Exhibit R

Florida Natural Areas Inventory
2008 Rare Plants on BRP Inventory

Listed and Rare Plant Inventory of Babcock Ranch

Final Report

May 2008

Florida Natural Areas Inventory
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INTRODUCTION

Babcock Ranch Preserve is a 73,239-acre property in Charlotte and Lee counties. The majority of the Ranch is located in southeastern Charlotte County and a smaller portion in northwestern Lee County, approximately 17.5 miles east of Punta Gorda, Florida, five miles north of the Caloosahatchee River, and 34.5 miles west of Lake Okeechobee. The western boundary is separated from the Fred C. Babcock-Cecil M. Webb Wildlife Management Area by State Road 31. The northernmost boundary is delineated by County Road 74 (Bermont Rd.). The eastern boundary extends along the Charlotte-Glades County line. The southernmost boundary lies one half mile north of County Road 78 (North River Rd.). Babcock Ranch is within the South Florida Water Management District (SFWMD) Caloosahatchee River Watershed.

The natural communities identified at Babcock Ranch include basin marsh, depression marsh, dome swamp, dry prairie, hydric hammock, mesic flatwoods, mesic hammock, pasture – improved, pasture – semi-improved, pine plantation, ruderal, scrub, scrubby flatwoods, slough, strand swamp, wet flatwoods, and wet prairie. The natural community data collected by Florida Natural Areas Inventory (FNAI) biologists includes a list of plant species seen in each habitat.

METHODS

Preliminary fieldwork

Using habitat information from a preliminary landcover map, the *County Distribution and Habitats of Rare and Endangered Species in Florida* (FNAI 1997), the state tracking list for Florida (Coile and Garland 2003), predictive range maps (generated by FNAI for all G1, G2 and G3-ranked species), the FNAI database, and online resources (i.e.: Institute for Systematic Botany, USDA PLANTS Database), FNAI botanists generated a search list of potential rare plants for Babcock Ranch (Table 1), their habitats and best survey periods (Tables 2 and 3). Survey sites were identified using Environmental Systems Research Institute, Inc. (ESRI) ArcGIS by selecting the appropriate habitat polygons in the preliminary landcover map for each rare plant species. Each polygon identified as potentially suitable for one or more rare plants was systematically surveyed on foot during the appropriate survey period.

Table 1. Rare plant search list for Babcock Ranch*

Scientific name	Common name	Global rank	State rank	Federal status	State status
Andropogon arctatus	pine-woods bluestem	G3	S3	N	LT
Calamintha ashei	Ashe's savory	G3	S3	N	LT
Calopogon multiflorus	many-flowered grass-pink	G2G3	S2S3	N	LE
Centrosema arenicola	sand butterfly pea	G2Q	S2	N	LE
Deeringothamnus pulchellus	beautiful pawpaw	G1	S1	LE	LE
Hymenocallis puntagordensis	spiderlily	G1Q	SNR	N	N
Elytraria caroliniensis var. *angustifolia*	narrow-leaved Carolina scalystem	G4T2	S2	N	N

Gymnopogon chapmanianus	Chapman's skeletongrass	G3	S3	N	N
Lechea cernua	nodding pinweed	G3	S3	N	LT
Linum carteri var. *smallii*	Carter's large-flowered flax	G2T2	S2	N	LE
Nolina atopocarpa	Florida beargrass	G3	S3	N	LT
Nymphaea jamesoniana	sleeping beauty waterlily	G5	S2S3	N	LE
Ophioglossum palmatum	hand fern	G4	S2	N	LE
Platanthera integra	yellow fringeless orchid	G3G4	S3	N	LE
Schizachyrium niveum	scrub bluestem	G1	S1	N	LE
Schizaea pennula	ray fern	G5	S1	N	LE
Warea carteri	Carter's warea	G3	S3	LE	LE

* many state-listed plant species including several *Tillandsia* species were omitted from this table. Any of these species observed during field surveys were documented and included in the results of this report.

