

City of Santa Cruz Interim Tarplant Management 1995 -2011

In 2002 65 acres of Arana Gulch was designated as critical habitat for the Santa Cruz tarplant by the U.S. Fish and Wildlife Service (USFWS). The Arana Gulch Park Master Plan will allow the City to improve and expand tarplant management by removing trails from more sensitive areas, fencing, and adding a proven grazing regime. Since acquisition of Arana Gulch in 1994, the City of Santa Cruz Parks and Recreation Department has actively initiated and overseen Santa Cruz tarplant management, in close coordination with consulting botanists. Throughout this 16-year period, the City has coordinated with the California Department of Fish and Game, US Fish and Wildlife Service, local botanists and tarplant experts in the Bay Area region, and interested members of the public to evaluate and implement tarplant management actions.

Botanists have long recognized that habitat supporting Santa Cruz tarplant requires some form of disturbance, in order to limit the dense non-native grasses that out-complete the tarplant. Natural disturbance processes likely included wildfire, grazing by large herbivores, and disturbance by smaller mammals. Over time the native coastal terrace prairie grasses grew less dense and non-native grasses currently dominant at Arana Gulch and most other similar coastal terraces. In recent history, Arana Gulch was grazed by cattle. After removal of the cattle in 1988, the tarplant population at Arana Gulch significantly declined. Within six years of the removal of cattle, the Santa Cruz tarplant population had declined from approximately 100,000 plants to 0.

The attached Table provides a summary of management actions that have been implemented by the City of Santa Cruz from 1995 through August 8, 2011, after the City's purchase of the site, for each of tarplant subpopulation areas (A, B, C, and D). The table also includes annual survey census data for each of the areas. Generally, the benefits of the management action are expected to be seen in the following year's census. The management actions that have been implemented thus far include:

- mowing only,
- mowing with raking,
- raking only,
- soil scraping (removing vegetation and thin layer of soil from surface), and
- prescribed burns.

1995 – 2001 Scraping/Fire/Mowing Management

Beginning in 1995, a year after acquiring the Arana Gulch property, the City began to work closely with volunteers, the California Native Plant Society, and agencies to implement management actions to enhance the tarplant population. Because the population had declined so dramatically (no plants were found on the site in 1994 or 1995), it was determined that a drastic measure, or catastrophic-type disturbance was needed. Scraping (scraping vegetation, thatch and a thin layer of soil) and fire are considered to be catastrophic-type disturbances.

In 1995, targeted areas within Subpopulation Area A were scraped, mechanically by a tractor and by volunteers with hand tools. A portion of the area was also hand raked by volunteers. The following year over 7,000 plants were found within the treated areas; the majority of the plants were located in the mechanically scraped area. In 1996 and 1997 scraping plots were done in Areas B and D. Plants were found in Area D after these treatments. In 1997, a controlled burn was conducted and the number of plants increased to over 12,000 in 1998.



As discussed in the Santa Cruz Tarplant Adaptive Tarplant Management Program, included as part of the *Arana Gulch Master Plan*, both scraping and fire are considered drastic measures and are not recommended by botanists to be implemented as a frequent management action. Both actions are recommended to be used sparingly through time and across the Santa Cruz tarplant habitat. Thus, in subsequent years, only mowing in some areas was conducted in an effort to reduce non-native grasses.

As shown in the attached table, the population counts declined within a few years of the more drastic management actions. Scraping plots were conducted again in Areas A and D in 2001 and subsequently the population increased in 2002 to approximately 10,000 plants in Area A and 156 plants in Area D. Then, similar to the previous use of scraping, the population declined in the following years. Thus it appears that while scraping or fire may yield a dramatic initial increase, these management actions did not appear to result in a sustainable increased Santa Cruz tarplant population.

2002 -2005 Mowing Management and Experimental Plots

In 2002 to 2005, the City Parks and Recreation Department's Resource Ecologist worked closely with botanists to conduct experimental treatments in designated areas in an effort to identify a more sustainable management strategy and to learn more about tarplant seed bank and reproduction.

