Cactus Conservation Institute

Peyote post-harvest regrowth – the harvested group

Raw data and summary of observations after four years

Notes:

Concerning data on regrowth involving multiple pups it is important to understand that there is not necessarily a direct 1:1 correspondence between sequential figures for individual pups within a single plant. It was not uncommon for some or all pups to be partly or entirely covered so some photos illustrate the pre-uncovery state.

Images of the tags can be viewed in a separate downloadable file labeled as such.

Images of regrowth for the actual plants that were harvested in our study can likewise be viewed in separate downloadable files for each year or a variety of other download types.

Images of the regrowth plants that were reharvested in the second and third phases of this study can be viewed in the downloadable files labeled Reharvest Images.

On 8 March 2010 the second phase of this study began with the two-year old regrowth of half the original harvested plants being reharvested. Those twenty plants were rooted for replanting and the mother plants are now part of a subgroup in the study.

On 13 March 2012 the third phase of this study began with the two-year old regrowth of half the reharvested plants being reharvested yet again (the third harvest of those plants in four years). The harvested buttons from those twenty plants were dried and saved for a study to determine the mescaline content of small regrowth buttons compared to crown tissue from eight-ribbed mature plants from the same population, and the mother plants are now part of a subgroup in the study. Both the thrice harvested plants and the once

harvested plants had four dead or missing plants. That data can be separately viewed in the downloadable report entitled "Phase 3 – Reharvest of Regrowth."

nd – No data available.
– – Missing data.

Plant No. [Tag IMG]	**Number of ribs**	**Diameter** (cm)	**Height** (cm)	**Weight** (gm)	**Regrowth as number of pups**	**Regrowth as diameter of pups** (cm)	**Comments**
2008 **2009** **2010** **2011** **2012**	**3 Mar. 2008** (This refers to the original plant.) Also entries for 2010-2012				**11 Nov. 2008** **7 Mar. 2009** **6 Mar. 2010** **15 Mar. 2011** **13 Mar. 2012**	**11 Nov. 2008** **7 Mar. 2009** **6 Mar. 2010** **15 Mar. 2011** **13 Mar. 2012**	
101	13 – 8, 7, 6, 7 *nd* *nd*	6.2	3.0	65	4 4 4 0 0	1.3, 2.5, 2.4, 1.2 2.0, 2.7, 2.5, 1.3 2.5, 3.1, 3.1, 20 *nd* *nd*	Reharvested 8 March 2010 Dead remains found. Reharvest set 13 March 2012
102	5 – *nd* *nd* *nd*	2.4	1.0	3	1 1 *nd* *nd* *nd*	1.5 1.5 *nd* *nd* *nd*	Plant not present. Hog activity. Plant not present.
103	5 – 7, 7 6, 6 5, 5	2.0	0.7	3	3 2 2 2 2	0.5, 0.8, 0.9 1.2, 1.3 1.4, 1.5 0.6, 0.6 2.6, 2.0	New control 13 March 2012
104	8 – * *nd* *nd*	4.6	1.5	23	– – 2 0 0	*nd* *nd* 9 *nd* *nd*	Tag not found. Plant not found. Tag not found. Plant not found. *Not countable. Carcass present. New control set 13 March 2012
105	8 –	5.0	1.5	23	*nd* *nd*	*nd* *nd*	

	nd *nd* *nd*				*nd* *nd* *nd*	*nd* *nd* *nd*	Presumed dead. Plant and tags were not locateable.
106	13 – 7, 5 not countable 5	6.3	1.6	45	2 3 2 1 1	2.0, 2.4 2.0, 2.4, 1.9 4.0, 7.0 1.0 1.5	Confusion detailed on image pages. Partially eaten. New control 13 March 2012
107	8 – *nd* *nd* *nd*	5.0	3.0	31	6 6 0 0 0	1.5, 2.0, 1.8, 1.3, 1.6, 1.4 1.8, 2.4, 2.2, 1.5, 1.9, 1.5 *nd* *nd* *nd*	Dead. Remains located. Abundant remains still present.
108	8 – 5, 7, 7 7, 7, 5* 7, unclear, 5	5.0	1.5	31	– 3 3 3 3	*nd* 2.1, 1.8, 2.1 2.1, 1.6, 2.4 2.1, 1.3, 1.3 3.2, 1.2, 2.1	Tag not found. Plant not found. Reharvested 8 March 2010 *Chewed on by herbivores. Reharvested 13 March 2012
109	9 – 7, 8, 7 8, 7, 7 8, 8, 8	5.8	1.9	43	– – 3 3 3	*nd* *nd* 2.9, 3.8, 3.4 3.1, 3.0, 3.1 4.3, 4.0, 3.8	Tag not found. Plant not found. Tag not found. Plant not found. New control 13 March 2012
110	8 – 7, 7 *nd* *nd*	4.1	1.8	23	– – 2 0 0	*nd* *nd* 2.5, 2.1 *nd* *nd*	Tag not found. Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010 Dead. Carcass located. Reharvest set 13 March 2012
111	8 – 8, 5 6 *nd*	2.7	0.9	6	– – 2 1 0	*nd* *nd* 2.0, 0.6 1.0 *nd*	Tag not found. Plant not found. Tag not found. Plant not found. New control 13 March 2012

