

**Report to the Monarch Joint Venture
Monitoring of Monarch Overwintering Sites in California
2013**



Overwintering monarch on eucalyptus, Santa Barbara County, CA.
Photo by Candace Fallon / The Xerces Society

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Introduction

Each year, hundreds of thousands of monarch butterflies return to overwintering groves that span the California coastline from Sonoma to San Diego Counties. Monitoring efforts at a subset of these sites have revealed an estimated 80% decline in monarch abundance at many sites since monitoring began in 1997. Ongoing loss and deterioration of monarch overwintering habitat is thought to be a major contributing factor to this decline, potentially putting the future of this incredible migration at risk. In order to protect the monarch migration, overwintering habitats must be identified, preserved, and carefully managed. To date, the Xerces Society has worked in partnership with the Monarch Joint Venture to address these needs: 1) to compile existing information from multiple published and unpublished sources to create a comprehensive Western Monarch Overwintering Site Database (which includes 476 monarch overwintering sites); 2) to develop and implement an overwintering habitat assessment protocol to evaluate the quality of monarch overwintering habitat; and 3) to monitor monarch abundance at approximately 120 sites over two years.

These projects over the last several years have enabled us to fill some of the major gaps in our understanding of the condition and occupancy status of western monarch habitat, but some questions remained. For example, monitoring efforts to date had largely overlooked overwintering sites on private lands, yet approximately one-third of the 476 current and historic California overwintering sites occur on privately owned or restricted land. To address this issue, the Xerces Society proposed to visit 16-20 historically significant sites on private lands. This report outlines the results of these visits, including site selection and survey protocols, survey results, and recommendations for future monitoring needs.

Site selection

Using our Database of Western Monarch Overwintering Locations, Xerces staff initially identified 25 priority overwintering sites on private or restricted access lands. Sites were considered a priority if they had supported more than 1,500 monarchs in the past, if they had not been visited regularly or at all in the last 5-10 years, or if they were in close proximity to historically large sites or were known to host overwintering monarchs but had no record of prior survey attempts. Using the land ownership parcel data we collected in 2013 as part of another MJV supported project, we identified the land owners for these 25 sites. Fifty-five contact attempts were made via phone calls, letters, and emails until we had secured permission to survey 21 sites. Five of these site visits were later postponed (see “Postponed site visits” below), leaving us with a total of 16 survey sites for the 2013 season (see Figure 1).

Sites visited in 2013

With the exception of two sites that had no record of prior surveys, all sites visited in 2013 had hosted at least 1,500 and up to 150,000 monarchs at some point in the past. Ten of these had not been visited in the last decade, two had not been surveyed in the last five years, and two were surveyed by Xerces staff in 2012 but identified as priority sites that should be revisited in 2013.



Figure 1: Map of overwintering sites visited in winters 2011-2013

Postponed site visits

During our site selection process, Hollister Ranch was identified as an important focus region for overwintering monarch surveys. Six sites associated with the Ranch are listed in our database, most of which had only been surveyed once or twice in the last 20 years. The ranch is located on the relatively untouched Gaviota Coast of Santa Barbara County and the habitat conditions of these historic sites were largely unknown. Hollister Ranch is a private restricted access community and permission to visit the Ranch, particularly for scientific surveys, has been difficult to obtain in the past.

In the early fall of 2013, Xerces staff submitted a scientific research permit to conduct monarch surveys on five of the Hollister Ranch sites (land owners for the 6th site had already contacted Xerces and given permission for surveys on their land). In November we received notice that we had been approved by the Ranch's scientific board to conduct monarch surveys during the 2013 overwintering season. However, our surveys were later postponed by the board citing an unusually hectic workload and an inability to properly coordinate our visit.

In January 2014 we were contacted by the board and notified of our preliminary approval to conduct surveys during the upcoming overwintering season. Only one of the sites we included in our proposal is owned outright by the Ranch; the remaining four are owned by private individuals within the Ranch boundaries. The Ranch committee is reaching out to these land owners on our behalf in order to secure survey permission. Pending these permissions, we can expect to access the five remaining Hollister sites in the Fall or Winter 2014.