2006 City Effort to Reintroduce Grazing

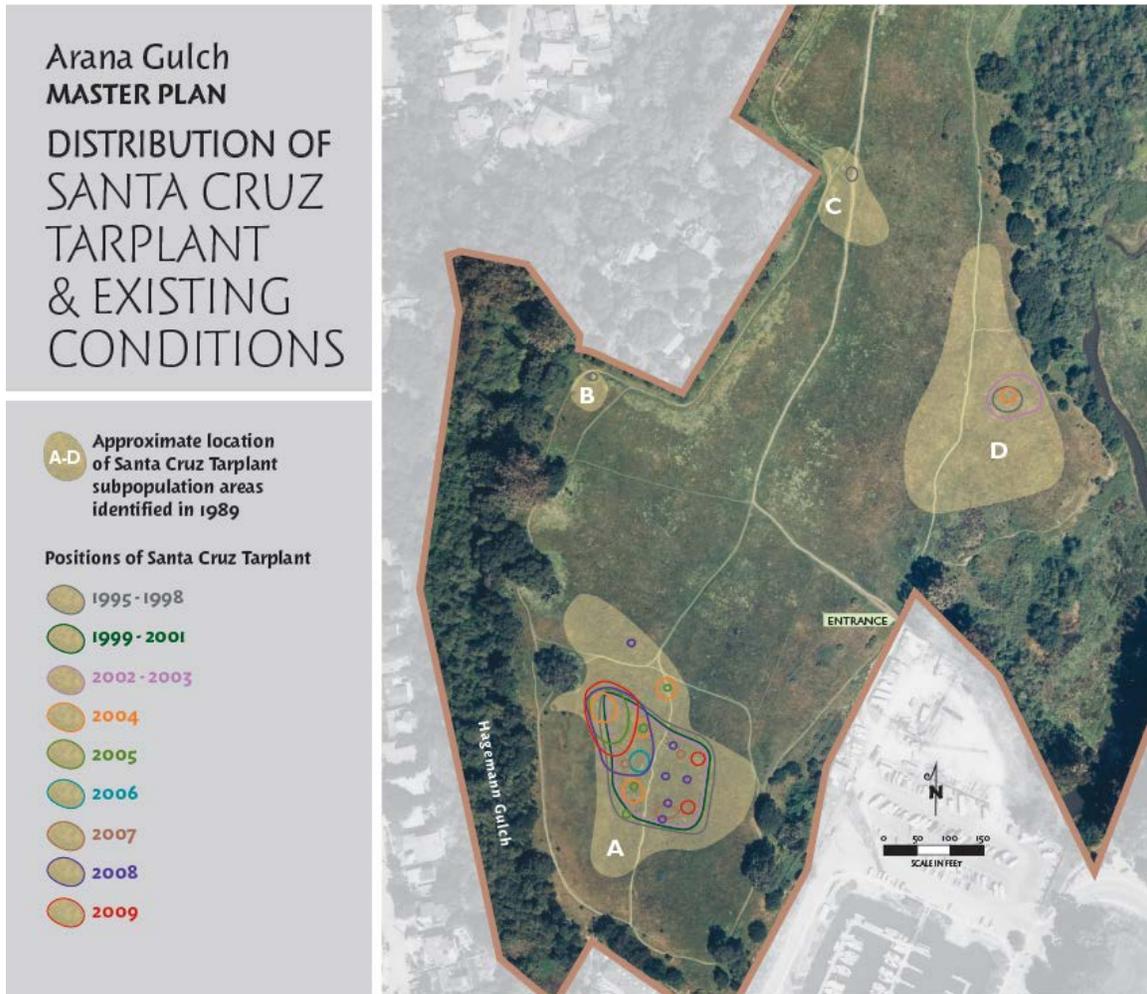
In 2006, with the tarplant population having declined to only 348 plants, the City of Santa Cruz focused on efforts to reintroduce cattle grazing to Arana Gulch. The consensus of botanists was that the re-introduction of cattle grazing was the most beneficial, and sustainable, management action for the Santa Cruz tarplant. The City prepared and submitted an application to the Coastal Commission in fall 2006 to install fencing to allow grazing within a 3-acre site (Area A). The initially proposed grazing area was relatively small because the Arana Gulch Master Plan was being legally challenged in court and had not yet been before the Coastal Commission for review. Opposition to the grazing was voiced by members of CNPS, the Sierra Club and other members of the general public and the City subsequently withdrew the application.



2006 – 2011 Mowing/Raking Management

In 2006 and 2007, all four of the subpopulation areas were mowed and raked; however, plants were only observed in Area A. From 2008 through 2011, twice a year mowing and raking occurred within Areas A and D. Areas B and C were mowed annually in conjunction with adjacent fuel break mowing. In fall 2010 small scraped plots were

created in Areas A and D to stimulate seed bank expression. These management actions were conducted under the direction of a consulting botanist, with input from agency staff and members of the tarplant working group. Despite implementation of these management actions, the tarplant population has continued to decline. However, in 2011 the City’s consulting botanist identified and mapped 11 tarplants in Area A. In addition, to mowing and raking of all identified tarplant areas, the City mowed all the meadows in Arana Gulch with the exception of seasonal wetland areas.



In summary, the City has implemented management actions yearly since 1995. These actions, at a minimum, have included mowing. Actions have also included less frequent catastrophic-level measures, such as soil scraping and controlled burns, under the guidance of botanists. The City has also previously made an effort to reintroduce cattle grazing but withdrew the application due to opposition from some community members. It is the City’s hope that there will not be another lengthy delay in implementing cattle grazing, which is the management action with the highest likelihood of sustainable success according to a consensus of botanists.

