

Report on *Holocarpha macradenia* Monitoring and Management at Watsonville Wetland Watch's Tarplant Hill Property

Watsonville Wetlands Watch, November, 2015

Tarplant Hill is a six acre property located in the City of Watsonville adjacent to Struve Slough, comprised of approximately 4.5 acres of coastal prairie and 1.5 acres of coastal scrub and wet meadow habitat. The property was privately owned until 2006 when it was purchased by Watsonville Wetlands Watch with the intent to protect and restore a significant *Holocarpha macradenia* population and the associated coastal prairie habitat. It was historically a part of a grazing and likely a dairy operation and beginning in the late 1980's was included within the planned Landmark Development, a large residential and commercial development. Prior to planned development, the grassland supported a healthy *H. macradenia* population, with an estimated 409,000 individuals recorded in a 1989 survey. Soon after that time grazing animals were removed from the property and without grazing and any other active management, the population plummeted to a single individual found in 1993.

In 2006, the year that Watsonville Wetlands Watch acquired the property, there were 2 individuals identified. In 2007, with support from the U.S. Fish and Wildlife Service Partners in Restoration Program, we initiated management measures to stimulate the tarplant with the goals of creating a self-sustaining population within the range of the historic population on the property. Management measures included an initial significant dethatching of the grassland, using a draft horse drawn rake, initiation of a mowing program throughout the growing season to maintain grass height conducive to tarplant growth, seed production and recruitment, and scraping of the top of the soil surface to stimulate the *Holocarpha macradenia* seedbank. 2015 monitoring recorded 2,239 individuals.

Scraping has demonstrated the most significant benefit to recruitment of tarplant from the seedbank (see data in Table 1. below). Scrapes are 100 square meters in dimension at a depth of 2 – 3" and are made to be round in shape which reduces the ratio of edge to area. A small tractor with a box scraper or bucket is used to remove about 2-3 cm of soil which is distributed around the edge of the scraped area. In addition to tractor made scrapes, one scrape was created by removing a layer of soil with a heavy duty hoe. This method worked for stimulating *H. macradenia* germination, but requires a couple of hours of labor. We have been creating only 3 scrapes per year, starting in 2007, so as not to expose too much of the seed bank in any one year. To date we have made 13 scrapes.

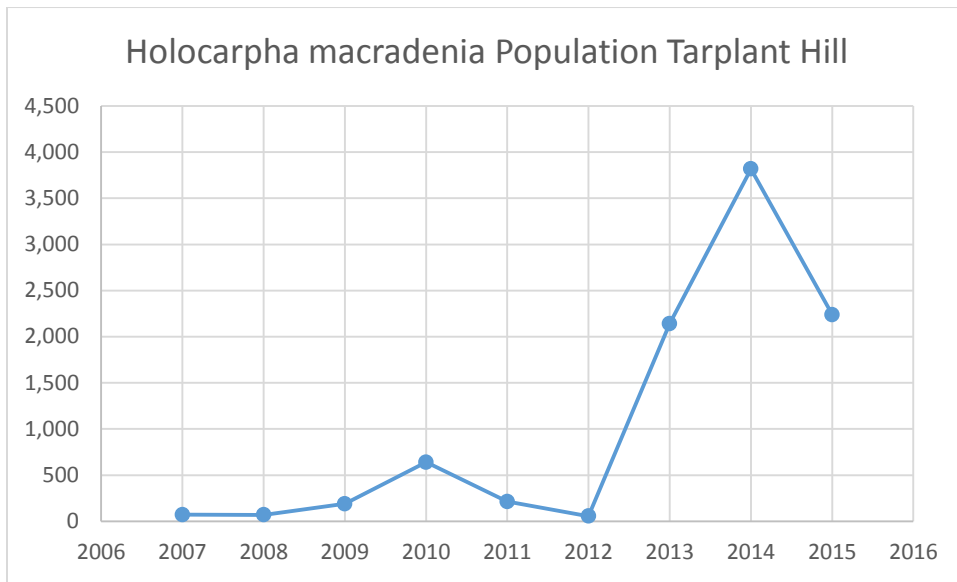
Scraped areas can be distinguished from the surrounding grassland even several years after they were created (see aerial photo below). The vegetation in these areas is much more sparse with less thatch build-up, and there remain significant patches of bare hard-packed soil which is ideal for *H. macradenia* germination. The scrapes also contain a much higher diversity of both native and non-native plants. There is an abundance of *Sisyrinchium bellum* and a few other native grassland species that have become established in the scraped areas. During the years of our management only one *H. macradenia* was found in an un-scraped area.

