

# **SAN BRUNO MOUNTAIN HABITAT CONSERVATION PLAN**



## **YEAR 2008 ACTIVITIES REPORT FOR SPECIAL-STATUS SPECIES**

**Endangered Species Permit PRT-2-9818**

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For:  
The County of San Mateo

January 2009

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## **SUMMARY**

This report describes monitoring activities and the status of species covered under the San Bruno Mountain Habitat Conservation Plan. This report is prepared on an annual basis and is prepared for the County of San Mateo for submission to the U.S. Fish and Wildlife Service. Three endangered species of butterfly are found on San Bruno Mountain and covered under the San Bruno Mountain HCP: the mission blue, callippe silverspot, and San Bruno elfin butterflies.

In 2008, callippe silverspot and San Bruno elfin butterflies were monitored. Both species had last been monitored in 2006. Callippes (CS) were monitored from May 8 to July 9. A total of 476 CS were counted in 2008, with 19.4 sightings/hour (S/H) for all transects combined, which was slightly higher than the average measured in the past eight years. The San Bruno population of Callippe silverspot has remained fairly stable over the last eight years: there has been no consistent growth or decline in the population since monitoring began. Population size and mean S/H across all 12 transects varied annually, and this variation is consistent with variation typically caused by annual variation in climatic conditions. Population sizes and S/H for each individual transect tended to mirror the population as a whole: none of the sub-populations located along each transect either declined or increase significantly over the past eight years. Callippes were the most abundant species seen in the 2008 Xerces Count, performed June 14 (201 CS observed). Callippes will next be monitored in 2010.

Two fires occurred on the Mountain in 2008: a small wildfire burned a portion of transect 12 on the Southeast Ridge above Highway 101, and a 300-acre wildfire burned all of transect 9 and a portion of transect 7. These transects should be monitored over the next few years for regrowth of butterfly host and nectar plant species.

One-time San Bruno elfin larvae counts were performed at 7 fixed points between the dates of May 23 and June 6. A total of 77 larvae were counted in 2008, which is significantly less than that found in previous years. The number of SBE larvae detected at the first two points monitored on May 23 and 27 was not significantly less than has been found in previous years, but counts performed in the last days of May and the first week of June found significantly fewer larvae. It seems that the larvae emerged earlier than expected and monitoring was conducted too late in the season. The habitat supporting the sedum and the sedum plants themselves appeared vigorous with no visible threats. Limited data on SBE larvae collected in mid May as well as the continued vigor of the sedum population suggests that the low count in 2008 was a result of monitoring methodology, and does not represent a drop in SBE abundance. The points will be monitored again in 2010, but it is recommended that they be visited in 2009 for brief surveys to assess larval presence in the third to fourth week in May.

## I. INTRODUCTION

This report describes the status of listed species and monitoring of these species that took place on San Bruno Mountain under Endangered Species Act Section 10(a)(1)(B) Permit PRT 2-9818 for the 2008 calendar year. Listed butterfly species on San Bruno Mountain include the mission blue (*Icaricia icarioides missionensis*, MB), callippe silverspot (*Speyeria callippe callippe*, CS) and San Bruno elfin (*Callophrys mossii bayensis*, SBE) butterflies.

With the implementation of the HCP, take of mission blue butterfly habitat on San Bruno Mountain was authorized under the Endangered Species Act Section 10(a)(1)(B) Permit. Approximately 14% of the total MB habitat is allowed to be taken by development. As of 2008, 9% of this take has already occurred. Although take of 8% of callippe silverspot butterfly habitat on San Bruno Mountain is allowable under the HCP, no take of CS or its host plant (*Viola pedunculata*) has been authorized since the CS was listed as federally endangered in 1997. Some limited take has occurred due to natural and man-induced causes, and these incidences have been reviewed by the U.S. Fish and Wildlife Service and have been too minor to cause effect to the butterfly populations.

Special-status species that are monitored on San Bruno Mountain include the three listed butterflies. Special-status plants have been monitored on the Mountain, but are not included in the current monitoring program due to funding constraints and the fact that no special-status plant species were taken by development allowed under the HCP. Each butterfly species is typically monitored every other year, which allows for a greater proportion of funding resources to be allocated to control of exotic vegetation in butterfly grassland habitat. In 2008, callippe silverspot and San Bruno elfin were monitored.

Appendices containing data collected in 2008 are located at the end of the report. Anyone interested in reviewing field data or other information collected by TRA Environmental Sciences should contact Sam Herzberg, Park Planner with the San Mateo County Parks and Recreation Division at (650) 363-1823. Previous annual activities reports and data are also available on-line at: <http://www.traenviro.com/sanbruno>.

## II. STATUS OF SPECIES OF CONCERN

### A. Mission Blue Butterfly (*Icaricia icarioides missionensis*)

The mission blue butterfly is the most widespread of the endangered butterfly species on the Mountain, and its distribution corresponds closely to the distribution of its host plants. Mission blues are limited primarily to areas where their host plants and nectar plants are concentrated. The host plants for the mission blue butterfly are three perennial lupines: silver lupine (*Lupinus albifrons* var. *collinus*), summer lupine (*L. formosus* var. *formosus*), and varied lupine (*L. variicolor*). Mission blues use a variety of native and nonnative species for nectaring (especially thistles), which are found throughout the grassland and coastal scrub plant communities. Protection from wind appears to be an important habitat component for MB, and often the species is detected on the leeward side of slopes, or within protected roadcut areas where host plants are present in suitable densities. Mission blues have been found to move up to approximately 0.25 miles between habitat patches (Thomas Reid Associates, 1982), though the species is likely to move further when dispersing between habitat areas. It is unlikely that MB

are capable of immigrating to, or emigrating from, San Bruno Mountain due to the urbanization barriers surrounding the Mountain.

Mission blues utilize silver lupine and summer lupine as their primary host plants, and utilize varied lupine less frequently on San Bruno Mountain. Silver lupine is the most widespread host plant species on the Mountain, and grows within dry habitats such as south and east-facing native and non-native grasslands, roadcuts, rock outcrops, fire breaks, ridgelines, erosion rills, and landslide scars. Summer lupine also grows within disturbed soil conditions, and colonizes roadways and landslide scars in more mesic areas, where soils are typically deeper and/or more sandy. Varied lupine grows in grasslands and along disturbed roadsides, typically within mesic exposures, and is commonly found within north and west facing grasslands. Mission blues tend to utilize larger patches of varied lupines, or when smaller patches of varied lupine are found in proximity to silver and/or summer lupine.

Typically, MB butterflies begin adult flight in March, and are most abundant in April. Observations begin to drop off by late May or early June. The timing and duration of the flight season is also influenced by overall seasonal climate as well as microclimate within separate regions of the Mountain. Late spring rains can delay the onset of the flight season throughout the Mountain while hot spring conditions can shorten it. Mission blue colonies on the warmer, dryer south-facing slopes of the Mountain begin and end their flight season earlier than colonies on the cooler north-facing slopes.

Mission blue butterflies were not monitored in 2008, although 35 MB were seen on the Callippe silverspot transects in the early part of the CS flight season (Appendix A). Data and analysis of the 2007 MB monitoring data are available in the 2007 Activities Report for Covered Species (TRA 2008).

## **B. Callippe Silverspot Butterfly (*Speyeria callippe callippe*)**

The callippe silverspot distribution is similar to that of the mission blue, however CS is less frequently observed on the west side of the Mountain. Habitat for CS includes grasslands supporting its host plant, *Viola pedunculata*. *Viola* is predominately found within mesic to dry open grasslands on both north and south-facing slopes. *Viola* can also be found on disturbed roadcuts, and along the boundaries between grassland and scrub under partial shade of taller plants.

Ridgelines and hilltops within grassland habitats are an important habitat component for this butterfly species, as callippes utilizes these features for mate selection. Callippe silverspots use a variety of native and nonnative species for nectaring (especially thistles) that are found throughout the grassland and coastal scrub plant communities. The species has been shown to move up to approximately 0.75 mile between habitat patches (Thomas Reid Associates, 1981), but likely can move further in multiple movements. Callippe silverspots are capable of dispersal to and from San Bruno Mountain and two adjacent open space areas, Sign Hill and McClaren Park (both are within 0.25 miles of San Bruno Mountain State and County Park). These parks have extremely limited habitat for callippe at the present time. It is likely that urbanization barriers preclude CS from immigrating or emigrating beyond these two adjacent parks.

The flight season for adult CS is typically from mid-May to mid-July. Due to their larger size and stronger flying ability than mission blues, callippes are not as sensitive to strong winds.

Often this species is detected along ridgelines and hilltops in high densities, sometimes during windy conditions (>10 mph average).

Callippes were monitored in the spring and summer of 2008. Survey methodology and results follow.

### Survey Methodology

Surveys were conducted on fixed transects to provide a means with which to compare CS observations from year to year at specific locations. Fixed transect locations were not chosen randomly but were placed in habitat areas with higher butterfly densities and areas that include a variety of slope exposures, nectar plants, and soil conditions (i.e. road cuts, ravines, and natural slopes). Even within high-density habitat locations, it is sometimes difficult to observe enough butterflies for statistical comparison. For this reason, fixed transects were located only in areas where there was a good chance of observing CS under desirable weather conditions. Transects vary in length from approximately 500 to 2100 meters and are permanently marked in the field. A total of 13 fixed transects were monitored in 2008.

