SAN BRUNO MOUNTAIN
HABITAT CONSERVATION PLAN

YEAR 2011 ACTIVITIES REPORT FOR COVERED SPECIES

Endangered Species Permit PRT-2-9818

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SUMMARY

This report describes monitoring activities and the status of species covered under the San Bruno Mountain Habitat Conservation Plan (HCP). 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 are covered under the San Bruno Mountain HCP: the mission blue (MB), callippe silverspot (CS), and San Bruno elfin (SBE).

Of the three butterflies, only MB was monitored in 2011. This species was last monitored in 2009. Mission blue transects were monitored two to three times in April and May. A total of 209 MB were counted in 2011 on 12 transects, which is slightly more than the number counted in 2009. Mission blue butterflies were observed on 10 of the 12 transects surveyed. No MB were seen on transects 3 or 8.

The highest performing transects continue to be found on the Southeast Ridge and South Slope. In addition, many MB were observed on transect 6, located on the Northeast Ridge (NER) in the vicinity of the lower NER water tank.

Areas where MB were seen in least density included transects on the Saddle, Dairy Ravine, and the north-facing slope of the Northeast Ridge (transect 8). All of these areas support landscapes of mixed scrub and grassland, with scrub encroaching on grassland habitats. Where grasslands are intact and vast such as the South Slope, MB were seen most frequently and in greatest numbers.

Fewer MB were recorded on transects 7 and 9 on the Northeast Ridge than in 2007 or 2009. A portion of transect 7 was disturbed as part of the Brookfield development and this may have contributed to lower sightings on this transect. However the remainder of transect 7 and all of transect 9 continue to support high quality grassland with host and nectar plants.

Recommendations for management at this time include continued weed control in areas of historical and restored grassland, and coastal scrub control (as funding permits) on north-facing slopes where scrub is encroaching on grassland habitat. San Mateo County may want to consider scrub management where scrub was removed during the 2008 fire, between Owl and Buckeye Canyons. In addition, French broom and gorse has become quite dense north of Guadalupe Canyon Parkway in the vicinity of transect 8. Management would require years of continued work due to the aggressive regeneration of these species.

It is also recommended that mission blue host plants be mapped across the mountain, as there is no current mapping of these plants. Knowledge of the distribution of butterfly habitat is critical for conservation and restoration efforts.

Callippe silverspot and San Bruno elfin butterflies will be monitored in 2012.

I. INTRODUCTION

This report describes the status of listed species and the results of species monitoring that took place on San Bruno Mountain (SBM) under Endangered Species Act Section 10(a)(1)(B) Permit PRT 2-9818 for the 2011 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 and callippe silverspot butterfly habitat on San Bruno Mountain was authorized under an Endangered Species Act Section 10(a)(1)(B) Permit. Although CS was a species of concern in the HCP and was one of the two primary species the HCP was designed to conserve, the butterfly was not listed under the Endangered Species Act at the time the Incidental Take Permit (ITP) was issued in 1983. After the listing of the callippe as endangered in 1997, HCP permittees were required to halt activities that could result in take of CS pending receipt of take authorization for that species from the USFWS. The City of Brisbane and San Mateo County submitted an application to amend the HCP and ITP to cover take of the CS which would allow the completion of development activities within the Northeast Ridge, an area planned for urban uses under the HCP and for any take associated with continued management of conserved habitat. In 2009, the Brookfield Northeast Ridge HCP Amendment authorized incidental take of CS in association with the Northeast Ridge development and for County management and monitoring on the rest of the Mountain. The original 1983 Section 10(a)(1)(B) Permit PRT 2-9818 was issued for 30 years and thus expires in March 2013. The County of San Mateo plans to apply for permit renewal.

The 2009 Brookfield Northeast Ridge HCP Amendment and ITP acts to 1) increase the area of Conserved Habitat within the Northeast Ridge, 2) provide supplemental HCP funding that would allow for additional management and monitoring activities to occur throughout the Mountain, and 3) authorizes incidental take of CS within the remaining development area (USFWS 2009). Under the amendment, the Brookfield Homes housing development on Administrative Parcel 1-07 would be completed. In 2011, the Brookfield Northeast Ridge property was sold to Toll Brothers, another development company that will proceed with planned development.

