

***Dudleya variegata* (Variegated Dudleya)**

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

First priority, Annually [Annually]

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

Sycamore Canyon/East Elliot/Fanita (P-15; High priority; Note that Fanita is Santee)

Otay River West (p-28; High priority; Note that CBI lists responsibility as 'Cities of Chula Vista/SD/County')

Marron Valley (P-34; High priority)

Additional CBI Recommended Monitoring Location:

Otay Mesa (CBI lists responsibility as 'City/County of SD' for this site)

Additional Locations Monitored in the City:

Black Mountain Ranch

Margerum Avenue

Mercy Road

Mission Trails Regional Park

Otay Lakes

Penasquitos Canyon

Santa Luz/Black Mountain

Spring Canyon/Goat Mesa

Years Monitored:

2001 (BMR, Margerum Rd, Mercy Rd., MTRP, Otay Lakes, Spring Cnyn)

2002 (BMR, Margerum Rd, Mercy Rd., MTRP, Otay Lakes, Spring Cnyn)

2003 (BMR, Margerum Rd, Mercy Rd., MTRP, Otay Lakes, Spring Cnyn)

2004 (East Elliot, Margerum Rd, MTRP, Otay Lakes, Spring Cnyn)

2005 (MTRP, Marron Valley, Otay Lakes, Spring Cnyn)

Methods:

Mission Trails Regional Park, Peñasquitos Canyon, and Santa Luz/Black Mountain *D. variegata* monitoring at these sites is performed by Mike Kelly and other volunteers. All populations are censused.

Marron Valley The *D. variegata* population is at Marron Valley is flagged, the boundaries are mapped using sub-meter GPS, and all flowering and non-flowering individuals within each area are counted (census) and recorded using standard data sheets. An individual is considered flowering if the internal flowering structures are visible (e.g., anthers, etc.), or if the plant has flowered (e.g., dried flower).

Otay Lakes At Otay Lakes, sixteen permanent transects were established randomly using a random numbers table within the *D. variegata* population in 2001. The transects are maintained as a GIS file and are relocated and flagged in the field. The transects are used for belt transect monitoring; the center line of the transect serves as the center point of a one-meter wide belt.

The transect is walked with a one-meter wide plastic pipe (approximately 2" wide pvc irrigation pipe, with the center line marked), and each *D. variegata* located within the one-meter wide belt is counted and recorded on standard data sheets. Flowering status is also recorded for each plant counted: An individual is considered flowering if internal flowering structures are visible (i.e., stamens, pistils) or if the plant has flowered (e.g., dried flower). It is non-flowering if no floral structures are present or if the plant is in bud stage only, with no internal flowering structures present.

General: Note that in addition to selected preserve area quantitative monitoring at the sites identified above, 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" and should be performed by "all preserve managers at all preserve units and monitoring directives."

Timing Note: This species can be difficult to locate when surrounding tarplant (*Deinandra fasciculata*) is in flower; this is most apparent at the Otay Lakes sites. If monitoring can be scheduled at the earliest stage of *D. variegata* flowering, tarplant can sometimes be avoided since its blooming time is slightly later. Early May in 2005 (very wet year) proved a good time for monitoring at the Otay Lakes site.

Figure 33. City of San Diego *Dudleya variegata* Monitoring Location, East Elliott

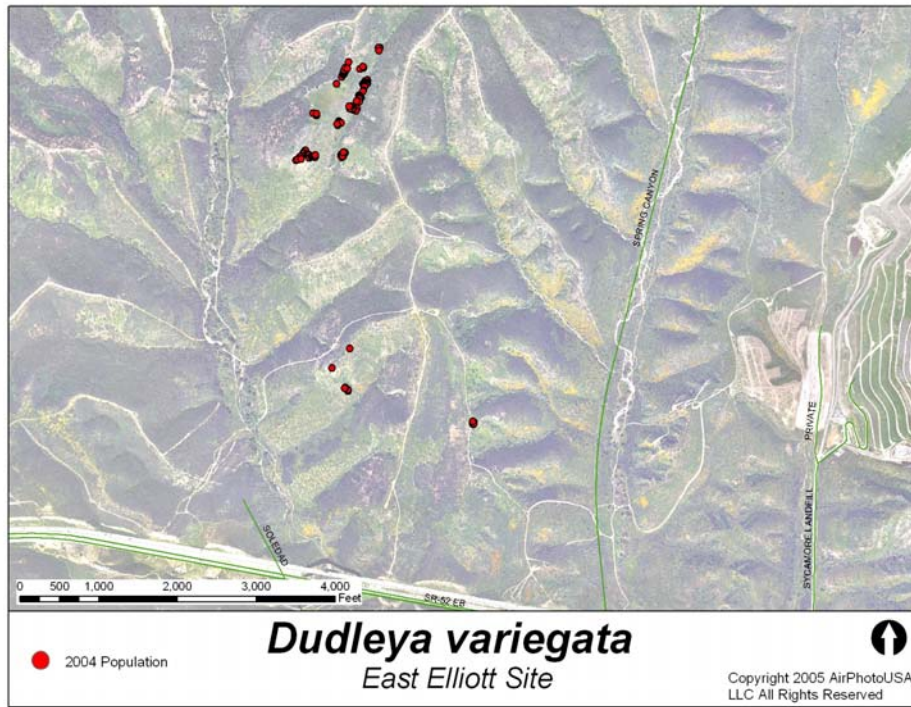


Figure 34. City of San Diego *Dudleya variegata* Monitoring Location, Marron Valley Vicinity Map

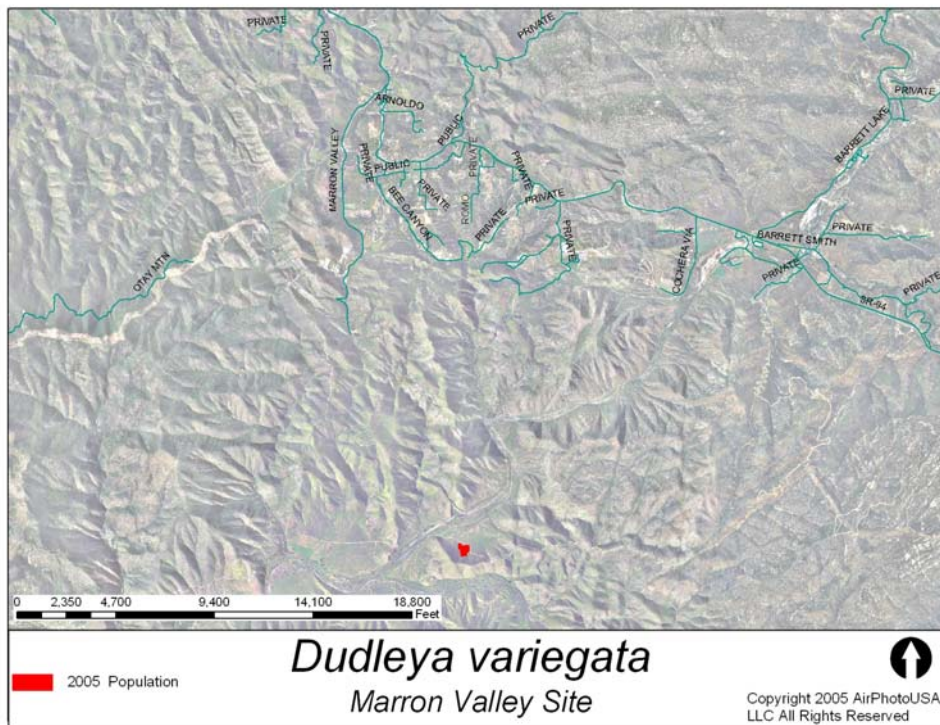


Figure 35. City of San Diego *Dudleya variegata* Monitoring Location, Marron Valley