Twelve of the 13 transects have been surveyed for CS eight times since 2000. Two additional transects were added in 2005 (transects 13 and 14) east of the terminus of Carter Street at Guadalupe Canyon Parkway. This location was chosen in order to learn more about potential CS presence and movement in grasslands north of Guadalupe Canyon Parkway and habitat at the west end of the Northeast Ridge, as residential development is planned within parcels on the Northeast Ridge. In 2008, transect 14 was not monitored as the area where this transect was located is now under modification (the eucalyptus grove was thinned and soils were graded and stabilized). Transect 13, however, is outside of the proposed development zone and was monitored in 2008.

The monitoring program attempts to catch the beginning and end of the flight season and thoroughly document the observations on a weekly or biweekly basis during that period. It is not cost effective for monitoring teams to monitor the fixed transects prior to species emergence, or to continue monitoring transects after most of the observations have dropped off. As a result, the actual monitoring period does not precisely correspond to the flight season for each butterfly species.

Ideally, each transect is monitored every 7-10 days during warm, calm weather (wind speeds less than 10 miles per hour) when CS are most active. However, in practice, transects are often surveyed less frequently due to poor weather conditions (fog and/or wind). Efforts are made to complete an observation cycle (a survey of all thirteen transects) within one to two days. All butterflies observed beyond a transect or in the transect vicinity during travel between transects are recorded as incidental observations. It should be noted that because of the steep slopes, various microclimates, and limited survey days, it is a challenge to monitor the butterflies on San Bruno Mountain in a consistent manner from year to year.

The duration spent walking a transect is recorded by the observer, and all CS observed along the transect are noted. The location and time of the observation is recorded on a map. The number of CS sightings per hour (S/H) is used for analysis. The number of CS observed on a particular transect is divided by the number of minutes to complete the transect survey. For each year, the

mean and maximum CS sightings per hour for all transects are used to compare relative CS abundance between years.

Summarized CS data is presented in Appendix A and raw data is presented in Appendix B.

Results

The observed flight season for CS lasted from May 8 to July 9, totaling 62 days. This is similar to what has been observed by TRA in the past several years (Table 1). A total of 476 Callippes were counted in 2008. This exceeds the number of CS counted in 2006 (443) and is similar to numbers seen in previous years (TRA annual reports).

**Table 1. Callippe Silverspot Flight Season Start and End Dates: 2000-2008**

Year	Date first CS observed	Date fixed transect surveys began	Date of last CS observation	Approximate length of flight season (Days)
2000	May 18	June 1	July 14	57
2001	April 4*	May 21	August 4	122
2002	May 8	May 17	July 9	62
2003	May 9	May 12	July 9	61
2004	April 27	April 28	June 15	49
2005	May 11	May 11	July 13	64
2006	May 18	May 24	July 18	62
2008	May 8	May 8	July 9	62

\*Second CS sighting in 2001 occurred on May 8.

There were two fires on San Bruno Mountain in 2008 that burned portions of the CS transects. A small fire on the Southeast Ridge above Highway 101 burned a portion of transect 12 in early June. On June 23, a wildfire burned approximately 300 acres in Owl and Buckeye Canyons. All of transect 9 and the east half of transect 7 was burned. No vegetation remained along transect 9 and monitoring of this transect ceased for the 2008 season. Some vegetation on transect 7 along the Ridge Trail and down the south slope survived the fire or was only moderately burned, and this transect continued to be monitored for the remainder of the flight season.

Callippes were observed on all transects in 2008 except for transect 13. The total sightings/hour for all transects combined in 2008 is 19.4, which is higher than that recorded in the past two monitoring years of 2006 and 2005 (14.5 sightings/hour in both years). Figure 1 (all figures are located after Section V) illustrates where on the transects CS were recorded in 2008. The mean sightings/hour calculated for each transect are discussed below (Figure 2).

Transect 9 had a greater mean S/H (55.5) in 2008 than in any year previously recorded (Figure 3). This S/H was obtained from three surveys, as monitoring of transect 9 ceased after the June 23 fire. Transect 9 follows a ridgeline between Owl and Buckeye Canyons down from the Ridge Trail (Figure 1) and numerous CS are always observed at the start of the transect on the hilltop

just above the Ridge Trail. As all of the vegetation was burned along this transect, it will be important to monitor the restoration of vegetation here in the next few years (see Recommendations, below).

Transects 11, 7, and 10 had the next highest mean S/H in 2008 (35.6, 30.5, and 23 respectively). These three transects, along with transect 9, are all located on the Southeast Ridge and sub-ridges. Transect 12, also on the Southeast Ridge, had fewer S/H than in previous years (Figure 3), likely due to the small fire that burned a middle section of the transect in early June.

Transects 3, 4, and 5 on the Northeast Ridge continue to have a mean S/H similar to the total mean calculated when all transects are combined. In 2008, the S/H on these three transects were 14.5, 11.2, and 16.9 respectively. Transect 8, above the quarry, also fell into this range with a S/H of 12.5.

Transect 1 (Dairy Ravine) and transect 2 (Saddle) are lower performing transects due to the limited viola habitat along these transects. These transects have been subject to significant weed infestations, that have been the focus of recent restoration work (such as the gorse removal project in the Saddle). As the viola habitat on these transects is fragmented and of lower quality than habitat found on the Southeast or Northeast Ridge, the habitat is of greater threat of becoming unsuitable for the butterflies. Continued maintenance including weed control is needed to preserve what butterfly habitat remains.

Transect 6 intersects only little viola habitat but is of interest to monitor due to its proximity to the Northeast Ridge development and overlap with that area burned in the 2003 Wax Myrtle Ravine fire. In addition, transect 6 passes through a planting island where host plants for the mission blue butterfly and nectar plants for both butterfly species were established. In 2008, a S/H of 2.2 was recorded on transect 6 (Figure 2). Since 2000, the S/H recorded on transect 6 has always remained less than 10 S/H (Figure 3).

Transect 13 was established in 2005 to collect data on butterfly presence as it is across from the section of Northeast Ridge planned for development by Brookfield Homes. Very few butterflies have been seen on transect 13, and no CS were seen in 2008. It is recommended that this transect be abandoned in future CS monitoring efforts.

The maximum S/H found on a transect in a given year is also a useful variable for analysis. By looking at only the maximum S/H, those S/H measurements captured at the beginning or end of the flight season that may be of lower value do not skew the data. Since 2000, no significant trends are seen in the data when analyzing the annual, maximum S/H averaged from the transects (Figure 4). Eight years is not enough data to detect small upwards or downwards trends in the data. However at this time, no perceptible upwards or downwards trends are seen in the data, and the CS population on San Bruno Mountain appears to remain steady, with slight yearly variation due to climatic conditions.

The maximum S/H on each transect from 2000 to 2008 were also analyzed to see if any downward trend on a particular transect might be found. A consistent, long-term decline in S/H on a transect may reflect a loss in habitat or change in habitat quality and signal a need for increased management. None of the transects were found to have a significant upward or downward trend in S/H (Figure 5). Small trends may emerge after more years of data collection,

but at this time, these results do not suggest a need for a change in habitat management at any specific transect. There are transects that have always had fewer butterflies due to limited habitat, such as transect 1, 2 and 6. Land managers may want to consider future restoration projects along these transects to restore/create butterfly habitat.

### Conclusion

Callippe silverspot butterflies are widely distributed through San Bruno Mountain's grassland habitat, and are one of the more abundant species seen during its flight season. During the annual Xerces Society butterfly count on San Bruno Mountain in 2007 and 2008, CS were the most abundant species seen, with a total of 47 counted in 2007 (July 4) and 201 in 2008 (June 14). The number and distribution of CS observed in 2008 indicates that the species continues to be found in similar abundance as has been found in the past eight years of monitoring. The number of butterflies seen on individual transects varies from year to year, but this variation does not suggest any that long-term changes in population size is occurring. No detectable change in CS distribution has been detected.

### Recommendations

Callippe silverspot monitoring is next scheduled for 2010. However, it is recommended that in 2009, transects 7, 9, and 12 be visited to assess how vegetation is re-establishing following the fires and to look for adult CS. A couple of visits to these transects in the middle of the flight season (June) would provide information on site restoration and butterfly usage.

Transect 13 was originally established in 2005 to provide data on CS distribution and movement with respect to the Brookfield Northeast Ridge development. Transect 13 intersects limited and sparse butterfly habitat, and in the three years it has been monitored, six butterflies were observed in 2005 and no butterflies were seen in 2006 and 2008. As the habitat intersected by transect 13 does not represent historical or current high-quality grassland habitat and was created for the purpose of providing information related to the Brookfield development, it is recommended that this transect be abandoned. Establishment of a new transect on the south slope should be considered when CS is next monitored in 2010. This area contains several large populations of viola on the south slope that are currently not monitored for CS.

In 2008, the weather station that was established on San Bruno Mountain began collecting data on June 1, thus missing the start of CS monitoring. For the next survey effort, it is recommended that temperature data from the weather station be used in place of, or in addition to, hand-held temperature devices. The hand-held devices have a moderate degree of variability and are influenced by being in a backpack, pocket, or in direct sun, and therefore can result in inaccurate temperature readings depending on how they are carried between and along transects.

