

**PIMA PINEAPPLE CACTUS SURVEY  
OF THE PROPOSED ROSEMONT PROJECT WATERLINE ALIGNMENT**

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**DATE:** March 11, 2009  
**PROJECT NO.** 1049.10 350 350

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**1. INTRODUCTION**

WestLand Resources, Inc. (WestLand) was retained by Rosemont Copper Company to survey for Pima pineapple cactus (PPC; *Coryphantha scheeri* var. *robustispina*) along an approximately 15.77-mile-long proposed waterline as part of the proposed Rosemont Project. A 120-ft wide area was surveyed along the

proposed waterline extending from just east of the Town of Sahuarita to the western base of the Santa Rita Mountains<sup>1</sup> (the Survey Area, Figure 1).

## **2. SPECIES STATUS**

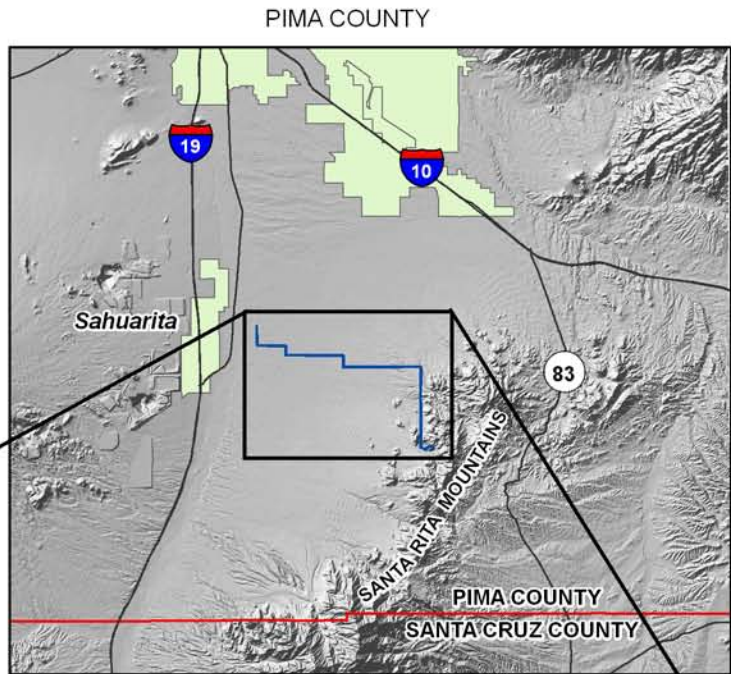
The PPC is listed by US Fish and Wildlife Service (USFWS) as endangered (58 FR 49875, 09-23-93) under the Endangered Species Act (ESA). There is no designated critical habitat or proposed critical habitat for PPC.

The PPC is reported to occur from 2,300 to 4,500 feet (700 to 1,400 meters) in elevation (EES 1992) in Pima and Santa Cruz counties, southern Arizona, and northern Sonora, Mexico (Benson 1982; Phillips and Phillips 1981). The known range of PPC in Arizona is from the Baboquivari Mountains east to the Santa Rita Mountains in Santa Cruz and Pima counties. Most of the known locations are in the Altar and Avra valleys, Santa Cruz River Basin, and the alluvial fans of the Sierrita, Santa Rita, Empire, Coyote, and Pajarito mountains (AGFD 2001), and two documented populations are known in northern Sonora, Mexico (USFWS 1998). The PPC does not occur in mountainous areas including the Sierrita, Baboquivari, Santa Rita, Quinlan, Coyote, Atascosa, Pajarito, Cerro Colorado, San Luis, and Tumacacori mountains. The species has not been found in riparian areas such as the Santa Cruz River floodplain or the Sonoita Creek drainage of Arizona (58 FR 49875).

