

Appendix A:

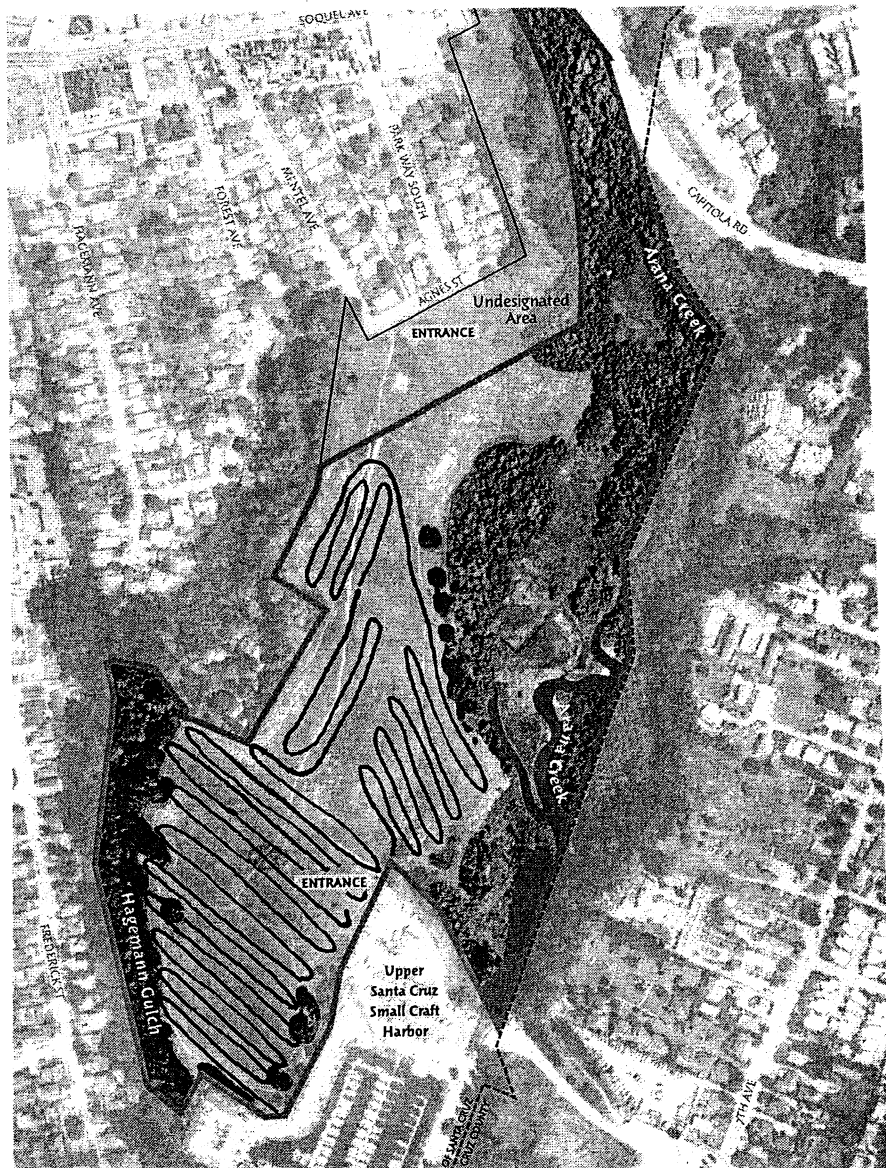
Suggestions for the Yearly Census of Santa Cruz Tarplant at Arana Gulch

- 1) The census should take place during the same period each and every year. Typically, this would be during the earliest reproductive peak (maximum floral anthesis), late June to early August, depending on rainfall, temperature and other factors that affect plant phenology.
- 2) The entire Coastal Prairie/Tarplant Management Area (CPTMA) should be searched, including areas beyond occupied patches, treatment areas, and subpopulation centers (A,B,C, D). Detection of the location of quiescent seedbanks is a high priority. Portions of the entire property that burn should be searched during the following summer. The entire Arana Gulch property should be searched during the summer following a burn over the entire property.
- 3) A standard pattern of search should be adopted by the Technical Advisory Group (TAG) of the Adaptive Management Working Group (AMWG). The pattern would allow visual inspection for a thorough search as specified in #2 above. The pattern will be given to the botanist as part of an instruction sheet prior to census.
- 4) A standard field datasheet should be adopted by the TAG. The datasheet should record plant locations (GPS points), plant size, number of branches, number of floral heads, patch size, and other relevant data.
- 5) The census should be conducted by a qualified botanist familiar with the species and its habitat. Additional search personnel, trained to recognize the species, will probably be required to insure thorough search in the allotted time.
- 6) A total crew of four (including the botanist) should be allotted 8 hours in a year when the population totals less than 2,000 plants. In a year with more than 2,000 plants, more time could be required or a sampling protocol devised so that only a representative portion of the population is measured for plant size, etc. The TAG can provide the sampling protocol and/or modify these parameters depending on its data requirements.
- 7) The botanist should summarize the raw data on a standard summary datasheet and presented as a map with precise plant locations shown. These, along with the field datasheets, should be submitted to the TAG before September 30 of that census year.
- 8) The botanist and the crew should be paid to conduct the census and to submit the products as specified in #7.