### **C. San Bruno Elfin (*Callophrys mossii bayensis*)**

San Bruno elfin are closely associated with their host plant, Pacific stonecrop (*Sedum spathulifolium*), which grows within higher elevation grasslands on northeast to northwest facing slopes above 500 feet elevation. Sedum often grows along transition areas between scrub and grassland. San Bruno elfins occur where there are high densities of sedum and in areas that are protected from strong winds. San Bruno elfins use a variety of nectar plants limited to the upper elevation grasslands and scrub on the Mountain. This species has been documented to move at

least 0.15 mile between habitat patches (Arnold, 1983), and can likely move much further over the course of multiple flight movements.

The adult flight season for SBE typically occurs between early March and mid April. Third and fourth instar SBE larvae are present and easily identifiable on sedum flower heads typically for 2-3 weeks in May and/or June.

A total of 21 points for monitoring SBE adults and/or larvae were established in 1998. Adult San Bruno elfin were monitored at fixed points consecutively from 1998 to 2004. A randomly-selected subset of monitoring points was chosen for monitoring San Bruno elfin larvae, and these were monitored every year from 1999 to 2003. Larvae are preferable to survey over adults as they are conspicuous, less sensitive to weather, and limit nearly all movement to sedum flower heads. No SBE monitoring of larvae was conducted in 2004 or 2005. In 2006 and 2008 larval SBE only were monitored. Therefore, a total of 7 years of larval monitoring has been conducted (1999-2003, 2006 and 2008).

All existing SBE butterfly habitat on San Bruno Mountain has been protected as open space within San Bruno Mountain State and County Park since 1975. Development that was approved through the San Bruno Mountain HCP did not affect this species, and therefore monitoring and management for this species and its habitat was not a requirement of the HCP permit. However, this species' habitat partly overlaps with that of the mission blue and callippe silverspot, and is composed of some of the most pristine coastal prairie and coastal scrub habitat on the Mountain. Therefore, monitoring and management of SBE has been performed on San Bruno Mountain because of the biological value of this species and its habitat.

San Bruno elfin butterflies were monitored in the spring of 2008. Survey methodology and results follow.

### Survey Methodology

One-time larvae counts were performed at 7 fixed points between the dates of May 23 and June 6 (numerous days of wind speeds greater than 20 mph delayed monitors' ability to conduct surveys in sequential days). Counts were initiated at the peak of the sedum bloom and when larvae had been confirmed as present. Counts were conducted within a 25-meter radius around each point. Every sedum was searched for larvae. No time limit was placed on the survey effort, due to the high variation in sedum density at each point. As much time was taken as needed at each point to allow for inspection of all sedum plants within the 25-meter radius. With one person performing a survey, a point may take up to four hours to survey.

### Results

Larvae counts were conducted over two weeks due to extreme weather conditions and staffing constraints. Past surveys have been conducted in late May to the first of June. The 2008 survey ran later into June, resulting in some sedum being surveyed later in their flowering stage. Ideally, the points are surveyed at the peak of the sedum bloom.

A total of 77 larvae were counted in 2008, which is significantly less than that found in previous years (a total of 355 larvae were counted in 2006) (Table 2). The reason for this appears to be

two fold, and is not assumed to represent a drop in the population size. It appears that the larvae emerged earlier this year than has been observed in past years. On May 14, an informal count was performed at three point transects. Five minutes were spent searching at each of points 15 and 17, and ten minutes were spent searching at point 13. In these few minutes of searching, a total of 18 larvae were found at point 13, 2 larvae were found at point 15, and 3 at point 17. As larvae were detected quickly at these transects on May 14, when the sedum was in an earlier flowering stage, it appears that the peak abundance of the larvae was timed slightly ahead of the peak in the sedum bloom.

**Table 2. San Bruno Elfin Larvae 2008 Point Data**

Point	Date Point	Temp	Wind	# Larvae	2006 #s
5/23	13	63	4	29	38
5/27	6	47	12	35	47
5/28	15	52	5.5	8	41
6/4	7	65	10	2	54
6/5	8	61	3	3	123
6/5	1	54	11.5	0	34
6/6	17	65	11	0	15
6/6	19	65	11	0	3
			TOTAL	77	355

The second apparent reason for the lower SBE numbers in 2008 is that the survey period went later into June than in previous years, and most of the larvae had already pupated. Monitoring performed in the first days of the 2008 survey found larval numbers not significantly lower than in previous years. The remainder of the monitoring days saw fewer and fewer larvae, with none seen at the final three points surveyed. Figure 7 illustrates the number of larvae counted at the 8 points over the course of the 2008 monitoring period. The line graph clearly displays the downward trend in larval numbers over time. The annual activities reports (TRA 2000-2007) were reviewed to learn the dates of the past SBE larvae surveys. For those years in which the survey dates were noted, the points were always surveyed no later than June 1 (Table 3). Surveying several of the points in 2008 after the first of June, combined with the larvae having emerged slightly earlier, resulted in lower larvae counts.

Reporting prior to 2006 failed to include information on the flowering stage of the plants when the larvae were counted, although it is assumed that counts were performed as close to the peak bloom as possible. It would be of interest to look for a correlation between larval abundance and flowering stage as well as other factors, such as rainfall. As of 2006, the flowering stage of the sedum is recorded when a point is surveyed.

**Table 3. San Bruno Elfin Survey Dates 1999-2008**

Year	Dates Surveyed	Total Larvae Counted
1999	5/17 - 6/1	140
2000	Unknown	115
2001	Unknown	253
2002	5/29 - 5/31	291
2003	5/28 - 5/30	281
2006	5/29 - 5/30	373

Year	Dates Surveyed	Total Larvae Counted
2008	5/23 - 6/6	77

The condition of the habitat at and around the 25-meter points was evaluated and any threats to habitat were noted. The sedum and associated vegetation all appeared vigorous and no threats were found. The rocky outcrops that support sedum tend to be within coastal scrub habitat that is more resistant to weed invasion than the grassland habitat where callippe silverspot and mission blue butterflies are found. No recommendations for vegetation management outside of continued monitoring of weed populations (performed by West Coast Wildlands) are needed.

### Conclusions

Data collection on San Bruno elfin larvae in 2008 was timed after the peak in larval abundance at most of the monitoring points. The number of SBE larvae detected at the first two points monitored on May 23 and 27 was not significantly less than has been found in previous years. But counts performed in the last days of May and the first week of June found significantly fewer larvae. It seems that the larvae both emerged earlier than expected, and monitoring was conducted too late in the season. The habitat supporting the sedum and the sedum plants themselves appeared vigorous with no visible threats. A change in habitat quality or density would be of concern for the SBE population. As the host plant habitat is limited in quantity and distribution, a loss or degradation of habitat may negatively impact SBE and result in a population decline.

### Recommendations

Although funding to repeat the SBE surveys will not be available until 2010, it is recommended that in the spring of 2009 some of the more easily accessed SBE points be visited several times in the early and mid stage of the sedum flowering period, in the third and fourth weeks of May. A count of larvae found within 10 to 15 minutes of searching will provide some information on the peak abundance of larvae with respect to the bloom stage, and will also indicate if the species abundance is similar to that found in years prior to 2008. In 2010, all points shall be monitored no later than June 1.

The most reliable way to collect larval data on SBE would be to conduct counts every few days at each of the points from the beginning to the end of the sedum bloom period. However, as there has been and will be no take of SBE habitat under activities covered by the HCP and as funding is limited, priority on butterfly monitoring has been on the MB and CS, both grassland species. Grasslands face a greater threat of loss from weeds and scrub conversion than does the micro-habitat of rocky outcrops where sedum is found. Therefore, priority funding is to habitat preservation and monitoring of MB and CS. With limited funding to SBE, one-time, snapshot surveys offer some data on the species without requiring significant resources.

### **D. Bay Checkerspot Butterfly (*Euphydryas editha bayensis*)**

A small population of the Bay checkerspot butterfly (BCB) was present near the summit of San Bruno Mountain up until the mid-1980's. This species has not been observed on SBM in over 20 years. No BCB larvae or adults were observed on San Bruno Mountain by field crews while conducting biological activities and overseeing development activities in 2008. In October 2000,

the U.S. Fish and Wildlife Service (USFWS) proposed critical habitat for the BCB, followed by a Final Rule issuance on the critical habitat designation in April 2001. The critical habitat designation includes the historic BCB habitat on the main ridge of San Bruno Mountain. This species must be taken into account when planning any activities that could impact BCB habitat.

**E. San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*)**

The San Francisco garter snake (SFGS) was identified in the San Bruno Mountain HCP (1982) as having potential habitat on San Bruno Mountain. No SFGS were observed on the Mountain by field crew while conducting biological activities and overseeing development activities in 2008. There have been no confirmed observations of SFGS on San Bruno Mountain in the 25 years of the HCP monitoring program. Based on the lack of significant ponds and other aquatic habitats, this species is unlikely to be present.

**F. California Red-legged Frog (*Rana aurora draytonii*)**

The California red-legged frog (CRLF) shares similar aquatic habitat with SFGS. Though it was not identified as a sensitive species at the time of the HCP, CRLF has since been listed as a Federally Threatened species. No CRLF were observed on San Bruno Mountain by field crews while conducting biological activities and overseeing development activities in 2008. There have been no confirmed observations of CRLF on San Bruno Mountain in the 25 years of the HCP monitoring program. Based on the lack of significant ponds and other aquatic habitats on San Bruno Mountain, it is unlikely this species is present.