112	13 – 8, 7, 8, 8 7, 8, 6, 6 6, 5, 6, 6	4.8	0.7	20	– 4 4 4 4	*nd* 2.1, 2.0, 1.7, 1.6 2.6, 1.3, 2.7, 2.4 1.3, 1.5, 1.3, 1.3 2.2, 2.0, 1.8, 1.8	Tag not found. Plant not found. Reharvested 8 March 2010 Reharvested 13 March 2012
113	13 – *nd* *nd* *nd*	6.3	2.6	74	1 0 0 0 0	0.9 *nd* *nd* *nd* *nd*	Dead. Remains located. Carcass still present.
114	8 – 7, 8 8, 5 *nd*	4.1	1.2	17	2 2 2 2 0	1.7, 1.9 1.7, 1.7 2.1, 2.2 2.3, 1.0 *nd*	Reharvested 8 March 2010 1 head looks older than the other. Reharvest set 13 March 2012
115	5 – *nd* *nd* *nd*	2.2	0.8	3	0 0 0 0 0	*nd* *nd* *nd* *nd* *nd*	Dead but not locateable. Carcass found.
116	8 – 8, 5, 6 5*, 8, 6 *nd*	4.4	0.3	23	3 3 3 3 0	1.7, 1.0, 1.4 1.7, 0.9, 1.6 2.5, 0.7, 1.8 2.5, 2.5, 0.7 *nd*	*Chewed on by herbivores. New control set 13 March 2012
117	8 – 11, 6, 6 8, 7, 12 *nd*	5.4	1.7	28	3 3 3 3 0	1.3, 2.8, 1.8 1.8, 3.0, 2.1 1.7, 3.6, 2.2 2.6, 2.5, 4.5 *nd*	New control set 13 March 2012
118	8 – 8, 7, 7, 6, 6 7, 7, 6 7, 7, 7	5.3	1.3	34	5 5 5 3 3	1.0, 1.3, 1.0, 1.2, 1.4 1.0, 1.9, 1.3, 1.7, 2.0 1.9, 1.1, 1.4, 1.0, 1.5 1.7, 1.8, 1.8 2.3, 2.3, 2.1	Reharvested 8 March 2010 Reharvested 13 March 2012
119	13 – 8, 5, 8, 8	5.4	2.3	48	4 4 4	1.9, 0.8, 1.5, 1.6 2.2, 0.9, 1.3,	

	6, 7, 7, 6 7, 5, 7, 5				4 4	1.9 2.4, 0.9, 1.6, 1.6 2.4, 2.8, 3.2, 1.9 4.0, 2.5, 3.1, 3.2	New control 13 March 2012
120	8 – 7, 8 7, 6 6, 6	5.6	1.4	28	– – 2 2 2	*nd* *nd* 1.8, 2.1 2.0, 1.5 2.2, 1.8	Tag not found. Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010 One crown was stepped on. Reharvested 13 March 2012
121	13 – 8, 7 7, 7 8, 7	6.3	2.6	71	2 2 2 2 2	1.9, 2.5 2.4, 2.6 2.4, 2.7 3.6, 3.4 4.0, 4.2	New control 13 March 2012
122	5 – 7 6 8	2.9	1.0	6	1 – 1 1 1	2.2 *nd* 2.1 1.7 2.1	Tag not found. Plant not found. Reharvested 8 March 2010 . Reharvested 13 March 2012
123	8 – 6, 5 7, 6 8, 7	5.0	1.8	31	– – 2 2 2	*nd* *nd* 2.1, 1.6 2.5*, 2.9 3.2, 3.0	Tag not found. Plant not found. Tag not found. Plant not found. *Regrowth after herbivore damage. New control 13 March 2012
124	8 – 7, 6 5, 5 8, 7	4.1	1.1	17	2 2 2 2 2	1.9, 2.1 1.8, 2.0 1.8, 1.8 0.8, 2.0 2.5, 2.0	Reharvested 8 March 2010 Reharvested 13 March 2012
125	8 – 5, 6 6, 7 7, 7	4.4	1.1	14	2 2 2 2 2	1.6, 1.5 2.0, 1.6 1.4, 1.4 2.5, 2.5 2.9, 2.9	New control 13 March 2012
126	13	5.0	2.0	54	–	*nd*	Tag not found.

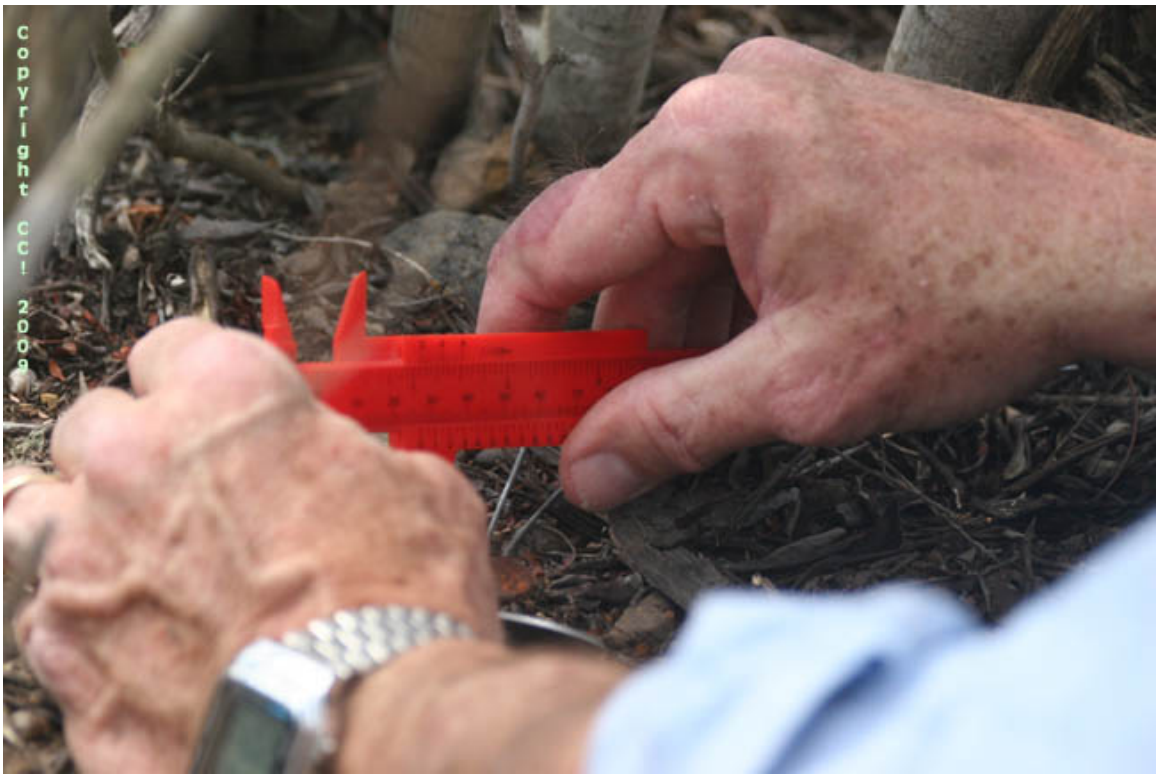
	– 6, 7, 7 7, 6, 8, 7 8, 6, 7, 6				– 3 4 4	*nd* 2.4, 2.5, 2.4 1.8, 1.9, 2.0, 1.4 2.6, 2.1, 2.3, 2.5	Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010 Reharvested 13 March 2012
127	8 – 8 8 8	4.3	1.2	28	1 1 1 1 1	1.8 2.0 2.3 3.0 3.7	 New control 13 March 2012
128	13 – 6, 8, 8 6, 7, 6, 7 6, 7, 7, 7	4.9	1.6	34	3 3 3 4 4	1.6, 2.4, 2.0 1.7, 2.8, 2.0 1.8, 2.8, 2.1 1.5, 1.7, 1.6, 1.5 2.2, 1.9, 2.1, 2.0	 Reharvested 8 March 2010 Reharvested 13 March 2012
129	10 – 6, 7, 7 8, 8, 7, 7 8, 8, 8, 7+	5.3	2.0	34	4 4 3 4 4	2.0, 2.0, 1.0, 2.2 2.2, 2.2, 1.7, 2.3 2.2, 2.0, 2.3 2.8, 2.8, 2.8, 2.8 3.0, 3.0, 3.0, 3.0	 New control 13 March 2012
130	8 – 7, 7 13, 8 –	5.3	1.6	23	2 2 2 2 missed	1.1, 3.1 1.1, 3.7 3.9, 1.4 4.7, 2.3 –	 Main crown was stepped on & healed.
131	8 – 7, 7, 7 6 *nd*	4.8	2.6	26	3 3 3 1 0	1.4, 1.2, 1.1 1.9, 1.5, 1.4 1.0, 1.7, 1.6 2.0 *nd*	Reharvested 8 March 2010 Lopsided; herbivores ate one side. Reharvested set 13 March 2012
132	8 – *nd* *nd* *nd*	4.4	1.5	17	2 2 *nd* *nd* *nd*	1.5, 2.0 1.9, 2.0 *nd* *nd* *nd*	Plant not present. Hog activity.
133	8 – 6	4.2	1.7	20	0 1 1	*nd* 0.8 1.3	

