

## **Restoration of the Santa Cruz Tarplant at Arana Gulch**

### **Management Overview:**

The City of Santa Cruz developed a Habitat Management Plan (2013) to help restore the Arana Gulch Open Space and SC tarplant. A technical advisory group was formed and advises the City on the habitat restoration effort.

### **SC Tarplant Locations:**

Arana Gulch has four areas where SC tarplants have been observed since the City acquired the property in 1994 and began restoration activities (see Attachment 1, Site Map). The four areas are located within approximately 30 acres of lower coastal prairie terrace. The number of plants observed has been less than 100 since 2006 (see Attachment 2, Number of SC Tarplants at Arana Gulch Per Year). From 1994 - present, SC tarplants were only observed once in Areas B and C in 1998. From 2005-present, SC tarplants have only been observed in SC Tarplant Area A. The last time SC tarplants were observed in Tarplant Area D was in 2004.

### **Goals:**

The short-term goal is to reach the 2006 level of 348 plants. The long-term goal is to expand the distribution of SC tarplants beyond the four SC tarplant areas. The City hired Dr. Susan Bainbridge (UC Berkeley Jepson Herbarium) to conduct a seed density/viability study and her results will further inform restoration activities and goal setting.

### **Management Trends:**

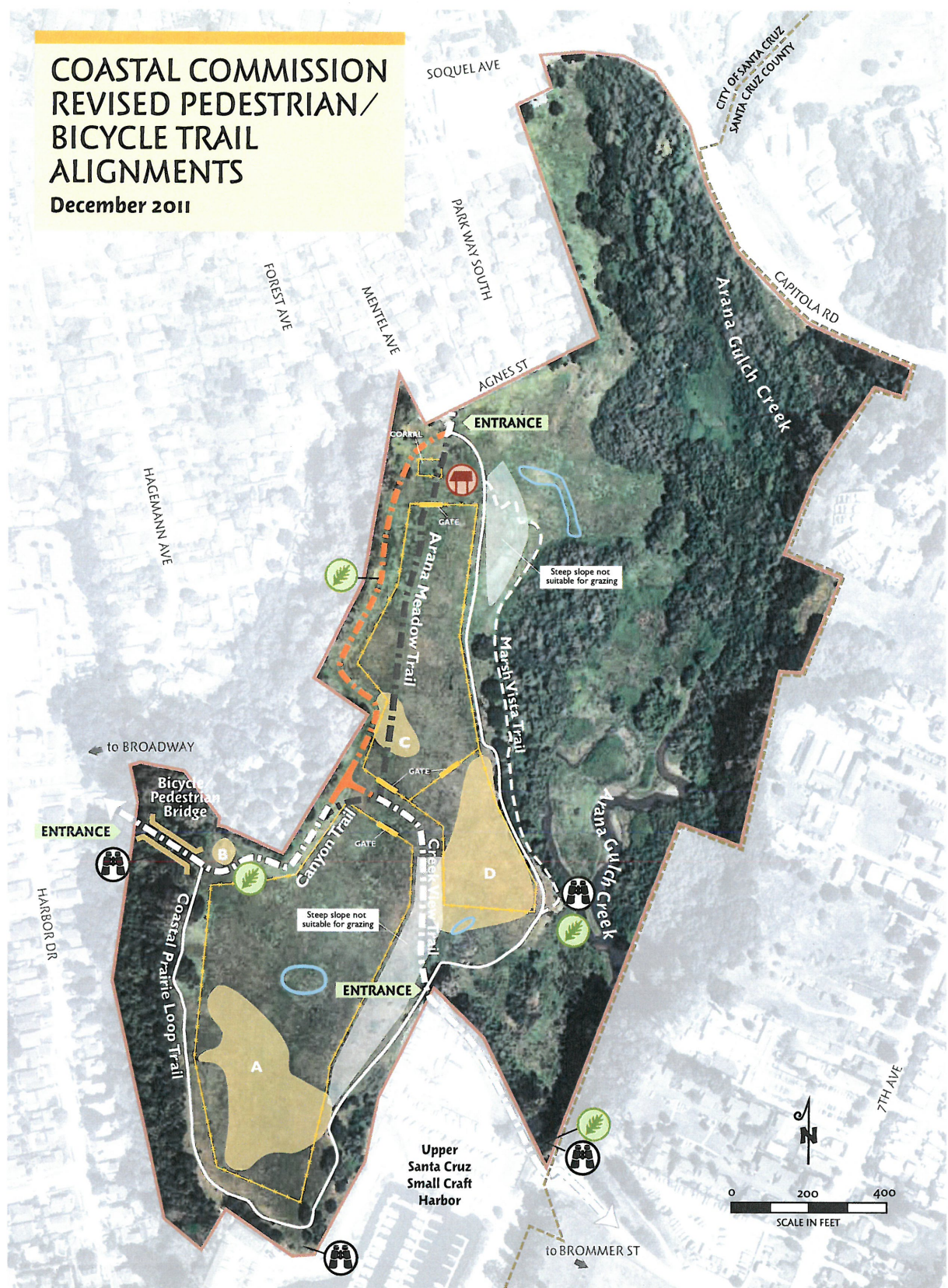
The management trends have included variations in type, frequency, timing, and intensity of management actions (see Attachment 3, Summary of Management Actions Per Year). They have included mowing (scythe-type or chopped mulch), scraping (by hand and mechanical), raking plots (onsite dispersal and off-site removal of biomass); fires (prescribed and one arson fire); and most recently cattle grazing. Cattle grazing fences were installed around Areas A, C, and D in 2014 and cattle grazing will be the primary management action to reduce the canopy height of the non-native grasses, disturb soil, and create bare ground in those areas. The cattle graze at Arana Gulch until mid-June and are removed before the SC tarplant bolt. Area B is located outside of the grazing areas and will be mowed, raked, and scraped. Dr. Susan Bainbridge is growing fourteen seeds for ex situ propagation and seed collection. Additional seed collection will not occur at Arana Gulch until the total number of plants exceeds 50. A weed management plan was created and will be implemented to control invasive species within and surrounding the coastal prairie and SC tarplant areas.