Table 2. Babcock Ranch rare plant habitats and best survey period

Species	**Habitats**	**Survey period**
Andropogon arctatus	Mesic flatwoods Wet flatwoods	September-November
Calamintha ashei	Scrub Scrubby flatwoods	July-November
Calopogon multiflorus	Wet prairie Wet flatwoods	March-September
Centrosema arenicola	Scrub Scrubby flatwoods	July-September
Deeringothamnus pulchellus	Dry prairie	July-November
Hymenocallis punta-gordensis	Wet prairie Wet flatwoods	July-December
Elytraria caroliniensis var. *angustifolia*	Wet prairie Wet flatwoods	July-December
Gymnopogon chapmanianus	Dry prairie Mesic flatwoods	September-November
Lechea cernua	Scrub Scrubby flatwoods	July-January
Linum carteri var. *smallii*	Wet prairie Wet flatwoods	January-April
Nolina atopocarpa	Dry prairie Mesic flatwoods	May-September
Nymphaea jamesoniana	Marsh lake	September-November
Ophioglossum palmatum	Hydric Hammock Mesic hammock	Year-round
Platanthera integra	Wet prairie Wet flatwoods	July-November
Schizachyrium niveum	Scrub Scrubby flatwoods	September-November
Schizaea pennula	Wet flatwoods	Year-round
Warea carteri	Scrub Scrubby flatwoods	July-January

Table 3. Babcock Ranch rare plant survey calendar

	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Andropogon arctatus			x	x	x							
Calamintha ashei	x	x	x	x	x							
Calopogon multiflorus	x	x	x						x	x	x	x
Centrosema arenicola	x	x	x									
Deeringothamnus pulchellus	x	x	x	x	x							
Hymenocallis punta-gordensis	x	x	x	x	x	x						
Elytraria caroliniensis var. *angustifolia*	x	x	x	x	x	x						
Gymnopogon chapmanianus			x	x	x							
Lechea cernua	x	x	x	x	x	x	x					
Linum carteri var. *smallii*							x	x	x	x		
Nolina atopocarpa	x	x	x								x	x
Nymphaea jamesoniana			x	x	x							
Ophioglossum palmatum	x	x	x	x	x	x	x	x	x	x	x	x
Platanthera integra	x	x	x	x	x							
Schizachyrium niveum			x	x	x							
Schizaea pennula	x	x	x	x	x	x	x	x	x	x	x	x
Warea carteri			x	x	x							

Field Surveys

Field surveys at Babcock Ranch were conducted from March 2007 to May 2008. FNAI botanists conducted intensive surveys for rare plants in all appropriate habitats and seasons. In addition to surveys focused solely on locating rare species, rare plant data were collected during natural community mapping, which included visits to a minimum of 95 percent of all designated community polygons. Locations of rare plants were recorded using a Trimble datalogger (GeoXM or Recon with an XC or XB GPS; 3m accuracy). Data on population size, plant condition, phenology, vegetative associates, management needs, and threats to long-term viability of each occurrence and its habitat were collected (see Appendix 1 for a list of attributes), All data collected were uploaded into ESRI GIS geographic data files.

RESULTS and RECOMMENDATIONS

The rare plant search list generated by FNAI botanists included two federally endangered species. Beautiful pawpaw (*Deeringothamnus pulchellus*), FNAI-ranked G1S1, is typically found in wet prairie or dry prairie habitats. Carter's warea (*Warea carteri*), ranked G3S3, favors scrubby flatwoods. Targeted surveys for these plants failed to locate occurrences of either species, and no other federally listed plants were found on Babcock Ranch. However, field surveys located 13 plant species listed threatened or endangered by the state of Florida (Table 4, Figure 1). Locations also are provided in the ESRI shapefile accompanying this report.