	6 6				1 1	2.0 2.1	New control 13 March 2012
134	8 – 6, 7 *nd* 6, 6	3.4	1.1	9	0 2 2 0 2	*nd* 1.4, 1.6 1.4, 1.4 *nd* 1.7, 1.9	Reharvested 8 March 2010 Reharvested 13 March 2012
135	13 – 12, 5 12, 6 13*, 7	5.4	1.0	28	2 2 2 2 2	2.8, 1.7 3.2, 1.9 3.9, 1.8 4.5, 2.4 5.0, 2.5	New control 13 March 2012 *Apical meristem regrowth.
136	13 – 6, 7, 7 5*, 6, 6 6, 7, 6	5.7	2.3	48	2 3 3 3 3	1.9, 1.9 2.4, 2.3, 1.4 2.1, 2.2, 2.0 1.2, 1.7, 1.3 2.5, 2.1, 1.8	Reharvested 8 March 2010 *Apex of plant off-center. Reharvested 13 March 2012
137	8 – 6, 6, 6 6, 7, 7 6, 7, 7	4.6	1.5	17	3 3 3 3 3	1.8, 1.8, 1.7 1.6, 1.6, 1.3 1.3, 1.2, 1.2 2.1, 2.0, 2.0 2.2, 2.0, 2.0	New control 13 March 2012
138	13 – 6, 5, 5 6 6	5.7	2.6	43	4 4 3 1 1	1.1, 1.4, 1.8, 1.1 1.2, 1.7, 2.4, 1.4 3.0, 1.2, 1.2 1.9 1.9	Tag not found. Plant was found. Reharvested 8 March 2010 Apical meristem eaten and regrown. Reharvested 13 March 2012
139	5 – 6 8 8	2.9	1.0	6	1 1 1 1 1	1.8 1.9 2.1 2.6 1.9	New control 13 March 2012
140	10 – *nd* *nd* *nd*	5.4	1.2	28	0 0 0 0 0	*nd* *nd* *nd* *nd* *nd*	Presumed dead but not locateable.
141	13	5.0	1.0	23	4	1.6, 1.6, 1.8,	

	– 7, 7, 7, 7 8, 9, 5* 8, 8, 8				4 4 3 3	1.5 –, –, –, – 2.0, 1.8, 1.5, 1.5 1.8, 2.0, 1.5 2.4, 2.2, 2.3	Reharvested 8 March 2010 *Pup still in the process of emerging. Reharvested 13 March 2012
142	13 – 6, 6, 6, 6 8, 7, 7, 6 6, 6, 5, 6	6.4	2.1	62	– – 4 4 4	*nd* *nd* 2.6, 1.3, 1.1, 1.2 2.0, 2.0, 2.0, 3.3 3.6, 2.4, 2.2, 2.3	Tag not found. Plant not found. Tag not found. Plant not found. New control 13 March 2012
143	13 – 8, 8, 7 7, 9, 7 8, 7, 7	6.3	1.9	51	– – 3 3 3	*nd* *nd* 2.9, 2.7, 2.6 1.7, 2.8, 2.1 3.1, 2.6, 3.0	Tag not found. Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010 Reharvested 13 March 2012
144	5 – 6, 6 6, 6 7, 6	3.9	1.7	23	2 2 2 2 2	1.0, 1.0 1.4, 1.3 0.9, 1.0 2.0, 2.0 2.2, 2.1	New control 13 March 2012
145	5 – 5 7 6	3.5	0.9	11	1 1 1 1 1	1.4 1.5 1.4 1.6 2.1	Reharvested 8 March 2010 Reharvested 13 March 2012
146	13 – 7, 8 8, 9 7, 8	5.9	1.5	37	2 2 2 2 2	1.8, 1.6 2.0, 1.9 2.2, 2.3 2.8, 2.8 3.0, 2.9	New control 13 March 2012
147	13 – 7, 7, 7, 6 8, 8, 8 7, 6, 6	5.7	1.6	34	4 4 4 3 3	1.0, 1.4, 1.4, 1.8 1.5, 1.5, 2.0, 2.0 1.7, 1.5, 1.7, 1.2 1.1, 1.5, 1.8 2.2, 1.6, 2.0	Reharvested 8 March 2010 Reharvested 13 March 2012
148	13 – 7	6.8	3.0	54	1 1 1	2.5 3.4 3.2	