Special-status species that are monitored on San Bruno Mountain include the three listed butterflies. Special-status plants have been monitored on the Mountain in the past, but are not included in the current monitoring program due to funding constraints and the fact that no special-status plant species are subject to take 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 2011, the mission blue was the only butterfly that was monitored.

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 SBM, and its distribution corresponds closely to the distribution of its host plants. 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 are limited primarily to areas where their host plants and nectar plants are concentrated. 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 SBM. 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 lupine, or smaller patches of varied lupine when 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 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.

Survey Methodology

In the winter of 2006/2007, 13 new transects were established on SBM for mission blue butterflies (Figure 1). In plotting out the new transects, effort was made to traverse as much MB habitat as possible. Historic habitat as well as restored or planted habitat was included. Where possible, old MB transects were incorporated into the new, longer transects. Transects vary in length from approximately 500 to 2100 meters and are permanently marked in the field. Of the 13 transects, 11 were established with the intention of being regularly monitored. Two transects (transects 2 and 3) were established as transects to be visited less frequently. Transects 2 and 3 were created to study MB usage of these sites, but these sites are not considered of highest importance in terms of measuring MB abundance on the Mountain. Transect 2 is located east of the Pointe Pacific housing development. Transect 3 includes a planting island on the south side of Guadalupe Canyon Pkwy between the Pkwy and Colma Creek. The newly established MB transects were monitored for the

first time in 2007 and again in 2009 and 2011.

Due to concern for monitor safety, in 2007 transects 4 and 5 were reconfigured so that monitors were no longer crossing Guadalupe Canyon Parkway. This was completed in 2009, and transect 4 now ends at the south side of Guadalupe Canyon Parkway and transect 5 connects to that portion of the old transect 4 that is on the north side of the Parkway (Figure 1). Thus the reconfigured transects 4 and 5 have only been monitored twice, in 2009 and again in 2011.

The purpose of fixed transects is to provide a means with which to compare MB 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 MB.

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 approximately 3 times during the flights season, with monitoring at any individual transect spaced at least 2 weeks apart. Monitoring occurs only during warm, calm weather (wind speeds less than 10 miles per hour) when MB are most active. Efforts are made to complete an observation cycle (a survey of all 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 MB observed along the transect are noted. The location and time of the observation is recorded on a map. The number of MB sightings per hour (S/H) is used for analysis. The number of MB observed on a particular transect is divided by the number of minutes to complete the transect survey. For each year, the average and maximum MB sightings per hour for all transects are used to look for upward or downward trends in MB encounter rates among and within transects. The maximum value is the highest S/H recorded on a transect in a given year. The maximum S/H found on a transect in a given year is 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.

Results

A total of 209 MB butterflies were observed in 2011, which is slightly more than the number counted in 2009, which was 188. Figure 2 displays the locations of the 209 MB sightings, and data is provided in Appendix A. Transects 1, 3, 5 and 8 were monitored two times, and transects 4, 6, 7, and 9-13 were each monitored three times. Transect 2 was not monitored in 2011. In 2007, 200 MB butterflies were observed, and in that year, the main transects were surveyed 4 to 5 times, including

during the very beginning and end of the flight season. Both in 2009 and 2011, surveys avoided the very start and end of the flight season. Thus both in 2009 and 2011, fewer surveys were conducted, yet by focusing surveys in the height of the flight season and not surveying at the beginning and end of the season, MB were encountered more frequently and a similar total number of butterflies were observed as in 2007.

Mission blue butterflies were observed on 10 of the 12 transects surveyed. No MB were seen on transects 3 or 8. Figures 3 and 4 display the average and maximum sightings/hour calculated at each transect in 2011. Table 1 lists these values alongside those calculated in 2007 and 2009. The average S/H on a given transect was calculated from the total number of butterflies counted on that transect during all surveys over the total minutes spent on the transect.

