



# Cactus Conservation Institute

## Peyote post-harvest regrowth – the harvested group

Summary of observations after six years



Regrowth on *Lophophora williamsii*

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 via the links for the tag numbers in the first column.

Images of regrowth for the actual plants that were harvested in our study can be viewed using the links in the column headed "Regrowth as number of pups".

Images of the regrowth plants that were reharvested in the second and third phases of this study can be viewed using the links in the comments column.

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.

On 10 March 2014, we returned for a follow-up visit and an additional reharvest of half of the two-yr old regrowth.

**nd** – No data available.

– – Missing data.

<b>Plant No.</b> [Tag IMG]	<b>Number of ribs</b>	<b>Diameter</b> (cm)	<b>Height</b> (cm)	<b>Weight</b> (gm)	<b>Regrowth as number of pups</b>	<b>Regrowth as diameter of pups</b> (cm)	<b>Comments</b>
<b>2008</b> <b>2009</b> <b>2010</b> <b>2011</b> <b>2012</b> <b>2014</b>	<b>3 Mar. 2008</b> (This refers to the original plant.) Also entries for 2010-2012 & 2014				<b>11 Nov. 2008</b> <b>7 Mar. 2009</b> <b>6 Mar. 2010</b> <b>15 Mar.</b>	<b>11 Nov. 2008</b> <b>7 Mar. 2009</b> <b>6 Mar. 2010</b> <b>15 Mar. 2011</b>	

					<b>2011 13 Mar. 2012 10 Mar. 2014</b>	<b>13 Mar. 2012 10 Mar. 2014</b>	
<b>101</b>	13 – 8, 7, 6, 7 <i>nd</i> <i>nd</i> <i>nd</i>	6.2	3.0	65	4 4 4 0 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 <i>nd</i> <i>nd</i> <i>nd</i>	Reharvested 8 March 2010 Dead remains found. Reharvest set 13 March 2012 Reharvest set 10 March 2014
<b>102</b>	5 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	2.4	1.0	3	1 1 <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	1.5 1.5 <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Plant not present. Hog activity. Plant not present.
<b>103</b>	5 – 7, 7 6, 6 5, 5 5, 5, 8, 8, 11	2.0	0.7	3	3 2 2 2 2 5	0.5, 0.8, 0.9 1.2, 1.3 1.4, 1.5 0.6, 0.6 2.6, 2.0 4.0, 4.0, 6.0, 5.8, 8.5	New control 13 March 2012
<b>104</b>	8 – * <i>nd</i> <i>nd</i> <i>nd</i>	4.6	1.5	23	– – 2 0 0 0	<i>nd</i> <i>nd</i> 9 <i>nd</i> <i>nd</i> <i>nd</i>	Tag not found. Plant not found. Tag not found. Plant not found. *Not countable. Carcass present. New control set 13 March 2012
<b>105</b>	8 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	5.0	1.5	23	<i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	<i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Presumed dead. Not locateable.
<b>106</b>	13 – 7, 5 not countable 5 7	6.3	1.6	45	2 3 2 1 1 1	2.0, 2.4 (error) 2.0, 2.4, 1.9 (error) 4.0, 7.0 (error) 1.0	Confusion detailed on image pages. Partially eaten. New control 13 March 2012

						1.5 3.2	
<b>107</b>	8 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	5.0	3.0	31	6 6 0 0 0 <i>nd</i>	1.5, 2.0, 1.8, 1.3, 1.6, 1.4 1.8, 2.4, 2.2, 1.5, 1.9, 1.5 <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Dead. Remains located. Abundant remains still present.
<b>108</b>	8 – 5, 7, 7 7, 7, 5* 7, unclear, 5 8, 7	5.0	1.5	31	– 3 3 3 (new) 3 2 (new)	<i>nd</i> 2.1, 1.8, 2.1 2.1, 1.6, 2.4 2.1, 1.3, 1.3 3.2, 1.2, 2.1 3.5, 2.9	Tag not found. Plant not found. Reharvested 8 March 2010 *Chewed on by herbivores. Reharvested 13 March 2012 Reharvested 10 March 2014
<b>109</b>	9 – 7, 8, 7 8, 7, 7 8, 8, 8 8, 8, 8	5.8	1.9	43	– – 3 3 3 3	<i>nd</i> <i>nd</i> 2.9, 3.8, 3.4 3.1, 3.0, 3.1 4.3, 4.0, 3.8 5.9, 5.6, 5.5	Tag not found. Plant not found. Tag not found. Plant not found. New control 13 March 2012
<b>110</b>	8 – 7, 7 <i>nd</i> <i>nd</i> <i>nd</i>	4.1	1.8	23	– – 2 0 0 0	<i>nd</i> <i>nd</i> 2.5, 2.1 <i>nd</i> <i>nd</i> <i>nd</i>	Tag not found. Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010 Dead. Carcass located. Reharvest set 13 March 2012 Reharvest set 10 March 2014
<b>111</b>	8 – 8, 5 6 <i>nd</i> <i>nd</i>	2.7	0.9	6	– – 2 1 0 0	<i>nd</i> <i>nd</i> 2.0, 0.6 1.0 <i>nd</i> <i>nd</i>	Tag not found. Plant not found. Tag not found. Plant not found. New control 13 March 2012 Photographs were missed.