**G. Plants of Concern**

Several rare and listed plant species are found on San Bruno Mountain, however no rare plants were monitored with HCP funds in 2008. San Francisco campion (*Silene verecunda* ssp. *verecunda*) was mapped in 2007 on American Tower property at the summit of San Bruno Mountain. Locations of San Francisco campion along with previously mapped mission blue host plants and San Bruno Mountain manzanita (*Arctostaphylos imbricata imbricata*) data was provided in the 2007 Activities Report for Covered Species.

In previous years, colonies of listed plants or rare plants with a status of CNPS List 1B or higher (i.e. *Arctostaphylos imbricata imbricata*, *Lessingia germanorum*, *Silene verecunda* ssp. *verecunda*, and *Helianthella castanea*) were mapped using GPS. See previous annual reports (1999-2007) for maps showing the distribution of these rare plants on San Bruno Mountain.

### **III. REFERENCES**

Arnold, 1983. Ecological studies of six endangered butterflies (Lepidoptera, Lycaenidae): island biogeography, patch dynamics, and design of habitat preserves. Univ. of Calif. Publications in Entomology. 99:1-161.

County of San Mateo, 1982. San Bruno Mountain Habitat Conservation Plan, Volume I and II. Prepared by Thomas Reid Associates.

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TRA Environmental Sciences, 2008. San Bruno Mountain HCP 2007 Annual Activities Report. Prepared for the County of San Mateo.

TRA Environmental Sciences, 2007. San Bruno Mountain Habitat Management Plan. Prepared for the County of San Mateo.

*All TRA documents/ resources available on-line at <http://www.traenviro.com/sanbruno/> or from County of San Mateo Parks and Recreation Division.*

### **IV. STUDY PARTICIPANTS**

Annual report prepared by Autumn Meisel of TRA Environmental Sciences.

2008 TRA Environmental Sciences Field Crew: Autumn Meisel, Reily Dibner, and Sara Krier.

County Coordinators for San Bruno Habitat Conservation Plan: Sam Herzberg.

## **V. GLOSSARY**

**Endangered** - Any species which is in danger of extinction throughout all or a significant portion of its range, other than a species of the class Insecta determined by the Secretary to constitute a pest whose protection under the provision of this Act would prevent an overwhelming and overriding risk to man (Federal Endangered Species Act, 1973).

**Endangered Species Act** - The Federal Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. Sections 1531-1543. The State of California also has an endangered species act which is referred to as the California Endangered Species Act (CESA).

**Invasive Species** - Non-native species of plants or animals that out-compete native species in a specific habitat.

**Fixed transects** - Permanently marked transects that are surveyed year after year. Fixed transects provide a means to compare butterfly observations from year to year at specific locations using standard statistical procedures.

**Habitat Conservation Plan (HCP)** - The San Bruno Mountain Area Habitat Conservation Plan as adopted by the County Board of Supervisors on September 14, 1982 (Resolution No. 43770).

**Habitat Islands** – Small areas of native habitat established in restoration sites. Native plantings are installed in relatively small islands where weeds can be more easily controlled. Planting islands generally range in size from 0.1 - 0.25 acres.

**Host plant** - Particular species of vegetation on which adult butterflies oviposit, and which provides a required food source for survival in the first stages of development after hatching.

**Incidental observation** - A butterfly observed outside of the transect (or point survey area) during travel between survey areas.

**Monitoring** - The task, undertaken by the Plan Operator, of regular observation of biological processes, development and conservation activities on San Bruno Mountain; the purpose is to assure compliance with the HCP, and to measure the success of its implementation.

**Section 10a** - A section of the Endangered Species Act which authorizes the Secretary of the Interior to permit, under such terms and conditions as he may prescribe, any act otherwise prohibited by Section 9 of the Act. The acts may be permitted for scientific purposes, or to enhance the propagation or survival of the affected species (16 U.S.C. Section 1539).

