

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

**Summary of Monitoring Results for
*Lotus nuttallianus***

May 2003

Introduction

Nuttall's lotus (*Lotus nuttallianus*) is an annual, spring-flowering herb found only in the coastal areas of San Diego. This sensitive plant species has become increasingly rare as development has progressed in the region.

Monitoring for this plant in the Mission Bay area (see attached map) was conducted on May 16, 2003 and May 27, 2003 by Holly Cheong, Melanie Johnson, Keli Balo, Jan Atha, and Eden Nguyen. The methodology and results of the monitoring are detailed below. The goal of the effort was to continue long-term monitoring of Nuttall's lotus under the Multiple Species Conservation Program (MSCP).

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. In 1998, surveys around Mission Bay were conducted by Gary Suttle, and MSCP staff began conducting annual surveys in 2000. In 2000, it was determined that 4 of the 9 sites documented by Gary Suttle had been developed or the populations had otherwise disappeared. A previously undocumented population was also discovered in 2000. The 2001 and 2002 surveys covered the five remaining sites documented in the 1998 and 2000 surveys and the one new site located in 2000. The location of each survey site was determined by field level surveys and then depicted on aerial photographs. These areas were photographed and then all plants were counted at Sites 2-5.

In previous years, all plants on Sites 1 and 6 could be counted. However, in 2003, there were too many individuals present to conduct a census on those sites. For Sites 1 and 6, 100-foot, randomly allocated line transects were mapped on the site using ArcView Geographic Information Systems (GIS). Each transect was then located and marked in the field. The population was surveyed using the line intercept method (Krebs, 1998). Each plant that crossed the line transect was measured to determine the length of the plant along the line transect and the perpendicular width of the plant intersected. This information was then used to estimate the population density on Sites 1 and 6 based on the following equation:

Density = (1/total length of transects)(Sum of 1/perpendicular width of plants intercepted)

Results and Conclusions

MSCP staff counted a total of 5,393 individuals with 2,425 flowering adults, and 2,968 non-flowering adults. In 2002, 210 individuals were counted. In 2001, 594 individuals were counted. These totals do not include population at the least tern nesting site as active nesting on the site prevented surveys. Low rainfall may account for the decrease in population size in previous years. A description of each site and the number of individuals found is given below.

Site 1 East of Sea World Drive, West of Interstate 5

According to the 1998 survey conducted by Gary Suttle, this site had several thousand individuals. During the 2000 survey, only 130 juveniles were counted on-site and during the 2001 survey, 399 individuals were documented on-site. Of the 399 individuals, 200 were juvenile plants, 58 were adult flowering plants, and 141 were adult non-flowering plants. Most of these plants were found underneath what appeared to be last season's growth. In 2002, 57 individuals were counted. In 2003, 3,581 individuals were estimated to be on-site (1,504 flowering and 2,077 non-flowering).

Ice plant (*Carpobrotus* spp.) occurs on about 30% of the site. Within the 30%, ice plant makes up 100% of the cover. If the ice plant infestation is recent, this may account for the significantly lower numbers of Nuttall's lotus found on-site. Wild radish (*Raphanus sativa*) was also found on-site and was not documented in the previous year. The wild radish occurs on about 40% of the site and within the 40%, the radish makes up 100% of the cover.

Also, this site is not protected from off-road vehicle use. Tire tracks and dumping were found in many locations on-site. It should also be noted that this site occurs on a former landfill. Therefore, the stability of this population from year to year may be affected by the previous use of this site. Low rainfall in recent years could also have affected plant numbers on-site.

Site 2 Hospitality Point, Volleyball Court

Over 200 plants were documented on this site in 1998. In 2000, only 34 flowering adults and 6 non-flowering adults could be located. In 2001, 224 plants were located; 84 juveniles, 71 flowering adults, and 69 non-flowering adults. In 2002, only 30 flowering adults and 15 non-flowering adults were located on site. In 2003, 130 plants were located on-site; 38 flowering adults and 92 non-flowering adults. These plants occur next to a volleyball court in an area planted with palm trees and other landscape plants. The proximity of the volleyball court may result in trampling of the plant; however, the area was fenced in 2001 and did not appear to be significantly impacted by trampling. Extremely low rainfall during the 2001-2002 season may have affected the population.