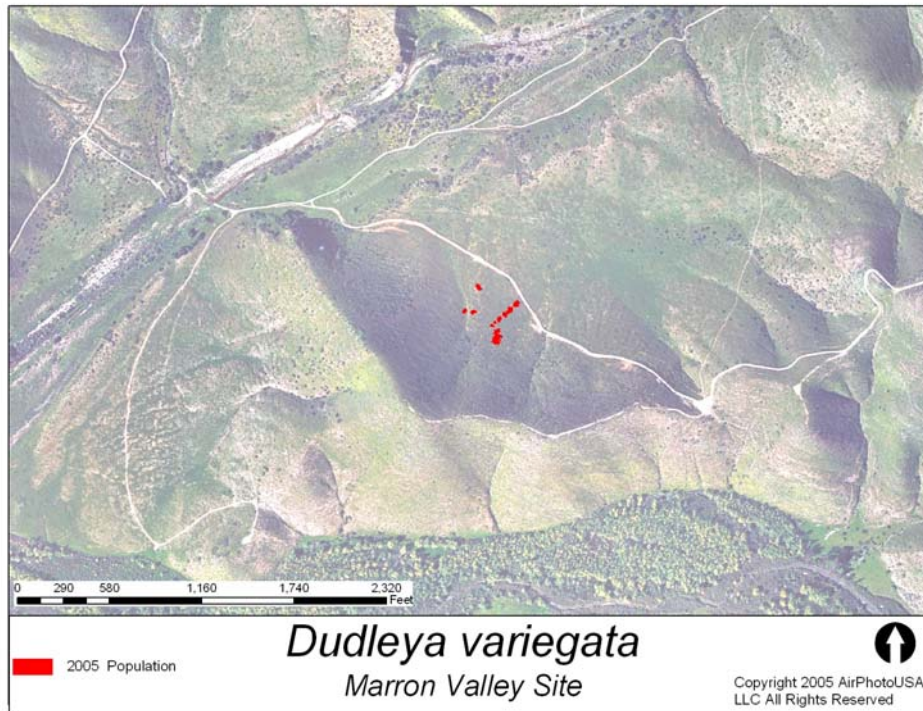


Figure 36. City of San Diego *Dudleya variegata* Monitoring Location, MTRP

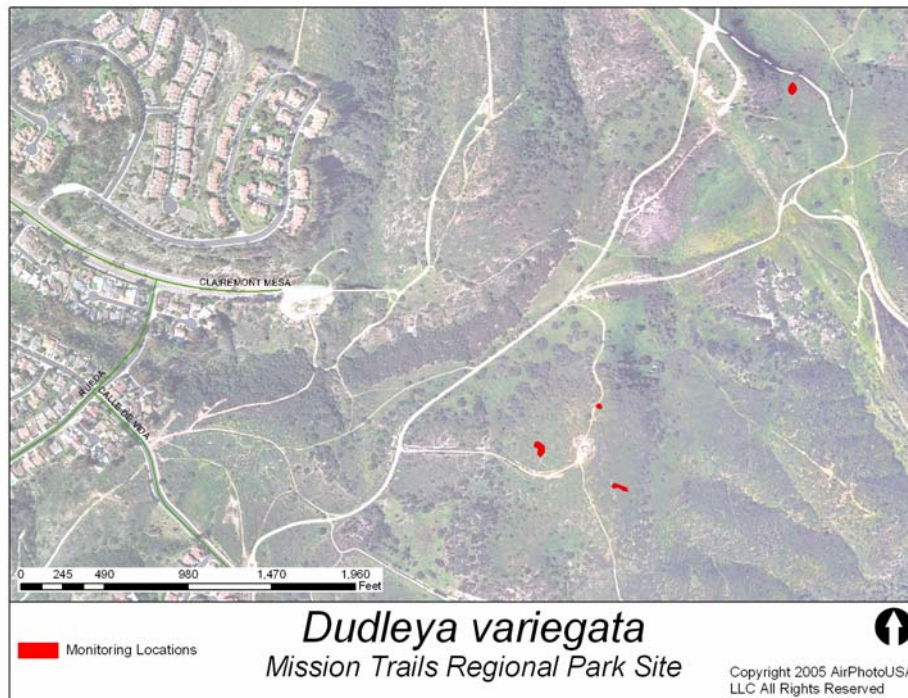
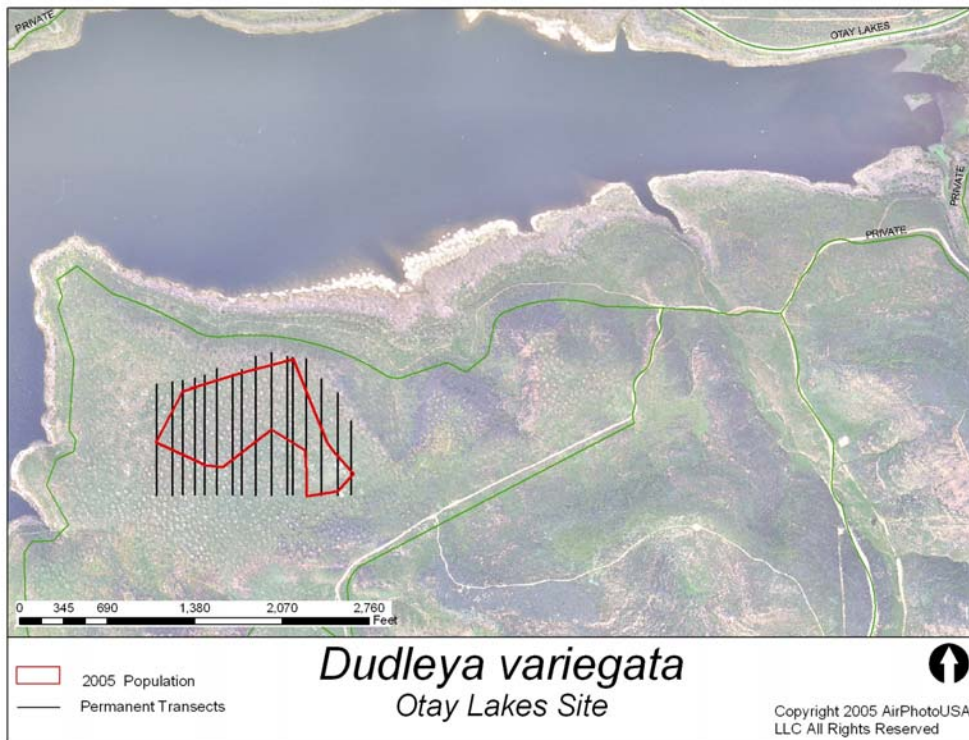


Figure 37. City of San Diego *Dudleya variegata* Monitoring Location, Otay Lakes



***Lessingia filaginifolia* var. *linifolia* (Del Mar Sand Aster)**

(aka *Lessingia filaginifolia* var. *filaginifolia*; Formerly *Corethrogyne filaginifolia* var. *linifolia*)

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):

San Dieguito River Bluffs (Overlook Park and Torrey Highlands) (P-4; Moderate Priority)

Del Mar Mesa (P-10; Moderate priority)

Additional CBI Recommended Monitoring Location:

Del Mar Highlands (Crest Canyon)

Carmel Mountain

Note that two populations are monitored on Carmel Mtn, and Crml Mtn West has been referred to as ‘Carmel Valley’ in past reports, with the eastern population referred to as ‘Carmel Mountain’ or ‘Carmel Mtn East.’ Below, ‘Carmel Mtn’ refers to both populations.

Years Monitored:

2001 (Overlook Park and Torrey Highlands; Carmel Mountain)

2002 (Overlook Park and Torrey Highlands; Carmel Mountain)

2003 (Overlook Park and Torrey Highlands; Carmel Mountain)

2005 (Overlook Park and Torrey Highlands; Carmel Mountain)

Methods:

A census of all individuals within each monitored population is conducted. Populations were mapped using submeter GPS technology in 2005 and should be periodically re-mapped when needed and as staffing/scheduling allows. During 2005 surveys, several very large subpopulations were located along the San Dieguito River Bluffs (Overlook Park and Torrey Highlands) that were not previously mapped. At the Overlook Park site, it is known that only previously mapped sites were re-visited/censused; however, it is unclear whether the Torrey Highlands areas are newly established populations or the areas simply were not surveyed in previous years. As such, an approximate survey boundary line should also be delineated along with population boundaries. Additionally, for larger populations, a subsampling method has been discussed due to the difficulty and potential inaccuracies in counting very large numbers of individuals. Because the species is associated with disturbed/bare areas, Del Mar Sand Aster is scattered throughout the monitoring sites. Many of the sites are fairly large and are difficult as well as time-consuming to survey due to steep terrain and heavy brush.

Note that in addition to selected preserve area quantitative monitoring at the sites identified above, 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” for Del Mar Sand Aster and that this preserve-level monitoring should be used to “inform management decisions” and is “required of all preserve managers at all preserve units where species occurs.”

The 2001 CBI report also recommends that “area-specific management directives must address the autecology and natural history of [this] species, which may require quantitative studies not associated with population trend monitoring.”