FIGURES

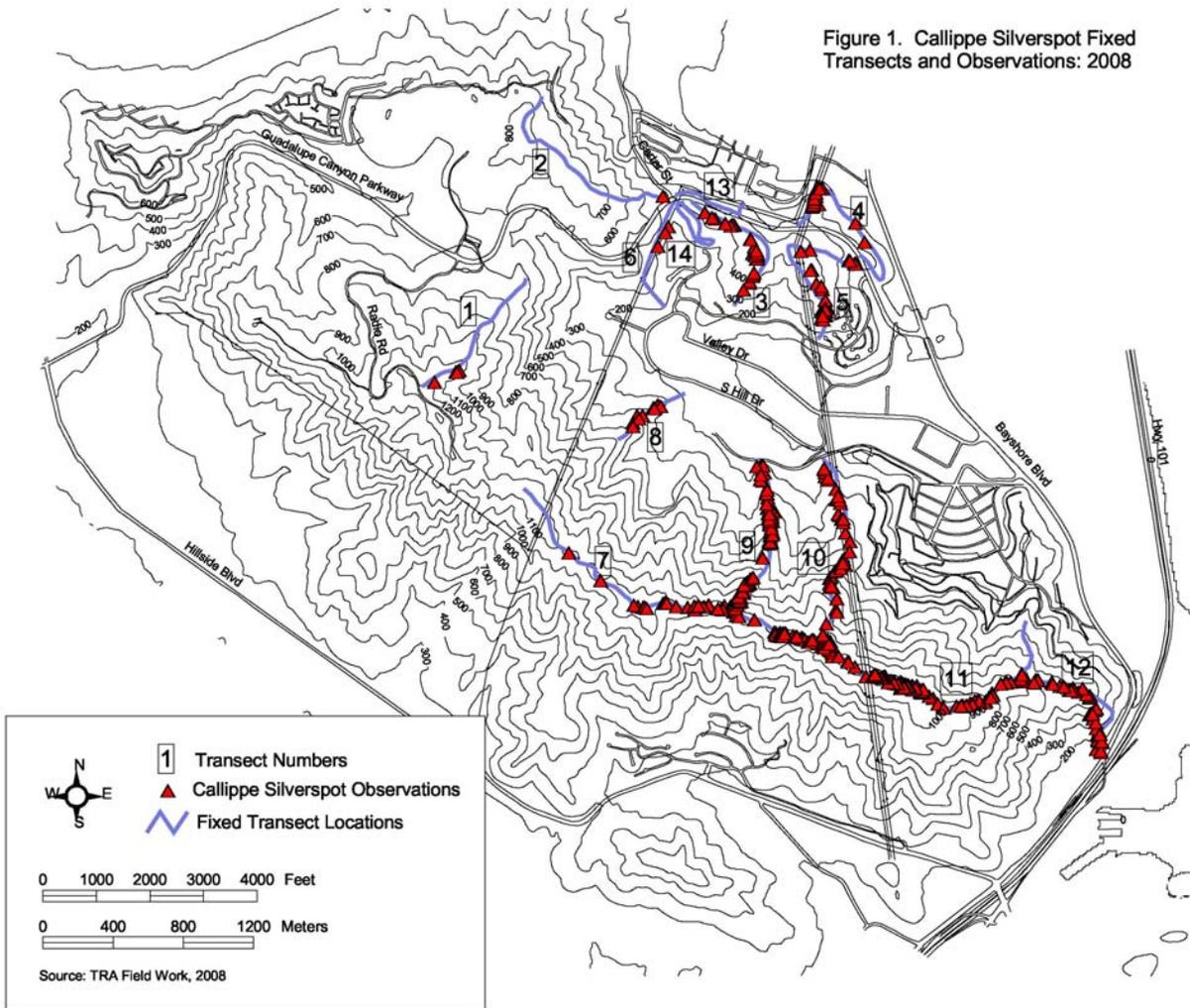


Figure 1. Callippe Silverspot Transects and Observations, 2008

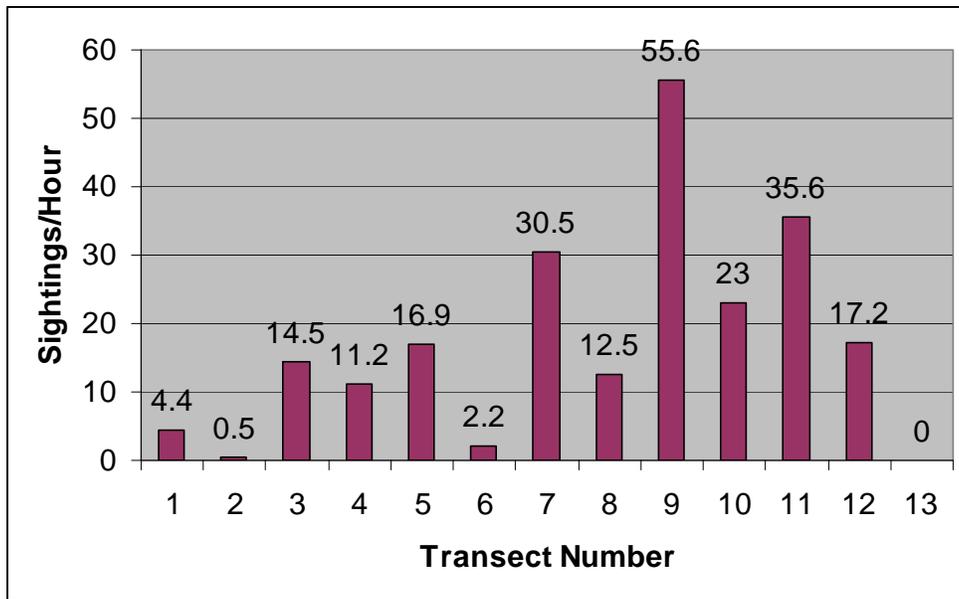


Figure 2. Mean number of CS sightings per hour for each transect in 2008

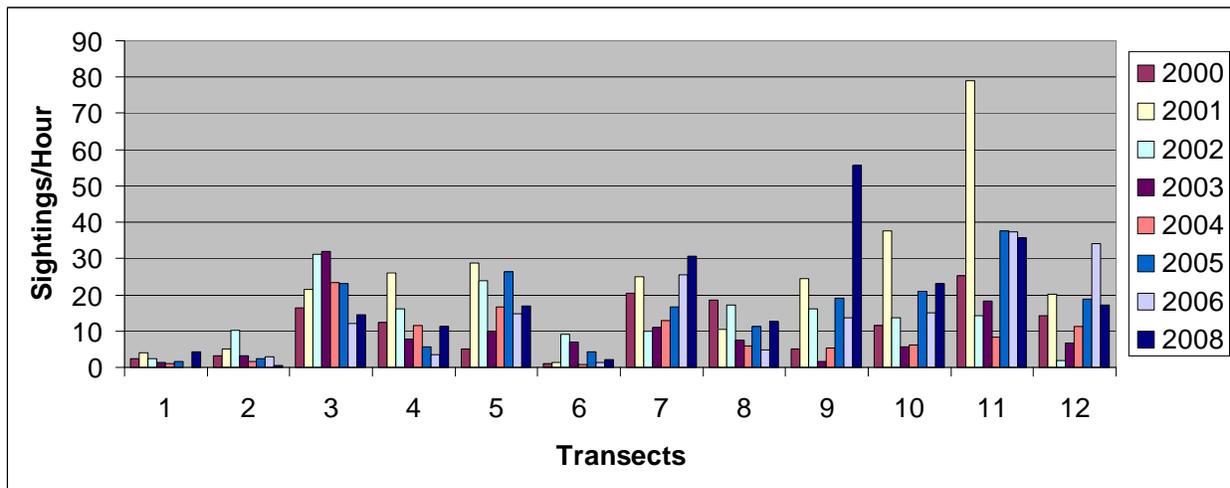


Figure 3. Comparison of mean CS sightings per hour on Transects 1-12 from 2000 to 2008

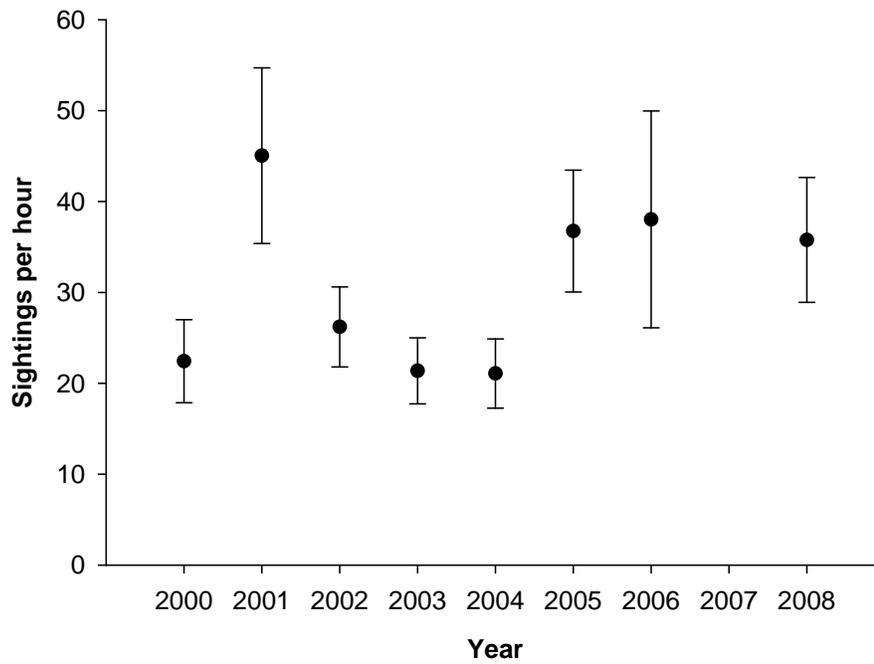


Figure 4. Mean Maximum CS Sightings/Hour from 2000 to 2008

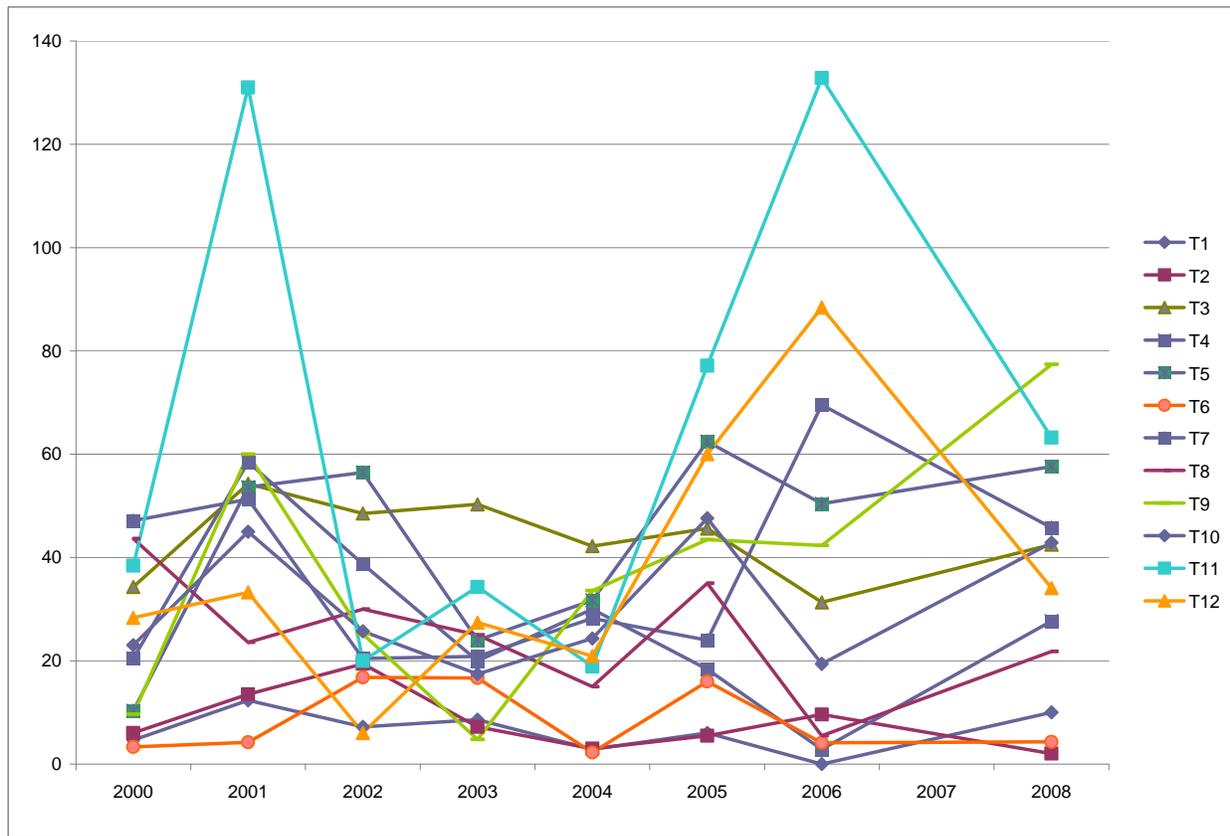


Figure 5. Maximum CS sightings/hour on each transect from 2000 to 2008. No data was collected in 2007.