Survey protocol

At each site, we assessed the condition of the overwintering habitat with our monarch habitat assessment protocol (which was developed with past support from the MJV), conducted monarch counts to estimate monarch abundance at each site, collected GIS location information (including points of cluster trees and a polygon of the entire site) and land ownership information, and identified potential threats to each site. We timed all of the site visits to occur during the annual Western Monarch Thanksgiving Count (WMTC). Nine sites were visited and assessed by staff from Xerces and an additional seven were assessed by staff from Monarch Alert. Volunteers accompanied staff on three of the site visits.

Data entry

All data from these surveys were entered into the Western Monarch Overwintering Site Database during December 2013 and January 2014. Data from 11 of the sites were also entered in the 2013 Western Monarch Thanksgiving Count database (five of the sites are considered location sensitive and were not included in this publicly available database).

Results of habitat assessment protocol

Site threats

Xerces and Monarch Alert staff assessed and documented overwintering habitat site characteristics using the Habitat Assessment Protocol during our 2013 site visits. Data from these forms were entered into the Xerces Society Western Monarch Overwintering Sites Database. Using this database, we queried site characteristics to determine primary site threats. The main threat to sites was the

eucalyptus leaf beetle (at half the sites). Erosion and old or aging trees were problems at roughly one quarter of the sites. The loss of trees due to old age, human activities, or erosion is a serious issue for the health of overwintering groves. Other site threats included dead or dying trees and very dense groves. All site threats are documented in Table 1.

Table 1: Site threats

Threat	Number of sites affected
Eucalyptus leaf beetle	8
Erosion	5
Old/aging trees	4
Tree trimming/removal	3
Dead/dying trees from non-disease source	3
Possibly too dense of trees (i.e., too much shade)	3
Road through site	2
Fire	2
Pesticide use (likely)	2
Cattle grazing	2
Bike path through site	1
Cut trees/tree removal	1

Tree species composition

Xerces also collected information on tree species composition at each grove, including cluster tree species. At actively clustering sites, the cluster trees were predominantly blue gum eucalyptus (*Eucalyptus globulus*). Table 2 displays all species used as cluster trees at the 7 active clustering sites surveyed in 2013. Other tree species present but not used as cluster trees included coast live oak, Monterey pine, and Monterey cypress.

Table 2: Aggregation species at sites surveyed

Species	Number of sites
<i>Eucalyptus globulus</i>	4
<i>Platanus racemosa</i>	2
<i>Eucalyptus</i> spp.	2

Nectar species composition

As part of the habitat assessment, we recorded nectar species present at each site. Blue gum eucalyptus was the most common nectar plant available during these survey periods. Seven of the sites did not have any blooming nectar species at the time of the survey, although they did support species that are known winter bloomers.

Table 3: Nectar species

Species	Number of sites
<i>Eucalyptus globulus</i>	4

Species	Number of sites
<i>Eucalyptus camaldulensis</i>	2
<i>Mesembryanthemum</i> sp.	1
<i>Citrus limon</i>	1
<i>Senecio mikanioides</i>	1
<i>Salix</i> sp.	1
<i>Ceanothus thyrsiflorus</i>	1
<i>Echium fastuosum</i>	1
<i>Baccharis pilularis</i>	1

Recommendations for future work

Fourteen of the land managers we worked with this season gave ongoing permission for volunteers to visit their property and conduct an annual monarch count and habitat assessment. We will promote the adoption of these sites by regional volunteers during the 2014 overwintering season. In addition, several of the land managers whose properties we visited during the 2013 season expressed interest in potentially working together on site-specific management plans, including managers at the CH1 Private Site and Little Sycamore Canyon. Overall, most of the sites visited would benefit from the addition of winter-blooming nectar plants and wind buffer trees. Stabilization of mature cluster trees along eroding creek beds is a major concern, as these trees are more susceptible to falling over in wind, storm, or flood events, leading to the loss of both cluster trees and adjacent trees that provide important microclimatic grove conditions. Sites composed predominantly of native western sycamore trees should be surveyed earlier in the season to see if these sites act more as autumnal or transitory sites. Many of the sycamore trees surveyed in 2013 had already lost a substantial portion of their leaves for the year and may not provide the best structure for overwintering monarchs. Efforts should be made to survey the remaining five Hollister Ranch sites that we were unable to survey this season, particularly since we have already been approved by the board. Two of the larger Hollister Ranch sites had historic counts of 7,500 to 10,000 monarchs.