

**City of San Diego
Multiple Species Conservation Program**

**Summary of Monitoring Results for
*Brodiaea orcuttii***

May 2003

Introduction

Orcutt's brodiaea (*Brodiaea orcuttii*) is an annual, purple flowered plant species that is associated with vernal pool habitat or wet meadows. Monitoring for this plant was conducted between April and May in various locations. Monitoring for this species began in 2001 and has been conducted annually (McMillan Biological Consulting and Conservation Biology Institute, 2001; Wildlife Research Institute, 2002). The locations, dates, and survey personnel for each survey are given in the table below. The methodology and results of the monitoring are detailed below. The goal of the effort was to continue the annual collection of data for long-term monitoring of Orcutt's brodiaea under the MSCP.

Orcutt's Brodiaea Surveys, 2003		
Location	Date	Surveyors
General Dynamics	April 21, 2003	Holly Cheong, Keli Balo, Melanie Johnson
Carroll Canyon	April 28, 2003	Holly Cheong, Randy Rodriguez, Betsy Miller
Nobel Drive	April 28, 2003	Holly Cheong, Randy Rodriguez, Betsy Miller
Del Mar Mesa	May 19, 2003	Holly Cheong, Eden Nguyen, Jan Atha, Melanie Johnson
United States International University (USIU)	May 28, 2003	Holly Cheong, Keli Balo, Betsy Miller

Methodology

Monitoring for this species was conducted in accordance with the Biological Monitoring Plan for the Multiple Species Conservation Program (Monitoring Plan), dated January 25, 1996. The location of each sampling site was determined by field level surveys and then depicted on aerial photographs. The irregular shape of the populations and wet vernal pools around the population area precluded the use of transects in most locations. Therefore, a one-meter quadrat sampling method was used to estimate the size of each population. One-meter quadrats were randomly allocated within the populations using randomly allocated points in ArcView Geographic Information System (GIS). Each point was then navigated to using a Global Positioning System (GPS) and quadrats were placed to the northeast, northwest, southeast, or southwest alternating direction with each point. For Del Mar Mesa, the population location was not available until the site was surveyed on May 19, 2003 and randomly allocated points in ArcView GIS could not be provided. In that case, points were randomly selected in the field.

The Nobel Drive population was small enough to completely count all individuals (census). Small areas within Del Mar Mesa and USIU were also completely counted. The USIU population was fairly large and did not contain any vernal pools. Therefore, the population size was estimated using a belt transect method. Four transects of varying lengths were randomly allocated by measuring the site length and assigning transects along points using a random

numbers table. Plants were counted within 1 meter on either side of the transect for a 2 meter wide belt.

Results

Surveyors estimated a total of 66,013 plants, which includes 13,656 flowering individuals and 52,357 non-flowering individuals. A description of each site and the number of individuals found at each site is given below.

General Dynamics

This site is located within a vernal pool preserve on the old General Dynamics plant site off of Ruffin Road in Clairemont Mesa (see attached map). A total of 46,018 individuals were estimated to be on-site including 3,942 flowering individuals and 42,076 non-flowering individuals. Over 10,000 individuals were estimated to be on-site in 2001, while no individuals were observed in 2002.

Carroll Canyon

This site is located in Mira Mesa within a vernal pool preserve (see attached map). A total of 10,247 individuals were estimated to be on-site, including 4,515 flowering individuals and 5,732 non-flowering individuals. A total of 5,000 individuals were estimated to be on-site in 2001, while no individuals were observed in 2002.

Nobel Drive

The Nobel Drive population is located in University City adjacent to Interstate 805 (see attached map). Individuals were found within the fenced vernal pool areas. A total of 37 flowering individuals were counted on-site; non-flowering individuals were not observed.

Del Mar Mesa

The Del Mar Mesa population is just north of Los Peñasquitos Canyon Preserve (see attached map). In 2003, 7,181 individuals were estimated, including 2,632 flowering individuals and 4,549 non-flowering individuals. In 2001, surveys were done in a different location in Del Mar Mesa and a population estimate was not calculated. No individuals were observed in 2002.

USIU

The USIU population is located behind the university in Scripps Ranch (see attached map). In 2003, 2,530 flowering individuals were estimated on-site; non-flowering individuals were not observed. Four individuals were observed in 2002, while over 10,000 plants were estimated on-site in 2001.

Recommendations

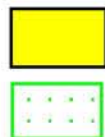
Future sampling methodology should require a census of all individuals present whenever possible. If a census cannot be done, belt transect sampling appears to be a viable, efficient sampling method for this species. However, it can only be used if the population area is large enough to accommodate reasonably sized transects or if the population area does not have wet vernal pools within it that may be damaged by this method. Randomly allocated quadrats using ArcView GIS and GPS technology can also be used as a sampling technique if the population size is small, irregular in shape, or impacts to vernal pools are a concern.

References

McMillan Biological Consulting and Conservation Biology Institute. 2001 MSCP Rare Plant Survey and Monitoring Report. 2001.

Ogden Environmental. Biological Monitoring Plan for the Multiple Species Conservation Program. 1996.

