

MSCP Rare Plant Monitoring: Field Monitoring Methods

City of San Diego
Planning Department
Multiple Species Conservation Program Division

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Introduction

The *Biological Monitoring Plan for the Multiple Species Conservation Program* (MSCP BMP) was developed in 1996 by Ogden Environmental, Inc. and is a component of the City of San Diego's MSCP. The plan sets forth monitoring requirements for a variety of species, including rare plants, which are covered by the MSCP permit in order to assess regional changes in habitat conditions and wildlife.

The City of San Diego began rare plant monitoring in 1999 with quantitative surveys of *Ambrosia pumila* and *Dudleya brevifolia*. In 2000 and 2001, Citywide rare plant reconnaissance surveys were conducted, as were expanded quantitative species monitoring efforts. In 2001, the Conservation Biology Institute (CBI) performed a review of the MSCP monitoring program. Their resulting draft *Status Summary of Biological Monitoring Protocols* included several recommendations to improve the MSCP monitoring program. The report was never finalized; however, some components of CBI's draft report have been incorporated into the City's monitoring program, and CBI's report recommendations have been included in this report.

Since 2001, the City has expanded the number of MSCP species and localities it monitors, and has performed plant monitoring in compliance with the BMP, with some exceptions due to incorrect species localities or recommendations made in CBI's 2001 report. Since neither the original BMP nor CBI's review outline specific methods to be used for plant monitoring, the City has worked to develop its own methods based on the general parameters set forth in the 1996 and 2001 reports. Most of these methods have been described generally in the City's annual plant monitoring reports; however, in order to ensure uniformity and avoid uncertainty due to staff turnover, this report has been developed to explain monitoring methods in greater detail and to serve as a central methods information repository. The manual has been created as a living document to be updated as plant monitoring methods change.

Thus, the goal of this manual is twofold: to ensure uniform implementation of the City's MSCP plant monitoring program as well as to detail current methodologies for use in rare plant monitoring improvements. It is our hope that this report will provide sufficient detail such that any biologist familiar with general monitoring methodologies and local species could use it to perform the City's rare plant monitoring. Additionally, this report is meant to provide background information on the City's monitoring requirements and methodologies so that the information can be used for improvements to the rare plant monitoring program.

***Acanthomintha ilicifolia* (San Diego Thorn-mint)**

MSCP Biological Monitoring Plan (BMP) Priority Listing and Required Monitoring Frequency [CBI Recommended Monitoring Frequency]

Second priority, Every two years [Annually]

BMP Required City Monitoring Locations:

None

Additional CBI Recommended City Monitoring Location (CBI, 2001):

Sabre Springs

Additional Locations Monitored in the City:

Black Mountain Ranch

Mission Trails Regional Park

Penasquitos Canyon

Years Monitored:

2000 (Blk Mtn Ranch, PQ Cyn, Sabre Springs)

2001 (Blk Mtn Ranch, MTRP, Otay Lakes, PQ Cyn, Sabre Springs)

2002 (Blk Mtn Ranch, MTRP, Otay Lakes, PQ Cyn, Sabre Springs)

2003 (Blk Mtn Ranch, MTRP, Otay Lakes, PQ, Sabre Springs)

2004 (Blk Mtn Ranch, MTRP, Otay Lakes, PQ Cyn, Sabre Springs)

2005 (Blk Mtn Ranch, MTRP, PQ Cyn, Sabre Springs)

Methods:

Black Mountain Ranch, Mission Trails Regional Park, Peñasquitos Canyon, Sabre Springs All *A. ilicifolia* monitoring, with the exception of Otay Lakes, is performed by Mike Kelly of the Conservation Resources Network and other volunteers. Based on correspondence with Mr. Kelly, full censuses are performed at each site. Additionally, 1x10 m transects have been established in order to compare and potentially project total counts from transects in future years. Permanent transects were selected by Mike Kelly in 1992 and each transect corner was staked with rebar, with an inscribed zero on one corner which indicates where the meter tape is laid. Three transects were placed in Santa Luz/Blk Mtn, three in Sabre Springs, and two in MTRP. Within each transect, all *A. ilicifolia* individuals are counted and recorded. Additionally, a percent cover of the following is assessed and recorded for each one meter within the ten meter transects: 1) Percent bare ground/litter; 2) Percent non-native and native cover for each meter of the 1x10 m transect; and 3) Within native cover, percent cover and number of *A. ilicifolia* individuals.

Additionally, a full plant list is generated for each transect and the surrounding site, and a threat assessment for each population is performed. Lastly, a GPS point is taken at each population.

Otay Lakes At Otay Lakes, there are relatively few plants in the population (60+/-), so a simple census is performed.

General: Note that in addition to selected preserve area quantitative monitoring, the 2001 CBI report suggests preserve-wide annual “Non-quantitative surveys to assess resource presence/absence or distribution, using habitat mapping, aerial photography, or other imagery,

and mapping of species distribution.” According to the report, such preserve-level monitoring would be used “to inform management decisions – required of all preserve managers at all preserve units and monitoring directives.”

Figure 1. City of San Diego *Acanthomintha ilicifolia* Monitoring Locations, Regional Map