Figure 38. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Regional Map

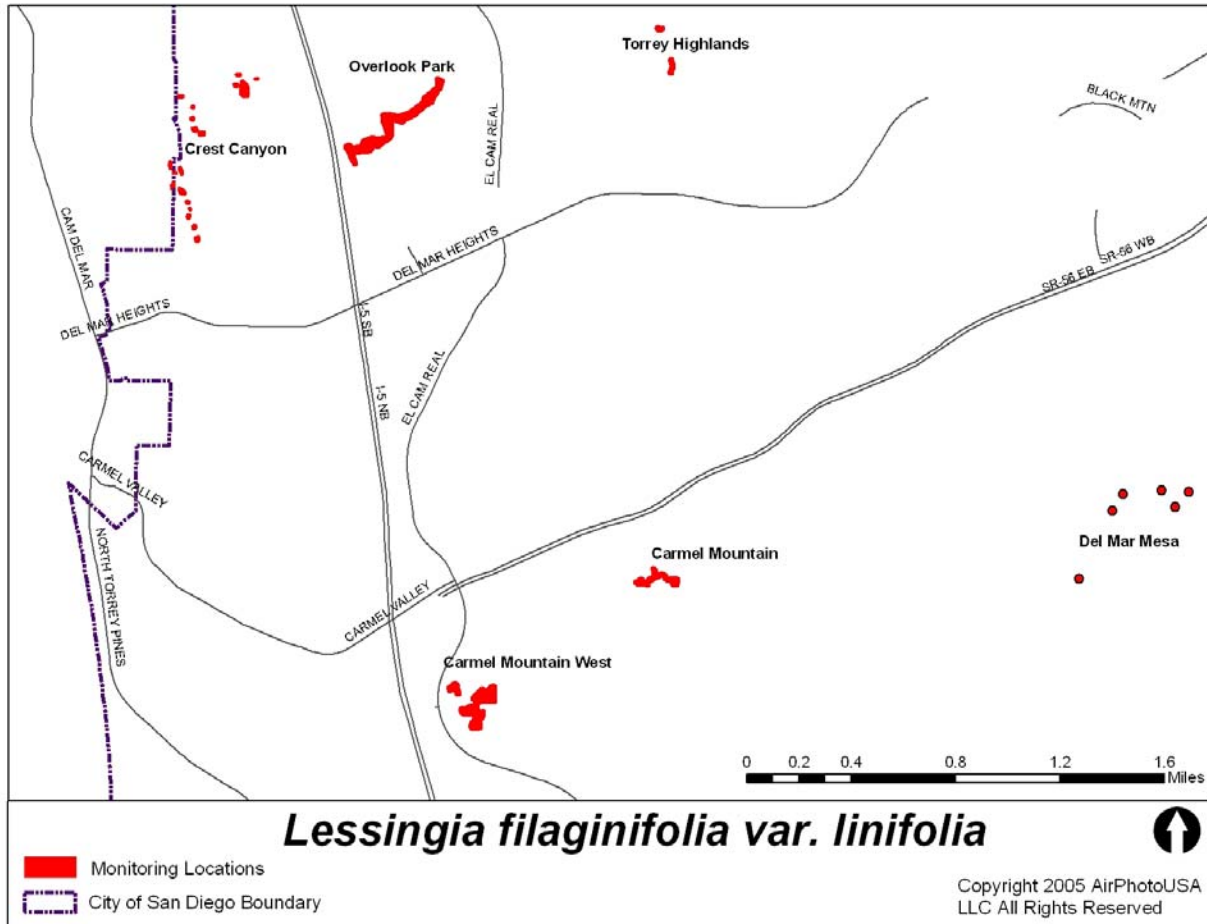


Figure 39. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Carmel Mountain

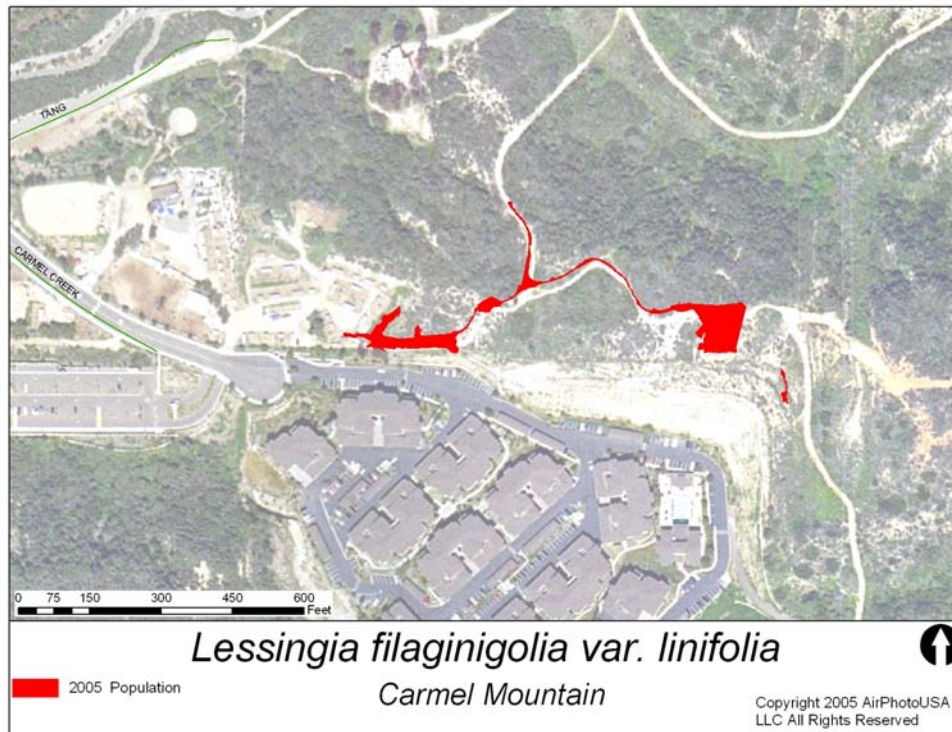


Figure 40. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Carmel Mtn West

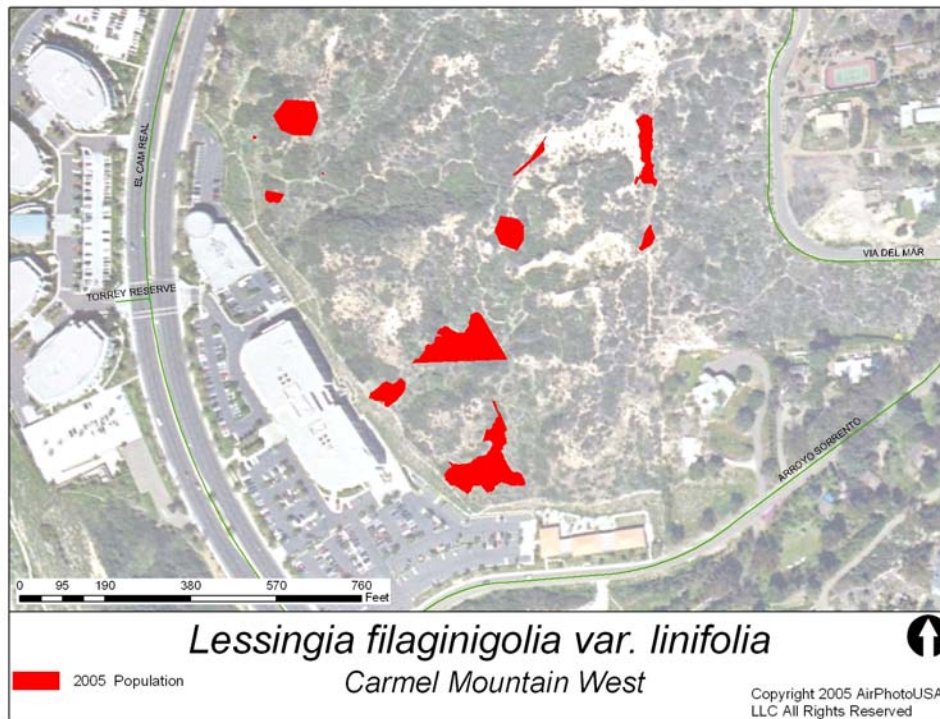


Figure 41. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Crest Cnyn

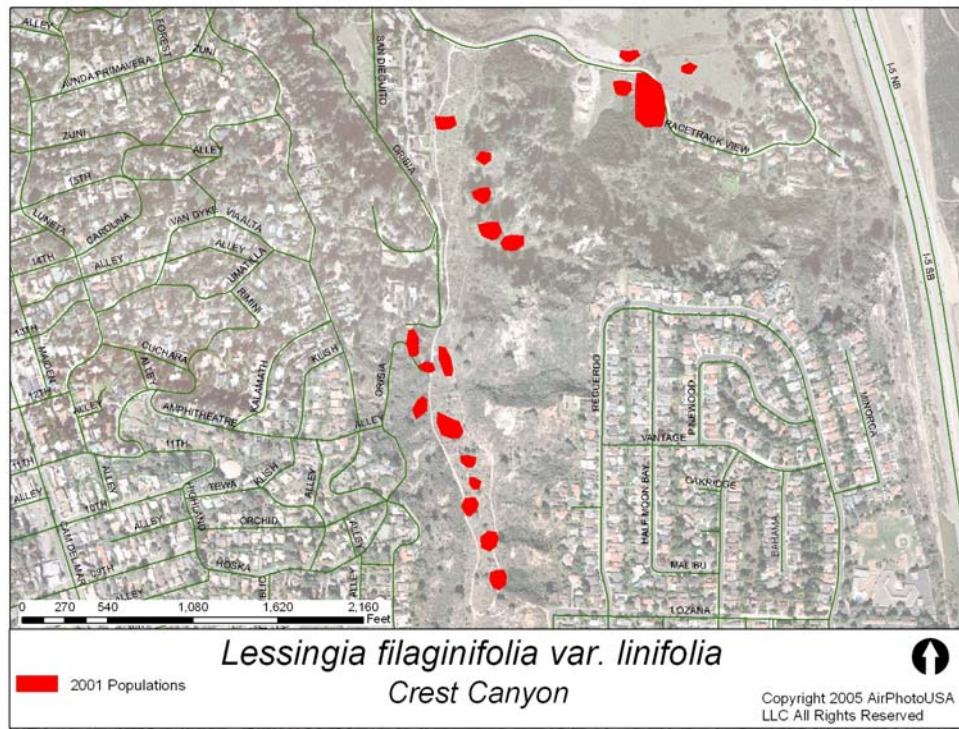


Figure 42. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Overlook Park

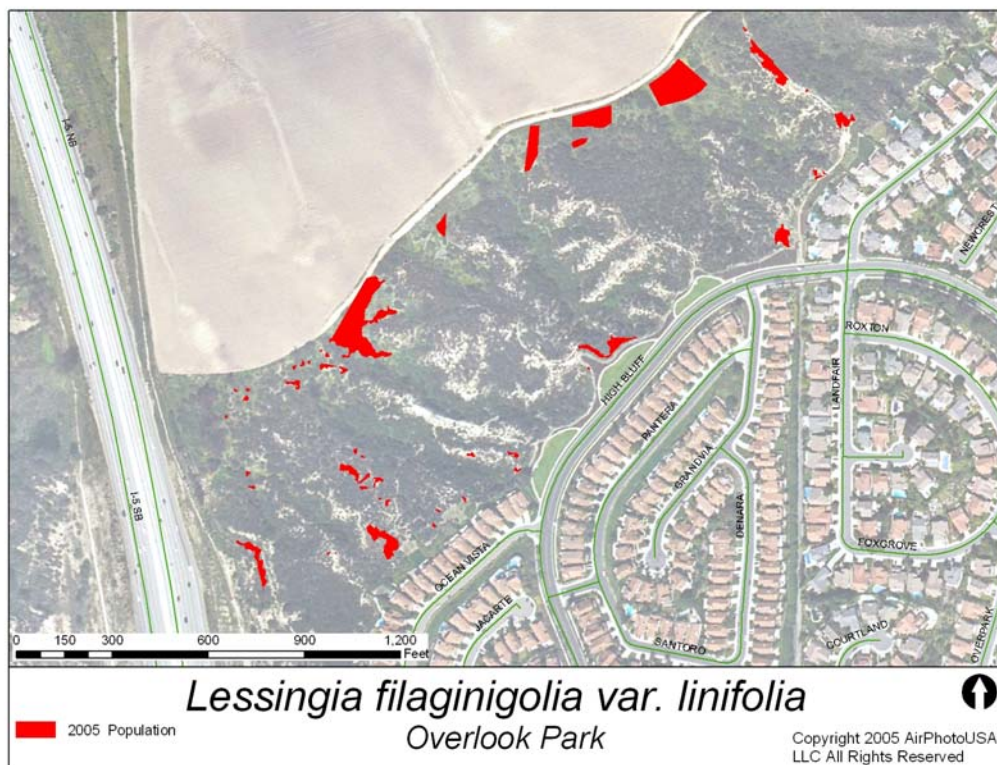


Figure 43. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Torrey Highlands

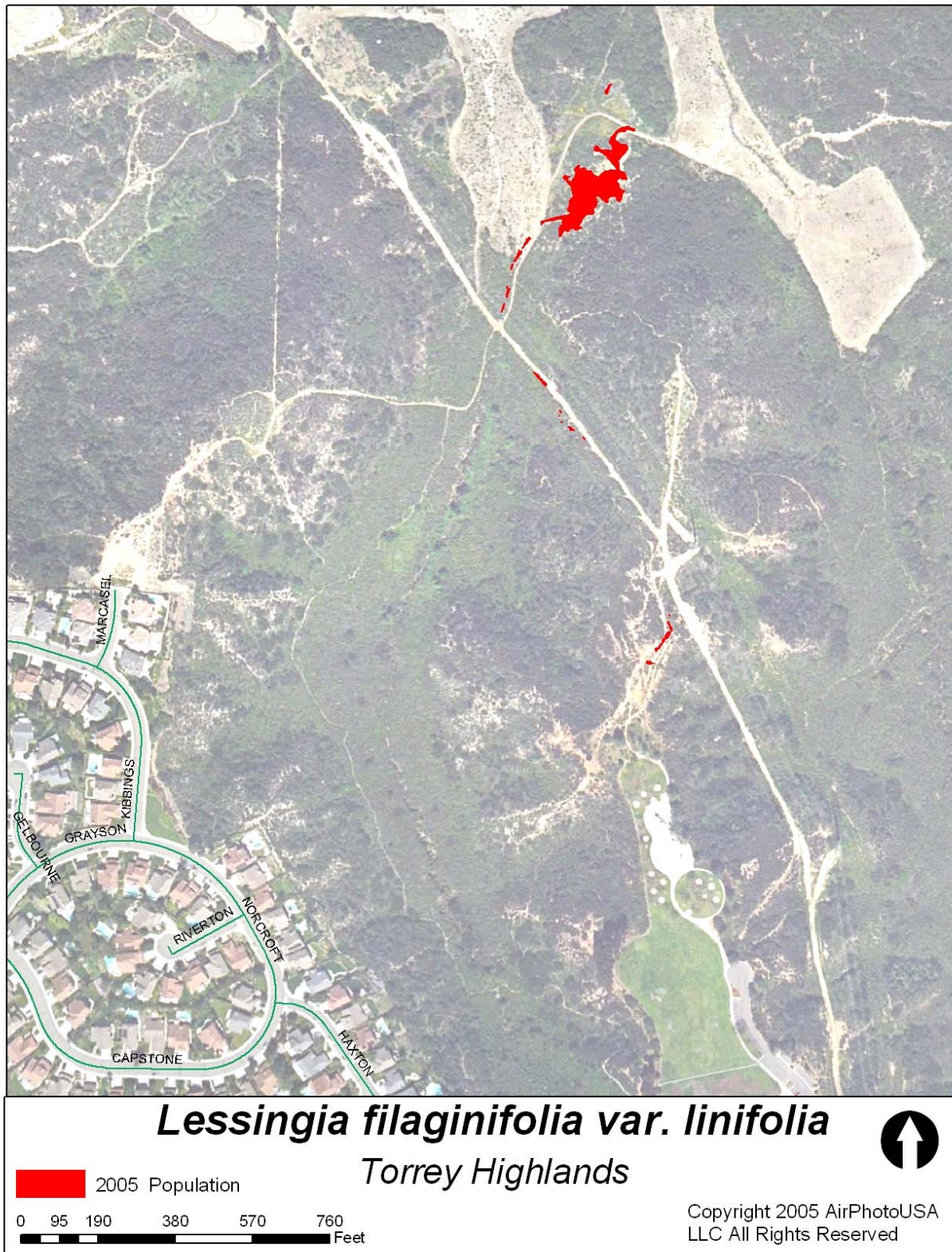
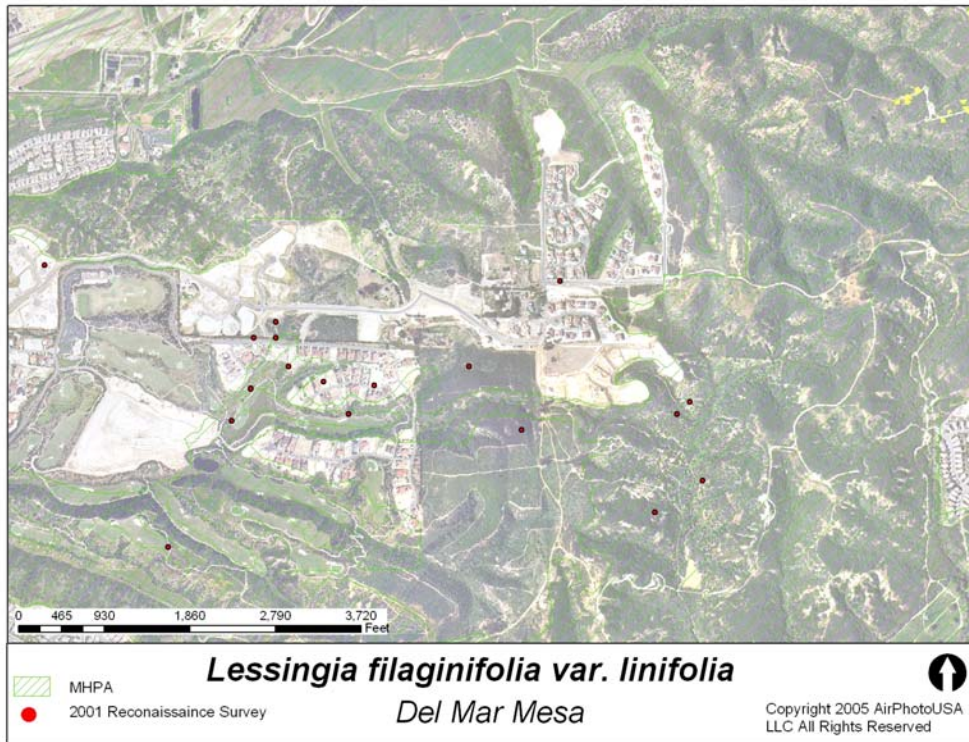


Figure 44. City of San Diego *Lessingia filaginifolia* var. *linifolia* Monitoring Location, Del Mar Mesa



***Lotus nuttallianus* (Nuttall's lotus)**

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

First priority, Annually [Annually]

BMP Required City Monitoring Locations:

None

CBI Recommended Monitoring Location:

San Diego River Flood Control Channel ('Hospitality Point – Riprap' or 'Site 3' of Mission Bay)

Additional Locations Monitored in the City:

Non-flood control portions of Mission Bay ('Sites 1-2 and 4-6')

Years Monitored:

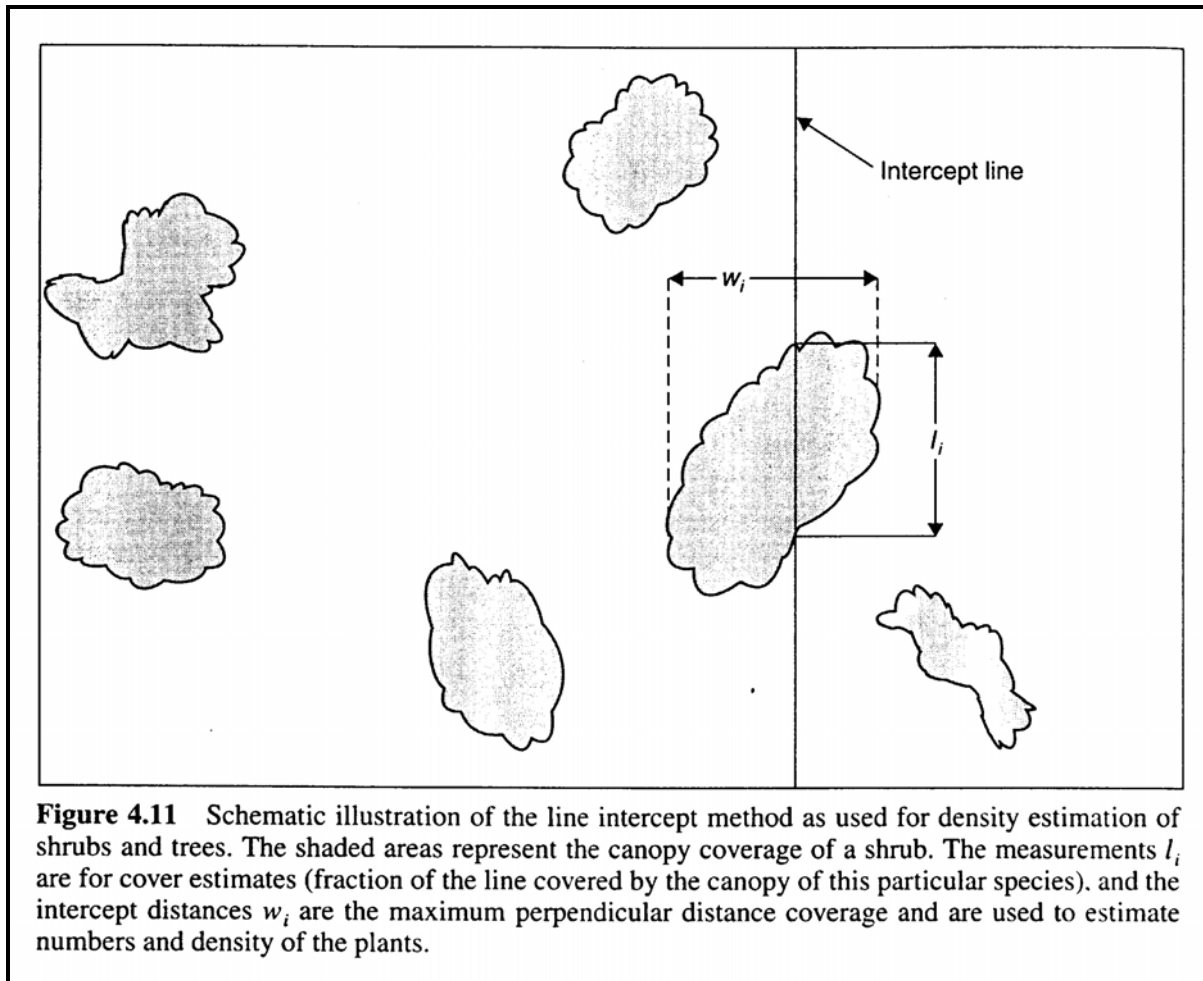
2000-2005 (Mission Bay, 'Sites 1-6')

Methods:

There are six *L. nuttallianus* populations monitored within Mission Bay Park, including: a) No Men's Land ('Site 1'), which overlays an historic landfill; b) West No Men's Land ('Site 6'), which may partially overlay the historic landfill; c) Hospitality Point- Volleyball Court ('Site 2'); d) Hospitality Point-Riprap ('Site 3'); and e) Mariner's Point/Least Tern Nesting Site ('Site 4'). An area referred to as 'Site 5' is a small population growing in pavement cracks near Mission Beach School; this site is visited only if time allows due to generally low population numbers and the disturbed nature of the area.