<b>112</b>	13 – 8, 7, 8, 8 7, 8, 6, 6 6, 5, 6, 6 <i>nd</i>	4.8	0.7	20	– 4 4 4 (new) 4 0	<i>nd</i> 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 <i>nd</i>	Tag not found. Plant not found. Reharvested 8 March 2010 Reharvested 13 March 2012 Reharvest set 10 March 2014
<b>113</b>	13 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	6.3	2.6	74	1 0 0 0 0 0	0.9 <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Dead. Remains located. Carcass still present.
<b>114</b>	8 – 7, 8 8, 5 <i>nd</i> <i>nd</i>	4.1	1.2	17	2 2 2 2 (new) 0 0	1.7, 1.9 1.7, 1.7 2.1, 2.2 2.3, 1.0 <i>nd</i> <i>nd</i>	Reharvested 8 March 2010 1 head looks older than the other. Reharvest set 13 March 2012 Reharvest set 10 March 2014
<b>115</b>	5 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	2.2	0.8	3	0 0 0 0 0 0	<i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Dead but not locateable. Carcass found.
<b>116</b>	8 – 8, 5, 6 5*, 8, 6 <i>nd</i> <i>nd</i>	4.4	0.3	23	3 3 3 3 0 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 <i>nd</i> <i>nd</i>	*Chewed on by herbivores. New control set 13 March 2012
<b>117</b>	8 – 11, 6, 6 8, 7, 12 <i>nd</i> <i>nd</i>	5.4	1.7	28	3 3 3 3 0 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 <i>nd</i> <i>nd</i>	New control set 13 March 2012
<b>118</b>	8 – 8, 7, 7, 6, 6 7, 7, 6	5.3	1.3	34	5 5 5 3 (new)	1.0, 1.3, 1.0, 1.2, 1.4 1.0, 1.9, 1.3, 1.7, 2.0	Reharvested 8 March 2010

	7, 7, 7 7, 1 (or 2?)				3 2 (new)	1.9, 1.1, 1.4, 1.0, 1.5 1.7, 1.8, 1.8 2.3, 2.3, 2.1 3.1, 1.6	Reharvested 13 March 2012 Reharvested 10 March 2014
<b>119</b>	13 – 8, 5, 8, 8 6, 7, 7, 6 7, 5, 7, 5 8, 6, 5, 7	5.4	2.3	48	4 4 4 4 4 4	1.9, 0.8, 1.5, 1.6 2.2, 0.9, 1.3, 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 5.7, 3.8, 4.2, 4.1	New control 13 March 2012
<b>120</b>	8 – 7, 8 7, 6 6, 6 <i>nd</i>	5.6	1.4	28	– – 2 2 (new) 2 0	<i>nd</i> <i>nd</i> 1.8, 2.1 2.0, 1.5 2.2, 1.8 <i>nd</i>	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 Reharvested 10 March 2014
<b>121</b>	13 – 8, 7 7, 7 8, 7 8, 8	6.3	2.6	71	2 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 4.9, 4.9	New control 13 March 2012
<b>122</b>	5 – 7 6 8 8	2.9	1.0	6	1 – 1 1 (new) 1 1 (new)	2.2 <i>nd</i> 2.1 1.7 2.1 1.8	Tag not found. Plant not found. Reharvested 8 March 2010 . Reharvested 13 March 2012 Reharvested 10 March 2014
<b>123</b>	8 – 6, 5 7, 6 8, 7 8	5.0	1.8	31	– – 2 2 2 1	<i>nd</i> <i>nd</i> 2.1, 1.6 2.5*, 2.9 3.2, 3.0 4.0	Tag not found. Plant not found. Tag not found. Plant not found.  *Regrowth after herbivore damage.