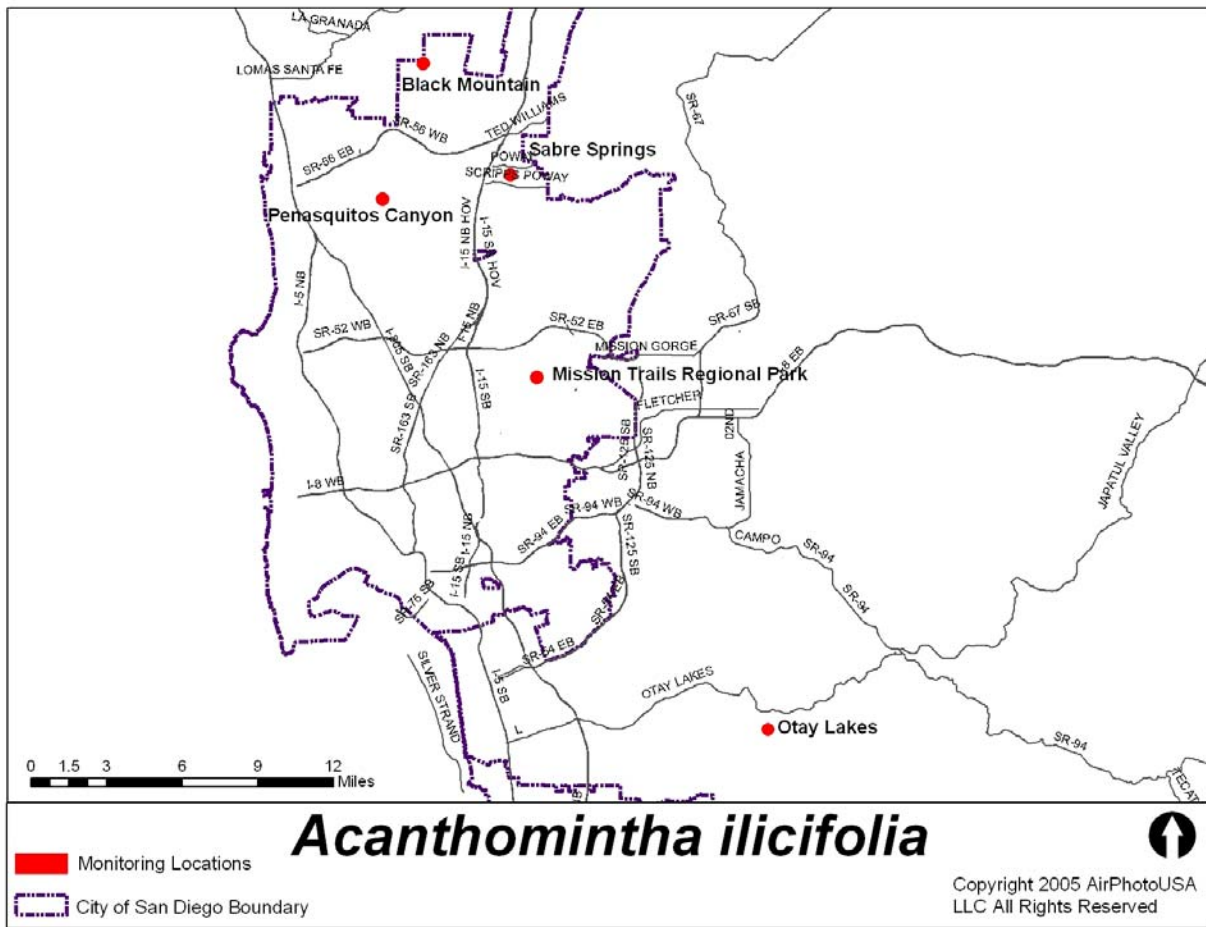


Figure 2. City of San Diego *Acanthomintha ilicifolia* Monitoring Location, Black Mountain



Figure 3. City of San Diego *Acanthomintha ilicifolia* Monitoring Location, MTRP



Figure 4. City of San Diego *Acanthomintha ilicifolia* Monitoring Location, Otay Lakes

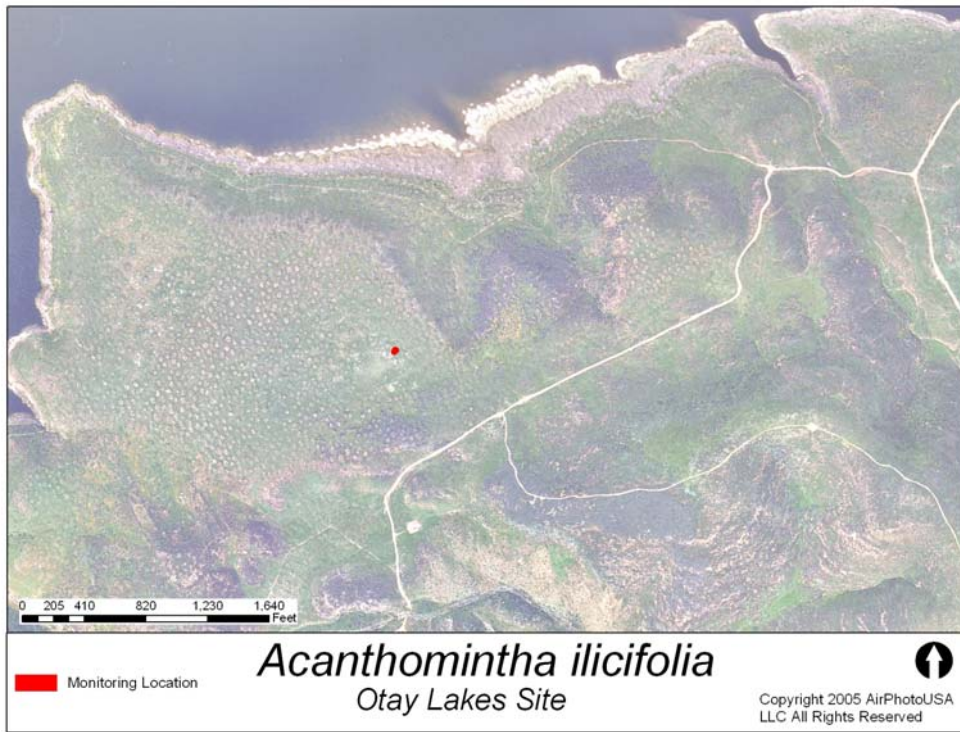


Figure 5. City of San Diego *Acanthomintha ilicifolia* Monitoring Location, Peñasquitos Canyon Region