Census Data for 2004 and 2005

Data in the following tables were collected using the same census technique for 2004 (June 30) and 2005 (July 27). A pattern of walking three or four abreast, spaced 5 m apart, was used to search areas within and between known subpopulations (A,B,C, and D). During 2005, data on plant size, number of branches, number of flower heads and nearest neighbor were also collected (to be submitted in a separate report). Isolated, solitary plants were each located with a GPS, but plants in dense patches were tallied collectively. The patch numbers corresponded to the same patches in both years.

The map below shows the approximate search pattern used in 2004.



<i>Holocarpha macradenia</i> @ Arana Gulch: Census 2004											
subpop	patch	N		W		# pl live	# pl dead	patch l x w (cm)	patch size (m2)	density (#/m2)	treatment
A	1	36	58.458	122	00.037	1					
		36	58.457	122	00.038	8					
		36	58.460	122	00.036	260					
		36	58.459	122	00.040	55					
		36	58.461	122	00.040	25					
							700x900	63	5.5	U	
	2	36	58.471	122	00.029	45					
		36	58.469	122	00.030	2					
		36	58.468	122	00.029	1					
		36	58.470	122	00.029	5					
							600x400	24	2.2	U	
	3	36	58.472	122	00.044	68					
		36	58.472	122	00.046	61					
		36	58.472	122	00.048	22					
							600x150	9	16.8	U	
	4	36	58.478	122	00.017	5					
		36	58.477	122	00.016	6					
		36	58.475	122	00.016	1					
		36	58.478	122	00.019	1					
		36	58.477	122	00.020	70					
		36	58.476	122	00.021	1					
		36	58.476	122	00.020	2					
		36	58.476	122	00.019	1					
							600x700	42	2.1	U	
					subpop sum	640					

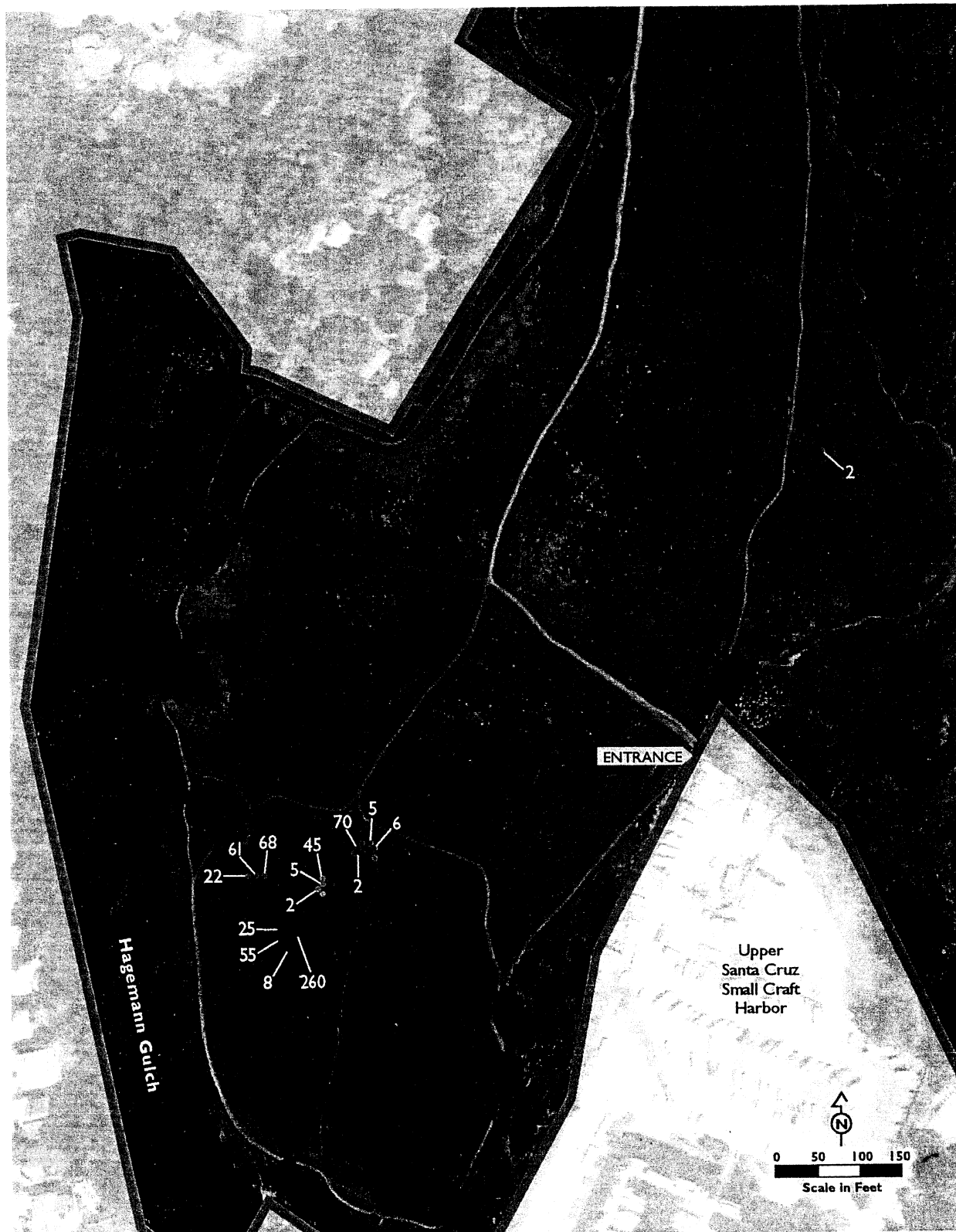
2004 Census (cont.)									
subpop	patch	N	W	# pl live	# pl dead	patch l x w (cm)	patch size (m2)	density (#/m2)	May-05 treatment
B				0					U
C				0					U
D		36 58.555	121 59.901	2					U
			Arana sum	641					
conducted June 30, 2004 by Vince Cheap, Gray Hayes, Matt Pavlik and Bruce Pavlik. T = 6 hrs									
U = untreated									