Prior to 2003, all populations were censused. However, in 2003 the populations at No Men's Land and West No Men's Land ('Sites 1 and 6', which are bisected by Sea World Drive) were too large to census. For these sites, 100-foot permanent line using a random numbers table in 2003. The populations are now surveyed using the T-square line intercept method (Krebs, 1998). A string is placed along the transect in the field, and each individual plant that crosses the line transect is measured along the length of the transect (e.g., distance that *L. nuttallianus* individual is in contact with transect) as well as perpendicular to the transect (e.g., maximum plant width of plant perpendicular transect). See figure from Krebs, below.

Figure 45. Illustration of Line Intercept Method (Krebs, 1998)



This information is recorded on standard data sheets and is then used to estimate the population density based on the following equation:

$$\text{Density} = (1/\text{total length of transects})(\text{Sum of } [1/\text{perpendicular width of plants intercepted}])$$

Additionally, in 2005 each transect was photographed and labeled in the office with its corresponding transect number. In the field, a photo of the transect datasheet or other indicator of transect number is taken immediately prior to the transect photo (for transect # identification in the office), and each transect is photographed with line-intersect string visible when possible. Transect photography and labeling was initiated in 2005. Though some monitoring photos were taken in previous years, they are unlabeled and therefore may not be useful for comparison unless the photo point can be determined using horizon landmarks.

