadle 409** *Galactia smallii*, **Woodmansee 1363** *Anemia adiantifolia*, **Woodmansee 1364** *Platythelys latifolia*, **Woodmansee 1365** *Jacquemontia curtisii*, **Woodmansee 1366** *Rhynchosia phaseoloides*.

PUBLICATION HISTORY

Two publications are in preparation for submission to peer reviewed journals: one detailing the rediscovery of *Ponthieva brittoniae*; the other details the discovery of *Rhynchosia phaseoloides*. A field account of the rediscovery of *Ponthieva brittoniae* has been accepted by the journal of the American Orchid Society, Orchids. Information has not yet been provided on the publication date of the latter article.

RESEARCH PERSONNEL

Project organization and development has been conducted by George D. Gann, principal investigator, in collaboration with Tom Armentano, ENP ecologist and co-principal investigator. Field research has been conducted by Gann, Jimi L. Sadle, Steven W. Woodmansee, Keith A. Bradley and IRC research assistants Melissa Abdo, Hannah Thornton, Anne Frances, Stephen Hodges, Emilie Verdon and Herbert Kesler. Craig Smith, ENP, provided transportation, field assistance, and technical advice. Tom Armentano provided information for several new locations of critically imperiled plants. Jonathan Taylor, ENP, assisted with surveys and provided ground transportation. Augmentation needs were developed in collaboration with Joyce Maschinski (FTBG), Bruce Holst (Selby), Harry Luther (Selby) and John Beckner (Selby).

SUMMARY OF RESEARCH TO BE ACCOMPLISHED DURING YEAR 2:

Task 1: surveys and mapping of critically imperiled species

- Continue surveys and map additional known stations for *Digitaria pauciflora*, *Eltroplectris calcarata*, *Galeandra beyrichii*, *Helenium flexuosum*, and *Spiranthes costaricensis*.
- Resurvey known station of *Sporobolus compositus* var. *clandestinus*.
- Conduct surveys in additional locations for all species as time allows.

Task 2: surveys for historical and extirpated species

- Survey recently burned hammock margins for *Croton lobatus*.
- Conduct further surveys for *Dalea cathagenensis* var. *floridana* along the eastern edge of ENP.
- Resurvey Palma Vista Hammock #2 for *Govenia utriculata* and *Prescotia oligantha*.
- Conduct surveys in additional locations for all species as time allows.

Task 3: establishment of monitoring plots

- Re-monitor all vegetation plots during wet and dry seasons.
- Conduct initial data analysis.
- Install additional plots if warranted by initial data analysis.
- Install humidity data loggers to collect solution hole humidity measurements in select plots.
- Collect and analyze soil samples to determine soil texture, nutrient status, organic content and water-holding capacity.

Task 4: assess augmentation needs

- Collect seeds/spores from ENP and/or other South Florida populations of select species for experimental cultivation at Selby. This stock will later be used for augmentation in ENP, pending compliance review, or at other sites to develop experimental protocols.
- Finalize list of specific augmentation sites.
- Initiate augmentation trials, pending NPS compliance review.

Task 5: reintroduction of extirpated plants

- Locate suitable germplasm of extirpated species for reintroduction to the Long Pine Key region of ENP.
- Finalize list of potential reintroductions candidates and locations.
- If appropriate and feasible, initiate reintroduction trials, pending NPS compliance review.

CITATIONS

Gann, G.D., K.A. Bradley, and S.W. Woodmansee. 2002. *Rare Plants of South Florida: Their History, Conservation, and Restoration*. Miami: The Institute for Regional Conservation.

Sadle, J.L., S.W. Woodmansee, G.D. Gann and T.V. Armentano. In prep. Rediscovery of *Ponthieva brittoniae* (Orchidaceae) in Everglades National Park.

U.S.F.W.S. 2004. U.S. Fish and Wildlife Service Publishes Updated List of Candidates for Endangered Species Act Listing. <http://news.fws.gov/NewsReleases/R9/3BF55A6E-F7F8-4293-B7F0E9E3E57A5004.html>

Woodmansee, S.W., J.L. Sadle, G.D. Gann and T.V. Armentano. In prep. Discovery of *Rhynchosia phaseoloides* (Fabaceae) in Everglades National Park.