### **Attachments:**

1. Site Map
2. Number of SC Tarplants at Arana Gulch Per Year
3. Summary of Management Actions Per Year

# COASTAL COMMISSION REVISED PEDESTRIAN/ BICYCLE TRAIL ALIGNMENTS

December 2011



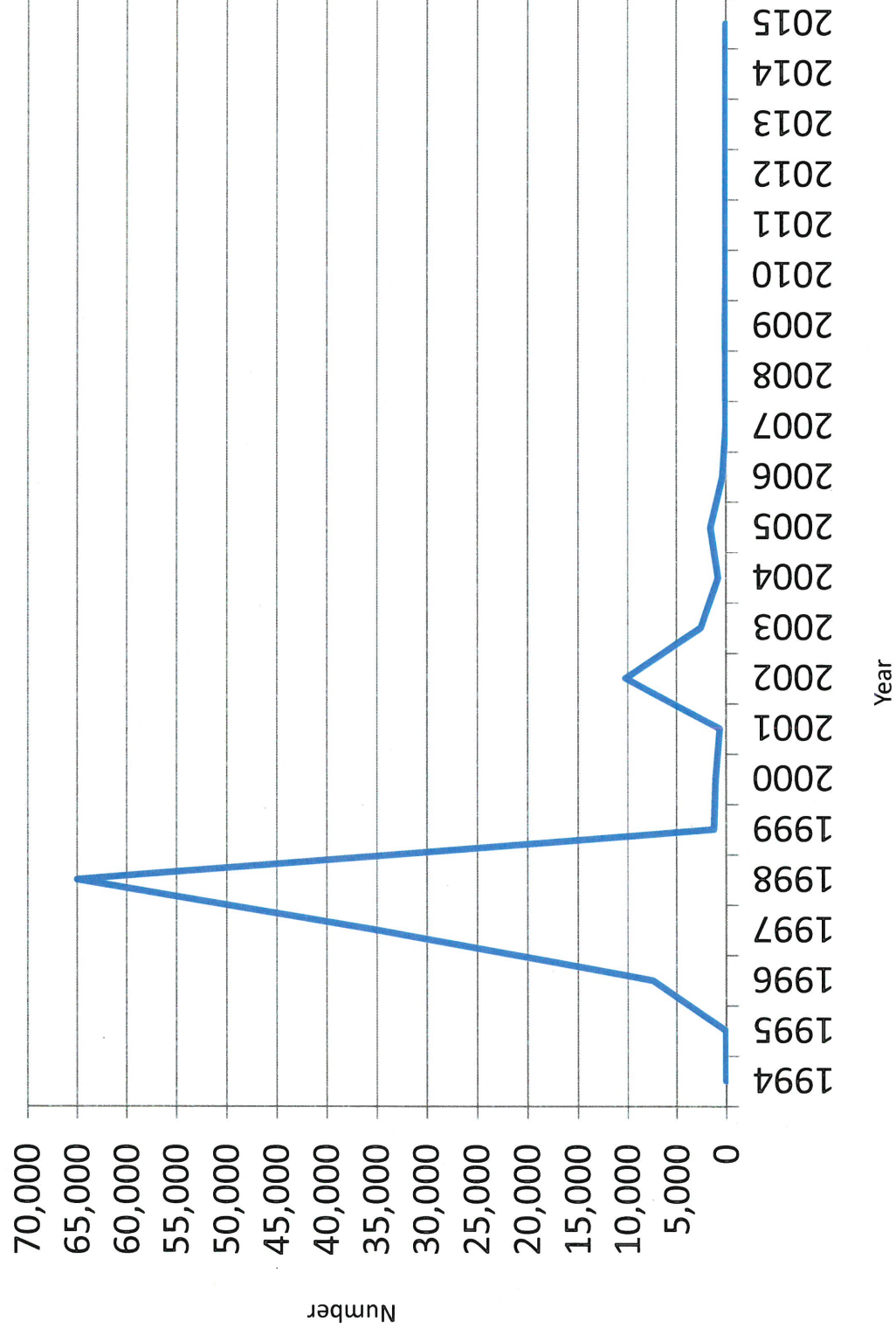
## LEGEND

- |  |  |                                    |
|--|--|------------------------------------|
| Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989 | Revised Pedestrian/Bicycle Trail (wheelchair accessible) | Pedestrian Trail (unpaved/no dogs) |
| Seasonal Wetlands  | Previous Trail Alignment                                 | Proposed Grazing Area              |
| Meadow Overlook Area (20ft x 20ft)   | Previous Trail Alignment Eliminated                      | Master Plan Boundary               |
| Interpretive Display   | Pedestrian Trail (unpaved)                               | City Limit                         |
| Overlook   |  |                                    |