L. nuttallianus populations at the Hospitality Point sites ('Sites 2 and 3') are determined by full census (e.g., counting all individuals present). However, it was noted at the Hospitality Point 'rip rap' site, the population appears to extend beyond the monitored area. Due to staff and time constraints, the full additional area was not added to the monitoring survey; however, should be

considered for additional monitoring. This may require a sub-sampling methodology, especially in high rainfall years.

The Mariner’s Point site (‘Site 4’), is entirely fenced to protect Least Terns, which are known to nest at the site. This population is visited and viewed through the fence so as not to disturb nesting. A qualitative assessment is made of the area. Because the area is fenced and protected from foot traffic and is regularly weeded by volunteers to protect terns at the site, this site does not typically have any significant management issues.

General 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” for *Lotus nuttallianus*. The report lists only the San Diego River Flood Control Channel in its ‘summary of species locations recommended for qualitative monitoring.’”

Figure 46. City of San Diego *Lotus nuttallianus* Monitoring Location, Vicinity Map

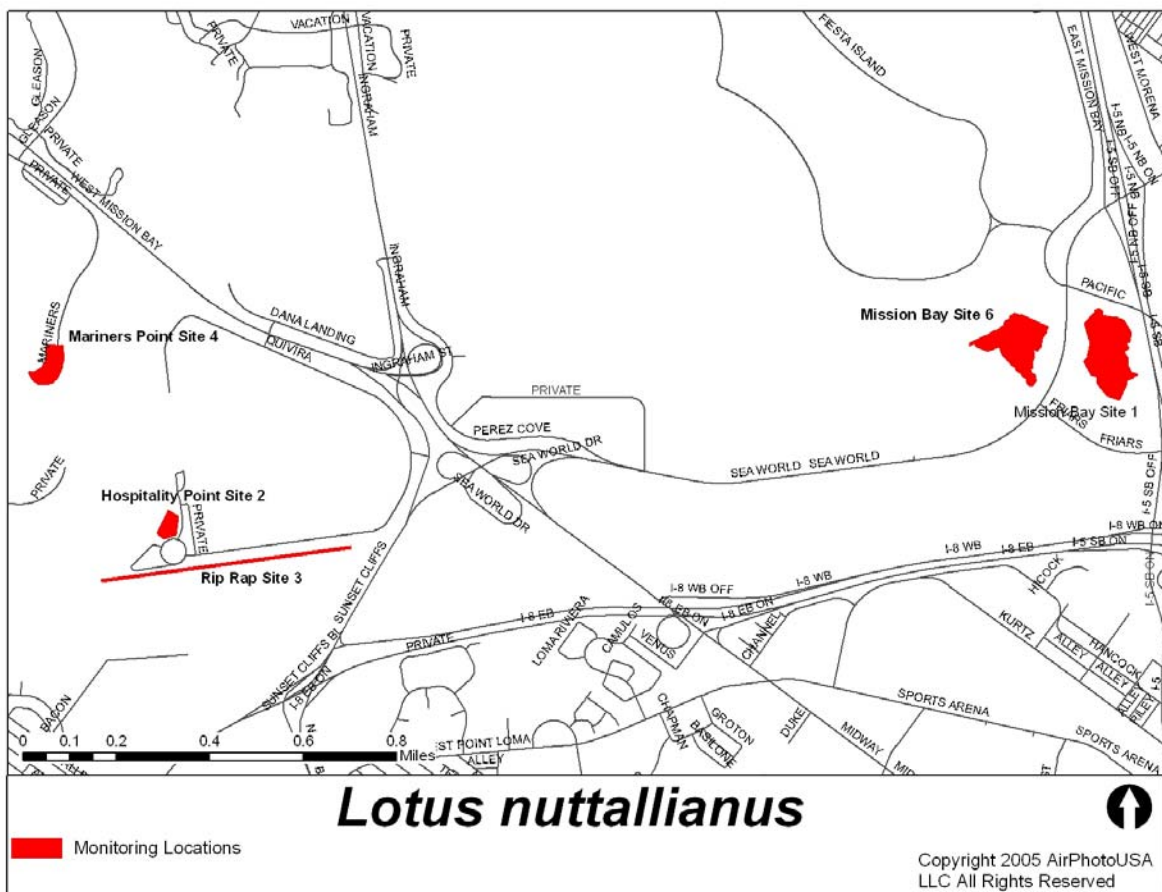


Figure 47. City of San Diego *Lotus nuttallianus* Monitoring Location, Mariner's Point



Figure 48. City of San Diego *Lotus nuttallianus* Monitoring Location, No Men's and S. Shores

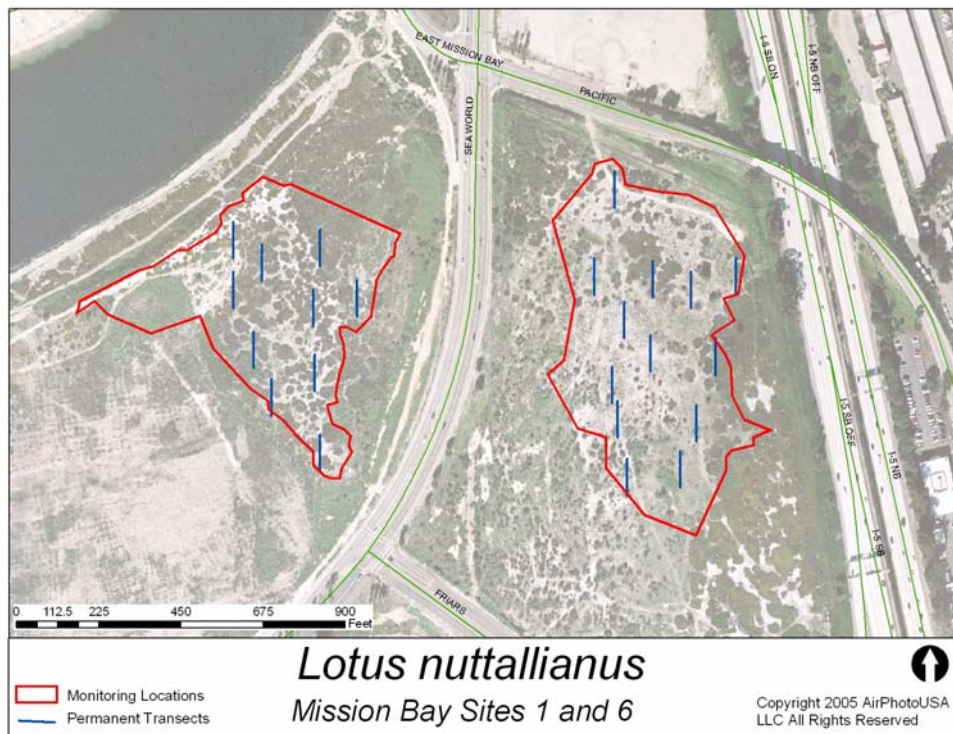


Figure 49. City of San Diego *Lotus nuttallianus* Monitoring Location, SD River Rip Rap and Hospitality Pt.



***Monardella viminea* (Willowy Monardella)**

Formerly *Monardella linoides* ssp. *viminea*, recent taxonomic work by Sanders and Elvin supports species classification

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

First priority, Annually [Annually]

BMP Required Monitoring Locations:

None

CBI Recommended Monitoring Location:

Marron Valley

Additional Locations Monitored in the City:

Sycamore Canyon

Lopez Canyon

Otay Lakes

Note that the Sycamore Canyon/P-14 population is the responsibility of the City of Santee; City staff monitor the small population west of Goodan Ranch in the Rancho Encantada area open space owned by the City of San Diego.

Years Monitored:

2000-2004 (all)

2005 (Lopez Cyn, Marron Valley, Sycamore Cyn)

Methods:

All plants are mapped using sub-meter GPS technology. If there are relatively low numbers of the plant, this can be done as point counts and either noting in the GPS layer whether each individual is flowering or non-flowering, or by assigning point numbers and using standard field sheets to note flowering status. For larger populations, the population boundaries can be mapped with polygons, and clump/plant counts and flowering status can be recorded in GPS fields or on standard field note sheets.

Because of this plant's clumping pattern of growth and tendency to have underground stems, individual plant extents can be difficult to determine. For consistency, a plant is considered one individual plant, or plant clump, if no other *M. viminea* stem bases are located within one foot of the plant's (clump's) stem base.

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." However, the report lists only Marron Valley for City of SD monitoring in its 'summary of species locations recommended for qualitative monitoring.'

It should also be noted that the southern populations of this species, including the Marron Valley population, have been described as a new species, *M. stoneana* (Novan).

Special Instructions and Driving Directions:

For the City’s Rancho Encantado lands near Sycamore Canyone, Coordinate entry through the County’s Sycamore Canyon/Goodan Ranch Park gate with Ranger Maureen Abare-Laudy prior to fieldwork [Goodan General #: 858/513-4737; Ranger Maureen Cell # 619/981-6438; email: Maureen.Abare-Laudy@sdcounty.ca.gov].

From downtown, take SR-163 North, then I-15 North. Take Poway Road east (right) to Garden Road; there is a 7-11 at the southeast corner of this intersection. Go right (south) on Garden Road. Garden will wind around to the east and come to a fork near Morning Star Ranch. Veer south (right) at this fork and continue on Sycamore Canyon Road. Pass through the Sycamore Canyon/Goodan Ranch Park gate and enter the Park. Pass historic structures and the Ranger’s trailer (may want to check in with ranger here), then pass into a large meadow. The trail to the Monardella canyon will be on the right near the southern portion of the meadow.