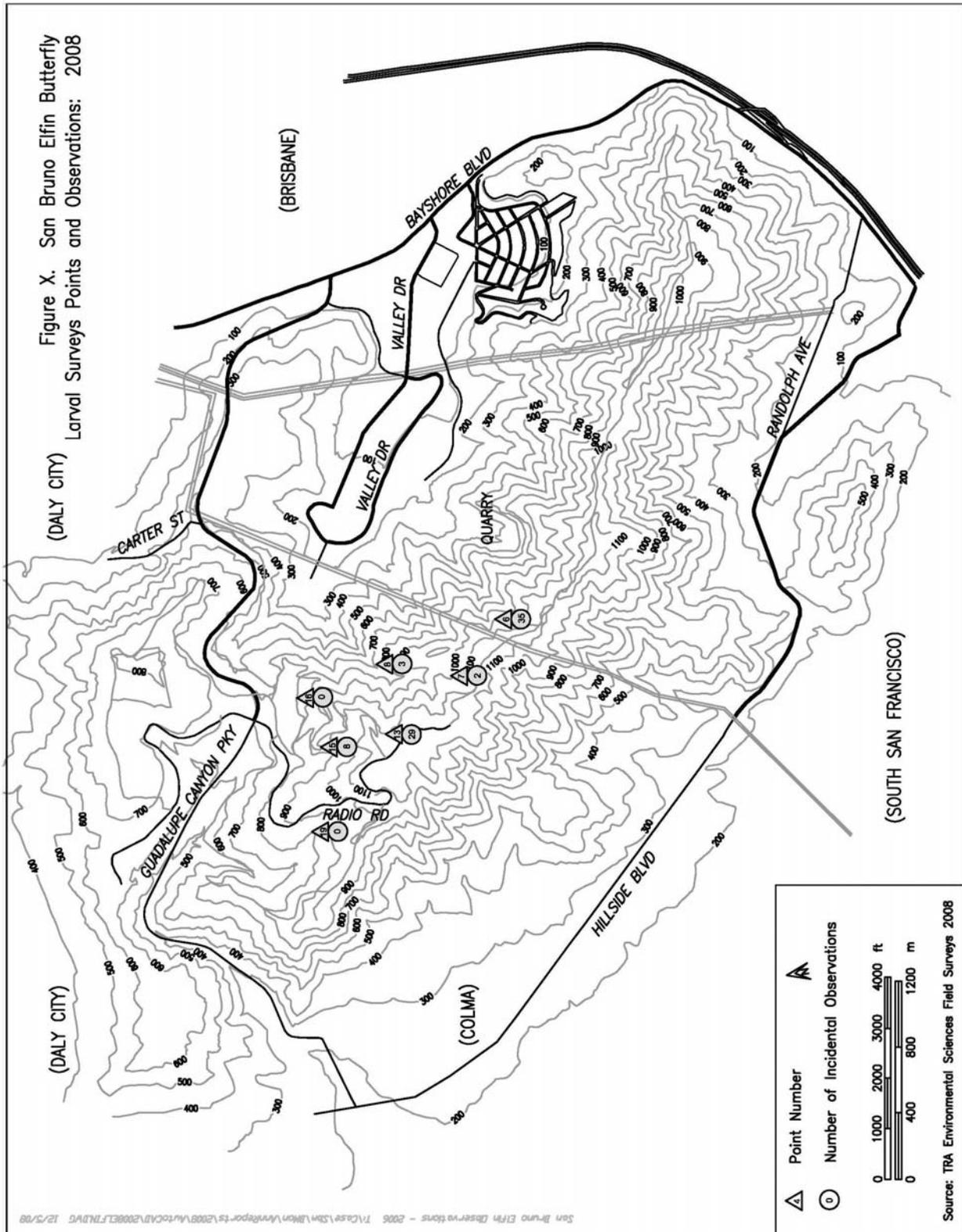


Figure 6. San Bruno Elfin Survey Points and Observations, 2008

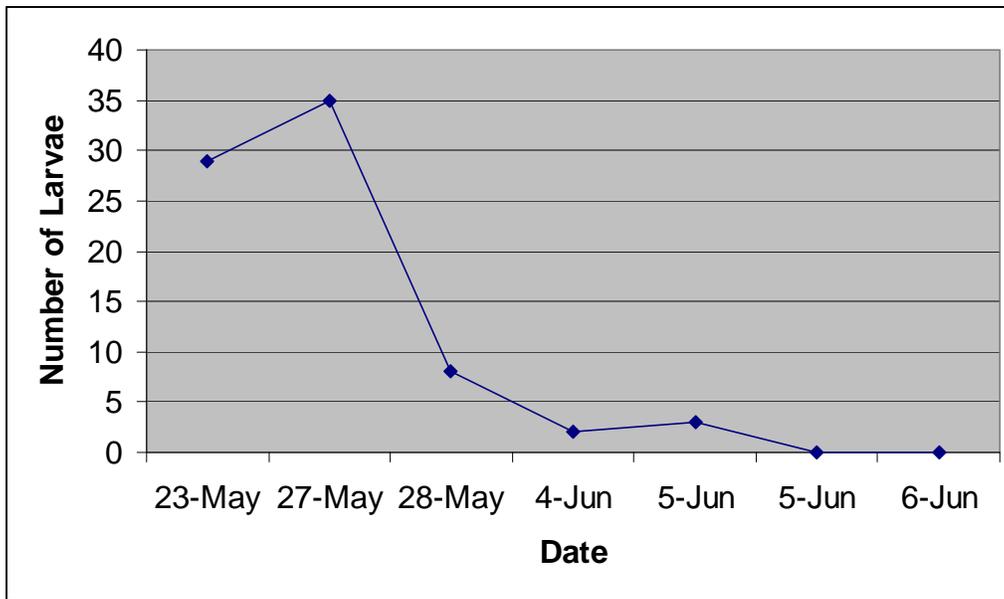


Figure 7. Number of SBE larvae counted over the monitoring period.

## Appendix A. 2008 Callippe Silverspot Summary Data

Transect #	Date	# CS	Minutes	S/H	Temp	Wind	Notes
1	5/9	0	18	0	55	6.5	
1	5/27	0	13	0	56.5	10	
1	6/10	2	19	6.3	71.8	1.3	
1	6/26	3	18	10	61.9	6.0	Post fire, poor air quality
	<b>total</b>	5	68	4.4			
2	5/9	1	30	2	55	6.2	2 MB
2	5/28	0	32	0	57.7	4.7	
2	6/11	0	22	0	75	8.0	
2	6/25	0	24	0	57.2	3.3	Post fire, poor air quality
2	7/10	0	23	0	73.4	6.5	Poor air quality
	<b>total</b>	1	131	0.5			
3	5/13	6	25	14.4	74	7.9	1 MB
3	5/28	17	24	42.5	57.7	4.7	1 MB
3	6/11	2	19	6.3	73.5	5.5	
3	6/25	2	22	5.5	54	5.8	Post fire, poor air quality
3	7/10	0	22	0	78.8	4.0	Poor air quality
	<b>total</b>	27	112	14.5			
4	5/9	1	33	1.8	58	2.9	3 MB
4	5/28	12	26	27.7	57.7	4.7	
4	6/11	11	26	25.4	75	4.0	
4	6/25	0	26	0	57.6	3.5	Post fire, poor air quality
4	7/10	0	18	0	80.6	6.5	Poor air quality
	<b>total</b>	24	129	11.2			
5	5/13	24	25	57.6	76.6	4.4	
5	5/28	7	26	16.2	60.4	2.5	
5	6/11	4	26	9.2	79.8	2.0	
5	6/25	0	25	0	59.4	4.0	Post fire, poor air quality
5	7/10	0	22	0	77	3.0	Poor air quality
	<b>total</b>	35	124	16.9			
6	5/13	1	19	3.2	77.7	4.5	1 MB
6	5/28	1	17	3.5	61.2	2.5	
6	6/11	0	15	0	79.6	3.5	
6	6/25	1	14	4.3	58.6	3.8	Post fire, poor air quality
6	7/10	0	16	0	78.8	2.1	Poor air quality

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Transect #	Date	# CS	Minutes	S/H	Temp	Wind	Notes
	<b>total</b>	3	81	2.2			
7	5/13	29	38	45.8	73	2.7	
7	5/27	14	34	24.7	59.4	8.4	
7	6/10	15	24	37.5	72	3.7	
7	6/26	16	34	28.2	66	1.8	Post fire
7	7/9	10	35	17.1	80	7.8	Post fire
	<b>total</b>	84	165	30.5			
8	5/8	0	12	0	61	3.0	
8	5/27	5	15	20	61.7	3.4	
8	6/10	4	11	21.8	71	3.2	
8	6/26	1	10	6	65	1.8	Post fire, poor air quality
	<b>total</b>	10	48	12.5			
9	5/13	4	23	10.4	74.4	2.2	2 MB
9	5/27	40	31	77.4	59.9	3.5	
9	6/10	31	27	68.9	73	3.9	
9	6/26	Post fire, all veg burned					
	<b>total</b>	75	81	55.6			
10	5/8	3	33	5.5	58.5	7.9	4 MB
10	5/27	25	35	42.9	56.1	4.3	1 MB
10	6/10	20	30	40	80.1	2.6	
10	6/26	11	30	22	68	1.5	Post fire, poor air quality
10	7/9	3	34	5.3	81.5	3.5	
	<b>total</b>	62	162	23.0			
11	5/8	17	37	27.6	54.4	9.9	9 MB
11	5/27	13	25	31.2	54.6	5.1	1 MB
11	6/10	20	26	46.1	78.9	5.8	2 MB
11	6/26	39	37	63.2	68.4	2.0	Post fire, poor air quality
11	7/9	0	25	0	81.5	7.0	
	<b>total</b>	89	150	35.6			
12	5/8	21	37	34.1	64	4.3	2 MB
12	5/27	17	35	29.1	58.6	5.7	4 MB; Post burn
12	6/10	11	37	17.8	78.9	1.9	2 MB
12	6/26	0	27	0	68	2.7	Post fire, poor air quality
12	7/9	1	38	1.6	81.5	0.8	

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<b>Transect #</b>	<b>Date</b>	<b># CS</b>	<b>Minutes</b>	<b>S/H</b>	<b>Temp</b>	<b>Wind</b>	<b>Notes</b>
	<b>total</b>	50	174	17.2			
13	5/9	0	10	0	58.8	2.7	
13	5/28	0	10	0	60.4	2.5	
13	6/11	0	9	0	75	6.0	
13	6/25	0	9	0	57.6	3.5	Post fire, poor air quality
13	7/10	0	9	0	77	7.7	Poor air quality
	<b>total</b>	0	47	0			
INC	5/8	3					
	5/27	3					
	6/10	5					
	<b>total</b>	11					<b>Total MB: 35</b>

