

Fragrant Prickly-Apple (*Harrisia fragrans*)  
Annual Monitoring and Mapping,  
Interim Report

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## INTRODUCTION

*Harrisia fragrans* Small ex Britton & Rose is an endemic shrubby cactus listed as endangered by the U.S. Fish and Wildlife Service and the State of Florida. It historically occurred in several coastal central Florida counties including Volusia, Brevard, Indian River and St. Lucie (Wunderlin & Hansen 2000). It has also been reported for Big Pine Key and the Flamingo area of Monroe County (Benson 1982). Today, all known occurrences are located in St. Lucie County in or around Savannas Preserve State Park (FNAI 1997, Rae 1996). According to Small (1933) this species was historically found in hammocks on high sand dunes, kitchenmiddens, and coquina ledges. The Institute for Regional Conservation (IRC) reported *H. fragrans* as being frequent in scrub and xeric hammock at the Savannas Preserve State Park (Bradley et al. 1999). The entire Savannas population is confined to an area approximately ten miles long and ½ mile wide. A Florida East Coast Railway railroad line dissects the population. The Savannas Preserve State Park is located on the western side of the railroad line. Most of the plants occur on the western side of the railroad line in the Savannas Preserve State Park and its inholdings.

Between 1988 and 1996, populations of *H. fragrans* in and around the Savannas Preserve State Park were monitored by John Rae (Rae 1996). Rae reported that in 1996 there were an estimated 321 plants present in 11 sub-populations on both private and public lands. He studied the demography of two sub-populations each summer between 1988 and 1996 recording mortality, plant size, fruiting, and flowering. His results indicated that both sub-populations had suffered serious decline; one sub-population declined by 63.8% and the other by 64.4%. Rae hypothesized that excessive shading as well as overexposure were responsible for such a high decline, theorizing that *H. fragrans* prefers partially shaded conditions.

In 1998, preliminary monitoring of the entire population at the Savannas Preserve State Park was initiated by IRC and Florida Department of Environmental Protection (FDEP). This study began in the fall of 1998 under the encouragement of FDEP biologist J.B. Miller while IRC was conducting a larger study of scrub habitats for the U.S. Fish and Wildlife Service (Bradley et al. 1999). During this preliminary census 802 plants were recorded.

While Rae reported the population decline of *H. fragrans*, it was unclear if it was truly in decline or not. IRC and FDEP data showed that a much larger population existed than Rae had estimated. A follow-up monitoring program was clearly needed to determine the long-term population trend of this species. Part of the problem may have been the technology used by Rae (sketch maps and aluminum tags), and possibly a lack of vigorous surveys to determine if new sub-populations of *H. fragrans* were being established while the two sub-populations were in decline. Based on the above, IRC proposed a continuation of annual monitoring for four additional years to determine the long-term population trend of this species.

## OBJECTIVES

1. Establish a long-term (five year) monitoring program for occurrences of *H. fragrans* populations at Savannas Preserve State Park (including its inholdings) in St. Lucie County;
2. Determine population trends of *H. fragrans* within the study area over a five year period (1998-2002);
3. Examine the effect of canopy cover on the demographics of *H. fragrans*.

## METHODS

- Re-monitor individual *H. fragrans* plants.
- Record all plants using an accurate GPS device (accurate to the decimeter).
- Record Rae's old tags, and place new tags on all individual *H. fragrans* by using stainless steel pre-numbered tags attached to the plants using rust proof wire (Adams and Lima 1994).
- Record flowering and fruiting activity, including number of fruits (mature or immature) and developing flowers on each plant.
- Record individual plant size by measuring the length of the longest stem.
- Record the number of stems per plant.
- Record canopy cover (full shade, partial shade, or full sun).

## RESULTS & DISCUSSION OF 2000 DATA COLLECTION

Data was collected between October 1 and November 9, 2000. A total of 1206 plants were mapped and tagged, 283 more than the 879 that were mapped in 1999. Forty-six plants that were mapped in 1999 had died and 33 plants could not be located and are presumed to be dead. Of the 283 plants that were newly recorded in 2000, approximately 63 are believed to be new plants, not individuals overlooked in 1999. Recruitment was observed to occur in two different ways, by seed and by fragments breaking off of parent plants and rooting on the ground. Of the new plants recorded in 2000, 25 were determined to be fragments from other plants. Thirty-eight plants were 0.5 dm tall or less and are believed to be new recruits from seed.

Plants were found nearly throughout the Savannas Preserve State Park. Colonies often occur in distinct clusters. Nine colonies of plants have been identified (Maps 1-8).

The data show that average plant size decreased 7.6 dm in 1999 to 6.4 dm in 2000. This is probably due to the continued discovery of new plants in 2000, particularly small plants that were more likely to be overlooked in previous years.

Average plant size increased with amount of shading. In 1999, plants in full sun averaged 6.5 dm in height, in partial shade 7.8 dm, and 8.0 dm in full shade. In 2000, the same trend was observed: plants in full sun average 5.9 dm in height, in partial shade 6.6 dm, and 7.0 dm in full shade.

The average number of stems decreased slightly from 2.9 per plant to 2.8 but there was no significant difference between the two years (t-test, p=0.83).

The data also show that plant stature (erect vs. prostrate) changed from 5% of plants prostrate to 14% of plants, more similar to what was recorded in 1998 (13%).

<b>Table 1</b>			
<b>Summary of <i>Harrisia fragrans</i> data</b>			
	<b>Fall 1998</b>	<b>Fall 1999</b>	<b>Fall 2000</b>
Number of Plants Mapped:	802	879 <sup>1</sup>	1206
Average Size:	8.5 dm	7.6 dm	6.4 dm
Average # Stems:	3.1	2.9	2.8
Number in Shade:	NA	347(38%)	486 (40%)
Number in Sun:	NA	177(19%)	195 (16%)
Number in Partial Shade:	NA	399(43%)	522 (43%)
Number in Fruit:	NA	208(23%)	210 (18%)
Number in Flower:	14 (2%)	3(0.003%)	12 (1%)
Erect:	695 (87%)	874(95%)	1037 (86%)
Prostrate:	103 (13%)	49(5%)	166 (14%)

#### ADDITIONAL OBSERVATIONS

We continue to find additional plants that were overlooked in previous years. The population appears to be stable; we have found no evidence that the population size is either increasing or decreasing.

In 2000, at least four plants were found to be infested with a scale insect (Homoptera). A sample was collected from one of these plants and sent to the Florida Department of Agriculture and Consumer Services – Division of Plant Industry for determination. The specimen was determined by A.B. Hamon to be *Diaspis echinocacti* (Diaspididae), cactus scale, a native scale common on cacti in Florida. It is unknown how much the presence of this scale affects individual plants.

Five plants attributed to the Walton Scrub Preserve in previous surveys were actually found to occur just outside the boundaries of the property, in part on property owned by the Florida Inland Navigation District (FIND) and 39 plants were later determined to be on private, posted property and were not monitored in 2000.

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<sup>1</sup> Excludes plants monitored in 1999 but not in 2000.

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