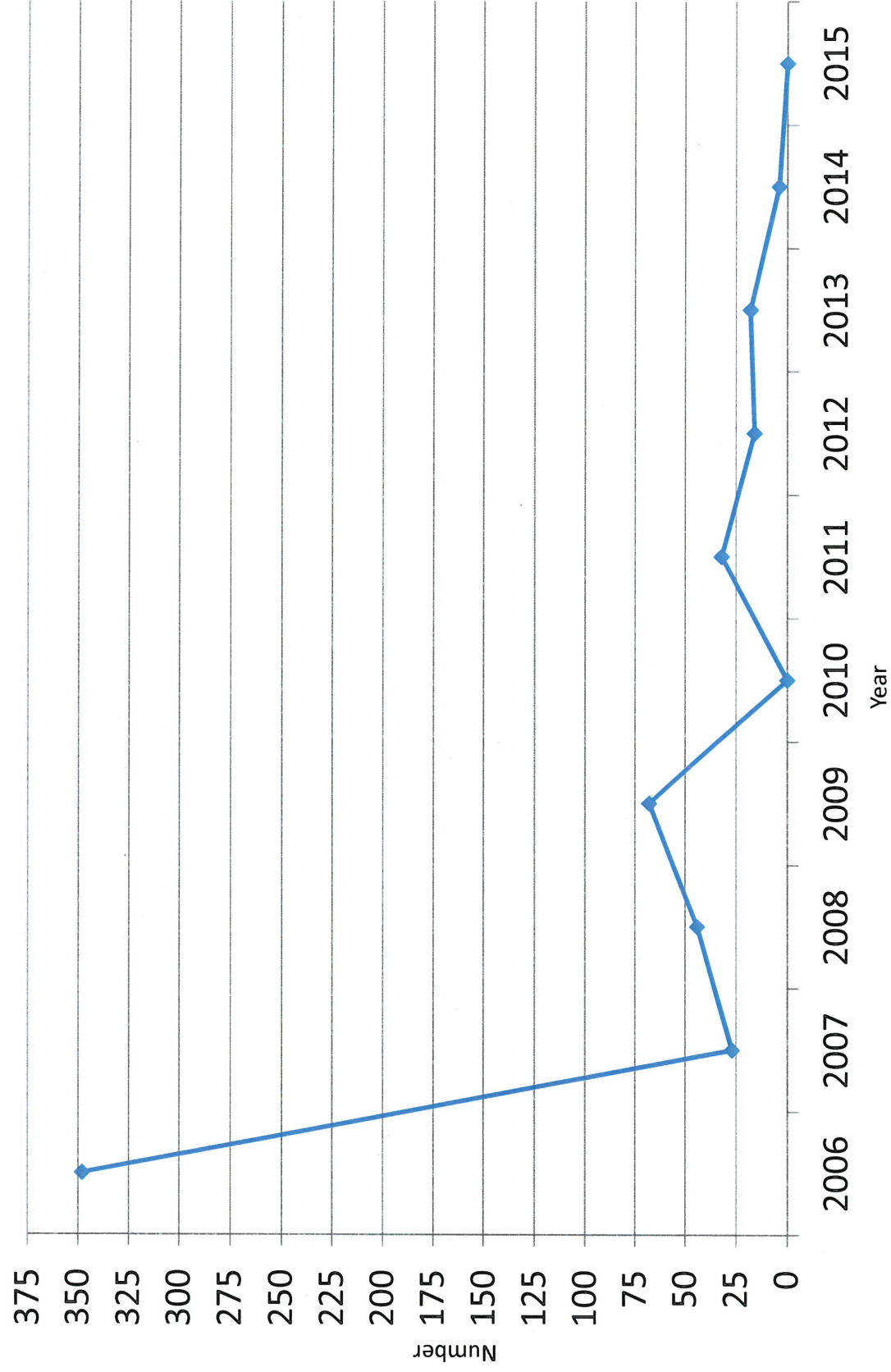
Note: Trail width symbol not to scale



Santa Cruz Tarplant Numbers in Arana Gulch from 1994 - 2015



Santa Cruz Tarplant Numbers in Arana Gulch from 2006 - 2015



**Santa Cruz tarplant – Summary of Management of Actions Per Year and plant Census, Arana Gulch**

U = indicates mowing type (scythe-type or chopped mulch), unknown M = indicates chopped mulch type mowing

Year	Area A		Area B		Area C		Area D	
	Total Plants	Management	Total Plants	Management	Total Plants	Management	Total Plants	Management
2015	0	Cattle Grazing (Feb. – June)	0	Mow and Hand Rake (May and June)	0	Cattle Grazing (Feb-June), Mowing (Late-May)	0	Cattle Grazing (Feb. – June)
2014	4 <sup>1,2</sup>	Mow (April and June), Plot raked (Mid-June)	0	Mow (April and June)	0	Mow (April and June), Plot Raked (Mid-June)	0	Mow (April and June), Plot raked (Mid-June)
2013	18 <sup>1,3</sup>	Mow (May)	0	Mow (May)	0	Mow (May)	0	Mow (May)
2012	16 <sup>1</sup>	Mow/Rake (early June)	0	Mow (June)	0	Mow (June)	0	Mow/Rake (early June)
2011	32	Mow/Rake (May) Mow (Oct) 3 scrape plots (Oct)	0	Mow (June) Mow/Rake (Oct)	0	Mow (June) Mow/Rake (Oct)	0	Mow/Rake (May) Mow (Oct)
2010	0	Mow/Rake (May) Mow/Rake/ 2 Scrape Plots (Oct.)	0	Mow (June)	0	Mow ( June)	0	Mow/Rake (May) Mow/Rake/ 1 Scrape Plot (Oct.)
2009	68	Mow/Rake (May) Mow/Rake (Dec)	0	Mow (May)	0	Mow (May)	0	Mow /Rake (May) Mow/Rake (Dec)
2008	44	Mow (April) Mow/Rake (Nov)	0	Mow (April, June)	0	Mow (April, June)	0	Mow (April) Mow/Rake (Nov)