Holocarpha macradenia @ Arana Gulch: Census 2005												
subpop	patch	N		W		# pl live	# pl dead	patch l x w (cm)	patch size (m2)	density (#/m2)	May-05 treatment	
A	1	36	58.458	122	00.038	180	1	330x120	3.96	45.7	U	
		36	58.459	122	00.038							
			36	58.468	122	00.045	37	0	160x180x90x140	1.96	18.9	C
			36	58.466	122	00.043						
			36	58.460	122	00.039	13	0	240x90	2.16	6.0	U
			36	58.467	122	00.041	1					U
			36	58.460	122	00.040	1					U
			36	58.457	122	00.039	11	0	320x80	2.56	4.3	U
			36	58.448	122	00.040						
		2	36	58.470	122	00.028	52	0	175x170	2.98	17.4	U
		3	36	58.476	122	00.044	33	0				C
						35	1					C
			36	58.475	122	00.043	394	9	80x90x115x60	0.72	559.7	C
			36	58.473	122	00.043	205	0	250x50	1.25	164.0	U
			36	58.473	122	00.043	167	0	95x52	0.49	338.1	C
		36	58.472	122	00.044	18	0	scattered			U	
		36	58.471	122	00.046	150	0	100x150	1.50	100.0	C	
		36	58.472	122	00.045							
		36	58.472	122	00.050	174	0	120x130x80x220	1.75	99.4	U	
		36	58.471	122	00.051							
		36	58.472	122	00.049	61	0	160x50x155x135	1.50	40.7	U	
		36	58.472	122	00.044	12	0	150x100	1.50	18.0	U	
		36	58.476	122	00.040	1					U	
		36	58.468	122	00.039	1					U	
	4	36	58.476	122	00.019	1					U	
			36	58.475	122	00.019	1					U
			36	58.479	122	00.018	4					U
		subpop sum				1552	11					

2005 Census (cont.)									
subpop	patch	N	W	# pl live	# pl dead	patch l x w (cm)	patch size (m ²)	density (#/m ²)	May-05 treatment
B				0	0				U
C				0	0				U
D				0	0				U
			Arana sum	1552	11				
conducted July 27, 2004 by Erin Espeland, Victoria Parson and Bruce Pavlik. T = 8 hrs.									
U = untreated, C = clipped on May 28, 2005 removing all live plant material from a patch of <i>Holocarpha macradenia</i> .									