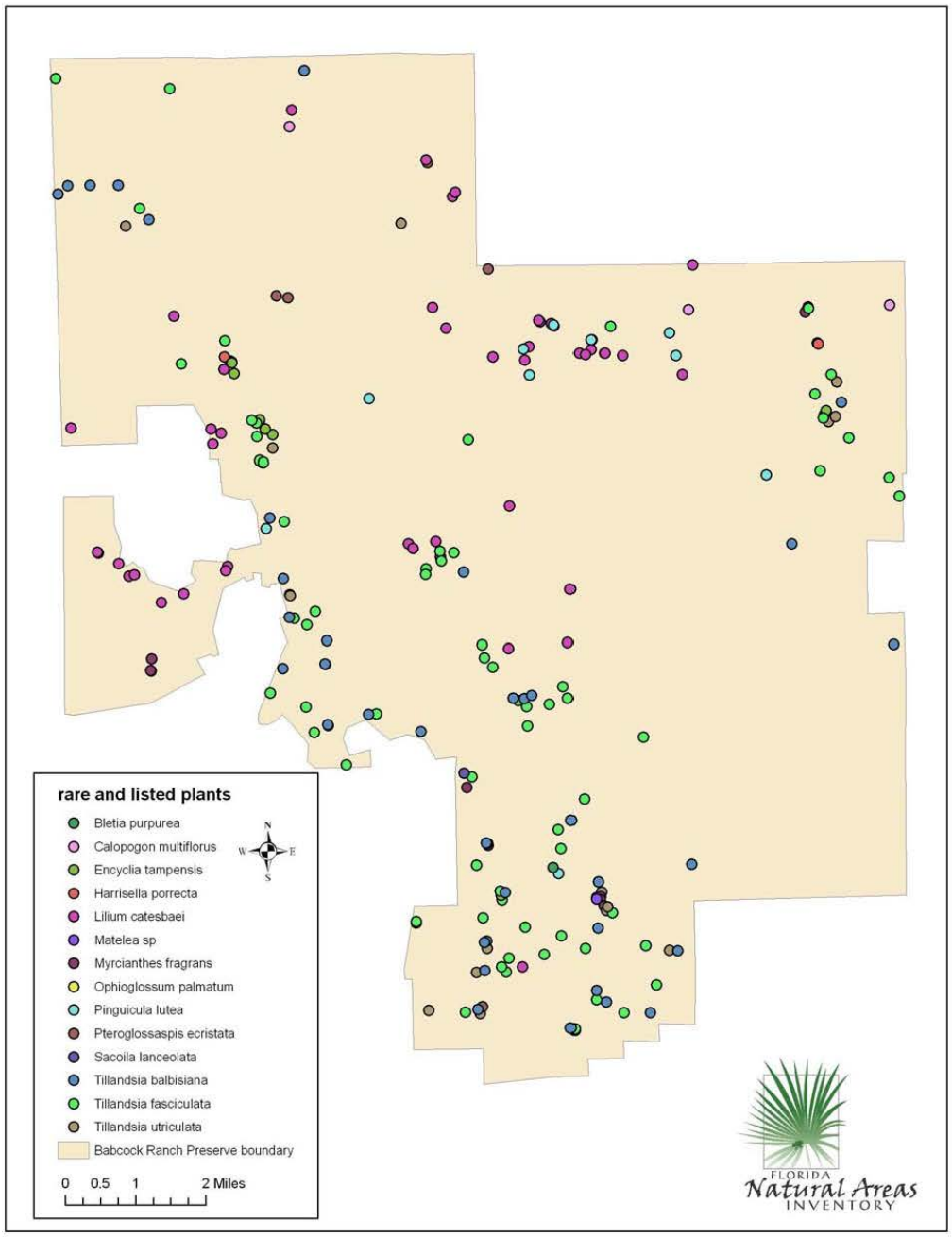

Figure 1. Locations of rare and state listed plants on Babcock Ranch Preserve

Table 4. Rare plants observed on Babcock Ranch Preserve, 2007-2008

Scientific name	Common name	Global rank	State rank	Federal status	State status
Bletia purpurea	pinepink	G5?	S3	N	LT
Calopogon multiflorus	many-flowered grass-pink	G2G3	S2S3	N	LE
Harrisella porrecta	needleroot airplant orchid	GU	SNR	N	LT
Lilium catesbaei	pine lily	G4	S4	N	LT
Matelea sp.	spiny pod	G2/G5	S2/NR	N	E or T
Myrcianthes fragrans	twinberry	G4	S4	N	LT
Ophioglossum palmatum	hand fern	G4	S2	N	LE
Pinguicula lutea	yellow butterwort	G4G5	S3	N	LT
Pteroglossaspis ecristata	giant orchid	G2G3	S2	N	LT
Sacoila lanceolata	leafless beaked orchid	G4	S3	N	LT
Tillandsia balbisiana	northern needleleaf	G5	S3	N	LT
Tillandsia fasciculata	cardinal airplant	G5	SNR	N	LE
Tillandsia utriculata	giant airplant	G5	S3	N	LE

Rare Plants Narrative Descriptions

Pinepink, *Bletia purpurea* (Lam.) DC.; Threatened-FL; Orchidaceae

Pinepink is a terrestrial orchid with three to five broadly linear, pleated leaves. This plant typically flowers from December through May but blooms may appear sporadically throughout the year. The inflorescence, which may exceed three feet, bears from three to 80 pink, rosy-purple, or deep purple flowers. Pinepink is one of more than 70 species of native orchids listed as endangered or threatened in Florida. A single occurrence of pinepink was made in April 2008 at the southern end of Babcock Ranch. This plant was located in a strand swamp dominated by pond cypress (*Taxodium ascendens*). Pinepink may grow in swamps on logs, stumps or the base of cypress trees above the high water line, or in pinelands and hammocks, or in humus over limestone.