Table 1. Average and Maximum S/H on each Transect: 2007, 2009 and 2011

Year/ Transect	Average Values				Maximum Values		
	2007	2009	2011		2007	2009	2011
1	2.4	3.57	3.9		10.3	5.8	5.7
2	0	3	-		0	3	-
3	7.1	22.5	0		7.1	22.5	0
4	N/A*	0	2.7		N/A*	0	4
5	N/A*	0	1.7		N/A*	0	1.8
6	2.8	9.68	15.3		6.3	12.4	18.1
7	3.9	6.18	0.8		10.3	9.5	2.4
8	0.6	0	0		3.5	0	0
9	4.6	4.5	2.7		7.6	6.9	5.6
10	4	1.15	7.6		8.7	1.2	14.4
11	11.3	15.04	15.2		20.6	25.8	21.3
12	6.5	14.21	5.1		14.1	20.4	7.4
13	2.2	13.33	11.1		6.0	20.0	19.4

*N/A as transects 4 and 5 were reconfigured in 2009 and thus cannot be compared to previous years

The transects have been monitored three times (2007, 2009, and 2011), with the exception of transects 2, 4 and 5 which have been monitored twice. This is too few years to allow for a statistical analysis of the data, and trying to tease out a trend from only three years of data can result in false conclusions. However, we can look at data anecdotally, and discuss the quality of the habitat along each of the transects. In considering the S/H calculated at each transect, the maximum value is the most useful as it most accurately represents the peak of the flight season.

The greatest number of mission blue butterflies observed and the highest maximum sightings/hour was on transect 11, where a total of 80 butterflies were observed over three surveys, with a maximum S/H of 21.3. Transect 11 is located on the Southeast Ridge and begins at a previously disturbed slope above Sisters City/Hillside Boulevard that supports lupines. The transect follows the Ridge Trail of San Bruno Mountain, and includes a portion of the Brisbane Acres. Transect 11 was also the most productive transect in 2009 and 2007, when a total of 82 and 88 MB were counted, respectively.

Transect 13 had the next greatest number of MB and highest maximum S/H, with a total of 46 observed over three surveys and a maximum S/H of 19.4. Transect 13 follows the Ridge Trail and then drops down a ridgeline to Hillside Blvd. In 2009, 28 MB were recorded on transect 13, and 12

were recorded in 2007. Both transects 11 and 13 are located on the south facing slope of San Bruno Mountain, where conditions are the most dry and sunny, and there is little threat of encroaching scrub habitat. Grassland habitat supporting lupines on the Southeast Ridge and South Slope was found to be intact and thriving during the 2011 surveys.

Transect 12 is also located on the South Slope and Southeast Ridge and follows a ridgeline from the Terrabay water tank to the Ridge Trail. Fewer MB were observed in 2011 than in the two previous monitoring years, and the S/H was also lower. However, the habitat here continues to support annual grasses, nectar sources, and lupine host plants, and thus the lower S/H is assumed due to natural year to year variation.

No MB were observed on transect 3, while previous years had detected a small number of butterflies. Transect 3 is a short transect that captures an area that was planted with lupines and nectar plants in 2000. Transect 3 is not located in a large area of grassland habitat and is thus not an area of highest priority for MB conservation. Although not in high numbers, lupines persist in this location. It is likely that MB are still utilizing this habitat patch and simply were not observed during the two surveys, or perhaps MB are not present at this location in all years.

No MB were observed on transect 8, nor were any seen in 2009. Transect 8 is located above the Linda Vista residential community. This site is a restoration site that was replanted with lupines in the mid-1980's. One MB was recorded here during the 2007 monitoring effort. The habitat around transect 8 has seen a significant increase in scrub, including non-native species such as French broom and gorse. It has been increasingly difficult to even walk this transect in some locations. It may be that MB are still present and just have not been documented, or it may be that the habitat is not of great enough quality to support MB. There is development to the north and scrub is encroaching from the south, slimming and compromising butterfly habitat. The east end of the transect is a cut slope that was planted with lupines and is not threatened by scrub. However, no MB have been recorded using this area.

Transects 7 and 9 are located on the Northeast Ridge, a portion of which has undergone habitat alteration and a loss of butterfly habitat as part of the Brookfield Development (now Toll Brothers). Transect 7 includes Arnold Slope and Callippe Hill. A single MB was observed during one of the three surveys, representing a maximum S/H of 2.4. The majority of transect 7 is within areas that were not disturbed by the Toll Brothers development. Temperatures ranged in the low 60s during surveys of this transect and transect 9, which may have contributed to the low number of butterflies observed. Mission blue butterflies were observed during two of the three surveys on transect 9, with a total of 6 MB observed. This is less than observed in 2009 and 2007, however, this does not necessarily represent a downward trend or change in MB abundance or distribution. The grassland habitat along both transect 9 and 7 (outside of the Brookfield development) continues to support high quality grassland with host and nectar plants. Scrub encroachment is not a threat here, and weeds, although always present, are treated annually and have not been observed to be displacing butterfly host plants.