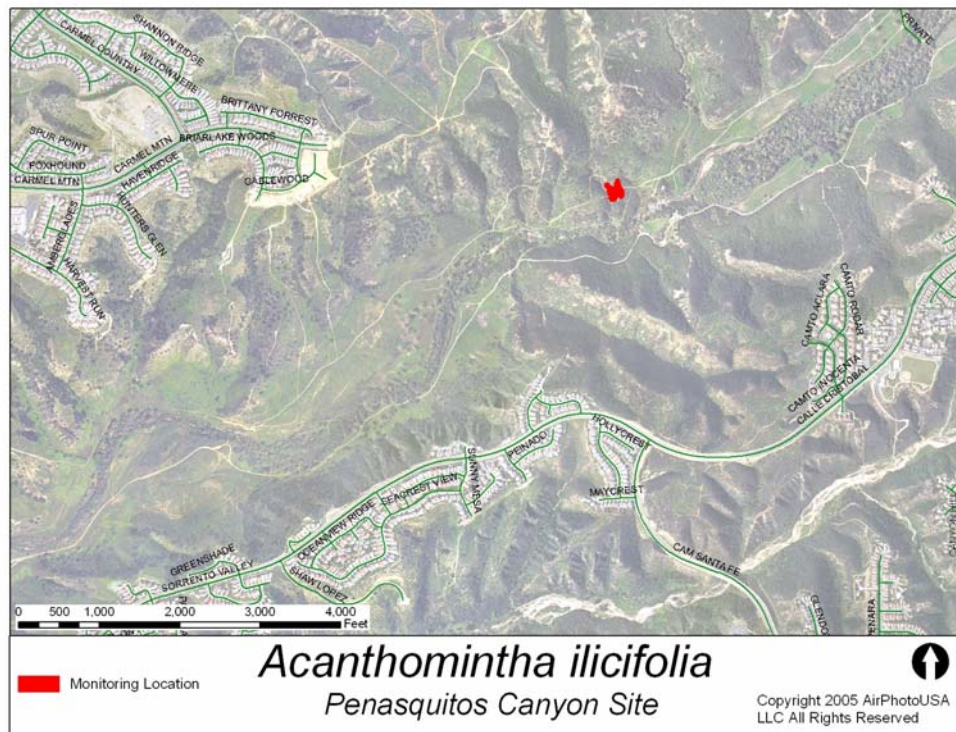
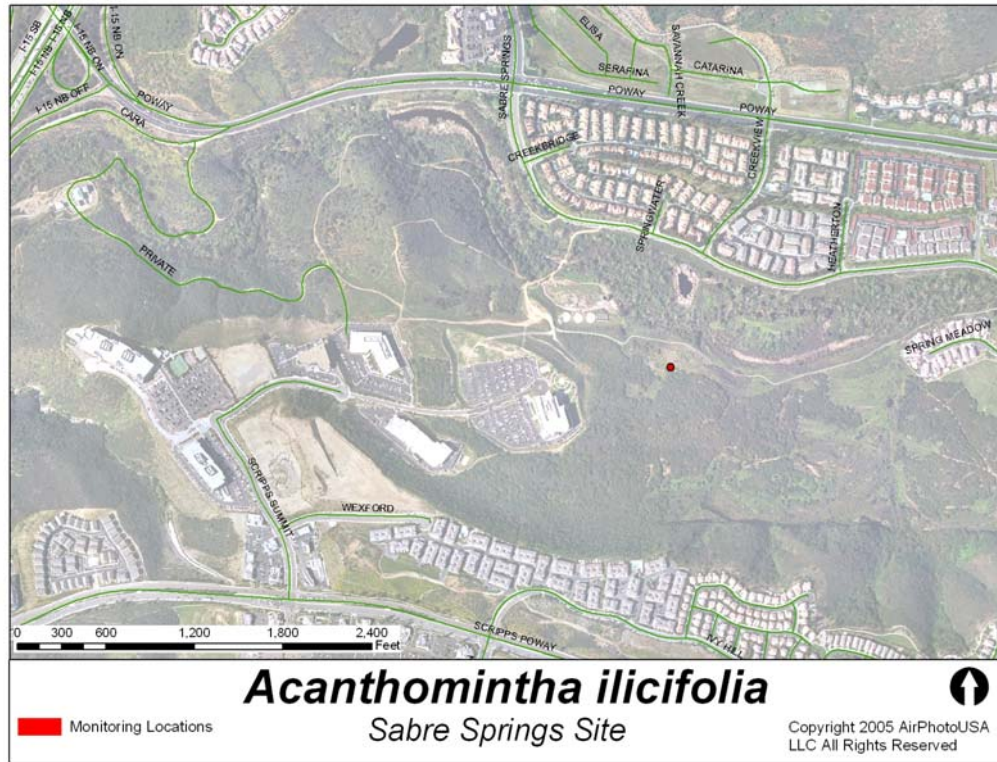


Figure 6. City of San Diego *Acanthomintha ilicifolia* Monitoring Location, Sabre Springs



***Ambrosia pumila* (San Diego Ambrosia)**

MSCP Biological Monitoring Plan (BMP) Priority Listing and Required Monitoring Frequency [CBI Recommended Monitoring Frequency]:

Second priority, Every two years [Annually]

BMP Required and CBI Recommended City Monitoring Location (BMP Point and Site Priority):

Mission Trails Regional Park (P-16; Moderate Priority)

Years Monitored:

1999, 2000, 2001, 2003

Methods:

The largest patch of San Diego ambrosia at MTRP (Ambrosia Management Plan “patch C6”), located immediately east of the Kumeyaay Lake Campground, was chosen during early survey years as a quantitative sampling area. According to previous monitoring reports, transect lines were allocated by staff in what was determined to be the core population area. Transects were aligned along an east to west stratification line in order to avoid problems with potential environmental gradients and the clumping distribution of San Diego ambrosia. Steel rods were installed to indicate the location of each transect. Transect post locations were mapped using a Global Positioning System (GPS). The total number of transects (N=13) and total number of quadrats (N=334) sample approximately 5% of the total sampling area.

A one meter square (1 m²) quadrat is used to define the quadrat boundary and estimate population size. The 1 m² quadrat is placed along the transect so that the quadrat is on the west side of the transect. Each “plant” (ramet) located within the 1 m² quadrat is counted and recorded. Quadrats are placed at 1 m intervals along each transect.

If time allows, the entire C6 population boundary is flagged and mapped using a sub-meter GPS unit.

In addition to quantitative surveys at population C6, each *A. pumila* patch documented in 1998 MTRP surveys for the management plan (Dudek and Associates, 2000) is qualitatively checked for presence or absence of San Diego ambrosia and for potential management issues. If time allows, population boundaries are flagged and mapped using a sub-meter GPS unit.