Site 3 Rip Rap South of Hospitality Point

Plant numbers for this site were not estimated in 1998. In 2000, 57 flowering adults and 7 non-flowering adults were found within the riprap along Mission Bay. In 2001, 8 flowering adults, 5 non-flowering adults, and 30 juveniles were documented. In 2002, 11 flowering adults and 10 non-flowering adults were found. In 2003, 497 plants were located; 78 flowering adults and 419 non-flowering adults. Threats to the plants may include trampling by fishermen and limited growing area due to the riprap.

Site 4 Mariner's Point, Least Tern Nesting Site

Plant numbers for this site were not estimated in 1998, although the species was described as thriving. In order to minimize disturbance to the least tern nesting site, a small area was surveyed and the total number of plants was estimated based on the total area of the site. In 2000, approximately 1269 flowering adults were estimated; in 2001, approximately 1582 flowering adults, 664 non-flowering adults, and 459 juveniles were estimated on-site. In 2002, approximately 2473 flowering and 618 non-flowering plants were estimated to be on-site. The 2002 survey may reflect a more accurate count of the population since a Global Positioning System was used to measure the survey area, which was determined to be 2,722 square feet. In 2003, active nesting of least terns prevented survey of the site. However, Nuttall's lotus continues to persist and appears to cover most of the site.

Site 5 Mission Beach School, North Parking Lot, North Fence

A previously undocumented population of Nuttall's lotus was found in the north parking lot of Mission Beach High School in 2000. Four flowering individuals were growing out of a crack between the parking lot and the sidewalk of the adjacent residential development. These individuals were located under an oleander bush.

When the site was revisited in 2001, it appeared that the lotus, along with the oleander bush, had been cleared during construction of a sidewalk. However, in July 2002 it was observed that an individual had grown back from the clearing. This site was not rechecked in 2003 since it is no longer considered a viable population (only one plant on-site).

Site 6 East of South Shores

Approximately 500+ individuals of Nuttall's lotus were documented on this site in 1998. In 2000, 146 juvenile plants were found on-site. In 2001, 17 juveniles could be found on-site, while no individuals were found in 2002. In 2003, surveys estimated 1,185 individuals on-site; 805 flowering adults and 380 non-flowering adults. Approximately 70% of the site was covered in ice plant. Significant populations of chrysanthemum and wild radish were also found in 2003. Although this site is across the street (Sea World Drive) from Site 1, there was little evidence to suggest that recent off-road vehicle use, dumping, or the former landfill use is affecting this population. One transient encampment was observed in 2002. MSCP staff believes that, similar to Site 1, ice plant is the primary threat to Nuttall's lotus on this site, especially if the ice plant infestation is recent.

Recommendations

In general, if additional populations of Nuttall's lotus are found within City of San Diego limits, surveys should be conducted in those areas. The Tijuana River Estuary, Silver Strand, and other historic populations should be checked for Nuttall's lotus. Also, coordination with other jurisdictions may help determine the regional status of this plant species. MSCP staff is working

closely with other jurisdictions in the MSCP Monitoring Coordination Committee to determine the regional status of covered species within San Diego County.

Many different site-specific measures can be implemented in order to enhance protection of Nuttall's lotus. Recommendations for site-specific measures are given below.

Site 1 East of Sea World Drive West of Interstate 5

Monitoring of this site should be continued. If possible, the site should be fenced to prevent off-road vehicle use and dumping. Removal of ice plant and other exotics on-site should also be explored.

Site 2 Hospitality Point Volleyball Court

Monitoring of this site should be continued and protection measures installed if the population appears to decline. Additional fencing or other protective measures may be necessary if trampling of plants becomes an issue.

Site 3 Rip Rap South of Hospitality Point

Monitoring of this site should be continued and a Global Positioning System should be used to map the extent of the population. This will help to determine if the population is declining or if annual variation in population size and structure is a significant factor in the reduced numbers observed in 2001 and 2002. Fencing and/or other protective measures may be necessary if trampling of plants becomes an issue in the future. Placing sand on the rip rap to increase the growing area is not recommended since the plant species appears to naturally grow up from under the rip rap and this would only result in burying the plant.

Site 4 Mariner's Point Least Tern Nesting Site

Because this population is thriving, intensive monitoring for this species is not recommended as it disturbs least terns during their nesting season. Instead, visual verification or presence/absence surveys of the species should occur from outside the fenced area to verify the condition of this population. Presence of any potentially harmful exotic species should also be noted during such surveys. Protection measures implemented for the least tern such as fencing and berms should adequately protect this population.

