

**2000 San Bruno Elfin Butterfly Survey
Milagra Ridge
Golden Gate National Recreation Area**

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Summary

In 2000, a total of 5 adults and 3 larvae of the endangered San Bruno elfin butterfly were observed in or near colonies of *Sedum spathulifolium* on Milagra Ridge in Pacifica, California. The adults were sighted on March 22nd and March 30th, and the larvae were sighted on June 3rd. These results prove the persistence of San Bruno elfin populations on Milagra Ridge.

The weather data show that the adult butterflies were sighted on relatively calm, clear days, whereas the larvae were sighted in cloudier, windier conditions. Further years of monitoring may reveal patterns in the effects of weather on both adults and larvae.

Introduction

The San Bruno elfin butterfly, *Callophrys mossii bayensis*, was listed as a federal endangered species in 1976. Widespread development resulting in habitat destruction has forced the butterfly into isolated populations along the San Francisco peninsula. Milagra Ridge (Golden Gate National Recreation Area) was added as a *C. m. bayensis* site with its discovery by Robert Langston in the mid 1980s. Sporadic surveys and observations were made from the mid-eighties until 1996 (see 1999 Milagra Ridge San Bruno Elfin Report for a brief listing of these sightings). After a break in monitoring in 1997 and 1998 (1996 survey resulted in 0 adults or larvae observed), the Site Stewardship Program made an attempt to set up an ongoing monitoring scheme in 1999, with the goal of determining the presence/absence and abundance of the butterfly. Adults and larvae of *C. m. bayensis* were monitored at Milagra Ridge beginning in 1999; this report marks the second consecutive year of the survey.

Natural History

Callophrys mossii bayensis (family Lycaenidae) is closely associated with its larval host plant, *Sedum spathulifolium*, a succulent that grows on rocky, north-facing slopes along the coast. The adults are quite sedentary, usually staying within 100 meters of the host plant. The adult flight season is from late February to early April, with only one generation per year (Arnold 1983).

Females oviposit on the ventral surface of *S. spathulifolium* in March and early April. The red or yellow larvae hatch in 5 to 7 days and feed on *Sedum* leaves in the first and second instar. Third instar larvae begin to feed on the flower heads of the *Sedum* in May, and continue to do so in the fourth instar. Third and fourth instar larvae may be tended by ants. The fourth instar pupates at the base of the hostplant, where it remains in diapause through the summer, fall, and early winter. Tachinid parasitization of larvae occurs at a rate of 50-80% (Arnold 1983).

Methods

In 1999, the monitoring methods were based on recommendations by Thomas Reid Associates obtained by Lisa Digirolamo in 1996 (Newby 1999). This year, the monitoring scheme was revised according to the methods currently in use at San Bruno Mountain.

Six survey "points" were marked and numbered at known colonies of *Sedum spathulifolium* on Milagra Ridge. Two of the points are identical to two of the "patches" surveyed in 1999, while the other four are either combinations of 1999 patches or newly discovered colonies (see Figure 1).

Each point was marked with an orange stake placed approximately at the center of the colony. The methods used for monitoring adults and larvae are described below.

Adults

C. m. bayensis adults were monitored approximately once per week in March, on a total of five occasions. The following data were taken at the beginning of each survey, at the point marker: Temperature, wind direction, wind speed, percent relative humidity, presence/absence of fog/precipitation, percent cloud cover, and percent of habitat in sun. A digital thermo-hygrometer and a hand held anemometer were used. In accordance with the weather parameters from the Mission blue butterfly surveys, the *C. m. bayensis* survey was only conducted if the temperature was above 13.5 degrees Celsius and the wind speed was below 7 meters per second. The observer walked through the colony of *Sedum spathulifolium* in a 25-foot radius around the point marker, watching for flying or perched butterflies. Close-focusing binoculars were used to confirm sightings when possible, and proved to be vital. Each individual observed was noted on the data sheet, and behavior was described. If after ten minutes no activity was observed, the observer moved on to the next point. All six points were monitored on each of the five survey dates.

Larvae

C. m. bayensis larvae were monitored on three occasions: June 3rd, June 11th, and June 18th. Weather data were recorded as described above, though the minimum weather parameters were not observed since butterfly larvae tend to be active in all weather conditions (TRA 1996). The observer checked all of the accessible *Sedum* flower heads within a 25-foot radius of each survey point, recording each individual observed. The start time was noted at each point, though the time spent at each colony varied according to how long it took to check the flower heads.

Results and Discussion

Adult Abundance

A total of 5 adults of *C. m. bayensis* were sighted on two survey dates in 2000. Two were sighted on March 22; one each at points 1 and 4. Three were observed on March 30, one at point 1 and two at point 2. All were initially sighted in flight, and four were then observed to land on various plants, such as California buttercup (*Ranunculus californica*), Hog Fennel (*Lomatium spp*), California poppy (*Eschscholzia californica*), soap plant (*Chlorogalum pomeridianum*), and vetch (*Vicia spp*). Sex was not determined. These results are summarized in Table 1 below.