	7 8				1 1	4.1 4.5	New control 13 March 2012
149	13 – 8x3, 7x3 7, 8* 7, 7	6.7	1.5	51	6 6 6 2 2	1.8, 1.1, 1.0, 0.9, 1.1, 1.8, 2.1, 2.0, 1.9, 1.4, 2.0, 2.0 2.9, 1.7, 1.9, 1.9, 1.7, 2.4 2.3, 2.4 3.0, 2.7	Reharvested 8 March 2010 *Deformed. Reharvested 13 March 2012
150	5 – 6, 7 8, 7 6, 6	2.9	1.0	9	2 2 2 2 2	1.3, 1.3 1.4, 1.4 1.0, 1.2 2.3, 2.3 2.8, 2.6	New control 13 March 2012

The plants being surveyed are part of a larger population occurring on private land in South Texas. The area of the survey site itself is defined with a transect of 17-gauge electric fence wire secured with steel stakes — the locations of which are recorded with a high resolution GPS. The transect zigzags through the study site with all plants in the study being located within approximately one-half meter of the wire. The area of the study site has not yet been accurately measured but we estimate it to be around half a hectare.

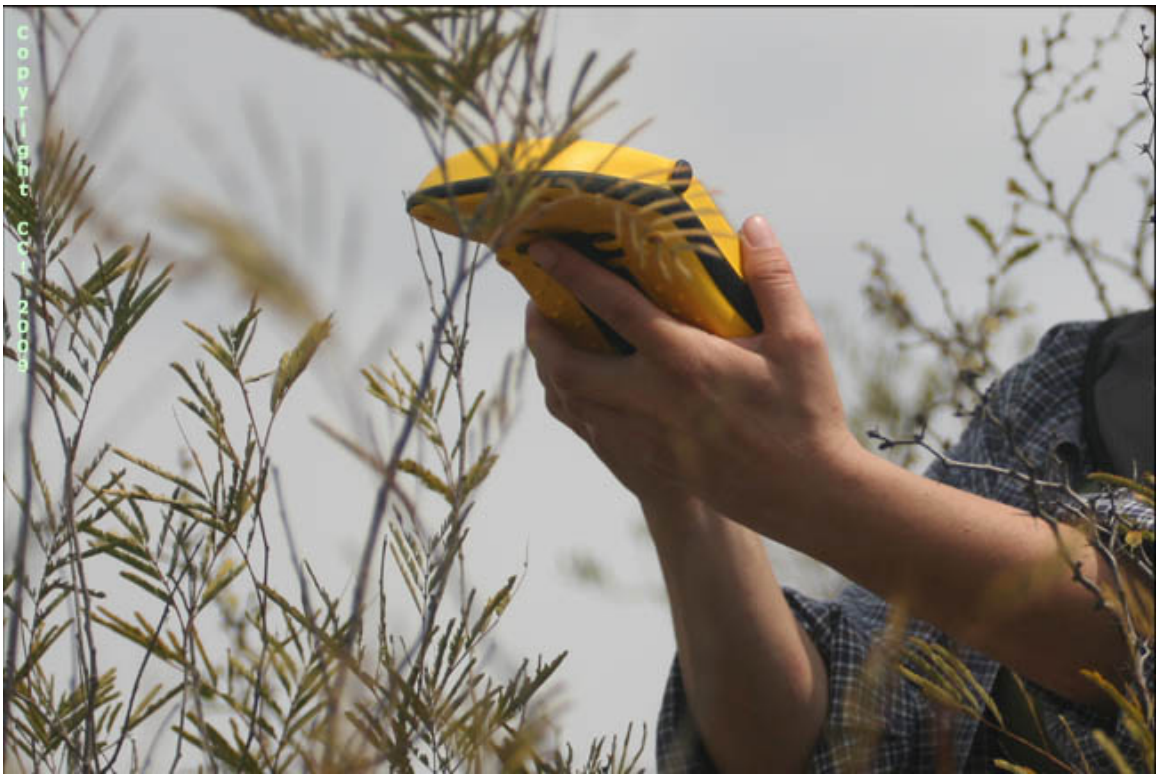


Taking measurements with a caliper

We also tagged and measured a control group of 50 plants on 23 NOV 2008, which in future monitoring will give us an idea of the magnitude of natural mortality not associated with harvesting. The results from our visits concerning those 50 individuals serving as our control group are available in a separate download.

An additional 20 plants (#201-220) were harvested during the November 2008 monitoring to make up for what was believed to be lost plants from the original group of 50 harvested plants. These results are reported as the Peyote post-harvest regrowth – late harvest adjunct group.

7 March 2009 update:
Interestingly we found the same number of harvested study plants (with their tags) but as can be seen in the table above these were not entirely the same plants & tags as had been located on 23 November 2008. On this visit we used a Trimble high-resolution GPS instrument to record the location of all tags and/or plants located.



Taking readings with Trimble GPS

Complete or partial burial of plants and their tags was sometimes encountered. To aid in future visits we added a rebar stake near each tagged plant.

6 March 2010 update:

A number of our tags and plants were completely buried and hence provided missing data in 2009. In 2010, thanks to the use of a high-powered metal detector, we located our tags, stakes and plants except in the instances where the plants and their tag were totally missing from the study site.