Alterations in hydrology, logging or other heavy equipment operations, and fire can reduce suitable habitat for pinepink. Prohibit vegetation clearing and soil disturbance in and around pinepink habitat. Monitoring for, and controlling, invasive plants is recommended as these plants can out-compete native species and create excessive overstory shading.

Many-flowered grass-pink, *Calopogon multiflorus* Lindl.; Endangered-FL; FACW (DEP), FACW (NWI); Orchidaceae

Many-flowered grass-pink was observed in flower and bud in April and June. This terrestrial herb bears one to two grass-like leaves. Showy, dark pink flowers are crowded along the stem and most open at roughly the same time. The petals are spreading and each is widest above the middle. Many-flowered grass-pink is one of more than 70 species of native orchids listed as endangered or threatened in Florida. Fewer than 20 plants of this species were seen in recently burned mesic flatwoods at three separate locations.

Many-flowered grass-pink is known historically throughout Florida but this species has become rare due to fire exclusion and conversion of habitat. Burning of flatwoods every two to three years during the growing season is an effective means of limiting woody plant encroachment and for maintaining habitat integrity and overall species diversity. In addition, avoiding soil and hydrological disturbances, such as bedding, intensive timbering, draining and roller-chopping, are important for maintaining populations of many-flowered grass-pink.

Needleroot airplant orchid, *Harrisella porrecta* (Rchb.f.) Fawc. & Rendle; Threatened-FL; Orchidaceae

Needleroot airplant orchid is a diminutive leafless epiphyte. The roots of this orchid are about one millimeter wide although they may exceed 30 cm in length. Inflorescences consist of one to six greenish-yellow flowers, each measuring less than three millimeters long. Plants typically bloom from August to September. Only three occurrences of needleroot airplant orchid were documented on Babcock Ranch. These plants are growing on ash (*Fraxinus* sp.) and on dahoon (*Ilex cassine*) in a hydric hammock within Telegraph Swamp and in a strand swamp along Jack Creek.

Evidence of cattle grazing and feral hog damage is present in both natural communities where needleroot airplant orchid is growing. The epiphytic nature of this plant generally precludes it from such disturbances but low-growing plants may be more at risk than those positioned above the grazing line. This rare orchid has rather exacting habitat requirements. This makes it particularly sensitive to adversely low humidity and high levels of desiccating sunlight. Alterations in forest hydrology and humidity levels, logging operations and fire can reduce suitable habitat for needleroot airplant orchid.

Pine lily, Catesby's lily, *Lilium catesbaei* Walter; Threatened-FL; FAC (DEP), FAC+ (NWI); Liliaceae

Pine lilies were documented only during the months of October and November when this rare plant was blooming. This lily bears conspicuous orange-red flowers with six spotted petal-like tepals. The pine lily's flower is the largest of any North American lily. Its leaves are small and relatively few and the bulb is usually small. Pine lilies usually occur as solitary plants or in

small groups of two to five individuals. More than 75 lilies were recorded during the survey. These plants are widely distributed across Babcock Ranch in mesic flatwoods, in wet flatwoods and, occasionally, in dry prairies.

Loss of habitat, especially conversion to pine plantations, is reducing pine lily numbers across the southeastern United States. This species prefers open, sunny flatwoods. Fire exclusion in flatwoods further contributes to the decline of this rare species. Habitat disturbances on Babcock Ranch include soil disturbances from feral hogs, ORV trails, and forestry operations. Prescribed burning of mesic and wet flatwoods on a two- to three-year interval will promote the open, grassy habitat that pine lilies favor.