Figure 50. City of San Diego *Monardella viminea* Monitoring Locations, Regional Map

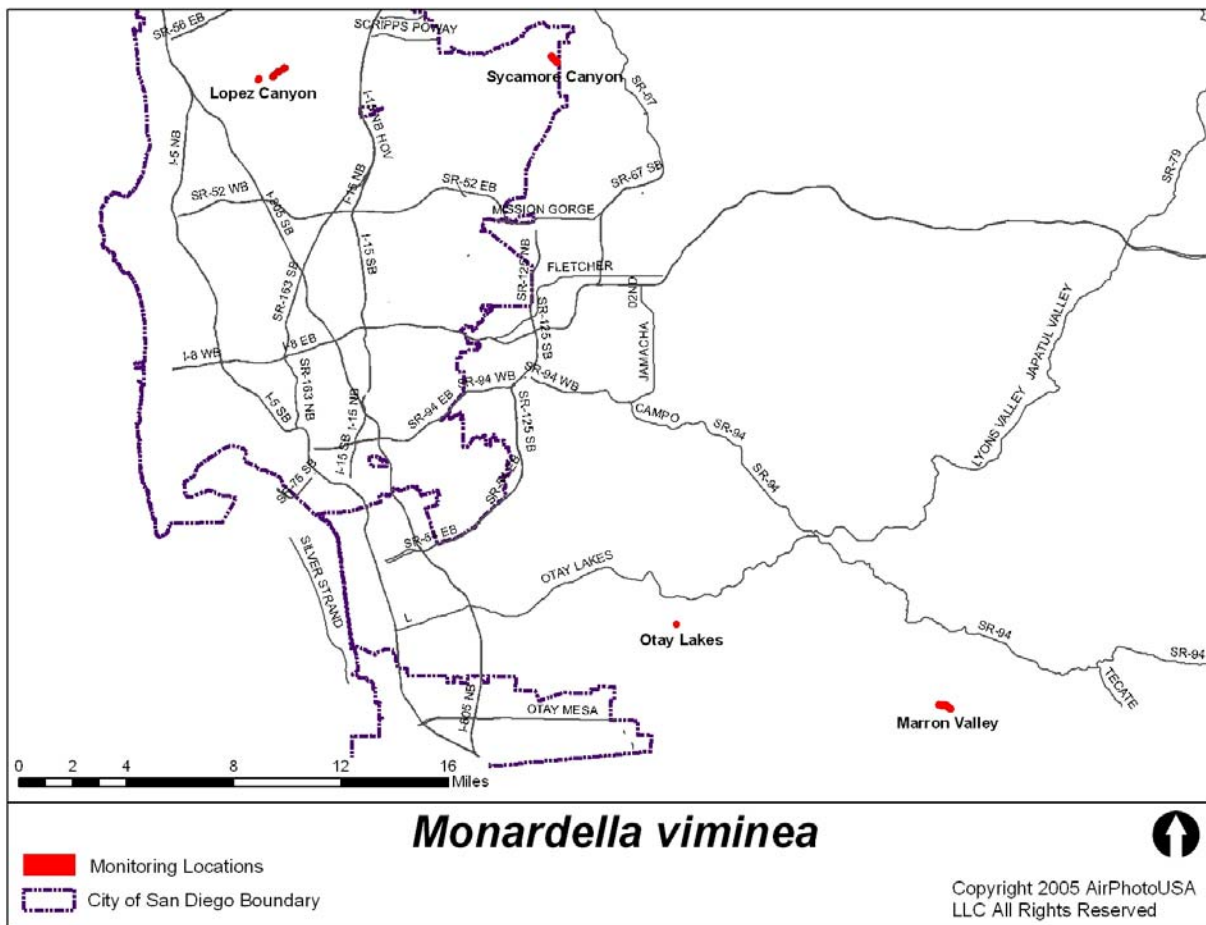


Figure 51. City of San Diego *Monardella viminea* Monitoring Location, Lopez Canyon

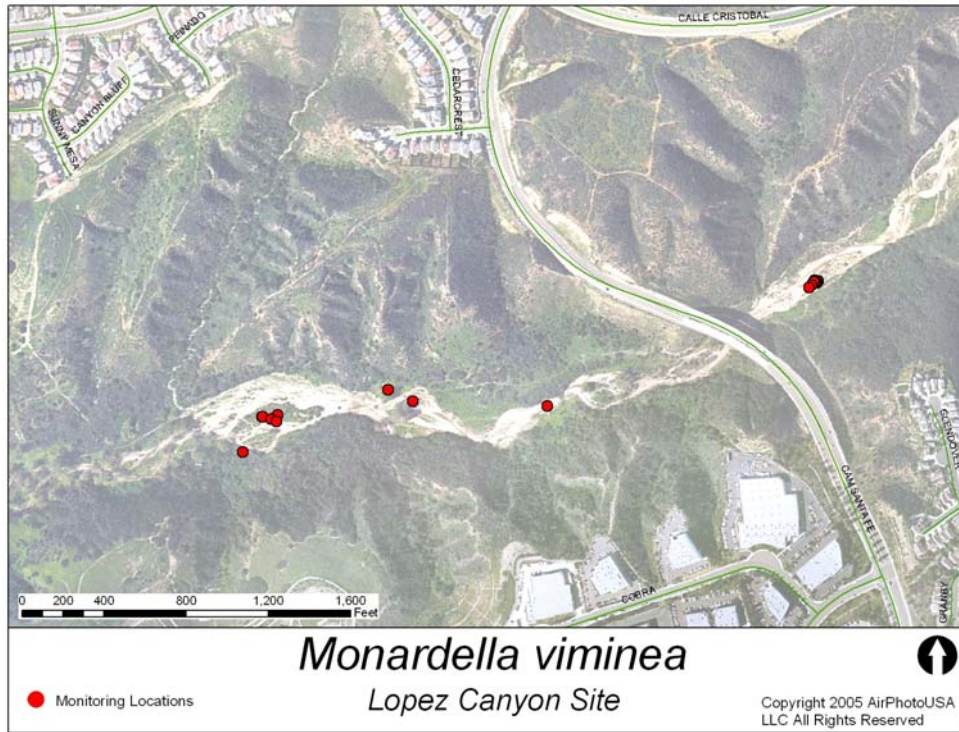


Figure 52. City of San Diego *Monardella stoneana* Monitoring Location, Marron Valley Vicinity Map

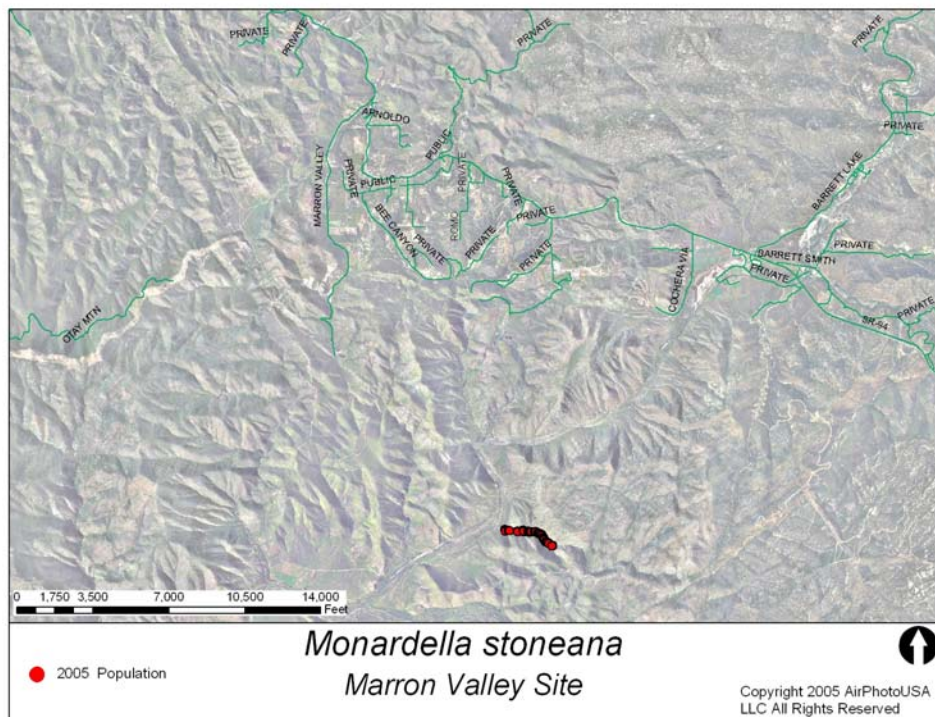


Figure 53. City of San Diego *Monardella stoneana* Monitoring Location, Marron Valley

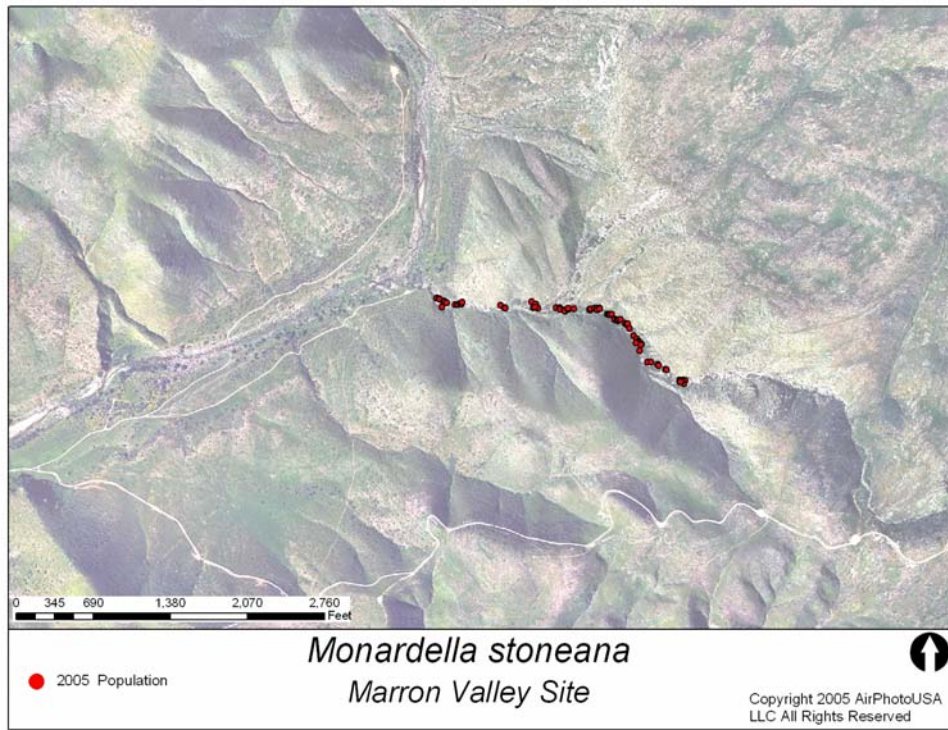
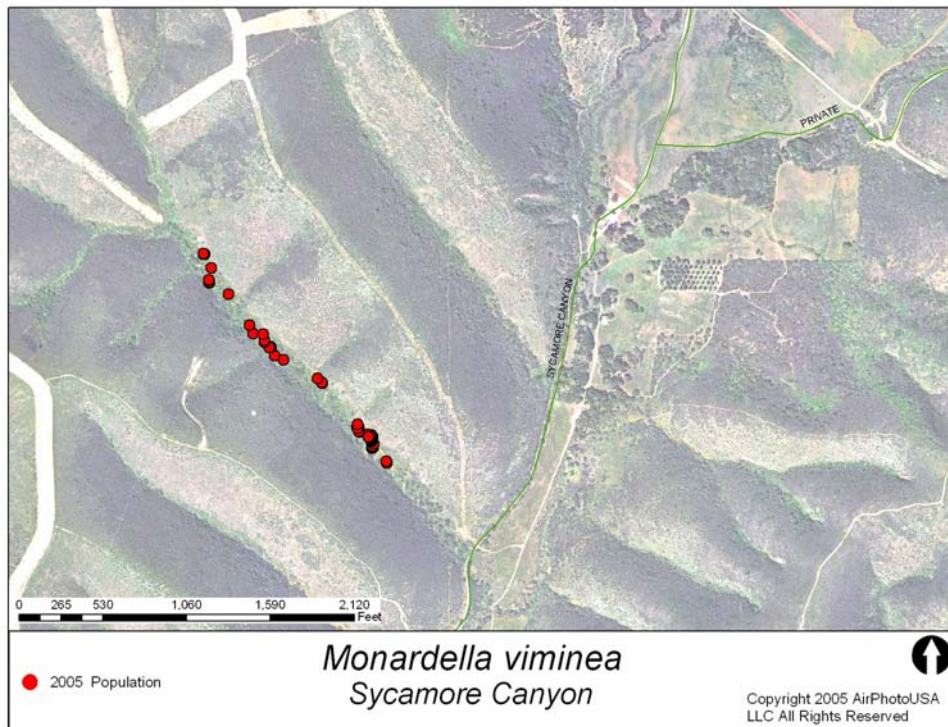