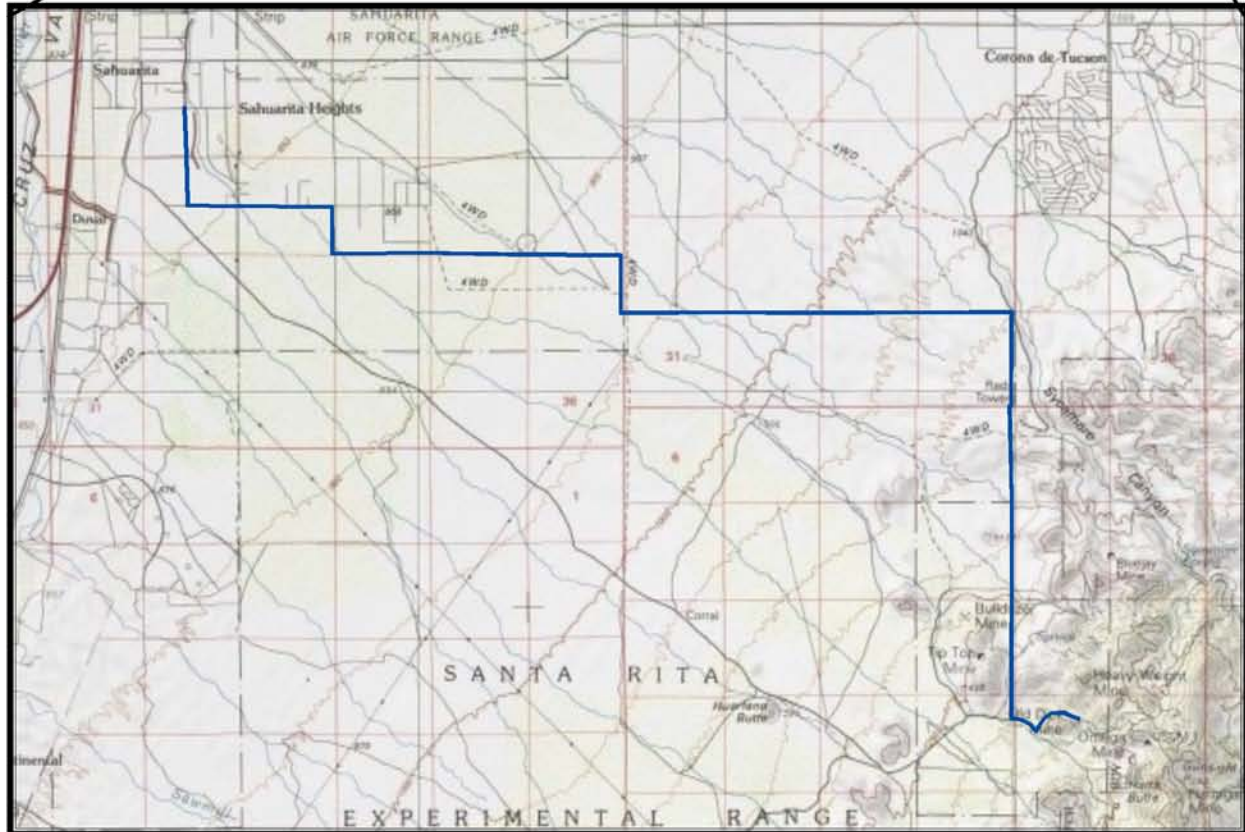
The PPC is generally found on Sonoran desertscrub alluvial fans and semidesert grassland ridges (Mills 1991). In rolling hilly habitats, the species has been found mainly on flat hilltops and rarely on slopes or in drainages separating the hilltops. Although PPC occur most commonly on flat ridgetops with little (less than 10 percent) slope, Mills (1991) reported some plants on south-facing hillsides (mid to upper slope) with slopes up to 15 percent (Mills 1991). Mills (1991) also reported that they found no plants on north-facing slopes of any significant size, despite intensive surveys. However, PPC have been found on a northern slope with approximately 25 percent grade (S. Hart, WestLand Resources, Inc., personal observation) but this is uncommon. Substrate composition is likely an important factor in determining PPC distribution, although we are not aware of any studies that conclusively identify important substrate factors. Substrates in which PPC occur are described as rocky to sandy or silty soils in alluvial valleys or on shallow-sloped (less than 10 percent grade) hillsides (Mills 1991) and White House sandy loam series (Roller 1996). They are not known to occur in very sandy or very rocky soils, in deeper soils along drainages, or in soils with high clay content (Mills 1991).