Milkvine, angle pod, spiny pod, *Matelea* spp. Aubl.; Endangered-FL, Threatened-FL; Apocynaceae

Matelea is a genus of herbaceous, twining vines with opposite, heart-shaped leaves. When damaged, the leaves exude a sticky, milky sap. Milkvine species are difficult to tell apart without flowers or fruits. All individual plants seen on Babcock Ranch were vegetative. Florida is home to six species of milkvine, five of which are listed as endangered. The sixth species – angle pod, *Matelea gonocarpos* (Walter) Shinners – is threatened. It is likely that the observed plants are, in fact, angle pod. Monitoring the four occurrences of *Matelea* on Babcock Ranch at various times during the spring to summer flowering times will aid in species identification. ; one of the following three species: Florida milkvine, *Matelea floridana* (Vail) Woodson, Endangered-FL; trailing milkvine, *Matelea pubiflora* (Decne.) Woodson, Endangered-FL.

Milkvines prefers moist, shaded habitats. The plants on Babcock Ranch are growing in hydric or mesic hammocks. Cattle and feral hogs pose a threat by disturbing hammock soils, by trampling plants and eating milkvine flowers, and by introducing invasive exotic plants. Invasive plants can out-compete native species and create excessive overstory shading.

Simpson's stopper, twinberry, *Myrcianthes fragrans* (Sw.) McVaugh; Threatened-FL; Myrtaceae

Simpson's stopper is an evergreen shrub or small tree that is readily identifiable throughout the year. The stems have reddish, smooth, exfoliating bark and the opposite leaves are often covered with minute, dark-colored dots. The fragrant white flowers ultimately produce edible red berries. This species occurs in six different hydric hammocks or mesic hammocks on Babcock Ranch. The plants range in size from two to 20 feet.

Soil disturbances from free-ranging animals can disturb soils and promote the establishment of invasive exotic plant species that may ultimately out-compete rare species such as Simpson's stopper. Examples include old world climbing fern (*Lygodium microphyllum*), Brazilian pepper (*Schinus terebinthifolius*), and guava (*Psidium guajava*). Simpson's stopper is not a fire-adapted shrub. While fires may reach the edge of a hammock community, saturated soils and humid conditions in the hammock typically limit the extent of a burn. Periodic burns in adjoining

flatwoods communities can reduce woody encroachment and lessen the likelihood of fires spreading into hammocks. Monitoring hammocks for invasive species and initiate appropriate control measures for each exotic species where needed.

Hand fern, *Ophioglossum palmatum* L.; FAC+ (NWI); Endangered-FL; Ophioglossaceae

Hand fern is an unusual and easily recognizable fern. The evergreen, palmately lobed leaves of this plant emerge from the humus among old leaf bases of cabbage palms (*Sabal palmetto*). Hand fern requires moist conditions to grow and reproduce and it is therefore restricted to shaded habitats with high humidity. On Babcock Ranch, a single occurrence of this distinctive epiphytic fern was recorded in a hydric hammock along Telegraph Swamp. It is quite probable, however, that larger populations of hand fern once existed, or still exist at Babcock Ranch.

Several types of ground disturbances are noted for this hydric hammock. The epiphytic nature of hand fern precludes it from such disturbances as hog digging and ORV trails. This rare fern has rather exacting habitat requirements. This makes it particularly sensitive to adversely low humidity and high levels of desiccating sunlight. Alterations in forest hydrology and humidity levels, logging operations, and fire in a hydric hammock can reduce suitable habitat for hand fern. While fires may reach the edge of a hammock, saturated soils and humid conditions typically limit the extent of a burn. Periodic burns in adjoining flatwoods communities can reduce woody encroachment and lessen the likelihood of fires spreading into hammocks.

Yellow-flowered butterwort, yellow butterwort, *Pinguicula lutea* Walter; OBL (DEP), FACW+ (NWI); Threatened-FL; Lentibulariaceae

Yellow-flowered butterwort is a rosette-forming perennial herb. This species is one of six butterworts that occur in Florida. The slickened leaves of this carnivorous plant help it trap insects. The bright yellow flowers and inrolled margins of each pale green leaf are distinctive features. Plants were observed blooming in January, February and March and fruiting plants were seen in April.