							New control 13 March 2012
<b>124</b>	8 – 7, 6 5, 5 8, 7 6	4.1	1.1	17	2 2 2 2 (new) 2 1 (new)	1.9, 2.1 1.8, 2.0 1.8, 1.8 0.8, 2.0 2.5, 2.0 2.3	Reharvested 8 March 2010  Reharvested 13 March 2012 Reharvested 10 March 2014
<b>125</b>	8 – 5, 6 6, 7 7, 7 7, 8	4.4	1.1	14	2 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 3.3, 3.2	New control 13 March 2012
<b>126</b>	13 – 6, 7, 7 7, 6, 8, 7 8, 6, 7, 6 7, 5, 8	5.0	2.0	54	– – 3 4 (new) 4 3 (new)	<i>nd</i> <i>nd</i> 2.4, 2.5, 2.4 1.8, 1.9, 2.0, 1.4 2.6, 2.1, 2.3, 2.5 1.8, 2.2, 2.7	Tag not found. Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010  Reharvested 13 March 2012 Reharvested 10 March 2014
<b>127</b>	8 – 8 8 8 8	4.3	1.2	28	1 1 1 1 1 1	1.8 2.0 2.3 3.0 3.7 4.1	New control 13 March 2012
<b>128</b>	13 – 6, 8, 8 6, 7, 6, 7 6, 7, 7, 7 8, 6, 7	4.9	1.6	34	3 3 3 4 (new) 4 3 (new)	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 2.5, 1.8, 1.4	Reharvested 8 March 2010  Reharvested 13 March 2012 Reharvested 10 March 2014
<b>129</b>	10 – 6, 7, 7 8, 8, 7, 7 8, 8, 8, 7+ 8, 8, 8, 8	5.3	2.0	34	4 4 3 4 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	New control 13 March 2012

						3.0, 3.0, 3.0, 3.0 3.2, 3.6, 3.2, 3.5	
<b>130</b>	8 – 7, 7 13, 8 – 7, 13	5.3	1.6	23	2 2 2 2 missed 2	1.1, 3.1 1.1, 3.7 3.9, 1.4 4.7, 2.3 – 5.0, 3.4	Main crown stepped on & healed.
<b>131</b>	8 – 7, 7, 7 6 <i>nd</i> 8, 5	4.8	2.6	26	3 3 3 1 0 2 (new)	1.4, 1.2, 1.1 1.9, 1.5, 1.4 1.0, 1.7, 1.6 2.0 <i>nd</i> 2.0, 1.5	Reharvested 8 March 2010 Lopsided; herbivores ate one side. Reharvested set 13 March 2012 Reharvested 10 March 2014
<b>132</b>	8 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	4.4	1.5	17	2 2 <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	1.5, 2.0 1.9, 2.0 <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Plant not present. Hog activity.
<b>133</b>	8 – 6 6 6 6	4.2	1.7	20	0 1 1 1 1 1	<i>nd</i> 0.8 1.3 2.0 2.1 2.9	New control 13 March 2012
<b>134</b>	8 – 6, 7 <i>nd</i> 6, 6 <i>nd</i>	3.4	1.1	9	0 2 2 0 2 (new) 0	<i>nd</i> 1.4, 1.6 1.4, 1.4 <i>nd</i> 1.7, 1.9 <i>nd</i>	Reharvested 8 March 2010  Reharvested 13 March 2012 Reharvested 10 March 2014
<b>135</b>	13 – 12, 5 12, 6 13*, 7  12*, 8	5.4	1.0	28	2 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  5.5, 3.2	New control 13 March 2012