Figure 54. City of San Diego *Monardella viminea* Monitoring Locations, Sycamore Canyon



***Muilla clevelandii* (San Diego Goldenstar)**

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):

Del Mar Mesa (P-11; Moderate priority)

Sycamore Canyon/East Elliot (P-15; High priority)

Additional CBI Recommended Monitoring Location:

Marron Valley

Additional Locations Monitored in the City:

Otay Lakes

Mission Trails Regional Park (MTRP)

Years Monitored:

2000 (Marron Vly)

2001 (Del Mar Mesa, MTRP, Otay Lakes)

2002 (Del Mar Mesa, Marron Vly, MTRP, Otay Lakes)

2003 (Del Mar Mesa, MTRP)

2004 (Marron Vly, Otay Lakes)

2005 (Otay Lakes)

Methods:

Del Mar Mesa and MTRP The Del Mar Mesa population was censused in 2003, as was the Mission Trails population from 2001-2003. Because of the low numbers in the Mission Trails population (12, zero, and six, respectively), this site is no longer monitored.

Otay Lakes Sixteen permanent transects were established randomly using a random numbers table within the *D. variegata* and *Muilla clevelandii* populations in 2001. The transects are maintained as a GIS file and are relocated and flagged in the field. The transects are used for belt transect monitoring; the center line of the transect serves as the center point of a one-meter wide belt. The transect is walked with a one-meter wide plastic pipe (approximately 2 wide pvc irrigation pipe, with the center line marked), and each *M. clevelandii* located within the one-meter wide belt is counted and recorded on standard data sheets. Flowering status is also recorded for each plant counted: An individual is considered flowering if internal flowering structures are visible (i.e., stamens, pistils) or if the plant has flowered (e.g., dried flower). It is non-flowering if no floral structures are present or if the plant is in bud stage only, with no internal flowering structures present. Note that this method works fairly well in normal or below-average rainfall; however in 2005 following high rainfalls, one transect took over three hours to complete, making the method extremely time-consuming. A sub-sampling is being considered in these years.

Marron Valley According to past monitoring reports, the Marron Valley population was monitored as follows: "At Marron Valley, six transects were randomly allocated with the

standard length of 130 feet. The belt transect method described above [Otay Lakes] was also used at Marron Valley.”

General: Note that in addition to selected preserve area quantitative monitoring at the sites identified above, 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” for *Muilla clevelandii*. According to the report, such preserve-level monitoring would be used “to inform management decisions” and is recommended for “all preserve managers at all preserve units and monitoring directives.”

Figure 55. City of San Diego *Muilla clevelandii* Monitoring Locations, Regional Map

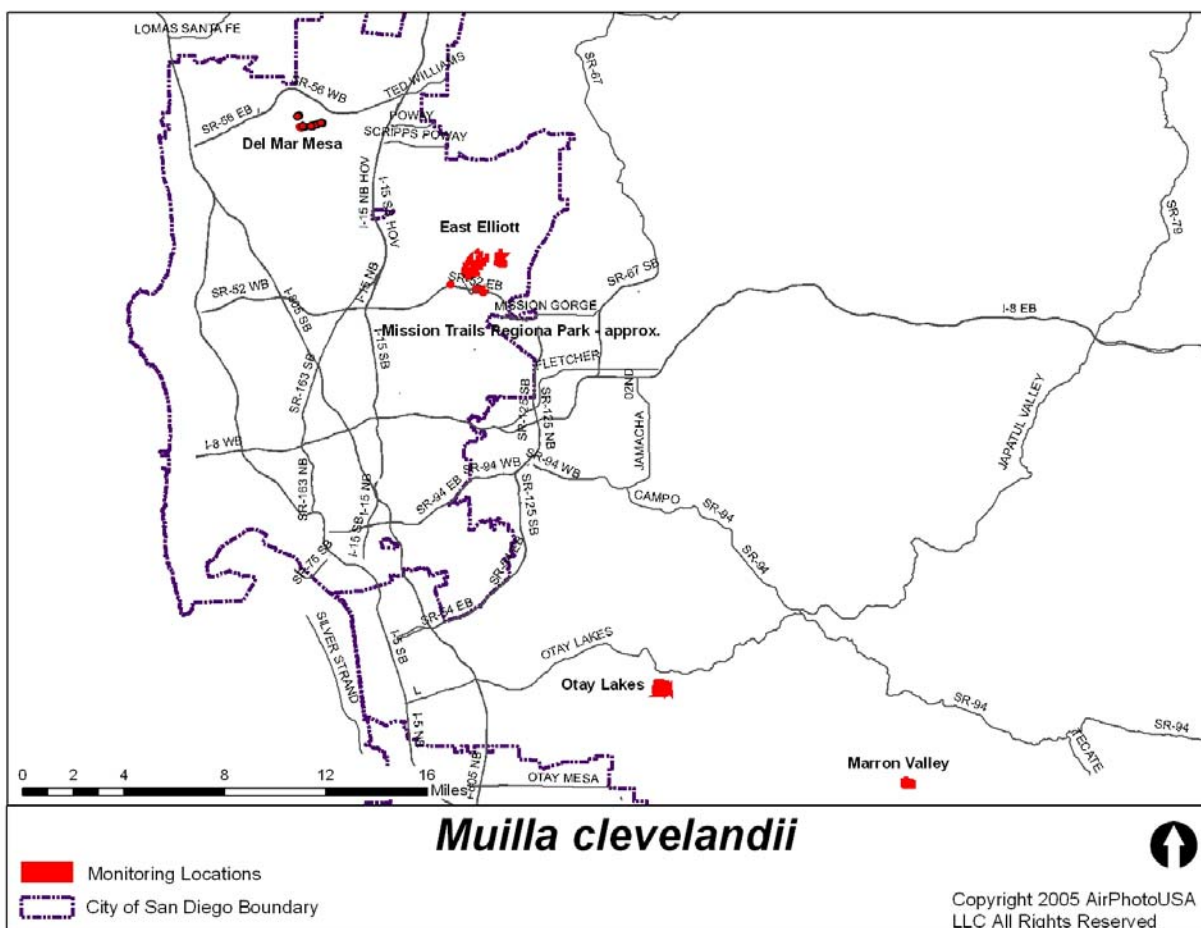


Figure 56. City of San Diego *Muilla clevelandii* Monitoring Location, Del Mar Mesa

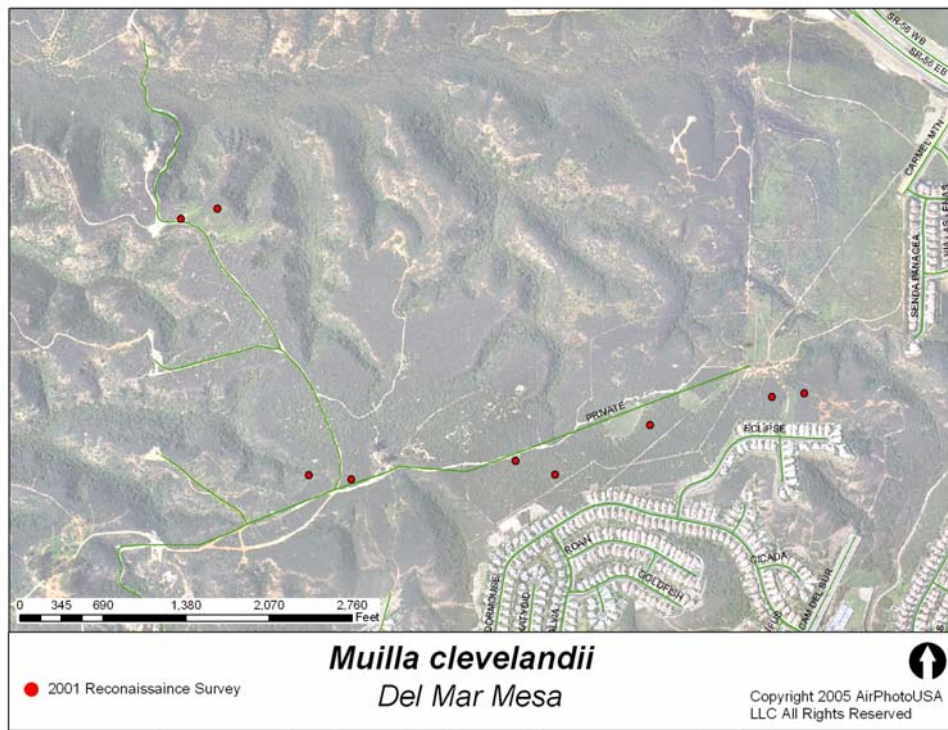


Figure 57. City of San Diego *Muilla clevelandii* Monitoring Location, East Elliot