The fact that five times as many adults were sighted in 2000 than in 1999 seems to suggest an increase in abundance at Milagra, but this increase in sightings is more likely due to the developing competence of the observer. The San Bruno elfin is very sedentary and hard to spot, so the observer spent time at San Bruno Mountain in March 2000 to become more familiar with the appearance and flight pattern of the butterfly. The use of close-focusing binoculars also increased the number of confirmed sightings in 2000.

Table 1: 2000 San Bruno Elfin Adult Surveys at Milagra Ridge

Date	# Sighted	Point Number
3/3/00	0	N/A
3/10/00	0	N/A
3/15/00	0	N/A
3/22/00	2	1 at Point 1 1 at Point 4
3/30/00	3	1 at Point 1 2 at Point 2

Larvae Abundance

A total of 3 *C. m. bayensis* larvae were observed in 2000 on Milagra Ridge, all on one survey date, June 3rd. The larvae were sighted at point 1, and were all found on the flower heads of *Sedum spathulifolium*.

Table 2: 2000 San Bruno Elfin Larvae Sightings at Milagra Ridge

Date	Point #	# Larvae
6/3/00	1	3

In 1999, 8 larvae were counted at Milagra. The fact that only 3 were observed this year may be due to a decrease in the number of sampling days (in 1999 there were 6, in 2000 there were 3). Nevertheless, the presence of the larvae, along with the increased adult sightings, proves the continued persistence of *C. m. bayensis* on Milagra Ridge.

Weather Data

Adult

The adult sightings occurred at temperatures ranging from 14.3 to 16.6 degrees Celsius, with an average of 15.38 degrees. The wind was relatively calm, ranging from .95 to 1.85 meters per second, with an average of 1.34 m/s. The cloud cover was negligible at each sighting, ranging from 0 to 5 percent. The relative humidity at the sightings ranged from 52 to 64 percent, with an average of 58.4 percent. The majority of the *Sedum* habitat at all sightings was in the sun, ranging from 60 to 90 percent, with an average of 74 percent. Table 3 shows the weather data at each of the five sightings.

Since no weather data was collected until 1999, there is little opportunity at this point to make comparisons or draw conclusions from this data. As more yearly data are collected, trends may develop.

Table 3: Weather for San Bruno Elfin Adult Sightings 2000

Date	Point #	% Habitat in sun	Temp.	Avg. wind speed (meters/second)	Relative humidity	% Cloud cover
3/22/00	1	60	16.6	1.55	53	5
3/22/00	4	80	14.3	1.85	52	2
3/30/00	1	90	15.2	1.4	59	0
3/30/00	2	70	15.4	.95	64	0
3/30/00	2	70	15.4	.95	64	0

Larvae

The weather data at the larvae sightings are summarized in Table 4 below.

Table 4: Weather for San Bruno Elfin Larvae Sightings 2000

Date	Time	% Habitat in sun	Temp. (Celsius)	Avg. Wind speed (meters/second)	Relative humidity	% Cloud cover
6/3/00	10:00 a.m.	0	15.3	3.05	52	100

Compared to the weather conditions at the adult sightings, the larvae seem to be active in windier and cloudier conditions. With such a small data set, it is difficult to say whether this is typical. The

poorer weather during the larvae sightings may be explained by the time of year. By June, the summer coastal weather pattern of low clouds and fog has generally set in at Milagra Ridge.

Since no weather data were collected until 1999, there is little opportunity at this point to make comparisons or draw conclusions from this data. As more yearly data are collected, trends may develop.

Conclusion

As evidenced by the 1999 and 2000 surveys, and as suggested by Thomas Reid Associates in 1985, the Milagra Ridge populations of *Callophrys mossii bayensis* are likely quite small (TRA 1985, Newby 1999). If the survey is conducted in a similar fashion every year, we can at least monitor the presence or absence of the butterfly, which is best determined by surveying both adults and larvae. Eventually it may be possible to determine population fluctuations and to devise more precise management strategies that will insure the persistence of the populations at Milagra Ridge.

Special thanks to two-year butterfly volunteer Sandra Camp for conducting the 2000 San Bruno elfin larvae monitoring!

Recommendations

1. If the survey is completed yearly from now on, the results will create an index from which to measure presence, absence, and population fluctuation of *C. m. bayensis* in different habitat areas on the ridge. Survey areas may be added if reasonable routes to other *Sedum* patches are discovered.
2. If the survey is conducted by someone inexperienced in monitoring *C. m. bayensis*, the observer should consult with the San Bruno Mountain butterfly coordinator (currently Thomas Reid and Associates) and visit San Bruno Mountain at the beginning of the elfin season to practice. The use of binoculars is strongly suggested.

Works Cited

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**Figure 1. San Bruno Elfin Butterfly Survey Points
Milagra Ridge 2000**