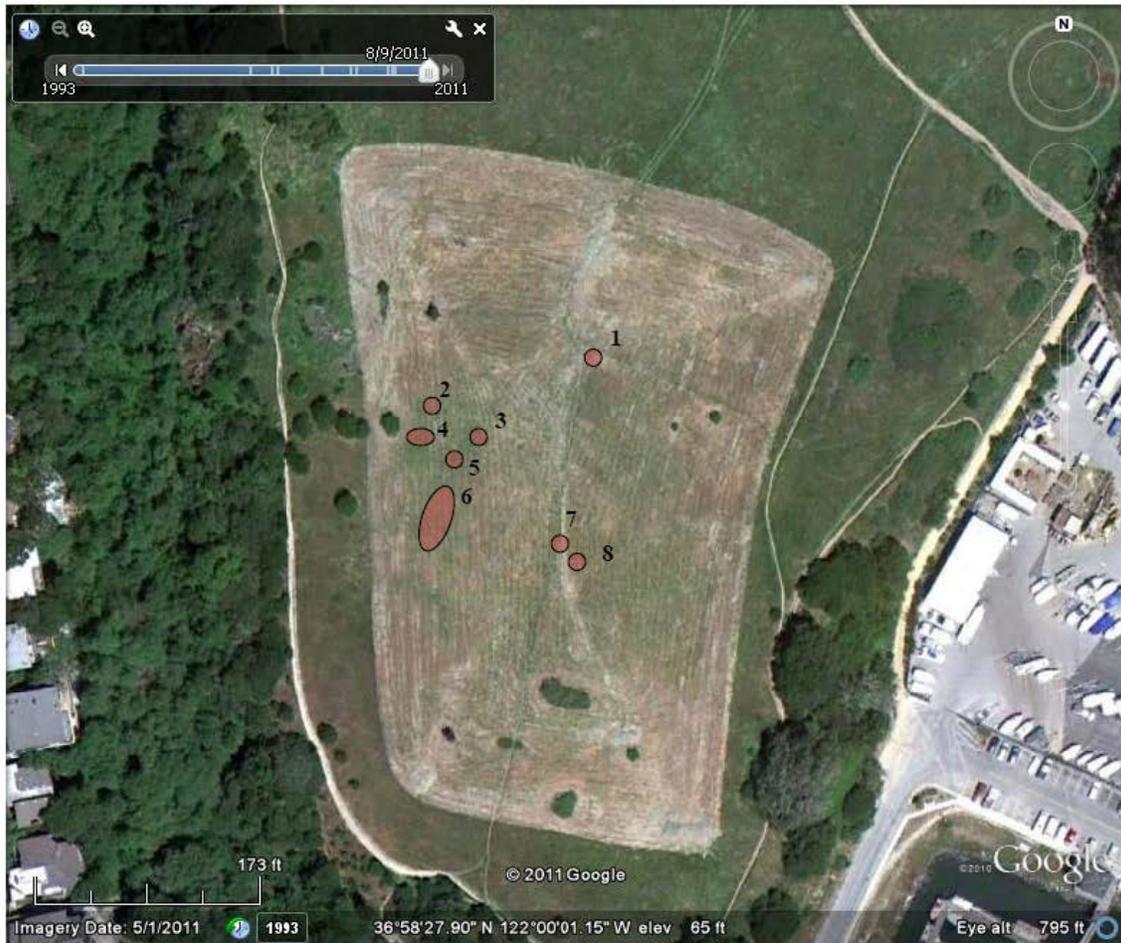


In the absence of grazing, the City will continue to manage the tarplant population and the surrounding grassland. Bi-annual mowing and raking will be the continued management regime. This regime may be supplemented with the use of selectively placed scraping plots, similar to those implemented in 2001 and 2010. Opportunities to utilize other animals for grazing/browsing (i.e., goats) may also be explored for 2011/12. These management actions will continue to be coordinated with botanists, agency personnel, and members of the tarplant working group.