Directions:

To Kumeyaay Lake population (‘C6’): Take SR-163 North, then SR-52 East to Mast Boulevard. Go left (northeast) on Mast, right (south) on West Hills Parkway, right (west) on Mission Gorge Road, then veer right on Father Junipero Serra Trail. Campground area and Ambrosia population will be on your right. Park in large parking lot on your right, Ambrosia population is immediately north of lot in fenced area.

GPS shapefile for the the Kumeyaay Lake population, along with all other MTRP populations, is located on the City MSCP’s E: drive in Monitoring/1998.

General: Note that the 2001 CBI report suggests annual preserve-wide “mapping species distribution and quantitative or semi-quantitative surveys to assess resource abundance, density or other indices to monitor status and trends through time.”

Monitoring Time Notes:

This species was surveyed in August, which is within its typical flowering season, prior to 2005. Because the species is above ground most of the year, though, it was decided that it can be monitored prior to August for presence/absence surveys (i.e., non-demographic surveys).

In 2005, though, over half of the C6 population had flowered and dried up by July. Based on discussions with Dr. McEachern, staff had planned to flag and map the population, then randomly allocate the transects within the population area, rather than in the core population area only. However, due to the difficulty in locating stems among other dried vegetation, it was determined that a population boundary would not be reliable. Staff has proposed performing *A. pumila* monitoring early in 2006, before the bulk of the other monitoring work, since surveys could not be performed in 2005.

Figure 7. City of San Diego *Ambrosia pumila* Monitoring Locations, Vicinity Map

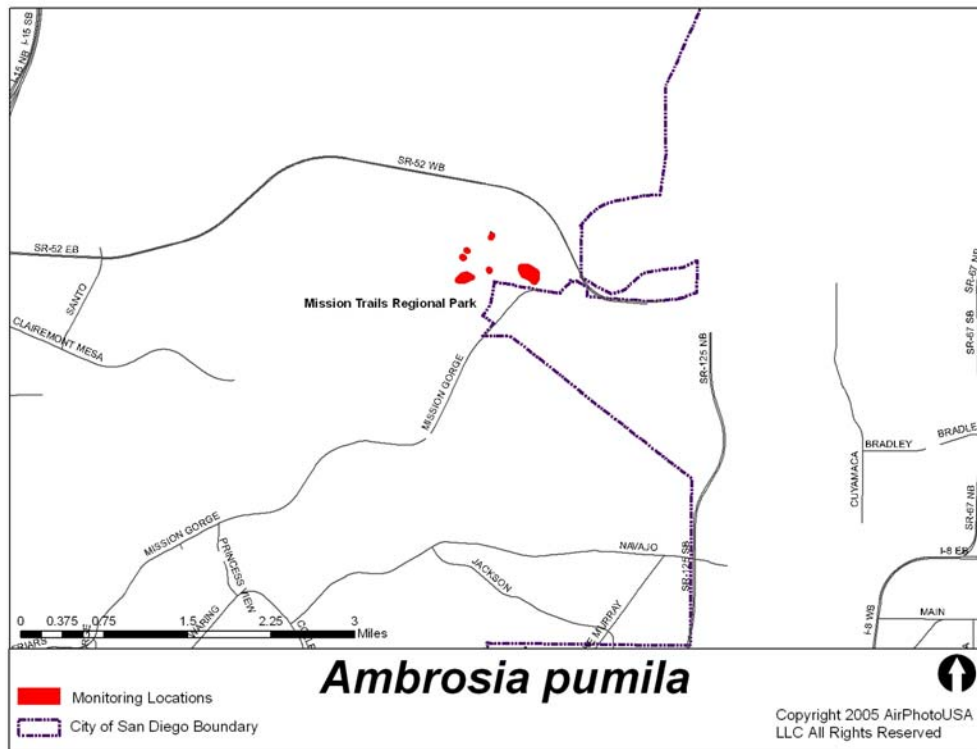
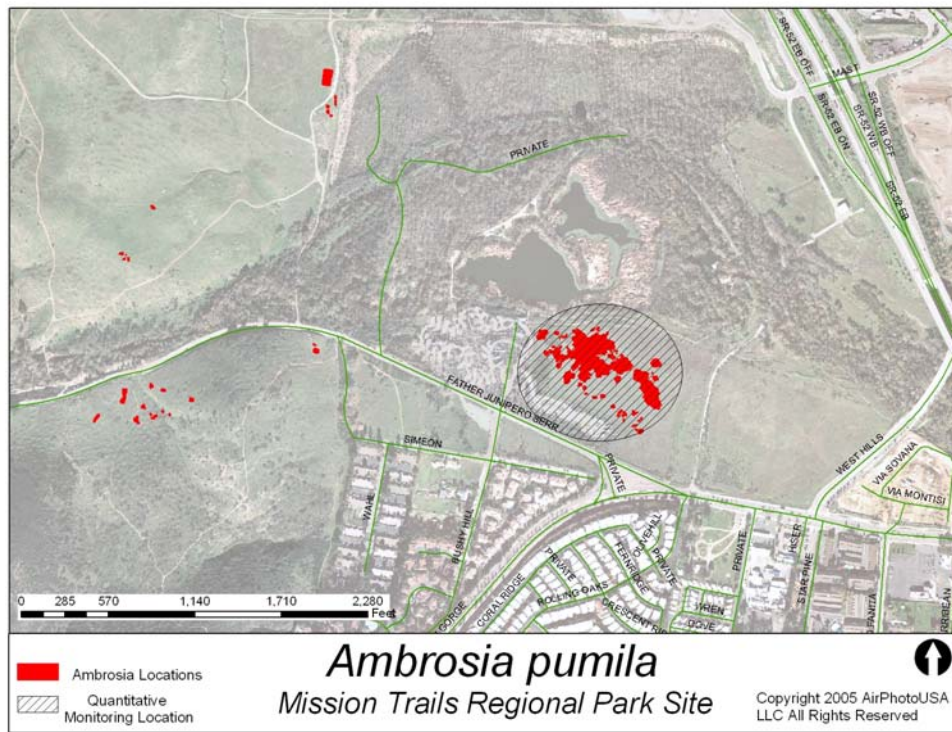