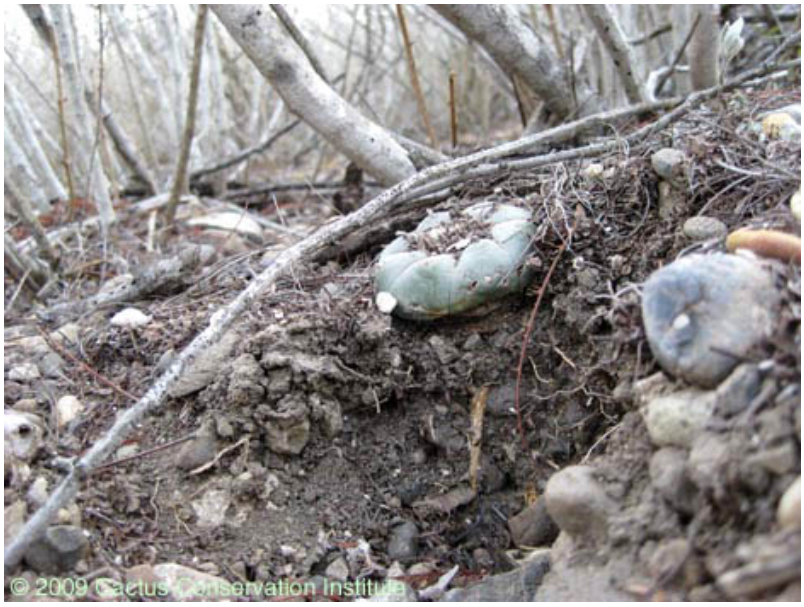
13 March 2012 update:
In 2012, thanks again to the use of a high-powered metal detector, we located all of our tags, stakes and plants except as mentioned above. We did not get photos of control #161's tag or plant again this year.

Feral hog activity was extensive at this site.

A hog hole at the study site with more recent secondary digging for something's occupancy

Two images above show hog diggings near #151

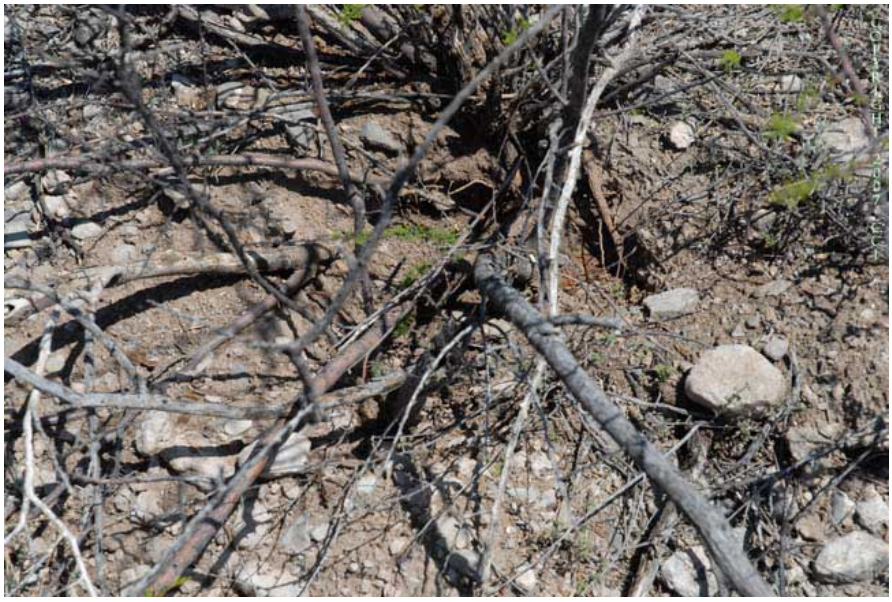
The image below shows part of Control #151, perhaps broken off by passing porcine traffic?

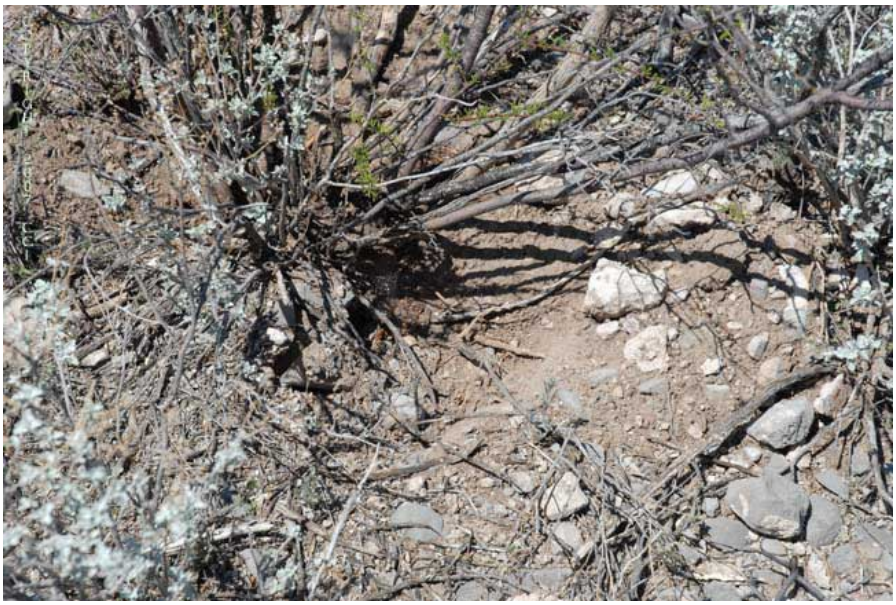


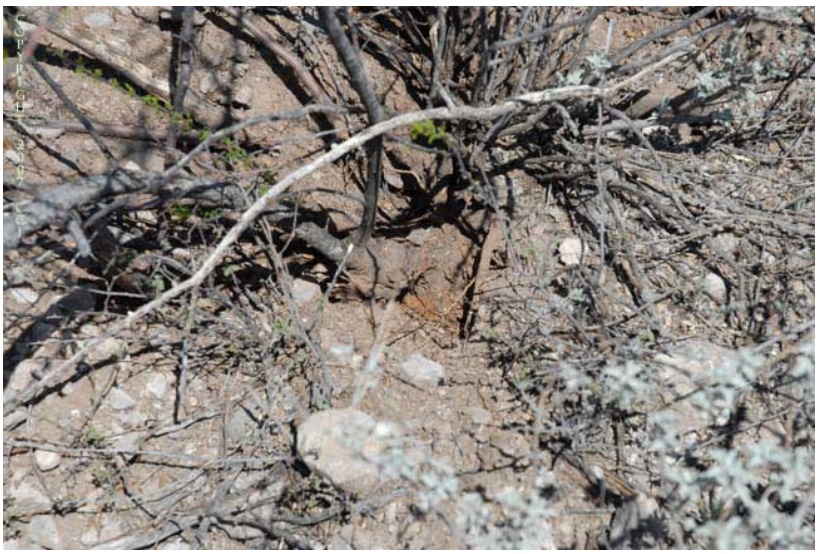
The hogs appear to be digging for something other than peyote.