Yellow-flowered butterwort occurs at 10 separate locations on Babcock Ranch. Single plants occur in some areas while large colonies of 50 to 100 plants are present elsewhere. This butterwort tolerates full sun or light shade and prefers damp, sandy-peat soils. Yellow-flowered butterwort favors mesic flatwoods, ecotones with wet flatwoods or, in one instance, the transition between dry prairie and depression marsh. Cattle are generating moderate to light soil disturbances in the vicinity of some of these occurrences. Protecting soil hydrology will contribute to the long-term survivability of Yellow-flowered butterwort. Prescribed burns during the growing season will benefit this rare species by limiting woody plant encroachment and overstory shading.

Giant orchid, non-crested eulophia, *Pteroglossaspis ecristata* (Fernald) Rolfe; Threatened-FL; Orchidaceae

Giant orchid is an uncommon terrestrial orchid whose stems may ultimately reach three feet or more. This perennial species has a somewhat inconspicuous habit, its two to four leaves being linear and grasslike. The leaves resemble those of saw palmetto (*Serrenoa repens*) seedlings. The flowers of this orchid are distinctive but are neither conspicuous nor showy. Giant orchid is one of more than 70 species of native orchids listed as endangered or threatened in Florida.

This orchid may occur in pine flatwoods, pine rocklands, or dry sandy sites. Giant orchid is sometimes also present in disturbed agricultural areas. Although giant orchid was recorded from just four separate locations on Babcock Ranch, one site – an improved pasture – contained more than 200 individuals. Elsewhere, single plants were found in mesic flatwoods and dry prairie. Giant orchid was recorded historically across much of Florida but is now considered rare. This species will benefit from prescribed fire, reduced competition from woody plants, and land management activities that do not involve soil disturbance.

Leafless beaked orchid, leafless beaked ladiestresses, *Sacoila lanceolata* (Aubl.) Garay; Threatened-FL; Orchidaceae

Leafless beaked orchid is a terrestrial herb that produces up to 30 reddish or orange-red flowers. The inflorescence may extend to nearly two feet and flowers appear from April through July. The two to seven leaves are arranged in a basal rosette but are usually absent at flowering. In May 2008, a single occurrence of leafless beaked orchid was documented in Telegraph Swamp where 28 flowering plants were scattered along a road and adjacent canal. This is one of more than 70 species of native orchids listed as endangered or threatened in Florida.

Leafless beaked orchid has historically ranged over much of peninsular Florida. This showy plant has become less common, due in part, to loss of habitat. Leafless beaked orchid prefers open habitats and may appear in open pastures, along roadsides, in wet flatwoods or sandhills. Fire exclusion and competition from invasive exotic plants further contribute to the decline of this species. Prescribed burning of wet flatwoods on a two- to five-year interval will promote the open habitat that this orchid favors.

Northern needleleaf, *Tillandsia balbisiana* Schult. & Schult.f.; Threatened-FL; Bromeliaceae

Northern needle-leaf bears reflexed, twisted or contorted, gray leaves that are often flushed red. The leaf sheaths are conspicuously inflated, giving the base of each plant a slightly swollen appearance. The floral bracts are green to red while the flowers are violet. Like other Tillandsia, the poorly developed roots of this epiphyte help secure to a variety of hosts. Northern needleleaf occurs most frequently on Babcock Ranch in dome swamps but is also present in hammocks, strand swamps and on the periphery of marshes and sloughs.

While northern needleleaf is fairly common and widespread across Babcock Ranch, the state of Florida lists this species and most other rosette-forming bromeliads as threatened or endangered. The Mexican bromeliad weevil (*Metamasius hemipterus*) has killed many plants since its accidental introduction in 1989. This insect burrows into, and destroys, the leafy rosettes of this

epiphyte. Since most *Tillandsia* are slow to mature, protecting the trees in primary habitats will encourage the development of healthy epiphyte populations. In 2007, researchers with the University of Florida's Institute of Food and Agricultural Sciences released a parasitic fly in Hillsborough County that kills the weevil's larvae. Results of this biological control effort are still pending.

Common wild-pine, cardinal airplant, *Tillandsia fasciculata* Sw.; Endangered-FL; Bromeliaceae

Common wild-pine is rosette-forming epiphyte with stiff, leathery, gray-green leaves. This plant produces a short flowering stalk in April or May. Overlapping greenish bracts hide the stalk itself. The conspicuous floral bracts are red and contrast with the small violet flowers. Roots, while poorly developed, serve to anchor this epiphyte to a variety of hosts. Trees with thick-ridged bark allow for easier attachment and seedling recruitment. Common wild-pine is most often observed in bright light on cypress and live oak, often in association with other *Tillandsia* species. On Babcock Ranch, common wild-pine is present in swamps, hammocks, flatwoods, and the periphery of basin marshes and sloughs.