2 Photos of Mowing at Arana Gulch meadows (Fall 2011)

Census of Santa Cruz Tarplant (August 9, 2011)



Census of Santa Cruz Tarplant, 8-9-11

Site No.	# Plants	Form/Fecundity	Previous Treatments
1	1	1 branched, 12 flower heads	Mowed/raked; scraped in 1995 (intensive plot scraping in 1995)
2	1	1 un-branched, 1 flower head	Mowed/raked; scraped in 1995; burn in 96/97
3	1	1 branched, 9 flower heads	Mowed/raked; scraped in 1995; burn in 96/97
4	11	11 un-branched, 11 flower heads	Mowed/raked; scraped in 1995; burn in 96/97
5	1	1 branched, 2 flower heads	Mowed/raked; scraped in 1995; burn in 96/97
6	12	7 un-branched, 7 flower heads	Mowed/raked; scraped in 1995
7	1	5 branched, 13 flower heads	Mowed/raked; hand scarified in 1995
8	4	1 branched, 14 flower heads	Mowed/raked; hand scarified in 1995
		3 branched, 14 flower heads	
		1 un-branched, 1 flower head	
TOTAL	32	84 flower heads	

Census Estimates and Management Actions for Subpopulations of Santa Cruz Tarplant at Arana Gulch

Year	Subpopulation A		Subpopulation B		Subpopulation C		Subpopulation D	
	Total Plants	Management	Total Plants	Management	Total Plants	Management	Total Plants	Management
2011 (as of 08/09/11)	32	Mow/Rake (May/October)	0	Mow (June) Mow/Rake (Oct.)	0	Mow (June) Mow/Rake (Oct.)	0	Mow/Rake (May/Oct.)
2010	0	Mow ^M /Rake (May) Mow/Rake/Scrape Plots (Oct.)	0	Mow ^M (June)	0	Mow ^M (June)	0	Mow ^M /Rake (May) Mow/Rake/Scrape Plots (Oct.)
2009	68	Mow/Rake ^M (May) Mow/Rake (Dec)	0	Mow ^M (May)	0	Mow ^M (May)	0	Mow ^M /Rake (May) Mow/Rake (Dec)
2008	44	Mow ^M (April) Mow/Rake (Nov)	0	Mow ^M (April, June)	0	Mow ^M (April, June)	0	Mow ^M (April) Mow/Rake (Nov)
2007	27	Mow ^M /Rake (April) Mow ^M /Rake (Nov)	0	Mow ^M /Rake (April) Mow ^M /Rake (Nov)	0	Mow ^M /Rake (April) Mow ^M /Rake (Nov)	0	Mow ^M /Rake (April) Mow ^M /Rake (Nov)
2006	348	Mow ^M /Rake (Oct)	0	Mow ^M /Rake (Oct)	0	Mow ^M /Rake (Oct)	0	Mow ^M /Rake (Oct)
2005	1,552	Experimental actions	0	Mow ^U (Fall)	0	Mow ^U (Fall)	0	None
2004	797	Experimental actions	0	Mow ^U (May-June)	0	Mow ^U (May-June)	2	None
2003	2,536	Experimental actions	0	Mow ^U (May-June)	0	Mow ^U (May-June)	57	None
2002	10,230	Experimental actions	0	Mow ^U (May-June)	0	Mow ^U (May-June)	156	None
2001	619	Mow/Scrape Plots (Bainbridge)	N/A	Mow ^U (May-June)	0	Mow ^U (May-June)	N/A	Mow/Scrape Plots (Bainbridge)
2000	1,053	Mow ^U (May-June)	0	Mow ^U (May-June)	0	Mow ^U (May-June)	1	None
1999	1,228	None	0	None	0	Mow ^U (May-June)	1	None
1998	12,800	Mow ^M , Prescribed fire north of A(Oct)	5	Mow ^U (May-June) Prescribed fire (Oct)	20	Mow ^U (May-June)	60	Prescribed fire (Oct)
1997	12,941	Prescribed fire (Oct)	0	Mow ^U (May-June)	0	Mow ^U (May-June)	21	Mow ^U /Rake (May) Scrape (plots) (Oct)
1996	7,420	Mow ^U /Rake (May) Arson fire (Oct)	0	Mow ^U (May) Scrape (plots) (Oct)	0	Mow ^U (May)	0	Mow ^U /Rake (May) Scrape (plots) (Oct)
1995	0	Mow (May) Mow ^M /Rake (June) Mechanical Scrape/Rake (Nov-Dec)	0	Mow(May) Mow (June)	0	Mow (May) Mow (June)	0	Mow (May) Mow/Rake (June)
1994	0	None	0	None	0	None	0	None
1994	City of Santa Cruz Purchases Arana Gulch Property							
1993	2	None	0	None	0	None	131	None
1989	Y ^b	None	Y ^b	None	0	None	Y ^b	None
1988	Cessation of Grazing Operation							
1986	100,000+ (Morgan) Grazing (dairy cattle)				10,000+ (Morgan) Grazing (dairy cattle)			
1977	≤ 100 (Morgan)	Grazing (35-40 dairy cattle)	N/A	Grazing (35-40 dairy cattle)	N/A	Grazing (35-40 dairy cattle)	N/A	Grazing (35-40 dairy cattle)

Y = present, but no counts available U = indicates mowing type (scythe-type or chopped mulch) unknown M = indicates chopped mulch type mowing