							*Apical meristem regrowth.
<b>136</b>	13 – 6, 7, 7 5*, 6, 6 6, 7, 6 7	5.7	2.3	48	2 3 3 3 (new) 3 1 (new)	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 2.8	Reharvested 8 March 2010 *Apex of plant off-center. Reharvested 13 March 2012 Reharvested 10 March 2014
<b>137</b>	8 – 6, 6, 6 6, 7, 7 6, 7, 7 5, 7, 8	4.6	1.5	17	3 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 2.8, 2.6, 2.8	New control 13 March 2012
<b>138</b>	13 – 6, 5, 5 6 6 <i>nd</i>	5.7	2.6	43	4 4 3 1 (new) 1 0	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 <i>nd</i>	Tag not found. Plant was found. Reharvested 8 March 2010 Apical meristem eaten and regrown. Reharvested 13 March 2012 Reharvested 10 March 2014
<b>139</b>	5 – 6 8 8 8	2.9	1.0	6	1 1 1 1 1 1	1.8 1.9 2.1 2.6 1.9 4.2	New control 13 March 2012
<b>140</b>	10 – <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	5.4	1.2	28	0 0 0 0 0 0	<i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i> <i>nd</i>	Presumed dead but not locateable.
<b>141</b>	13 – 7, 7, 7, 7 8, 9, 5* 8, 8, 8 8, 8, 3	5.0	1.0	23	4 4 4 3 (new) 3 3 (new)	1.6, 1.6, 1.8, 1.5 –, –, – 2.0, 1.8, 1.5, 1.5 1.8, 2.0, 1.5 2.4, 2.2, 2.3 2.8, 2.7, 1.8	Reharvested 8 March 2010 *Pup still in the process of emerging. Reharvested 13 March 2012

							Reharvested 10 March 2014
<b>142</b>	13 – 6, 6, 6, 6 8, 7, 7, 6 6, 6, 5, 6 8, 8, 5, 5	6.4	2.1	62	– – 4 4 4 4	<i>nd</i> <i>nd</i> 2.6, 1.3, 1.1, 1.2 2.0, 2.0, 2.0, 3.3 3.6, 2.4, 2.2, 2.3 4.8, 2.8, 2.7, 2.6	Tag not found. Plant not found. Tag not found. Plant not found.  New control 13 March 2012
<b>143</b>	13 – 8, 8, 7 7, 9, 7 8, 7, 7 6, 6, 7	6.3	1.9	51	– – 3 3 (new) 3 3 (new)	<i>nd</i> <i>nd</i> 2.9, 2.7, 2.6 1.7, 2.8, 2.1 3.1, 2.6, 3.0 2.5, 2.2, 1.8	Tag not found. Plant not found. Tag not found. Plant not found. Reharvested 8 March 2010  Reharvested 13 March 2012 Reharvested 10 March 2014
<b>144</b>	5 – 6, 6 6, 6 7, 6 5, 7	3.9	1.7	23	2 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 3.0, 3.1	New control 13 March 2012
<b>145</b>	5 – 5 7 6 6	3.5	0.9	11	1 1 1 1 (new) 1 1 (new)	1.4 1.5 1.4 1.6 2.1 1.2	Reharvested 8 March 2010  Reharvested 13 March 2012 Reharvested 10 March 2014
<b>146</b>	13 – 7, 8 8, 9 7, 8 7, 8	5.9	1.5	37	2 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 3.7, 4.1	New control 13 March 2012
<b>147</b>	13 – 7, 7, 7, 6 8, 8, 8 7, 6, 6 6	5.7	1.6	34	4 4 4 3 (new) 3 1 (new)	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	Reharvested 8 March 2010  Reharvested 13 March 2012

						2.2, 1.6, 2.0 2.8	Reharvested 10 March 2014
<b>148</b>	13 – 7 7 8 8	6.8	3.0	54	1 1 1 1 1 1	2.5 3.4 3.2 4.1 4.5 5.3	New control 13 March 2012
<b>149</b>	13 – 8x3, 7x3 7, 8* 7, 7 5, 5, 6, 7	6.7	1.5	51	6 6 6 2 (new) 2 4 (new)	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 2.2, 1.9, 2.0, 2.1	Reharvested 8 March 2010 *Deformed. Reharvested 13 March 2012 Reharvested 10 March 2014
<b>150</b>	5 – 6, 7 8, 7 6, 6 5, 6	2.9	1.0	9	2 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 4.0, 4.0	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.

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.

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.



Taking measurements with a caliper

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. 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.



Taking readings with Trimble GPS

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 or its tag again this year.

10 March 2014 update:

In 2014, we had the interesting challenge of photographing and measuring plants amidst rain. I somehow did not photograph #111's tag or rebar this year.

Due to issues created by the rain, I also did not acquire any "after"-photographs of the plants that had been reharvested this year.

Feral hog activity was extensive at this site. In 2014, we discovered that the impact of wandering cattle had been added to the study site.

*Lophophora* is surviving many known challenges.



View of the former sites for #101 & #102 following a thorough search.  
Wire that is visible in the center right is the start of our transect line.