Figure 8. City of San Diego *Ambrosia pumila* Monitoring Location



***Arctostaphylos glandulosa* ssp. *crassifolia* (Del Mar Manzanita)**

MSCP Biological Monitoring Plan (BMP) Priority Listing and Required Monitoring Frequency [CBI Recommended Monitoring Frequency]:

Third priority, Every five years [Every five years]

BMP Required and CBI Recommended City Monitoring Locations (BMP Point and Site Priority):

Del Mar Heights/Crest Canyon (P-3; High priority)

Carmel Mountain (P-8; High priority)

Del Mar Mesa (P-10; Moderate priority)

Peñasquitos Canyon (P-12; Low priority)

San Dieguito River Bluffs (P-5; Low priority)

Years Monitored:

2002 (Carmel Mtn, Crest Cnyn, PQ Cnyn)

Methods:

In 2002, *A. glandulosa* ssp. *crassifolia* populations were censused using submeter GPS technology. Each individual located was recorded. In areas where the terrain was too steep, the approximate location was identified on orthophotographic aerial map as a point. No demographic information was recorded.

Note that the 2001 CBI report suggests preserve-wide “mapping species distribution and quantitative or semi-quantitative surveys to assess resource abundance, density or other indices to monitor status and trends through time” every five years, and that “area-specific management directives must address the autecology and natural history of these species, which may require quantitative studies not associated with population trend monitoring.” The report includes only the above-listed locations in its ‘summary of species locations recommended for qualitative monitoring,’ which may be the only known locales of this species in the City.

Figure 9. City of San Diego *Arctostaphylos glandulosa* ssp. *crassifolia* Monitoring Locations, Regional Map

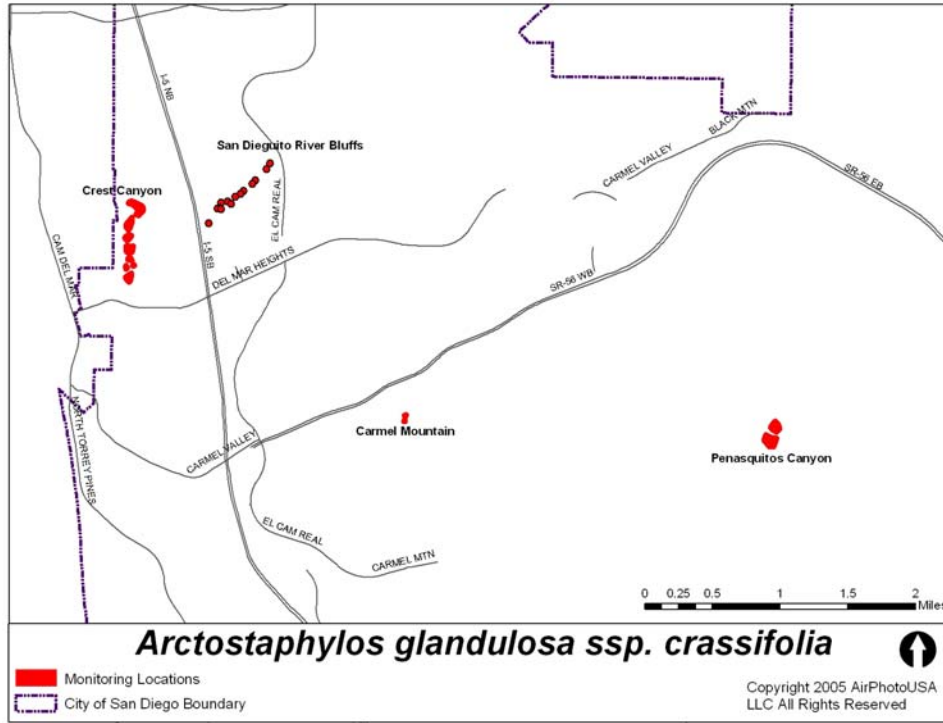


Figure 10. City of San Diego *Arctostaphylos glandulosa* ssp. *crassifolia* Monitoring Location, Carmel Mtn

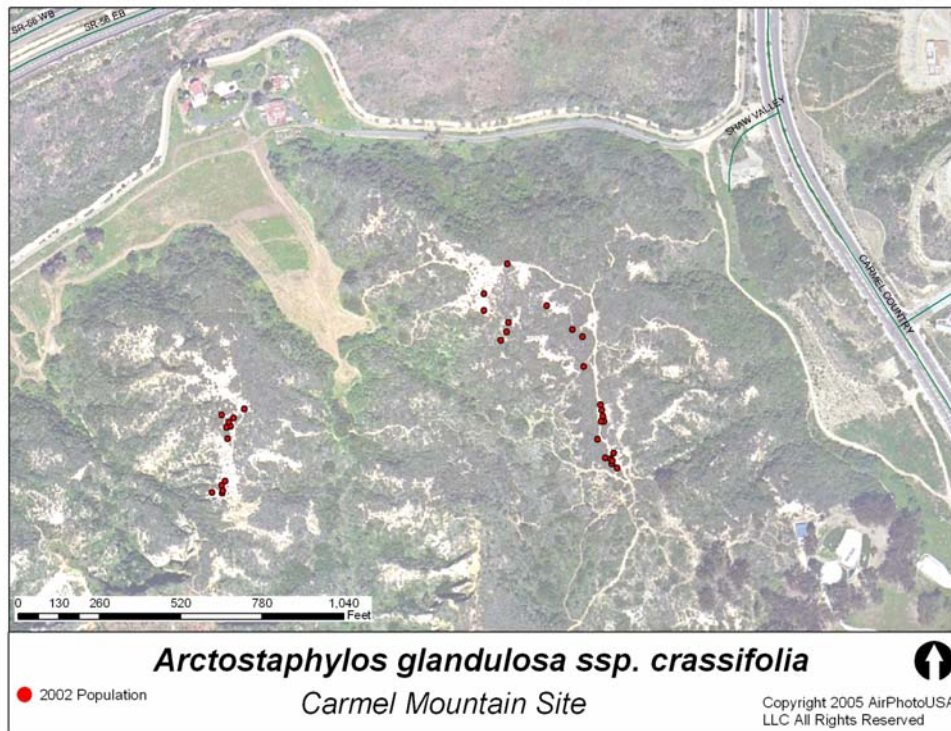


Figure 11. City of San Diego *Arctostaphylos glandulosa* ssp. *crassifolia* Monitoring Location, Crest Cyn