**Appendix B. 2008 Callippe Silverspot Raw Data**

TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
1	F	R	6/10/08	9:33
1	F	T	6/10/08	9:34
1	F	R	6/26/08	12:15
1	?	S	6/26/08	12:18
1	?	S	6/26/08	12:18
2	F	S	5/9/08	11:44
3	F	S	5/13/08	12:31
3	F	S	5/13/08	12:31
3	F	S	5/13/08	12:42
3	F	N	5/13/08	12:45
3	F	N	5/13/08	12:45
3	F	T	5/13/08	12:56
3	?	T	5/28/08	10:15
3	F	S/N	5/28/08	10:19
3	F	T/N	5/28/08	10:20
3	F	N	5/28/08	10:21
3	?	T	5/28/08	10:21
3	F	T/R	5/28/08	10:22
3	F	T	5/28/08	10:23
3	W	R	5/28/08	10:23
3	F	S	5/28/08	10:25
3	F	S	5/28/08	10:25
3	F	R	5/28/08	10:28
3	F	S	5/28/08	10:28
3	?	S	5/28/08	10:28
3	?	S	5/28/08	10:30
3	F	R	5/28/08	10:32
3	F	R	5/28/08	10:32
3	F	R	5/28/08	10:33
3	?	T, U	6/11/08	10:36
3	?	T, D	6/11/08	10:36
3	F	R	6/25/08	10:17
3	F	R	6/25/08	10:19
4	F	S	5/28/08	11:01
4	F	R	5/28/08	11:01
4	F	S/R	5/28/08	11:02
4	F	S/R	5/28/08	11:02
4	F	S/R	5/28/08	11:02
4	F	S/R	5/28/08	11:02
4	?	T	5/28/08	11:04
4	?	T	5/28/08	11:04
4	?	T	5/28/08	11:06
4	?	S	5/28/08	11:07
4	?	S	5/28/08	11:07
4	?	S	5/28/08	11:17
4	F	R/T	5/9/08	12:45
4	?	R, S	6/11/08	10:59
4	?	R, S	6/11/08	10:59

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
4	?	R, S	6/11/08	10:59
4	?	R	6/11/08	11:00
4	?	S, R	6/11/08	11:02
4	?	S, R	6/11/08	11:02
4	?	S, R	6/11/08	11:02
4	?	S, R	6/11/08	11:02
4	?	S	6/11/08	11:03
4	?	S	6/11/08	11:03
4	?	S, R	6/11/08	11:04
5	F	S	5/13/08	11:57
5	F	S	5/13/08	11:57
5	F	S	5/13/08	11:57
5	F	S	5/13/08	11:58
5	F	R	5/13/08	11:58
5	F	T	5/13/08	12:04
5	F	T	5/13/08	12:08
5	F	T	5/13/08	12:09
5	F	T	5/13/08	12:11
5	F	S	5/13/08	12:11
5	F	S	5/13/08	12:11
5	F	S	5/13/08	12:11
5	F	S	5/13/08	12:11
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	F	T	5/13/08	12:12
5	W	T	5/13/08	12:15
5	F	T	5/13/08	12:15
5	?	T	5/28/08	9:36
5	F	S	5/28/08	9:41
5	F	T	5/28/08	9:45
5	?	T	5/28/08	9:48
5	F	R	5/28/08	9:50
5	F	S	5/28/08	9:50
5	F	S	5/28/08	9:53
5	F	N	6/11/08	9:56
5	F	S	6/11/08	10:05
5	?	S	6/11/08	10:05
5	F	F	6/11/08	10:08
6	F	S	5/13/08	13:25
6	?	T	5/28/08	10:55
6	F	S	6/25/08	10:49
7	F	T	5/13/08	10:18
7	F	S/N	5/13/08	10:19
7	F	S	5/13/08	10:21

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
7	F	S	5/13/08	10:21
7	F	S	5/13/08	10:21
7	F	T	5/13/08	10:24
7	F	R/S	5/13/08	10:25
7	F	R	5/13/08	10:26
7	F	R	5/13/08	10:26
7	F	S	5/13/08	10:28
7	F	S	5/13/08	10:28
7	F	S	5/13/08	10:29
7	F	S	5/13/08	10:29
7	F	T	5/13/08	10:29
7	F	T	5/13/08	10:29
7	F	R	5/13/08	10:29
7	F	R	5/13/08	10:29
7	F	S	5/13/08	10:29
7	F	S	5/13/08	10:35
7	F	S	5/13/08	10:35
7	F	S	5/13/08	10:36
7	F	S	5/13/08	10:36
7	F	T	5/13/08	10:36
7	F	T	5/13/08	10:36
7	F	S	5/13/08	10:37
7	F	S	5/13/08	10:37
7	F	S	5/13/08	10:37
7	F	T	5/13/08	10:39
7	F	S	5/13/08	10:41
7	F	S/R	5/27/08	11:01
7	F	T	5/27/08	11:04
7	F	T	5/27/08	11:07
7	W	T	5/27/08	11:07
7	?	T	5/27/08	11:11
7	?	S	5/27/08	11:11
7	F	S/R	5/27/08	11:15
7	F	S/R	5/27/08	11:15
7	F	S/R	5/27/08	11:15
7	F	S/R	5/27/08	11:15
7	F	S/R	5/27/08	11:15
7	F	S	5/27/08	11:17
7	F	S	5/27/08	11:17
7	F	S	5/27/08	11:17
7	F	T	6/10/08	10:53
7	W	S	6/10/08	10:57
7	F	S	6/10/08	11:00
7	F	S	6/10/08	11:00
7	F	S	6/10/08	11:01
7	F	N	6/10/08	11:03
7	F	S	6/10/08	11:04
7	F	S	6/10/08	11:04
7	F	S	6/10/08	11:05
7	F	T	6/10/08	11:11

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
7	F	N	6/10/08	11:15
7	F	T	6/10/08	11:15
7	F	T	6/10/08	11:15
7	F	S	6/10/08	11:16
7	F	S	6/10/08	11:16
7	F	T	6/26/08	10:21
7	W	T, S	6/26/08	10:34
7	F	S	6/26/08	10:42
7	F	S	6/26/08	10:42
7	F	S	6/26/08	10:42
7	W	S	6/26/08	10:42
7	W	S	6/26/08	10:42
7	W	S	6/26/08	10:43
7	W	S	6/26/08	10:44
7	F	S	6/26/08	10:46
7	F	S	6/26/08	10:46
7	F	S	6/26/08	10:46
7	W	S, R	6/26/08	10:47
7	F	S, R	6/26/08	10:47
7	F	S, R	6/26/08	10:47
7	F	S, R	6/26/08	10:47
8	W	S	5/27/08	9:22
8	F	S	5/27/08	9:22
8	F	R	5/27/08	9:24
8	F	R	5/27/08	9:27
8	F	S	5/27/08	9:29
8	F	T	6/10/08	9:42
8	W	T	6/10/08	9:47
8	F	T/S	6/10/08	9:48
8	F	R	6/10/08	9:50
8	W	T, S	6/26/08	12:28
9	F	S	5/13/08	10:52
9	F	R	5/13/08	10:52
9	F	S	5/13/08	11:07
9	F	S	5/13/08	11:09
9	F	S	5/27/08	11:33
9	F	S	5/27/08	11:33
9	F	S	5/27/08	11:34
9	F	S	5/27/08	11:34
9	F	S	5/27/08	11:34
9	F	S	5/27/08	11:35
9	F	S	5/27/08	11:35
9	F	S	5/27/08	11:35
9	F	S	5/27/08	11:35
9	F	S	5/27/08	11:35
9	W	S	5/27/08	11:37
9	F	S	5/27/08	11:37
9	F	S	5/27/08	11:37
9	F	S	5/27/08	11:37
9	F	S	5/27/08	11:37
9	F	S	5/27/08	11:39

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
9	F	S	5/27/08	11:39
9	F	T	5/27/08	11:46
9	F	S	5/27/08	11:49
9	F	S	5/27/08	11:49
9	F	S	5/27/08	11:49
9	F	R	5/27/08	11:51
9	F	S	5/27/08	11:53
9	F	S	5/27/08	11:53
9	F	S	5/27/08	11:53
9	F	S	5/27/08	11:54
9	F	S	5/27/08	11:54
9	W	S	5/27/08	11:54
9	W	S	5/27/08	11:54
9	W	S	5/27/08	11:55
9	F	S	5/27/08	11:55
9	F	S	5/27/08	11:55
9	F	S	5/27/08	11:57
9	F	S	5/27/08	11:57
9	F	S	5/27/08	11:58
9	F	S	5/27/08	11:58
9	F	R/S	5/27/08	12:00
9	F	S	5/27/08	12:01
9	F	M	5/27/08	12:01
9	F	M	5/27/08	12:01
9	F	R	5/27/08	12:02
9	F	S	6/10/08	11:27
9	F	S	6/10/08	11:27
9	F	S	6/10/08	11:27
9	F	S	6/10/08	11:28
9	W	S	6/10/08	11:28
9	W	S	6/10/08	11:30
9	W	R	6/10/08	11:30
9	F	S	6/10/08	11:30
9	F	S	6/10/08	11:30
9	F	S	6/10/08	11:30
9	F	S	6/10/08	11:30
9	F	S	6/10/08	11:31
9	F	S	6/10/08	11:32
9	F	T/S	6/10/08	11:41
9	F	S	6/10/08	11:42
9	F	S	6/10/08	11:42
9	F	S	6/10/08	11:42
9	W	S	6/10/08	11:42
9	W	S	6/10/08	11:42
9	F	T	6/10/08	11:43
9	F	S	6/10/08	11:46
9	F	S	6/10/08	11:46
9	F	S	6/10/08	11:46
9	F	S	6/10/08	11:47
9	W	S	6/10/08	11:48