Table 1. Summary of Rare Plant Survey Results, August 2003 - August 2004

Species	Location	Surveys complete?	Plants Present	New location?¹
<i>Adiantum melanoleucum</i>	Osteen Hammock	Yes	Present	
<i>Anemia wrightii</i>	Pfleuger Hammock	Yes	Present	
<i>Anemia wrightii</i>	Warren Hammock	Yes	Present	
<i>Basiphyllaea corallicola</i>	Deer Hammock area	Yes	Present	
<i>Basiphyllaea corallicola</i>	Long Pine Key Block A	Yes	Present	Yes
<i>Basiphyllaea corallicola</i>	Long Pine Key Block B	Yes	Present	
<i>Basiphyllaea corallicola</i>	Long Pine Key Block F	Yes	Present	Yes
<i>Basiphyllaea corallicola</i>	Long Pine Key Block H	Follow up	?	
<i>Basiphyllaea corallicola</i>	Long Pine Key Block I	Follow up	?	
<i>Basiphyllaea corallicola</i>	Long Pine Key Block J	Yes	Present	
<i>Basiphyllaea corallicola</i>	Wright Hammock area	Yes	Present	Yes
<i>Bourreria cassinifolia</i>	Long Pine Key Block H (pinelands SE of Redd Hammock)	Yes	Present	
<i>Bourreria cassinifolia</i>	Palma Vista Hammock #2	Yes	Present	
<i>Bourreria cassinifolia</i>	Wright Hammock area	Yes	Present	
<i>Brassia caudata</i>	Deer Hammock	Yes	Not present	
<i>Brassia caudata</i>	Osteen Hammock	Yes	Not present	
<i>Brassia caudata</i>	Turkey Hammock	Yes	Not present	
<i>Brassia caudata</i>	Winkley Hammock	Yes	Not present	
<i>Croton lobatus</i>	Pinelands about Mosier Hammock	No	?	
<i>Dalea carthagenensis</i> var. <i>floridana</i>	East boundary, west of Mowry	Yes	Not present	
<i>Dalea carthagenensis</i> var. <i>floridana</i>	Roadside and canal bank 14miles SW of Paradise Key	Yes	Not present	

Desmodium lineatum	Long Pine Key Block H	Yes	Present	
Desmodium lineatum	Long Pine Key Block J	Yes	Present	
Desmodium lineatum	Pine Block I2	Yes	Present	Yes
Digitaria pauciflora	Long Pine Key Block A	Yes	Present	
Digitaria pauciflora	Long Pine Key Block C	Yes	Present	
Digitaria pauciflora	Long Pine Key Block D, NE edge	Yes	Present	
Digitaria pauciflora	Long Pine Key Block E	Yes	Present	Yes
Digitaria pauciflora	Long Pine Key Block H, W edge of 3rd glade	No	?	
Digitaria pauciflora	Long Pine Key Glade 2 1/2	No	?	
Digitaria pauciflora	Long Pine Key Hole in the Donut, Glade 6	No	?	
Digitaria pauciflora	Pinelands about Osteen Hammock	No	?	
Eltroplectris calcarata	Fairchild Hammock	Yes	Present	Yes
Eltroplectris calcarata	Frampton Hammock	Yes	Present	Yes
Eltroplectris calcarata	Grimshawe Hammock	Yes	Present	Yes
Eltroplectris calcarata	Hammock #120	No	?	
Eltroplectris calcarata	Mosier Hammock	No	Present	
Eltroplectris calcarata	Osteen Hammock	Yes	Present	
Eltroplectris calcarata	Palma Vista Hammock #1	Yes	Present	Yes
Eltroplectris calcarata	Palma Vista Hammock #2	Yes	Present	
Eltroplectris calcarata	Pay-Fee Hammock, north side	Follow up	?	
Eltroplectris calcarata	Pilsbry Hammock	Yes	Present	Yes
Eltroplectris calcarata	Rattlesnake Hammock	Yes	Present	Yes
Eltroplectris calcarata	Redd Hammock	Yes	Present	
Eltroplectris calcarata	Winkley Hammock	Yes	Present	Yes