Figure 12. City of San Diego *Arctostaphylos glandulosa* ssp. *crassifolia* Monitoring Location, Peñasquitos

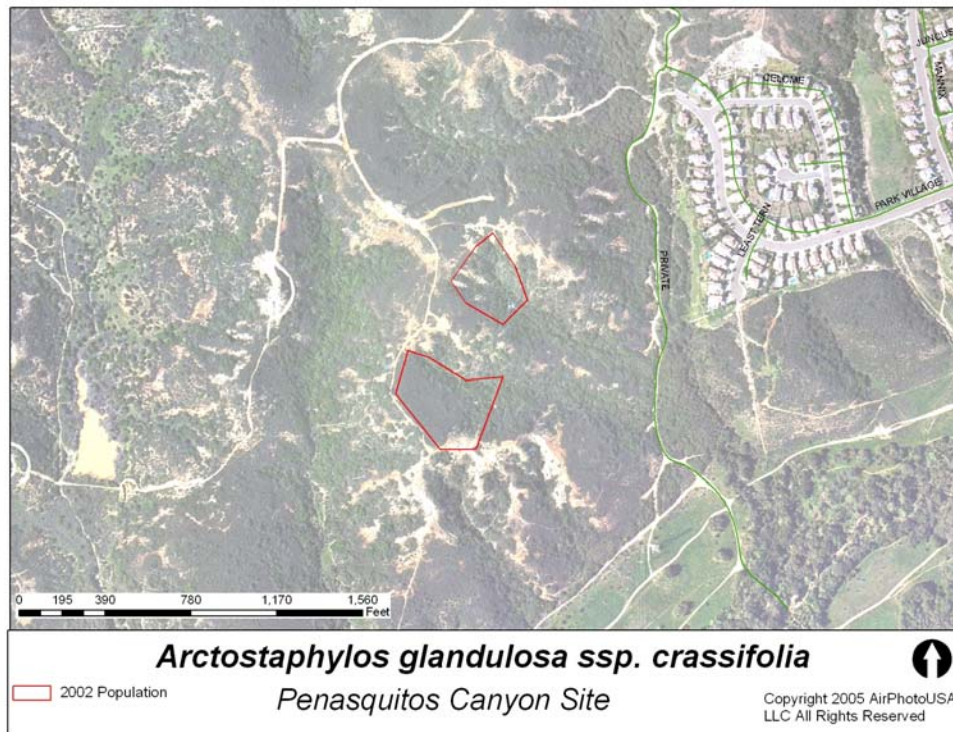
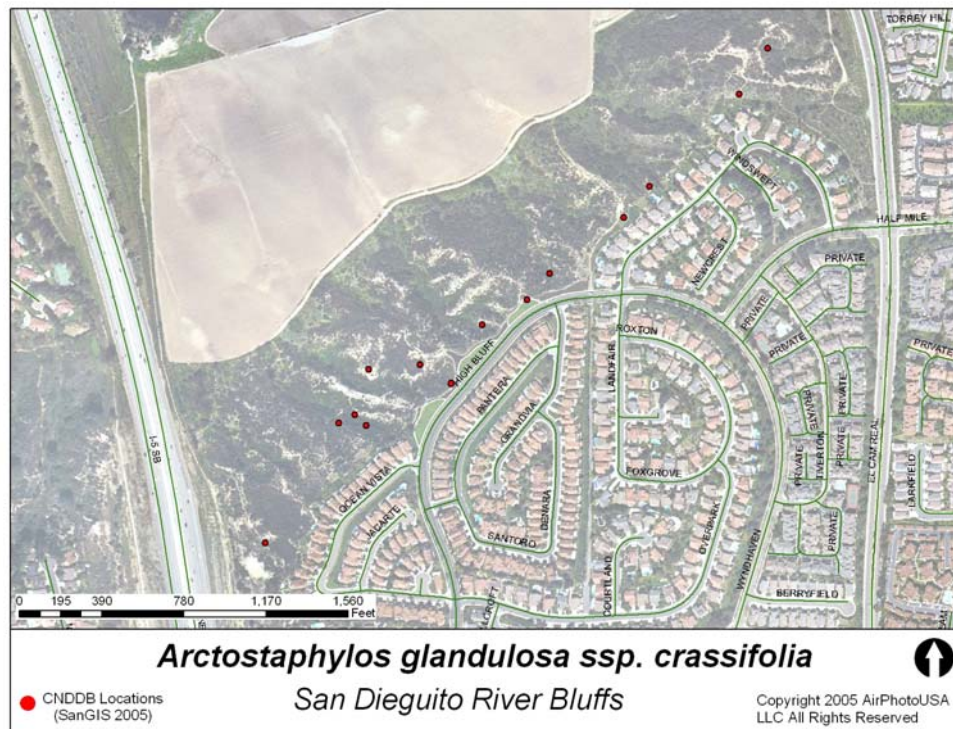


Figure 13. City of San Diego *Arctostaphylos glandulosa* ssp. *crassifolia* Monitoring Location, San Dieguito River Bluffs



***Brodiaea orcutti* (Orcutt's Brodiaea)**

MSCP Biological Monitoring Plan (BMP) Priority Listing and Required Monitoring Frequency [CBI Recommended Monitoring Frequency]:

Second priority, Every two years [Annually]

BMP Required and CBI Recommended City Monitoring Locations (BMP Point and Site Priority):

Carmel Mountain (P-9; Moderate priority)

Del Mar Mesa (P-11; Moderate priority)

Additional Locations Monitored in the City:

Carroll Canyon

General Dynamics

Nobel Drive

Years Monitored:

2001 (Gen Dynamics, Nobel Dr, Carroll Canyon, Del Mar Mesa)

2002 (Gen Dynamics, Nobel Dr, Carroll Canyon, Del Mar Mesa)

2003 (Gen Dynamics, Nobel Dr, Carroll Canyon, Del Mar Mesa)

2005 (Gen Dynamics, Carroll Canyon, Nobel Drive)

Methods:

General Dynamics and Carroll Canyon During 2001-2003, *B. orcuttii* monitoring at General Dynamics and Carroll Canyon was performed by counting all individuals within one meter square quadrats, then using the counts to estimate the total site population. However, quadrats were selected in the field in a non-random manner. Based on this information and a site visit in spring 2005 during which it was noted that the population is fenced, thus *B. orcuttii* faces very few threats from human disturbance. As a species that requires open area, though, *B. orcuttii* could be threatened by community transitions if adjacent scrub habitat extends into the open areas within the site. Based on these observations, Dr. Kathryn McEachern of the USGS recommended a new monitoring method for this species at the the General Dynamics and Carroll Canyons sites.

In 2005, six permanent plots (1 x 3 m) were established within both the General Dynamics and Carroll Canyon *B. orcuttii* populations in order to track potential habitat change/succession. Three plots were placed immediately adjacent to shrub-dominated areas; three were placed in areas not immediately adjacent shrub habitats. All plots were selected in the field by staff (non-random). All plots were staked using surveyors nails and were also mapped using submeter GPS technology. Within each 1 x 3 m plot, all flowering and non-flowering individuals within each plot are counted (census) and recorded using standard data sheets. An individual is considered flowering if any internal flowering structures are visible to the naked eye (i.e., flower is opened enough such that internal structures, e.g., filaments, are visible) or if the plant has flowered (e.g., dried flower).

Nobel Drive The Nobel Drive population is very small (23 in 2005) and can be easily counted (censused).

Del Mar Mesa According to 2003 monitoring reports, “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 as randomly allocated points using ArcView software on a Geographic Information System (GIS). Each point was then navigated to using a submeter 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 “selected in the field.”

General: Note that in addition to selected preserve area quantitative monitoring at Carmel Mountain and Del Mar Mesa, the 2001 CBI report suggests preserve-wide annual “Non-quantitative surveys to assess resource presence/absence or distribution, using habitat mapping, aerial photography, or other imagery, and mapping of species distribution.” According to the report, such preserve-level monitoring would be used “to inform management decisions – required of all preserve managers at all preserve units and monitoring directives.”

Figure 14. City of San Diego *Brodiaea orcuttii* Monitoring Locations, Regional Map

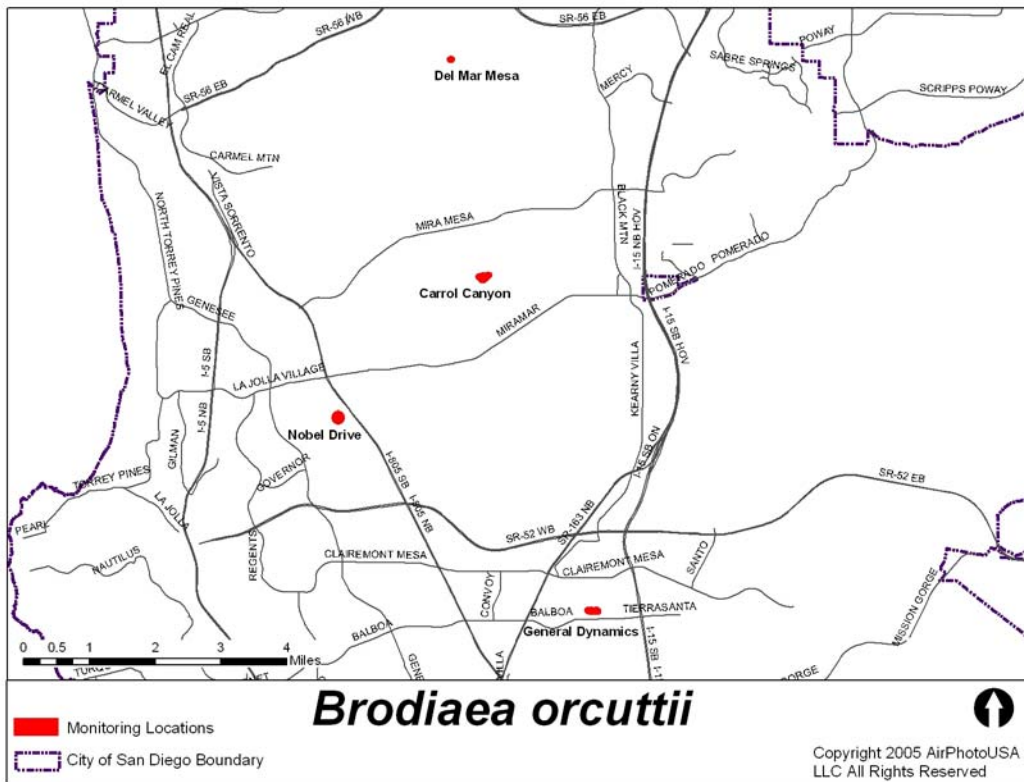


Figure 15. City of San Diego *Brodiaea orcuttii* Monitoring Location, Carroll Canyon