Do not confuse this digging with the human holes encountered in Mexico. The two are usually easy to tell apart. Hogs dig with hooves from under the scrub brush and target something typically in or under the nurse plant roots whereas humans trample the nurse plants and use tools for digging out the peyotes. We have set up a game camera but presently lack a photograph of the hogs. However, hog scat that we encountered on 8 March 2010 provided even more tangible physical evidence of their presence than did their holes. Two hogs were glimpsed on the run not far from the study site on our July 2010 visit.

Peyote is a cryptic species which can be hard to spot even when present in abundance. These *Larrea* shrubs are common nurse plants. Can you see peyote growing under them? Neither could we. This is *Lophophora williamsii* habitat in the Sierra de la Amargosa.

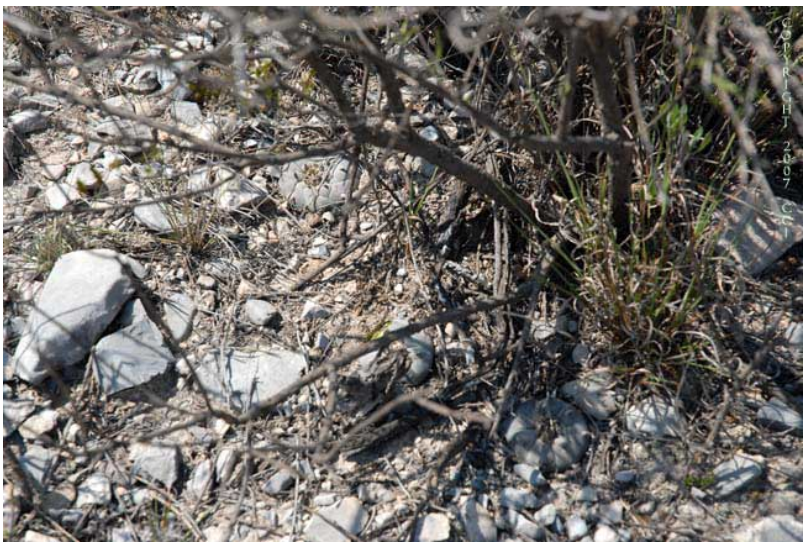






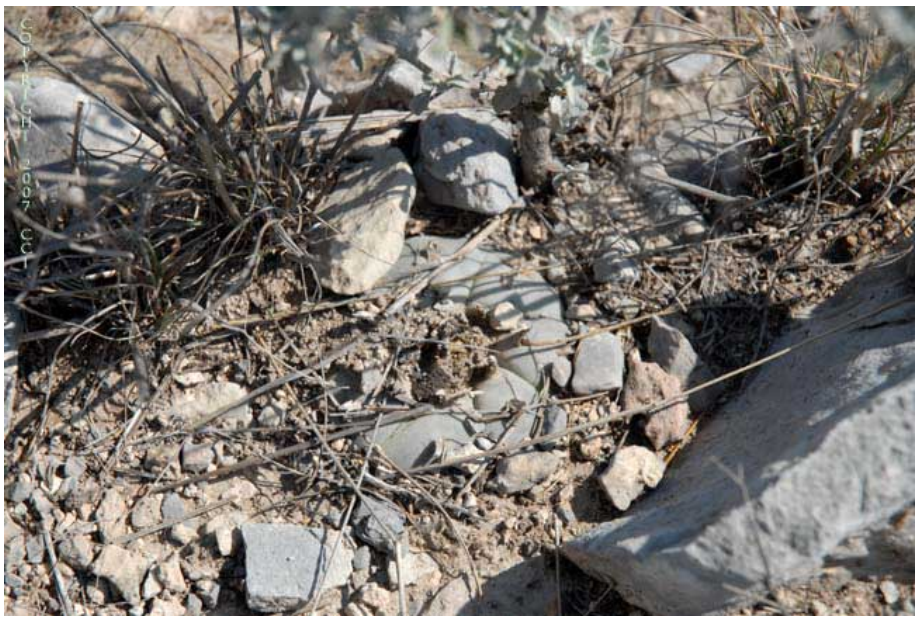
We expected to find *L. williamsii* here but instead found only holes precisely where the peyote plants would have been. Notice the shallow pits at the base of the badly trampled shrubbery where peyote plants should be growing? It appears that these peyotes were harvested along with their roots. If any viewers have trouble imagining where the peyote plants would normally be in these photographs, take a look at some other peyote plants that are growing with similar nurse plants and then come back here to look for the shallow holes in similar spots in these images.

A closer view of *Lophophora williamsii* in habitat near Saltillo.



A closer view of *Lophophora williamsii* in habitat near Saltillo.