2007	27	Mow <sup>M</sup> /Rake (April) Mow <sup>M</sup> /Rake (Nov)	0	Mow <sup>M</sup> /Rake (April) Mow <sup>M</sup> /Rake (Nov)	0	Mow <sup>M</sup> /Rake (April) Mow <sup>M</sup> /Rake (Nov)	0	Mow <sup>M</sup> /Rake (April) Mow <sup>M</sup> /Rake (Nov)
2006	348	None	0	None	0	None	0	Mow <sup>M</sup> /Rake (Oct)
2005	1,552	None	0	None	0	None	0	None
2004	797	None	0	None	0	None	2	None
2003	2,536	None	0	None	0	None	57	None
2002	10,230	None	0	None	0	None	156	None
2001	619	Experimental actions: (Bainbridge)	N/A	None	0	None?	N/A	Experimental actions: (Bainbridge)
2000	1,053	Mow <sup>U</sup> (May-June)	0	Mow <sup>U</sup> (May-June)	0	Mow <sup>U</sup> (May-June)	1	None
1999	1,228	None	0	None	0	Mow <sup>U</sup> (May-June)	1	None
1998	65,000	Mow <sup>M</sup> , Prescribed fire north of A(Oct)	5	Mow <sup>U</sup> (May-June) Prescribed fire (Oct)	20	Mow <sup>U</sup> (May-June)	60	Prescribed fire (Oct)
1997	35,000	Prescribed fire (Oct)	0	Mow <sup>U</sup> (May-June)	0	Mow <sup>U</sup> (May-June)	21	Mow <sup>U</sup> /Rake (May) Scrape (plots) (Oct)

1996	7,420	Mow <sup>U</sup> /Rake (May) Arson fire (Oct)	0	Mow <sup>U</sup> (May) Scrape (plots) (Oct)	0	Mow <sup>U</sup> (May)	0	Mow <sup>U</sup> /Rake (May) Scrape (plots) (Oct)
1995	0	Mechanical/Hand Scrape of 3 acres Mow <sup>M</sup> /Rake (June)	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

<sup>1</sup> plants found in scrape plot created in 2011

<sup>2</sup> 76 flowering heads

<sup>3</sup> 54 flowering heads