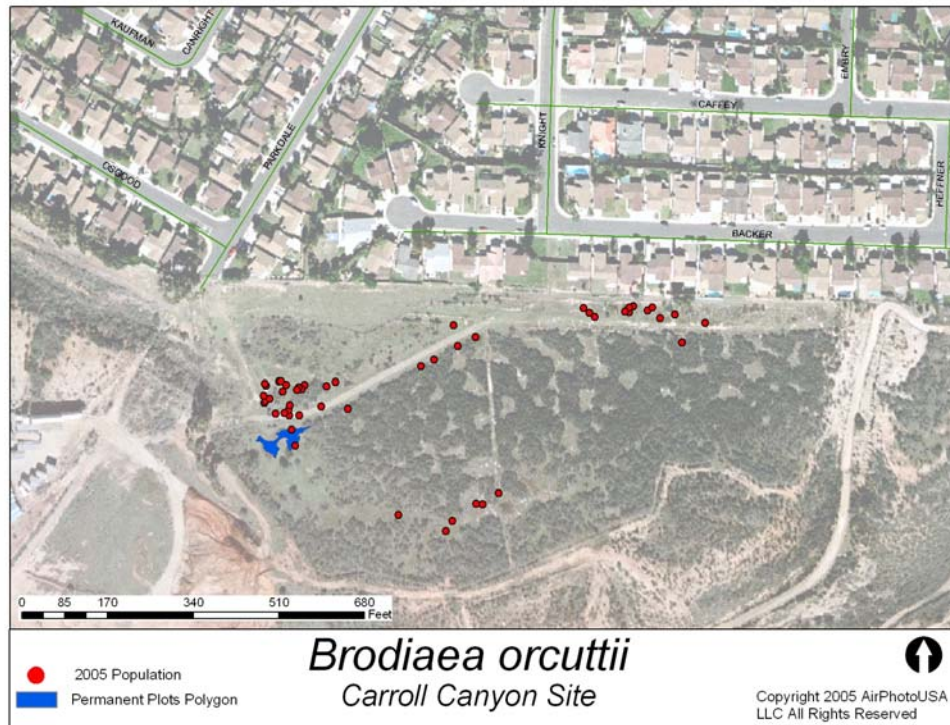


Figure 16. City of San Diego *Brodiaea orcuttii* Monitoring Location, Del Mar Mesa

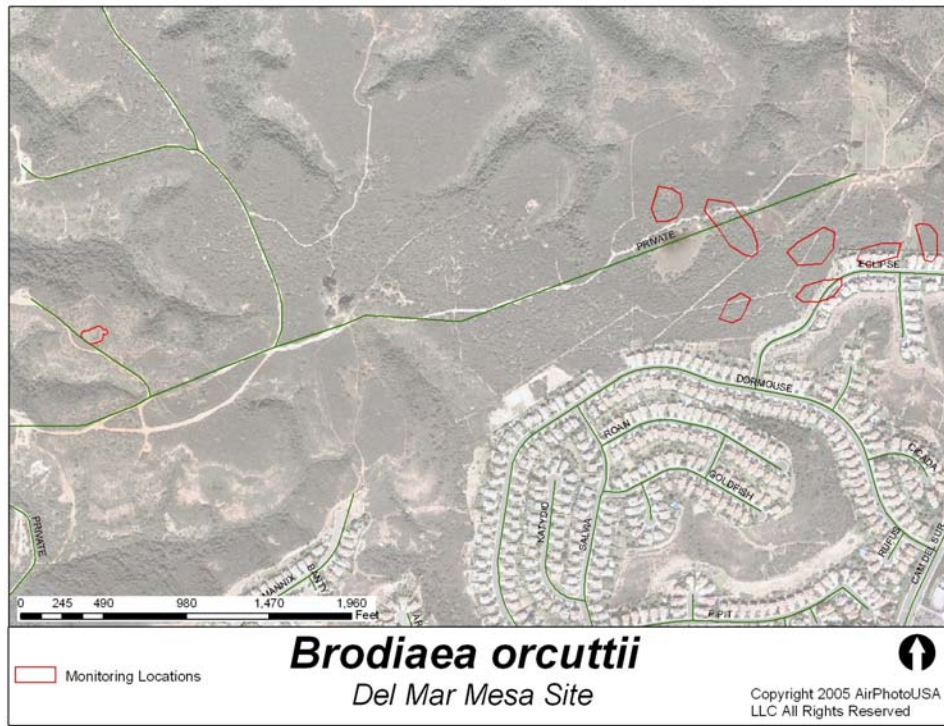


Figure 17. City of San Diego *Brodiaea orcuttii* Monitoring Location, General Dynamics

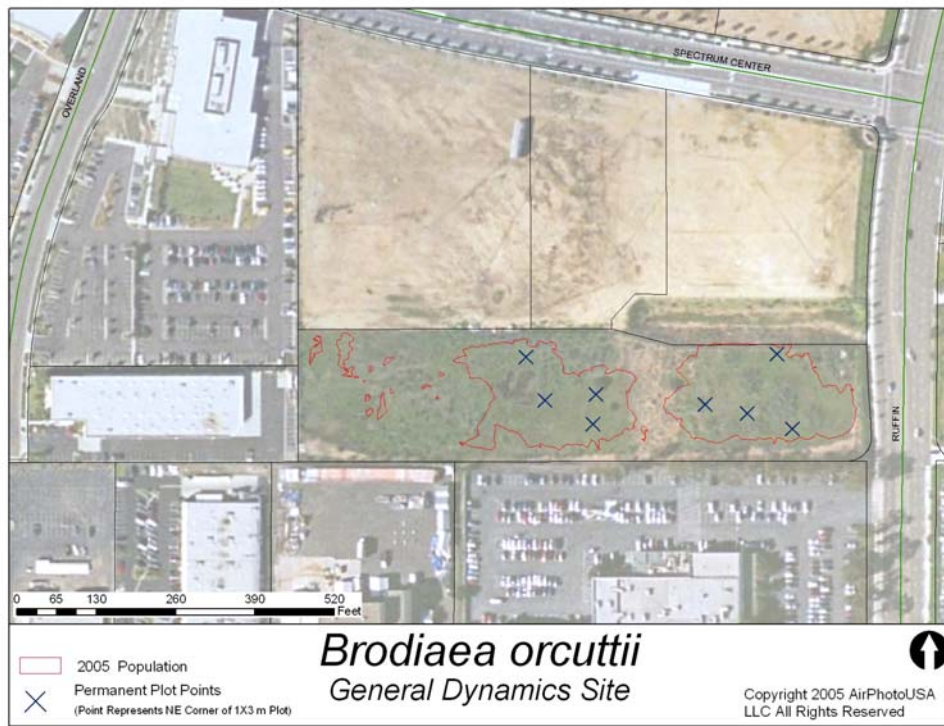


Figure 18. City of San Diego *Brodiaea orcuttii* Monitoring Location, Nobel Drive