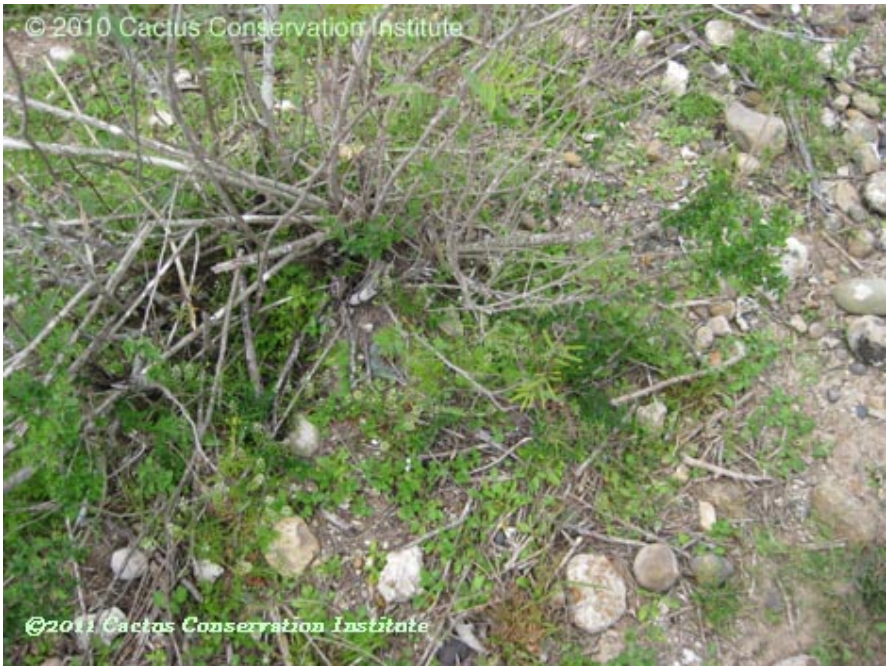
A closer view of *Lophophora williamsii* in habitat near Saltillo.



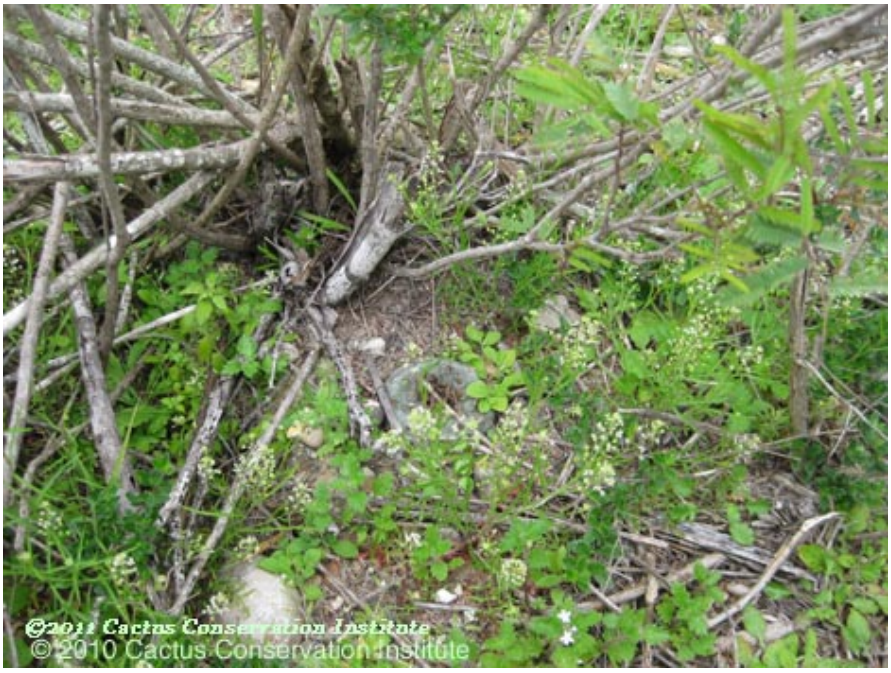
A closer view of *Lophophora williamsii* in habitat near Saltillo.

A closer view of *Lophophora williamsii* in habitat near Saltillo.

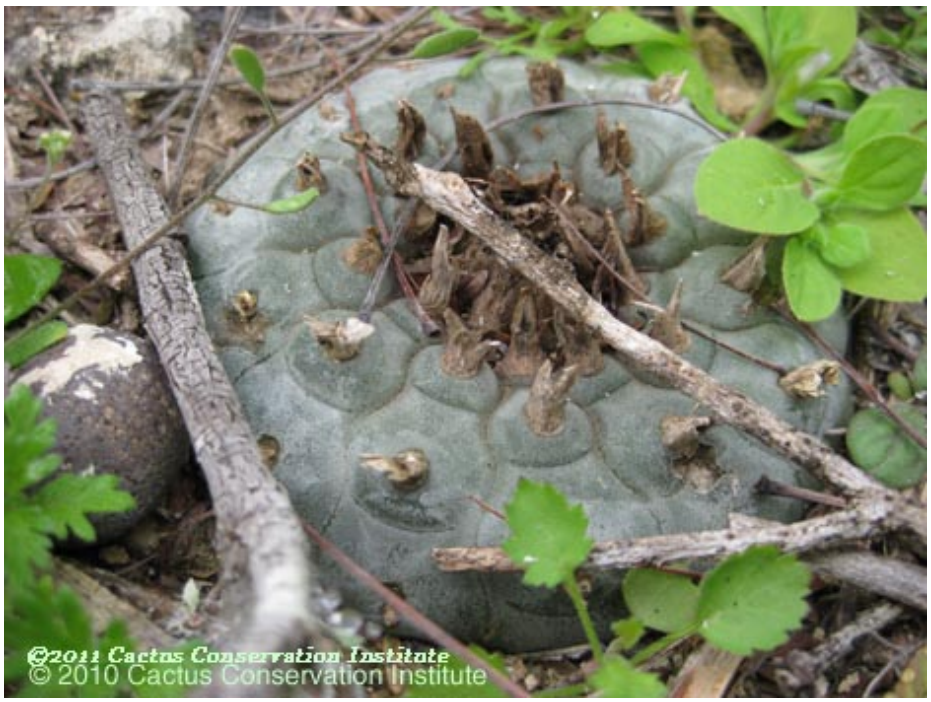
Some further examples of how difficult *Lophophora* can be to locate in the wild are demonstrated by additional photographs.