↓
Types
of
Shrub 22 hrs 2005

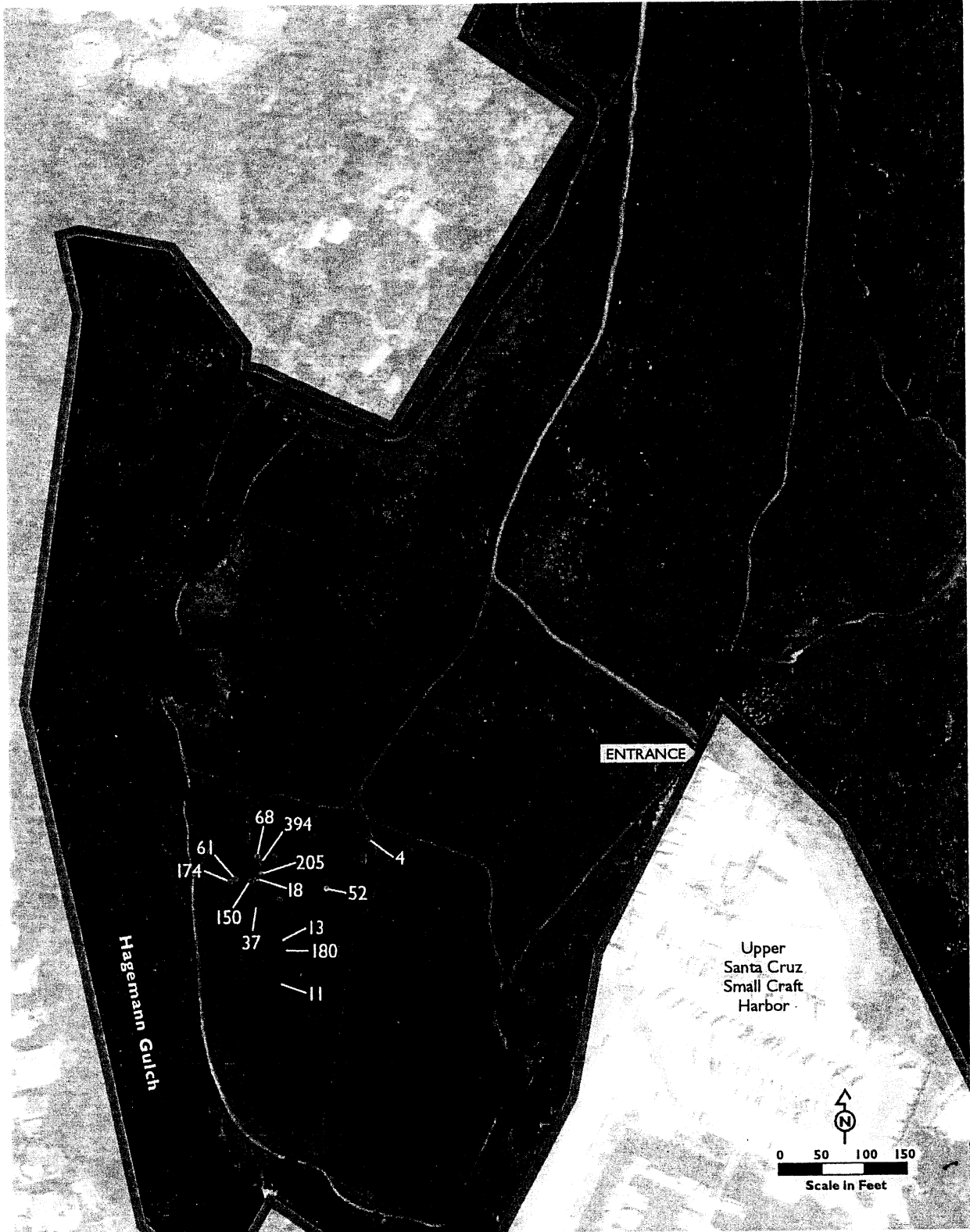
Santa Cruz Tarplant 2004 Census



Positions of patches and individual Santa Cruz Tarplants in subpopulations A and D from the 2004 Census at Arana Gulch. Subpopulations B and C had no above-ground individuals. Colors indicate patches (see Appendix A data tables), the pointers indicate the number of individuals at a particular GPS location (WGS 84) within a patch.

2004 PATCH	
• 1	• 3
* 2	* 4

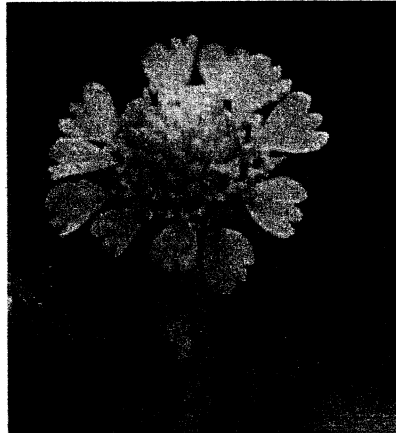
Santa Cruz Tarplant 2005 Census



Positions of patches and individual Santa Cruz Tarplants in subpopulations A from the 2005 Census at Arana Gulch. Subpopulations B, C and D had no above-ground individuals. Colors indicate patches (see Appendix A data tables), the pointers indicate the number of individuals at a particular GPS location (WGS 84) within a patch.

2004 PATCH	
• 1	• 3
• 2	• 4

**A Management Program for Santa Cruz Tarplant
(*Holocarpha macradenia*)
At Arana Gulch**



Prepared for

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August 1, 2005