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<sup>1</sup> Crossing T17S, R14E, Sections 17, 20, 21, and borders of Sections 22/27, 23/26, and 24/25; T17S, R15E, borders of Sections 30/31, 29/32, 28/33, 27/34 and 34/35; and T18S, R15E, borders of Sections 2/3, 10/11, and 14/15, and Section 23, Gila and Salt River Meridian



Approximate Scale 1" = 10 Miles



T.17S.,R.14E. Portion of Sections 17, 20-28  
 T.17S.,R.15E. Portion of Sections 26-35  
 T.18S.,R.15E. Portion of Sections 2,3,10,11,14,15,22&23  
 Pima County, Arizona,  
 Sahuarita, Corona De Tucson, Helvetia  
 USGS 7.5' Quadrangles



**Legend**

Survey Area



**ROSEMONT PROJECT WATERLINE  
 Pima Pineapple Cactus Survey**

Vicinity Map  
Figure 1

### **3. METHODS**

The survey followed guidelines set forth in the USFWS document entitled *Pima Pineapple Cactus 3 Tier Survey Methods* (Roller 1996). Surveyors walked transects approximately 15 feet apart to attain 100 percent coverage of the Survey Area. A single, 100-percent coverage survey was completed between October 7 and 21, 2008, by a WestLand field crew with extensive PPC survey experience.

The boundaries of the Survey Area were entered into a Trimble GPS unit with sub-centimeter accuracy. The unit was carried in the field to guide the survey. In places, the Survey Area straddled fencing along the boundary of private property. In these situations, the private property was not included in the survey but the survey width remained 120 feet, with the fence becoming one boundary.

UTM coordinates (in NAD 27) of all PPC found were entered into the Trimble unit. PPC were tagged with a unique number and the number of stems and general health of each plant was recorded.

### **4. SURVEY AREA DESCRIPTION**

The Survey Area is located mainly on alluvium on the west side of the Santa Rita Mountains. The Survey Area passes through undeveloped lands, except for short stretches with residences in a rural setting on one side of the alignment (Figure 2). The Survey Area included dirt roadways over much of its length.

Jackson (1989) mapped the geomorphological units that the Survey Area crosses. The western approximately 7 miles of the Survey Area are generally planar with a gentle but gradually increasing upward slope to the east. This section starts on late Pleistocene–early Holocene soils at the west end, moving east over a mosaic of middle and late Pleistocene through Holocene soils. The next 3.5 miles continue east onto a wide alluvial fan of early Pleistocene (older) origin spilling out of Sycamore Canyon in the Santa Rita Mountains. This surface is easily distinguished in aerial color photography (shown reddish in color) and typified by northwest-trending, steep-sloped ridges and an increasingly steep overall gradient as the base of the Santa Rita Mountains are approached (Figure 2). The Survey Area then turns south and continues on the same surface for close to 2 miles, then for more than 1.5 miles crosses a surface with a similar overall slope and age, but of different origin and with shallower cut ridges. The final approximately 1.75 miles of the Survey Area crosses a small, outlying hill of the mountains protruding from the alluvial material, ending in a steep drainage at the base of the mountains. The low point of the Survey Area is approximately 2,730 feet above mean sea level (amsl) near its western end, and the high point is approximately 4,500 feet amsl near its eastern end.