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
9	F	T	6/10/08	11:50
9	W	R	6/10/08	11:50
9	W	R	6/10/08	11:51
9	W	R	6/10/08	11:51
9	F	S	6/10/08	11:52
10	?	T	5/27/08	11:32
10	?	T	5/27/08	11:32
10	?	T	5/27/08	11:33
10	?	T	5/27/08	11:33
10	?	T	5/27/08	11:38
10	F	S	5/27/08	11:44
10	?	T	5/27/08	11:45
10	F	S	5/27/08	11:45
10	F	R	5/27/08	11:45
10	F	S	5/27/08	11:45
10	F	S	5/27/08	11:45
10	F	S	5/27/08	11:46
10	?	S	5/27/08	11:46
10	F	T	5/27/08	11:50
10	?	T	5/27/08	11:53
10	F	R	5/27/08	11:54
10	F	S	5/27/08	11:56
10	W	R	5/27/08	11:56
10	F	R	5/27/08	11:56
10	F	R/S	5/27/08	11:58
10	F	S	5/27/08	12:00
10	F	R	5/27/08	12:02
10	?	T	5/27/08	12:03
10	F	S	5/27/08	12:04
10	F	T	5/8/08	12:27
10	F	T	5/8/08	12:27
10	F	T	5/8/08	12:27
10	F	S	6/10/08	11:44
10	F	S/R	6/10/08	11:46
10	F	T	6/10/08	11:47
10	F	S	6/10/08	11:54
10	F	S	6/10/08	11:54
10	W	T/S	6/10/08	11:55
10	F	R	6/10/08	11:55
10	F	S	6/10/08	11:57
10	F	S	6/10/08	11:57
10	F	R/S	6/10/08	11:58
10	F	S	6/10/08	11:58
10	F	S	6/10/08	12:02
10	F	S	6/10/08	12:04
10	W	S	6/10/08	12:05
10	F	S	6/10/08	12:05
10	F	R	6/10/08	12:06
10	F	S	6/10/08	12:08
10	W	T	6/10/08	12:09

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
10	?	S/R	6/10/08	12:10
10	F	R	6/10/08	12:13
10	F	S	6/26/08	11:09
10	F	S	6/26/08	11:09
10	F	S	6/26/08	11:09
10	W	S	6/26/08	11:09
10	F	R	6/26/08	11:11
10	F	N	6/26/08	11:17
10	F	T	6/26/08	11:21
10	?	T	6/26/08	11:22
10	F	N	6/26/08	11:22
10	F	T	6/26/08	11:25
10	F	S	6/26/08	11:26
10	?	R, S	7/9/08	11:30
10	?	R, S	7/9/08	11:30
10	?	S	7/9/08	11:38
10-	F	S	5/27/08	11:33
11	?	T	5/27/08	11:05
11	?	T	5/27/08	11:05
11	F	T/M	5/27/08	11:08
11	F	T/M	5/27/08	11:08
11	F	S	5/27/08	11:09
11	F	S	5/27/08	11:09
11	W	R	5/27/08	11:09
11	?	S	5/27/08	11:09
11	F	R	5/27/08	11:11
11	?	T	5/27/08	11:17
11	F	R/S	5/27/08	11:19
11	F	T	5/27/08	11:26
11	F	T	5/27/08	11:26
11	F	T	5/8/08	11:49
11	F	S	5/8/08	11:49
11	F	S	5/8/08	11:49
11	F	S	5/8/08	11:50
11	F	S	5/8/08	11:50
11	F	T/S	5/8/08	11:50
11	F	T	5/8/08	11:50
11	F	S	5/8/08	11:51
11	F	T	5/8/08	11:52
11	F	S	5/8/08	12:02
11	F	T	5/8/08	12:07
11	F	T	5/8/08	12:08
11	F	T	5/8/08	12:12
11	F	T	5/8/08	12:14
11	F	T	5/8/08	12:14
11	F	T	5/8/08	12:21
11	F	T	5/8/08	12:21
11	?	S	6/10/08	11:21
11	?	S	6/10/08	11:21
11	?	S	6/10/08	11:21

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TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
11	F	T	6/10/08	11:22
11	F	S	6/10/08	11:24
11	F	S	6/10/08	11:24
11	F	S	6/10/08	11:25
11	F	S	6/10/08	11:29
11	F	R/S	6/10/08	11:31
11	F	S	6/10/08	11:32
11	W	S	6/10/08	11:32
11	F	S	6/10/08	11:34
11	F	S	6/10/08	11:34
11	F	S	6/10/08	11:34
11	F	S	6/10/08	11:35
11	F	S	6/10/08	11:35
11	F	T	6/10/08	11:38
11	F	T	6/10/08	11:40
11	F	S	6/10/08	11:42
11	W	T	6/10/08	11:42
11	F	R	6/26/08	10:26
11	?	T	6/26/08	10:32
11	F	S	6/26/08	10:32
11	?	T	6/26/08	10:33
11	F	S	6/26/08	10:34
11	F	T	6/26/08	10:37
11	W	R	6/26/08	10:44
11	F	S	6/26/08	10:46
11	F	S	6/26/08	10:46
11	F	S	6/26/08	10:46
11	W	S	6/26/08	10:46
11	?	S	6/26/08	10:46
11	F	R	6/26/08	10:49
11	F	R	6/26/08	10:49
11	F	R	6/26/08	10:49
11	F	S	6/26/08	10:50
11	F	S	6/26/08	10:50
11	?	S	6/26/08	10:50
11	F	S	6/26/08	10:50
11	F	S	6/26/08	10:50
11	?	S	6/26/08	10:50
11	F	S	6/26/08	10:50
11	F	S	6/26/08	10:50
11	F	R	6/26/08	10:51
11	F	S	6/26/08	10:52
11	F	T	6/26/08	10:53
11	?	S	6/26/08	10:54
11	?	S	6/26/08	10:54
11	?	S	6/26/08	10:54
11	?	S	6/26/08	10:54
11	?	S	6/26/08	10:54
11	F	R	6/26/08	10:56
11	F	S	6/26/08	10:56

*SBM HCP-- 2008 Activities Report for Covered Species*

TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
11	F	T	6/26/08	10:57
11	W	S	6/26/08	10:57
11	F	T	6/26/08	10:57
11	F	S	6/26/08	11:00
11	F	R	6/26/08	11:01
11	F	S	6/26/08	11:02
12	F	S	5/27/08	10:19
12	?	T	5/27/08	10:23
12	F	R	5/27/08	10:26
12	W	R	5/27/08	10:28
12	F	R	5/27/08	10:35
12	F	S	5/27/08	10:36
12	F	S	5/27/08	10:37
12	F	T	5/27/08	10:37
12	?	T	5/27/08	10:39
12	F	R	5/27/08	10:41
12	?	T	5/27/08	10:41
12	F	R	5/27/08	10:45
12	?	T	5/27/08	10:47
12	?	T	5/27/08	10:47
12	?	T	5/27/08	10:49
12	?	T	5/27/08	10:49
12	?	T	5/27/08	10:50
12	F	R	5/8/08	10:30
12	F	S	5/8/08	10:30
12	F	R	5/8/08	10:33
12	F	S	5/8/08	10:39
12	F	T	5/8/08	10:40
12	F	T	5/8/08	10:44
12	F	S	5/8/08	10:45
12	F	S	5/8/08	10:45
12	F	R	5/8/08	10:47
12	F	S	5/8/08	10:47
12	F	S	5/8/08	10:47
12	F	S/R	5/8/08	10:51
12	F	S/R	5/8/08	10:51
12	F	S	5/8/08	10:51
12	F	T	5/8/08	10:53
12	F	N	5/8/08	10:55
12	F	S	5/8/08	10:58
12	F	R/T	5/8/08	10:59
12	F	R	5/8/08	11:07
12	F	S	5/8/08	11:12
12	F	R	5/8/08	11:12
12	F	R	6/10/08	10:28
12	F	R	6/10/08	10:28
12	F	T	6/10/08	10:50
12	F	S	6/10/08	10:52
12	F	S	6/10/08	10:56
12	W	S	6/10/08	10:56

*SBM HCP-- 2008 Activities Report for Covered Species*

TRANSECT	CONDITION	BEHAVIOR	DATE	TIME
12	?	T	6/10/08	10:57
12	F	S	6/10/08	10:57
12	F	T	6/10/08	10:59
12	F	S	6/10/08	11:00
12	F	T	6/10/08	11:01
12	?	S	7/9/08	10:00
INC	F	S	5/27/08	10:13
INC	?	T	5/27/08	11:00
INC	?	T	5/27/08	11:00
INC	F	R	5/8/08	10:25
INC	F	S	5/8/08	10:25
INC	F	S	5/8/08	11:41
INC	F	S	6/10/08	10:21
INC	F	S	6/10/08	11:13
INC	F	S	6/10/08	11:13
INC	W	R	6/10/08	11:14
INC	F	T	6/10/08	11:15

KEY: F: wings are fresh; W: wings are worn; B: wings are battered; R: resting; S: searching; T: traveling; N: nectaring.