<i>Galeandra beyrichii</i>	Mosier Hammock	No	Present	
<i>Galeandra beyrichii</i>	Royal Palm Hammock	Yes	Present	
<i>Govenia utriculata</i>	Palma Vista Hammock #2	Follow up	?	
<i>Helenium flexuosum</i>	Long Pine Key Block B (Gate 6)	Yes	Present	
<i>Helenium flexuosum</i>	Long Pine Key Block D	Yes	Present	Yes
<i>Helenium flexuosum</i>	Long Pine Key Block E	Yes	Present	
<i>Helenium flexuosum</i>	Long Pine Key Block H	Yes	Present	Yes
<i>Helenium flexuosum</i>	Long Pine Key Gate 8	Yes	Present	
<i>Helenium flexuosum</i>	Sawmill Road	No	?	
<i>Hypelate trifoliata</i>	Deer Hammock	Yes	Present	
<i>Hypelate trifoliata</i>	Long Pine Key Block A	Yes	Present	Yes
<i>Hypelate trifoliata</i>	Long Pine Key Block B, SW portion	Yes	Present	
<i>Hypelate trifoliata</i>	Torre Hammock	Yes	Present	Yes
<i>Lomariopsis kunzeana</i>	Osteen Hammock	Yes	Present	
<i>Macradenia lutescens</i>	Deer Hammock	Yes	Not present	
<i>Macradenia lutescens</i>	Osteen Hammock	Yes	Not present	
<i>Macradenia lutescens</i>	Royal Palm Hammock	Yes	Not present	
<i>Macradenia lutescens</i>	Turkey Hammock	Yes	Not present	
<i>Macradenia lutescens</i>	Winkley Hammock	Yes	Not present	
<i>Oncidium ensatum</i>	Baker Hammock	Yes	Present	
<i>Oncidium ensatum</i>	Deer Hammock	Yes	Present	
<i>Oncidium ensatum</i>	Frampton Hammock	Yes	Present	Yes
<i>Oncidium ensatum</i>	Grimshawe Hammock	Yes	Present	
<i>Oncidium ensatum</i>	Mystery Hammock	Yes	Present	Yes

Oncidium ensatum	Osteen Hammock	Yes	Present	
Oncidium ensatum	Palma Vista Hammock #1	Yes	Present	Yes
Oncidium ensatum	Palma Vista Hammock #2	Yes	Present	
Oncidium ensatum	Rattlesnake Hammock	Yes	Present	Yes
Oncidium ensatum	Redd Hammock	Yes	Present	
Oncidium ensatum	Robertson Hammock	Yes	Present	
Oncidium ensatum	Royal Palm Hammock	Yes	Present	
Oncidium ensatum	Say Hammock	Follow up	?	
Oncidium ensatum	Torre Hammock	Yes	Present	Yes
Oncidium ensatum	Turkey Hammock	Yes	Present	
Oncidium ensatum	unnamed hammock 550m SW of Pine Glades Lake	Yes	Present	Yes
Oncidium ensatum	Unnamed hammock NE of Pineland Trail	Yes	Present	Yes
Oncidium ensatum	Wild Lime Hammock	Yes	Present	Yes
Oncidium ensatum	Winkley Hammock	Yes	Present	
Oncidium ensatum	Wright Hammock	Yes	Present	
Oncidium undulatum	Royal Palm Hammock	Yes	Not present	
Passiflora sexflora	Osteen Hammock	Yes	Present	
Passiflora sexflora	Royal Palm Hammock	Yes	Not present	
Pecluma plumula	Cadwalader Hammock	Yes	Present	
Pecluma plumula	Dewhurst (China) Hammock	Yes	Present	
Ponthieva brittoniae	Long Pine Key Block A	Yes	Present	Yes
Ponthieva brittoniae	Long Pine Key Block B	Yes	Present	Yes
Ponthieva brittoniae	Pine Block E near Winkley and Wright Hammocks	Yes	Present	
Prescotia oligantha	Palma Vista Hammock #2	Follow up	?	

<i>Rhynchosia phaseoloides</i>	Osteen Hammock	Yes	Present	Yes
<i>Rhynchosia phaseoloides</i>	Palma Vista Hammock #2	Yes	Present	Yes
<i>Schizaea pennula</i>	Royal Palm Hammock	Yes	Not present	
<i>Spiranthes costaricensis</i>	Atoll Hammock	No	?	
<i>Spiranthes costaricensis</i>	Avery Hammock	No	?	
<i>Spiranthes costaricensis</i>	Fairchild Hammock	Yes	Present	
<i>Spiranthes costaricensis</i>	Hammock #120	No	?	
<i>Spiranthes costaricensis</i>	Osteen Hammock	Yes	Present	
<i>Spiranthes costaricensis</i>	Palma Vista Hammock #2	Yes	Present	
<i>Spiranthes costaricensis</i>	Rattlesnake Hammock	Yes	Present	Yes
<i>Spiranthes costaricensis</i>	Royal Palm Hammock	Yes	Present	
<i>Spiranthes costaricensis</i>	Winkley Hammock	Yes	Present	Yes
<i>Spiranthes torta</i>	Pinelands SW of Deer Hammock	Yes	Present	
<i>Sporobolus compositus</i> var. <i>clandestinus</i>	Osteen Hammock area	Follow up	?	
<i>Thelypteris reticulata</i>	East boundary cypress dome	Yes	Present	Yes
<i>Thelypteris reticulata</i>	Hole in the Donut station along road to Environmental Center	Yes	Present	
<i>Thelypteris reticulata</i>	Pine Island Station	Yes	Present	
<i>Thelypteris reticulata</i>	Royal Palm Hammock	Yes	Present	
<i>Thelypteris serrata</i>	Pine Island Station	Yes	Present	
<i>Thelypteris serrata</i>	Royal Palm Hammock	Yes	Not present	
<i>Tillandsia fasciculata</i> var. <i>clavispica</i>	Palma Vista Hammock #2	Yes	Not present	
<i>Trichomanes punctatum</i> subsp. <i>floridanum</i>	Royal Palm Hammock	Yes	Not present	
¹ New locations include IRC discoveries as well as discoveries made by T.V. Armentano.				