Wildlife Research Institute. 2002 MSCP Rare Plant Survey and Monitoring Report. 2002.



Population Area

MHPA

Carroll Canyon

Brodiaea orcuttii

Survey Date: 4/28/03



Source: H. Cheong, B. Miller
R. Rodriguez



Population Area



MHPA

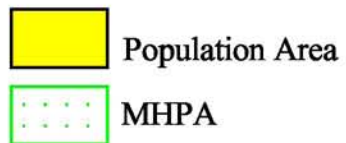
General Dynamics

Brodiaea orcuttii

Survey Date: 4/21/03



Source: M. Johnson,
H. Cheong, K. Balo



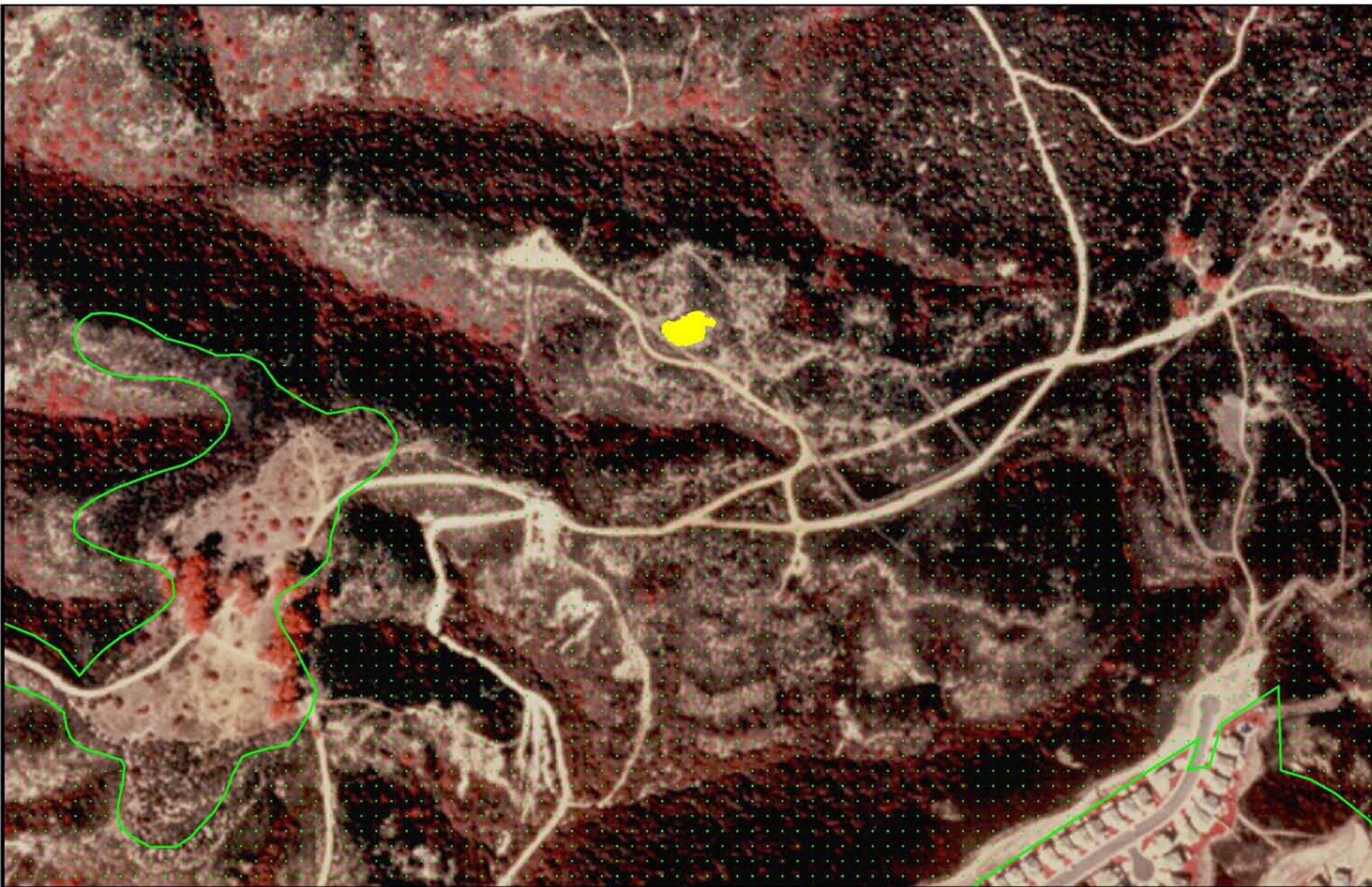
Nobel Drive

Brodiaea orcuttii

Survey Date: 4/28/03



Source: H. Cheong, B. Miller,
R. Rodriguez



Population Area



MHPA

Del Mar Mesa

Brodiaea orcuttii

Survey date: 5/19/03



Source: H. Cheong, M. Klein, J. Atha,
E. Nguyen, B. Miller, K. Balo,
S. McMillan



Population Area



MHPA

USIU
Brodiaea orcuttii

Survey date: 5/21/03



Source: H. Cheong, K. Balo,
B. Miller