On Brown's (1994) map of biotic communities of the southwest, the west end of the Survey Area is near the boundary of the semidesert grassland and Arizona upland subdivision of the Sonoran desertscrub biotic communities, crossing eastward within semidesert grassland. The Survey Area crosses through

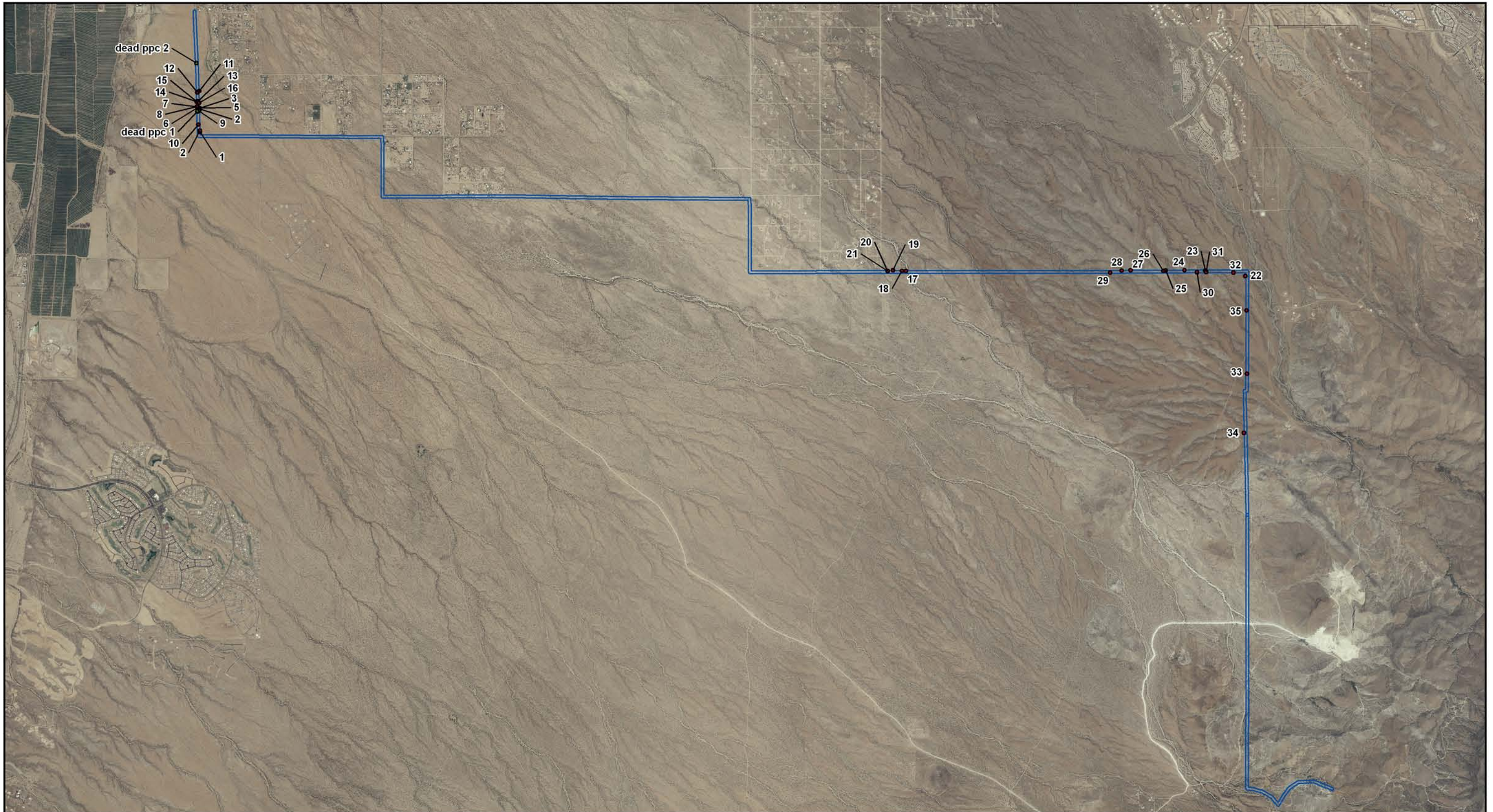


Image Source: NAIP, 2007



**Legend**

- Survey Area
- PPC Location

**ROSEMONT PROJECT WATERLINE  
Pima Pineapple Cactus Survey**

PPC Location Map  
Figure 2

various vegetation communities, including mesquite–cactus scrub with more Sonoran desertscrub influence; creosotebush (*Larrea tridentata*) flats; relatively densely vegetated xeroriparian areas with velvet mesquite (*Prosopis velutina*), blue palo verde (*Parkinsonia florida*), whitethorn acacia (*Acacia constricta*), and other shrubs; and areas that were likely typical semidesert grassland decades ago, but now support more mesquite, soaptree yucca (*Yucca elata*), and many species of shrubs and sub-shrubs.