Site 5 Mission Beach School, North Parking Lot North Fence

Since only one plant is remaining, presence/absence surveys can be conducted but this population should not be monitored as a viable population. While the individual plant on-site may be useful in the future for propagation or transplantation, it does not represent a population that is likely to persist at this site.

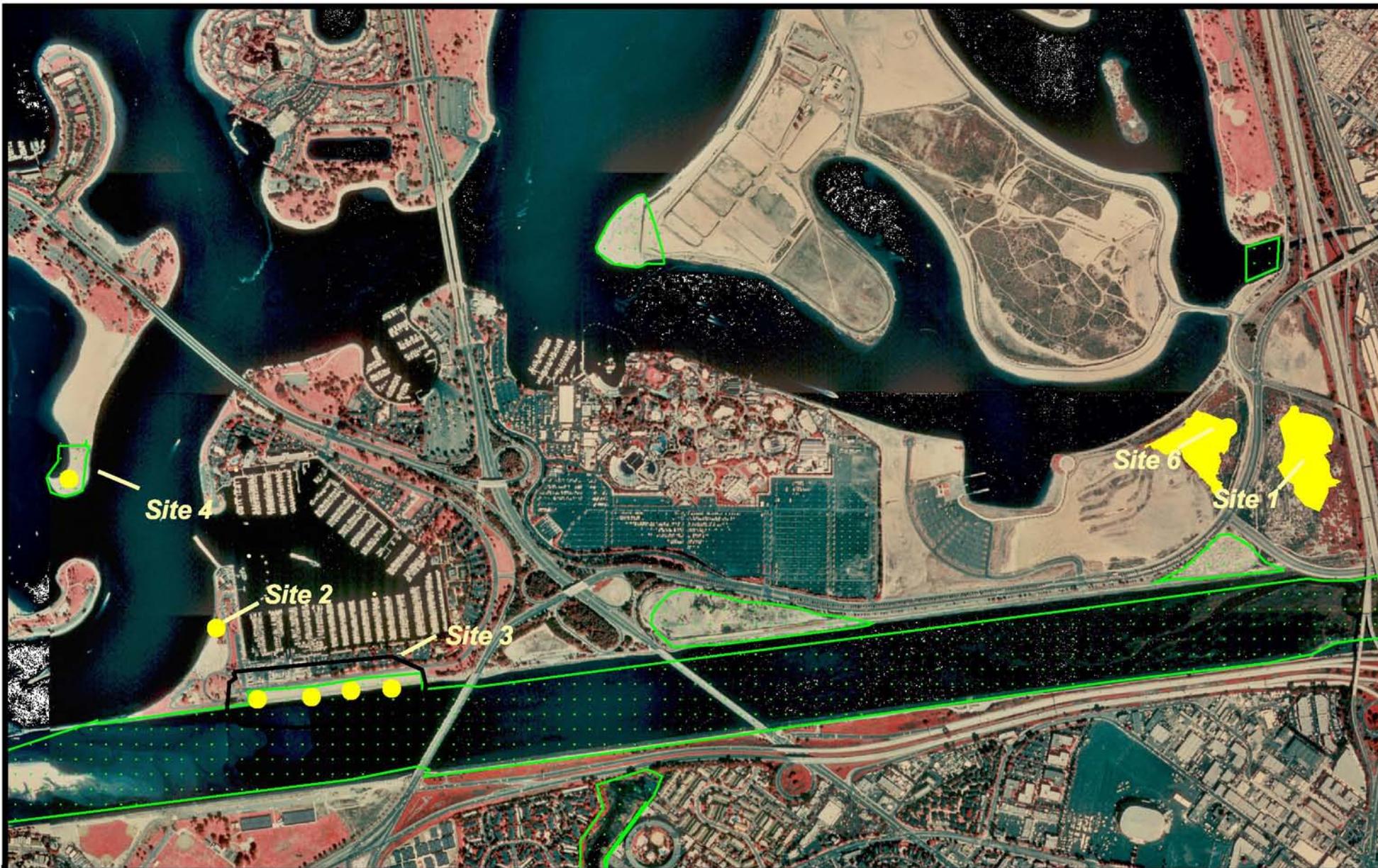
Site 6 East of South Shores

Monitoring of this site should be continued. Removal of ice plant and other exotics on-site should also be explored.

References

Krebs, Charles J. Ecological Methodology. 2nd ed. Addison-Wesley Pub Co., 1998.

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



● Survey Sites

□ MHPA

Mission Bay

Lotus nuttallianus

Survey Dates: 5/16/03, 5/27/03



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