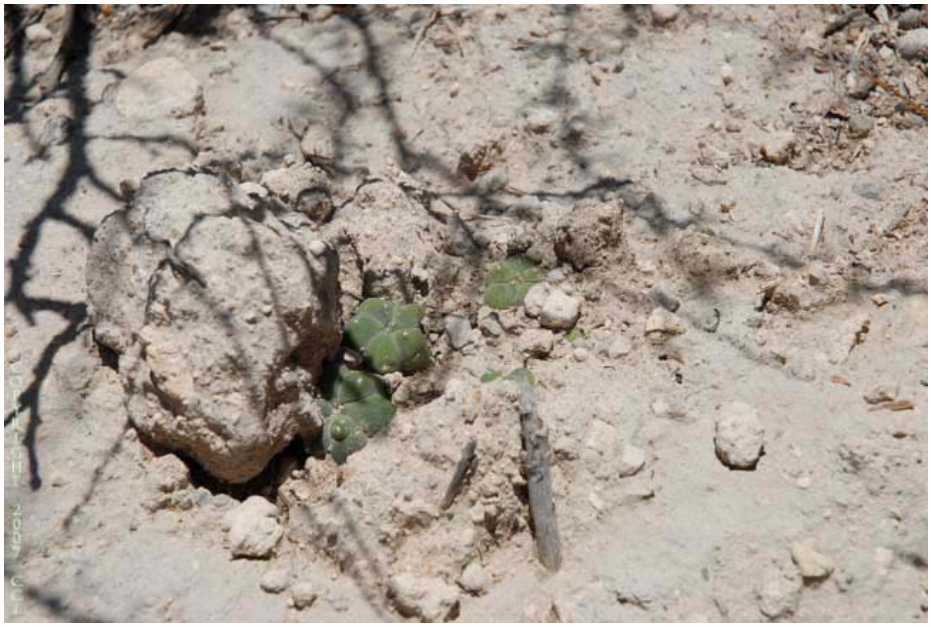
Lophophora williamsii in its brushy habitat of South Texas.



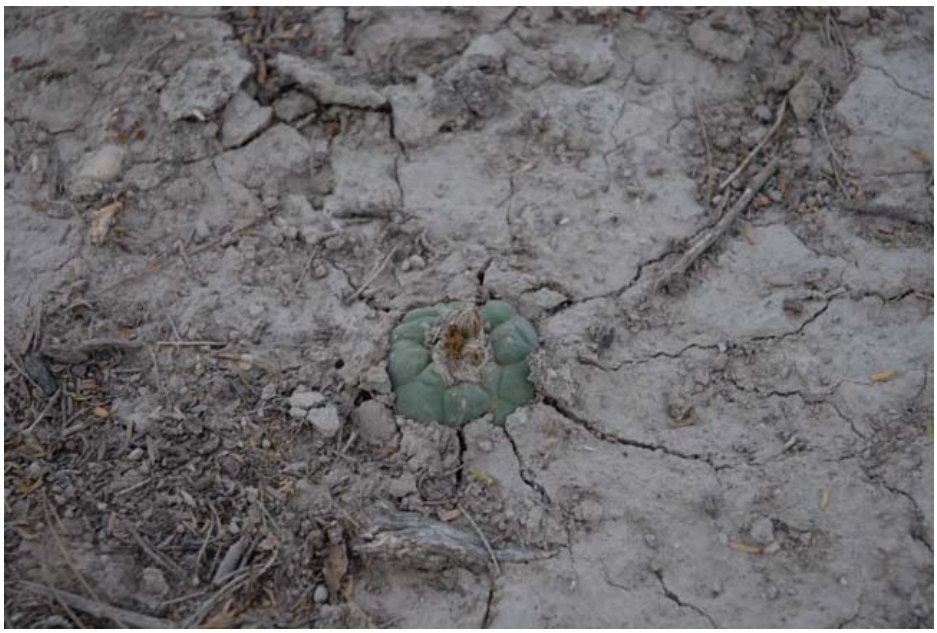
Lophophora williamsii in its brushy habitat of South Texas.



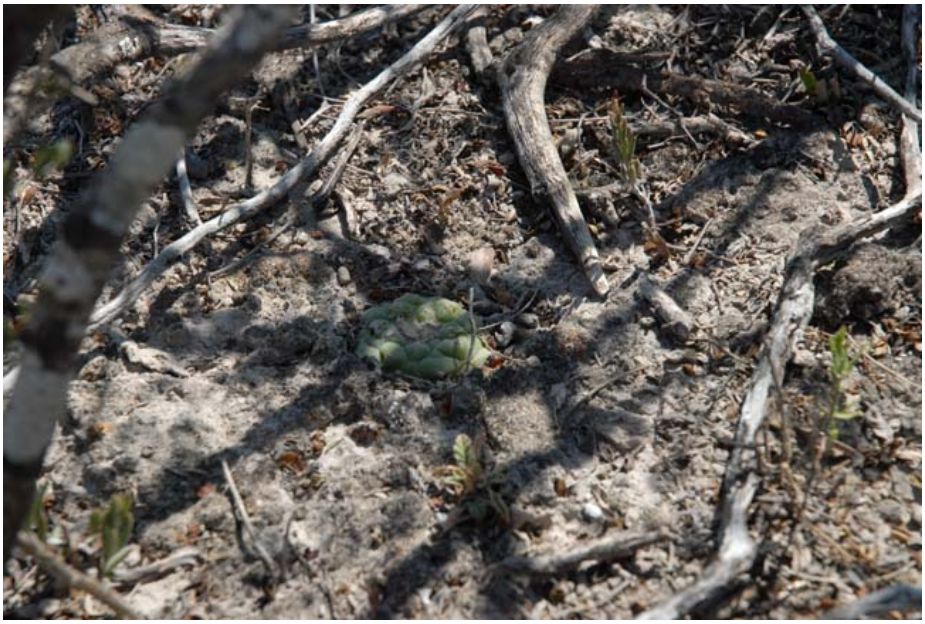
Lophophora williamsii in its brushy habitat of South Texas.



Lophophora williamsii in habitat in SLP.



Lophophora koehresii swelling in response to recent rain.



Lophophora koehresii in habitat.

Lophophora williamsii var. *echinata* in habitat.