## 5. PIMA PINEAPPLE CACTUS SURVEY RESULTS

The 120-ft-wide, 15.77-mile-long Survey Area covers approximately 229 acres. WestLand mapped, tagged, and recorded data on the 35 live PPC that were found during the survey effort. Distribution of the PPC was not uniform along the Survey Area. A cluster consisting of 16 live PPC and two dead PPC was found along the westernmost portion of the Survey Area (Figure 2). Soils within this westernmost portion are of late Pleistocene to early Holocene origin. Approximately 6.5 miles to the east of the first cluster, a group of 5 PPC was found on middle Pleistocene soils just east of the intersection of Camino de Aurelia and South Kolb Road (Figure 2). The other 14 PPC were found dispersed over approximately 2.5 miles of early Pleistocene soils within the Sycamore Canyon alluvial fan, where the alignment makes its final turn to the south (Figure 2). The gaps where no PPC were found are notable, including approximately 6.5 miles between the western and middle clusters, 1.5 miles from the middle cluster to the first PPC on the Sycamore Canyon fan, and the final southeastern 3.5 miles of the Survey Area (Figure 2).

The UTM coordinates, in NAD 27, of all live PPC found during the survey are provided in Table 1.

**Table 1. Locations and Notes for PPC found during the Rosemont Waterline Survey, October 2008**

PPC Tag No.	UTM Coordinates (NAD 27)		Notes
	Easting	Northing	
1	506158	3533168	No pups, healthy
2	506153	3533187	2 main stems, no pups, healthy
3	506152	3533475	4 pups, 2 fruits, healthy
4	506152	3533480	4 pups, healthy
5	506149	3533481	2 healthy main stems, 4 pups (3 dead)
6	506131	3533489	5 pups, healthy
7	506121	3533499	Dead main stem, 6 pups
8	506117	3533501	No pups, healthy
9	506140	3533444	No pups, 1 fruit, healthy
10	506133	3533261	10 pups, healthy
11	506144	3533705	2 fruits, unhealthy
12	506121	3533690	Main stem unhealthy, 4 pups
13	506128	3533570	No pups, healthy
14	506119	3533561	No pups, healthy
15	506113	3533565	1 healthy stem, 1 dead stem
16	506144	3533550	Main stem dead, 3 pups
17	515453	3531336	no pups; healthy

**Table 1. Locations and Notes for PPC found during the Rosemont Waterline Survey, October 2008**

PPC Tag No.	UTM Coordinates (NAD 27)		Notes
	Easting	Northing	
18	515399	3531335	1 pup; healthy
19	515281	3531349	
20	515212	3531334	no pups
21	515211	3531335	7 pups
22	519923	3531270	4 stems 1 dead 3 fruit healthy
23	519395	3531340	7 pups; fair health
24	519121	3531347	2 pups; healthy; 1 fruit
25	518874	3531346	2 pups; healthy; 2 dry fruit remnants
26	518842	3531336	8 pups; healthy
27	518412	3531347	0 pups; healthy
28	518293	3531339	main stem dead; 6 pups; healthy
29	518143	3531316	26 pups; healthy; 2 dry-partial fruit; 3 ripe fruit
30	519283	3531321	3 pups; healthy
31	519409	3531322	0 pups; healthy
32	519763	3531315	3 pups healthy 3 fruits
33	519944	3529983	4 stems 2 dead 6 pups
34	519905	3529206	3 pups; healthy
35	519938	3530817	11 pups; healthy

## 6. LITERATURE CITED

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