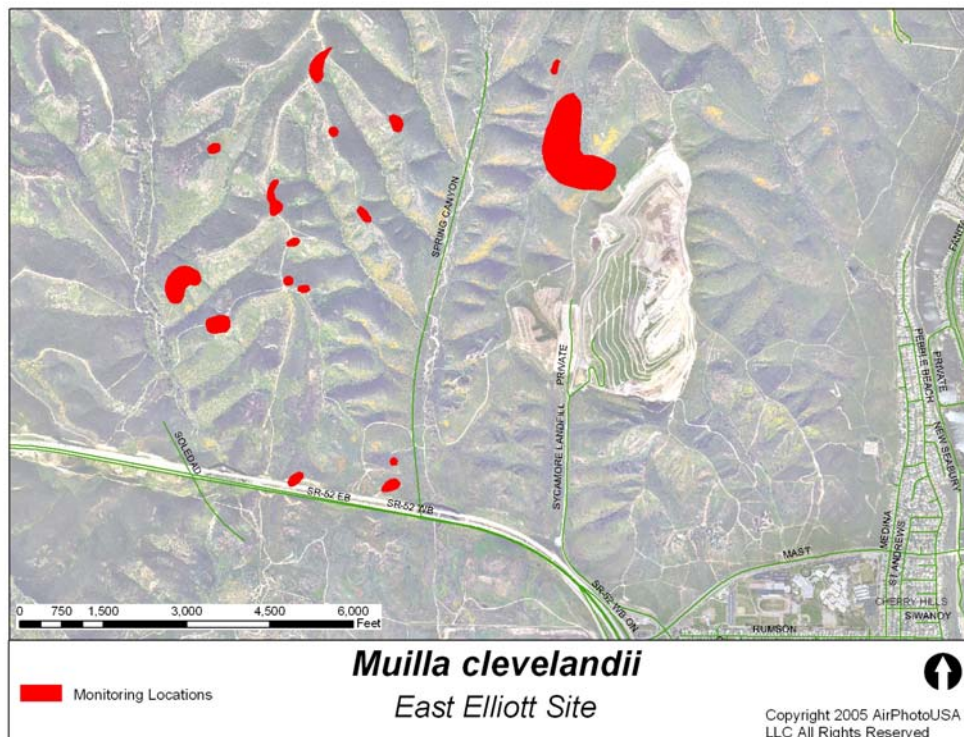


Figure 58. City of San Diego *Muilla clevelandii* Monitoring Location, Marron Valley Vicinity Map

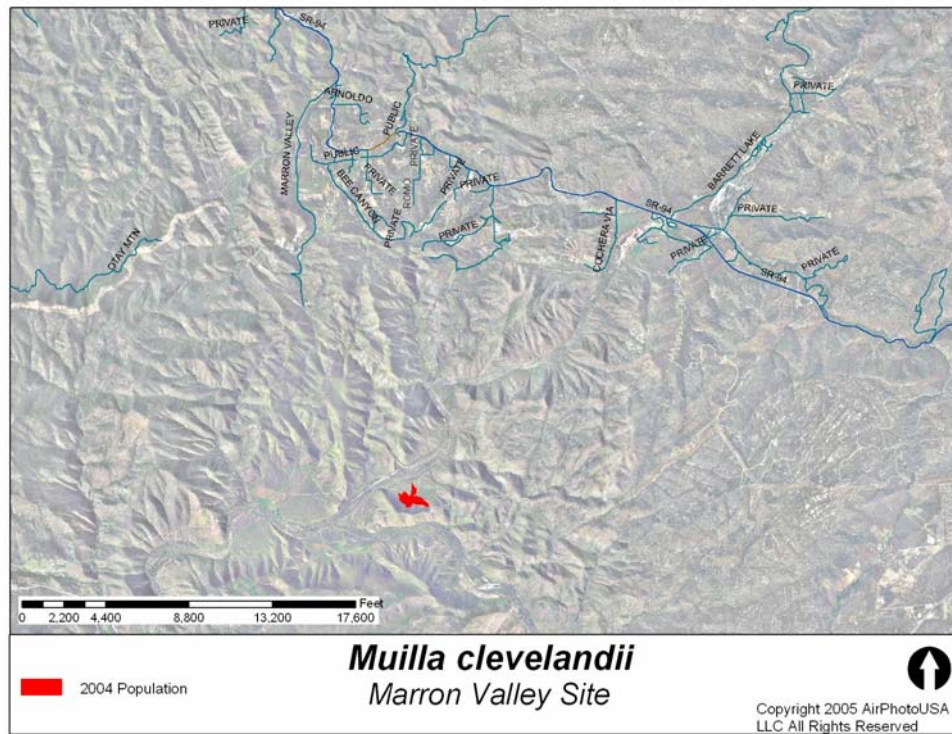


Figure 59. City of San Diego *Muilla clevelandii* Monitoring Location, Marron Valley

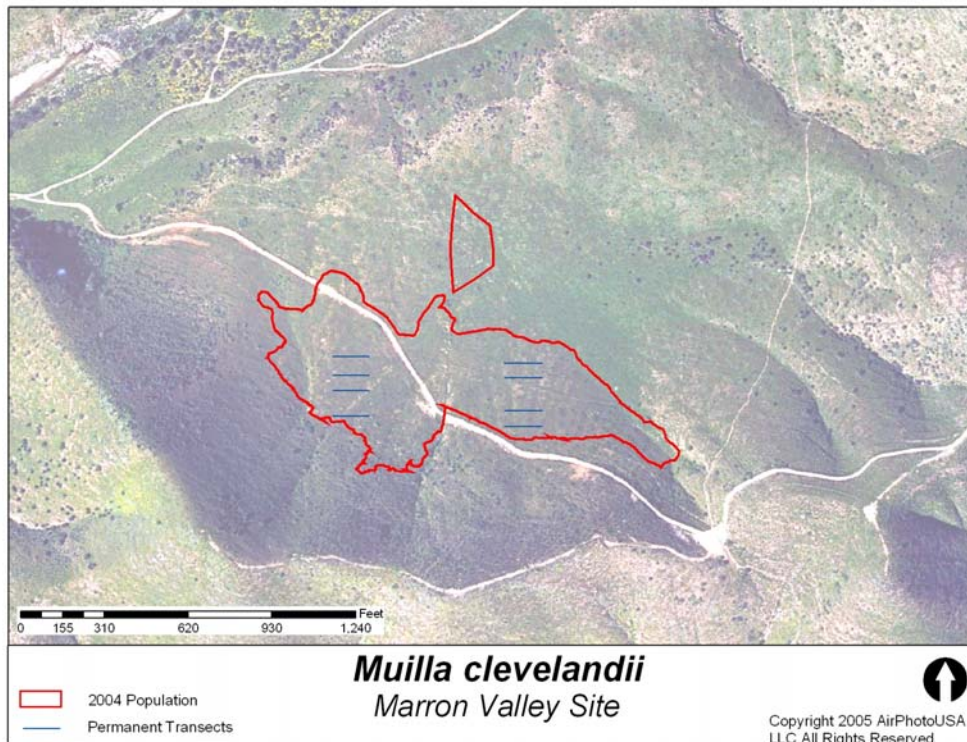
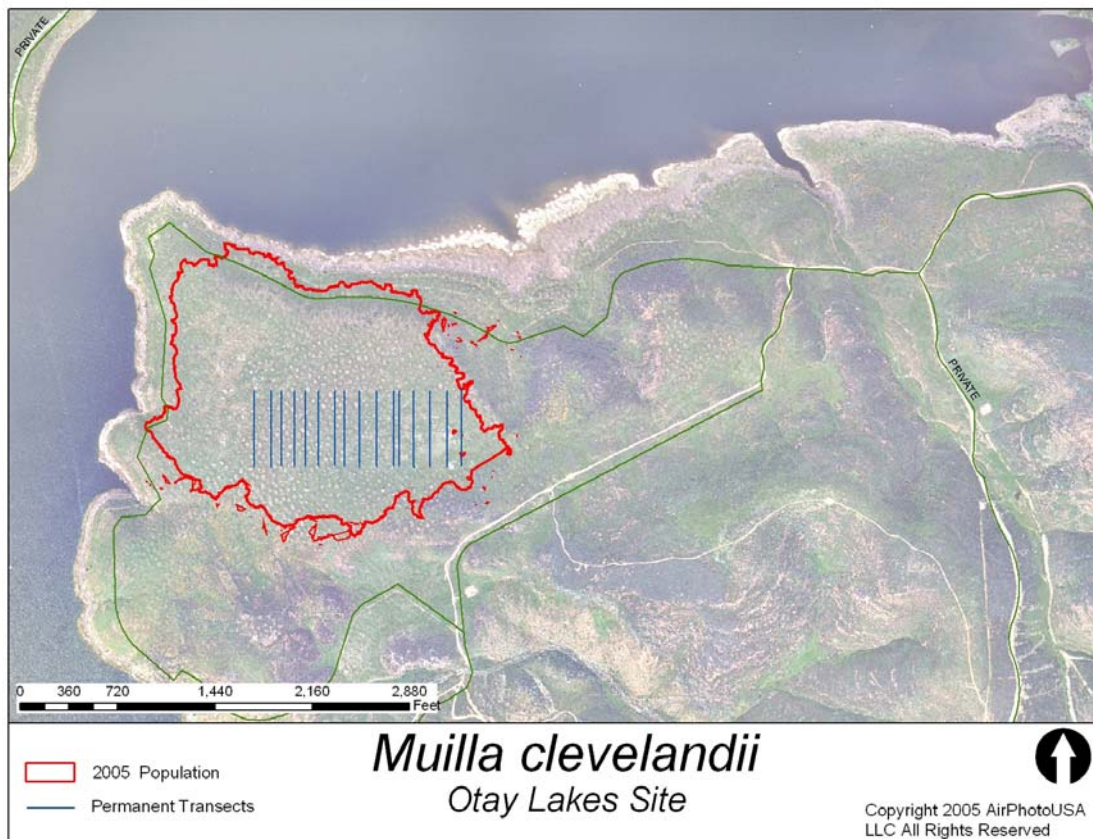


Figure 60. City of San Diego *Muilla clevelandii* Monitoring Location, Otay Lakes



***Rosa minutifolia* (Desert/Small-Leaf Rose)**

Priority Listing/Required Monitoring Frequency:

Third priority/Every five years

Required Monitoring Locations:

Otay River Valley/West Otay Mesa (P-25) – Low priority

Monitoring is not performed by City staff due to the fact that only known *R. minutifolia* population is on mitigation site that is currently monitored and managed by permittee. If the land is transferred to the City of San Diego in the future, the City will assume monitoring of these lands.

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.” 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.”