Table 2. Recommendations for augmentation and reintroduction of rare plant species in Long Pine Key, Everglades National Park.

Species	Preliminary Recommendation	Proposed organization	LPK Habitat	Location	IRC Status for LPK
Adiantum melanoleucum	Augment	Marie Selby Botanical Gardens	rockland hammock sinkhole	Osteen Hammock	critically imperiled
Anemia wrightii	Additional data needed		marl prairie/rockland hammock ecotone		critically imperiled
Basiphyllaea corallicola	No action		pine rockland		critically imperiled
Bourreria cassinifolia	No action		pine rockland		critically imperiled
Brassia caudata	Reintroduce	Marie Selby Botanical Gardens	rockland hammock	Osteen, Royal Palm Hammock	extirpated
Croton lobatus	Additional data needed		rockland hammock/pine rockland ecotone		historical
Dalea carthagenensis var. floridana	No action		pine rockland?		extirpated
Desmodium lineatum	No action		pine rockland		critically imperiled
Digitaria pauciflora	No action		pine rockland/marl prairie		critically imperiled
Eltroplectris calcarata	No action		rockland hammock		critically imperiled
Galeandra beyrichii	Additional data needed		rockland hammock		critically imperiled
Govenia utriculata	Additional data needed		rockland hammock		historical
Helenium flexuosum	Consider augmentation	Fairchild Tropical Botanic Garden	pine rockland	Hole-in-the-Donut	critically imperiled
Hypelate trifoliata	No action		pine rockland & rockland hammock		critically imperiled
Lomariopsis kunzeana	Augment	Marie Selby Botanical Gardens	rockland hammock sinkhole	Osteen Hammock	critically imperiled
Macradenia lutescens	Reintroduce	Marie Selby Botanical Gardens	rockland hammock	Osteen, Royal Palm Hammock	extirpated
Oncidium ensatum	Augment	Marie Selby Botanical Gardens	rockland hammock	Royal Palm Hammock	critically imperiled
Oncidium undulatum	Reintroduce	Marie Selby Botanical Gardens	rockland hammock	Royal Palm Hammock	extirpated (present in extreme southern ENP)
Passiflora sexflora	Augment	Fairchild Tropical Botanic Garden	rockland hammock	Royal Palm Hammock	critically imperiled
Pecluma plumula	Consider augmentation	Marie Selby Botanical Gardens	rockland hammock		critically imperiled
Ponthieva	No action		pine rockland		critically

brittoniae					imperiled
Prescotia oligantha	Additional data needed		rockland hammock		historical
Rhynchosia phaseoloides	Additional data needed		rockland hammock		critically imperiled
Schizaea pennula	No action		rockland hammock		extirpated
Spiranthes costaricensis	No action		rockland hammock		critically imperiled
Spiranthes torta	Additional data needed		marl prairie & pine rockland?		critically imperiled
Sporobolus compositus var. clandestinus	Additional data needed		pine rockland		critically imperiled
Thelypteris reticulata	Augment	Marie Selby Botanical Gardens	rockland hammock/cypress dome	Royal Palm Hammock	critically imperiled
Thelypteris serrata	Augment	Marie Selby Botanical Gardens	rockland hammock?	To be determined	critically imperiled
Tillandsia fasciculata var. clavispica	No action		rockland hammock		extirpated
Trichomanes punctatum subsp. floridanum	Reintroduce	Marie Selby Botanical Gardens	rockland hammock	Royal Palm Hammock	extirpated