The top of the hill is mowed several times annually, with great care taken to not damage any flowering *H. macradenia*. *Baccharis pilularis* and *Quercus agrifolia* are removed as we are prioritizing coastal prairie habitat within the historic Tarplant population footprint. *Carduus pycnocephalus*, *Helminthotheca echioides*, *Phalaris aquatica* and *Foeniculum vulgare* are removed annually.

Holocarpa macradenia Population Monitoring 1984-2015
 Tarplant Hill
 Property

Year	Plants	Inflorescences	
1984	10,000		
1985	100,000		
1986	20,000		
1989	409,000		
1990	38,000		
1991-92	N/A		
1993	1		
1994	1		
1995-2002	N/A		
2003	1		
2004	8		
2005	60		
2006	2		
2007	70		Avg. Infl. / plant
2008	69	130	1.88
2009	189	629	3.33
2010	639	8946	14.00
2011	213	1524	7.15
2012	55	762	13.85
2013	2141	3834	1.79
2014	3818		
2015	2239		

Table 1. *Holocarpha macradenia* population, Tarplant Hill, 2006 - 2015



Tarplant Hill Aerial Photo, 2015. Note visible circular scrapes.

**Grassland Monitoring Tarplant Hill
Percent Cover Comparison 2009-2012**

Species	2009	2010	2011	2012
Anagalis arvensis	0.00	0.00	0.52	0.2
Avena fatua	1.89	10.91	34.37	35.98
Baccharis pilularis	0.33	0.74	0.26	0.40
Bromus diandrus	3.00	5.16	0.00	3.18
Bromus hordaceus	10.11	3.24	1.03	5.37
Cardaria draba	0.11	0.15	0.26	0.00
Carduus pycnocephalus	0.56	0.44	0.00	0.00
Cirsium vulgare	0.00	0.44	0.52	0.20
Convolvulus arvensis	0.22	1.18	7.49	2.78
Danthonia californica	0.11	0.15	0.00	0.60
Erodium botrys	0.33	0.44	0.00	0.40
Festuca perennis	11.11	7.67	20.41	11.93
Geranium dissectum	7.11	10.77	0.00	1.39
Helminthotheca ecioides	0.44	1.33	0.26	0.80
Hypochaeris radicata	0.33	0.59	5.68	3.78
Juncus occidentalis	0.11	0.00	0.00	0.00
Lactuca seriola	0.00	0.00	0.00	0.20
Phalaris aquatica	4.67	6.19	9.04	7.16
Plantago lanceolata	0.22	1.62	5.43	7.16
Raphnus sativa	0.22	0.15	0.00	0.00
Rumex acetocella	0.00	0.15	0.26	0.60
Sisyrinchium bellum	0.00	0.00	1.03	1.19
Trifolium angustifolium	0.56	2.21	0.26	0.00
Trifolium subterraneum	0.22	4.57	0.00	1.19
Vicia sativa	7.56	6.78	0.26	2.19
Vulpia myuros	17.56	35.10	0.78	11.53
Thatch	32.67	0.00	11.63	0.6
Bare Soil	0.56	0.00	0.26	0.4

	2009	2010	2011	2012
Percent Cover Native	0.55	0.89	1.55	2.19