Tillandsia fasciculata var. *densispica* is the most common variety in central and southern Florida. The state now lists all varieties of common wild-pine and most other rosette-forming bromeliads as threatened or endangered. An accidentally introduced weevil, the Mexican bromeliad weevil (*Metamasius hemipterus*), kills many plants by burrowing into, and destroying, the leafy rosettes. Since most *Tillandsia* are slow to mature, protecting the trees in primary habitats will encourage the development of healthy epiphyte populations. In 2007, researchers with the University of Florida's Institute of Food and Agricultural Sciences released a parasitic fly in Hillsborough County that kills the weevil's larvae. Results of this biological control effort are still pending.

Giant airplant, giant wild-pine, *Tillandsia utriculata* L.; Endangered-FL; Bromeliaceae

Giant airplant is a large, rosette-forming epiphyte. The inflorescence of flowering plants may reach or exceed three feet in height. The floral bracts are erect and widely spaced, green or tinged purple and the individual flowers are white. Giant airplants may live for as many as 20 years, however, this is a monocarpic species. After flowering, the plant releases it seed and then dies. Like other Tillandsia, the poorly developed roots of this epiphyte help secure to a variety of hosts. Trees with thick-ridged bark allow for easier attachment and seedling recruitment. Giant airplant often grows in bright, exposed areas in swamps, hammocks, mesic flatwoods, and occasionally on the periphery of basin marshes and in improved pastures. Most of the 19 sightings of giant airplant were in the northeastern and southern sections of Babcock Ranch. Usually only one or two plants were observed at any one location.

Giant airplant is the largest *Tillandsia* species and the largest bromeliad in Florida. Its historic range extended across much of the central and southern peninsula. Since its introduction in 1989, the Mexican bromeliad weevil (*Metamasius hemipterus*) has killed many plants by

burrowing into, and destroying, the leafy, tank-like rosettes. Florida now lists giant airplant and most other rosette-forming bromeliads as threatened or endangered. Since most *Tillandsia* are slow to mature, protecting the trees in primary habitats will encourage the development of healthy epiphyte populations. In 2007, researchers with the University of Florida's Institute of Food and Agricultural Sciences released a parasitic fly in Hillsborough County that kills the weevil's larvae. Results of this biological control effort are still pending.

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APPENDIX 1. DATA ATTRIBUTES, DEFINITIONS, AND VALUES FOR FNAI-TRACKED RARE PLANT POINTS

ATTRIBUTES	VALUES
SITE	Name of the managed area.
DATE	Date of data collection.
SURVEYOR	Name of the FNAI field surveyor
FIELD_ID	Number assigned to this point by the FNAI scientist during field work; not necessarily unique.
POINT_ID	Unique number assigned to each point by ArcView.
SPECIES	Scientific name of rare plant occurring at that point.
COM_NAME	Common name of rare plant occurring at that point.
COUNT	Estimated number of individuals in the population. Count values are: 1-10 11-50 51-100 101-1000 >1000
AREA_OCCUP	Estimated area that the population occupies in hectares or square meters. Area occupied values are: <1 square meter 1 - 10 square meters 11 - 100 square meters 101 - 1000 square meters (0.03 acre - 0.25 acre) 1001 - 2500 square meters (0.25 acre - 0.6 acre) 1/4 hectare – 1/2 hectare (0.6 acre - 1.2 acre) >1/2 hectare – 1 hectare (1.2 acre - 2.5 acres) >1 hectare – 10 hectares >10 hectares – 100 hectares >100 hectares
PHENOLOGY	Characteristic phenology of the plants. Phenology values are: flower/bud flower/fruit fruit/spore in leaf dormant
OTH_EODATA	Other element occurrence (EO) data including any observations on the status, management needs, and viability of the population.
FNAI_NC	Type of natural community, using the FNAI classification system plus "pine plantation," "pasture- improved," "pasture- semi-improved," and "ruderal".

DISTURB_1 Describes the primary disturbance in the vicinity of the rare plant population. If there is more than one type of disturbance, the most prevalent form of disturbance is entered here and the lesser disturbance is entered in Disturb_2. Disturbance values are:
not evident
agriculture
cattle disturbance
clearing (includes dove fields, old fields, and food plots that are less than 0.5 acre, i.e. that are not delineated as ruderal polygons)
ditch/canal
exotics
firebreaks
fire suppression
forestry operations (e.g., logging, loading areas, bedding, equipment rutting, slash piles, and other mechanical disturbances; does not include burning)
hog digging
impoundment (e.g. artificial ponds and lakes, borrow pits, dams, dikes)
natural
ORV trail
road
trash dumping
woody encroachment
cause unknown
other (details provided in the COMMENTS field)

DISTURB_2 Describes the secondary disturbance, if any, in the vicinity of the rare plant population. Disturbance values are the same as DISTURB_1.

DISTURB_SEV Severity of the disturbance(s). Disturbance severity values are:
none
light
moderate
heavy
severe

FNAIGLOBAL Global rank of the element (rare plant) assigned by FNAI.*

FNAISTATE State rank of the element (rare plant) assigned by FNAI.*

FEDERAL Federal legal status.*

STATE State legal status.*

COMMENTS Comments is an optional field used by the surveyor to provide additional information about the FNAI-tracked plant population.

Appendix 2. Florida Natural Areas Inventory Rank Explanations

GLOBAL AND STATE RANKS

Florida Natural Areas Inventory (FNAI) defines an **element** as any rare or exemplary component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. FNAI assigns two ranks to each element found in Florida: the **global rank**, which is based on an element's worldwide status, and the **state rank**, which is based on the status of the element within Florida. Element ranks are based on many factors, including estimated number of occurrences, estimated abundance (for species and populations) or area (for natural communities), estimated number of adequately protected occurrences, range, threats, and ecological fragility.

GLOBAL RANK DEFINITIONS

G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or human factor.
G2	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or human factor.
G3	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals), or found locally in a restricted range, or vulnerable to extinction from other factors.
G4	Apparently secure globally (may be rare in parts of range).
G5	Demonstrably secure globally.
GH	Occurred historically throughout its range, but has not been observed for many years.
GX	Believed to be extinct throughout range.
GXC	Extirpated from the wild but still known from captivity or cultivation.
G#?	Rank uncertain (e.g., G2?).
G#G#	Range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species, and the T portion refers to the subgroup; T# has same definition as G#.
G#Q	Ranked as species but there is some question as to whether it is a valid species.
G#T#Q	Same as above, but validity as subspecies or variety is questioned.
GU	Global rank unknown; due to lack of information, no rank or range can be assigned.
G?	Temporarily not ranked.

STATE RANK DEFINITIONS

State ranks (S#) follow the same system and have the same definitions as global ranks, except they apply only to Florida, with the following additions:

SA	Accidental in Florida and not part of the established biota.
SE	Exotic species established in Florida (may be native elsewhere in North America).
SX	Believed to be extirpated from state.

Florida Natural Areas Inventory Rank Explanations

FEDERAL AND STATE LEGAL STATUSES

Provided by FNAI for information only.
For official definitions and lists of protected species, consult the relevant state or federal agency.

FEDERAL LEGAL STATUS

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

LE	Endangered: species in danger of extinction throughout all or a significant portion of its range.
LT	Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.
E(S/A)	Endangered due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
T(S/A)	Threatened due to similarity of appearance (see above).
PE	Proposed for listing as Endangered species.
PT	Proposed for listing as Threatened species.
C	Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
XN	Non-essential experimental population.
MC	Not currently listed, but of management concern to USFWS.
N	Not currently listed, nor currently being considered for listing as Endangered or Threatened.

FLORIDA LEGAL STATUSES

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

LE	Endangered: species, subspecies, or isolated population so few or depleted in number or so restricted in range that it is in imminent danger of extinction.
LT	Threatened: species, subspecies, or isolated population facing a very high risk of extinction in the future.
LS	Species of Special Concern is a species, subspecies, or isolated population which is facing a moderate risk of extinction in the future.
PE	Proposed for listing as Endangered.
PT	Proposed for listing as Threatened.
PS	Proposed for listing as Species of Special Concern.
N	Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505.

LE	Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.
LT	Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.
PE	Proposed for listing as Endangered.
PT	Proposed for listing as Threatened.
N	Not currently listed, nor currently being considered for listing.