On transect 1, located at the ranger's station, MB were detected during both surveys, although in low numbers. A total of 5 butterflies were observed, with a maximum sightings/hour of 5.7. This is the same number of MB that were observed on transect 1 in 2009. In 2011, one MB was observed alongside the roadway that leads to the ranger's station and the other four were found on that part of the transect that circles through coastal scrub and grassland below the ranger's station (Figure 2). Transect 1 is located in an area dominated by native species. No immediate threats to butterfly

habitat were noted.

Transect 4 includes an area that was restored (planting island) in Dairy Ravine in 2000. This transect was surveyed three times in 2011, and a total of two MB were observed. No MB were seen on transect 4 in 2009. One butterfly was observed within the planting island in 2007 for the first time, and a total of two were seen on the transect that year. Transect 4 is located in an area not highly utilized by MB and with few lupines, yet a small number of butterflies apparently do use the habitat here.

Transect 5 supports both *L. albifrons* and *L. formosus* and is located in the Saddle, east of the intersection of Guadalupe Canyon Parkway and Carter Street. This transect was surveyed twice in 2011, and one MB was seen during each survey. No butterflies were seen along this transect in 2009, and in 2007, one butterfly was observed. Coastal scrub succession is gradually taking over the small and isolated patches of lupines in the eastern saddle, and this could be why so few butterflies are observed here.

Transect 6 is located on the Northeast Ridge in the vicinity of the lower NER water tank. It extends through grasslands on the east side of lower Wax Myrtle Ravine. A total of 34 mission blue butterflies were observed on transect 6, making it the third highest number of observations, after transects 11 and 13. A maximum S/H of 18.1 was recorded on transect 6, which is higher than recorded in previous years.

Transect 10 is located at the foot of Owl and Buckeye Canyons. A total of 16 MB were observed over the three surveys, the same number as counted in 2007. A maximum S/H of 14.4 was calculated, which is higher than in 2009 or 2007. Transect 10 does not intersect a great quantity of MB host plants, although the transect does traverse grassland habitat with diverse nectar sources. Part of this transect was burned in the June 2008 fire, and *Lupinus formosus* is rapidly regenerating.

Transect 2 was not visited in 2011. It is a short transect located within the Pointe Pacific development area. This transect was visited once in 2009 and one MB was seen. No MB were observed in 2007. This site may still be used by MB, although presumably infrequently or in low numbers.

Conclusions

Mission blues are found in relatively low density (as is typical for most Lycanidae species), but are widely distributed on San Bruno Mountain. The number and distribution of mission blues observed in 2011 on San Bruno Mountain indicates that this species continues to be found in a wide variety of microclimates and slope exposures on the Mountain, although in significantly varying densities. This conclusion is consistent with historic monitoring data as well as anecdotal observations from butterfly monitors working on the Mountain since 1981.

As documented over the past 30 years of butterfly monitoring on SBM, the Southeast Ridge and South Slope continue to provide high quality habitat for mission blue butterflies. The South Slope contains large areas of grassland, and as this south-facing side of the Mountain is drier and warmer, coastal scrub succession is less of a threat than on the north facing slopes. Mission blues are widely distributed on San Bruno Mountain, but it is only on the South Slope and Southeast Ridge that MB are consistently found in high densities. Ongoing weed management aids in maintaining these grasslands.

Radio Ridge is located on the west side of San Bruno Mountain where native coastal scrub dominates and lupine plants are found on road cuts and areas of thin, rocky soils. The habitat around transect 1 has seen little change and there are no immediate threats to the butterfly habitat here. Butterflies continue to be seen from year to year in low numbers as has been the case since the inception of the HCP.

Within the Guadalupe Hills, the area around transects 6 and 9 on the Northeast Ridge continues to support high quality butterfly habitat and scrub encroachment is not of great concern here. Ongoing management of weed species including thistle and fennel, should continue to maintain these grasslands. The Northeast Ridge in the vicinity of transect 7 has seen an alteration of habitat and a loss of butterfly host and nectar plants due to the Toll Brothers development. However, once the development is complete, comprehensive restoration will be undertaken and hopefully MB nearby will re-colonize the restored habitat.

The area of the Guadalupe Hills where transect 8 is located has become invaded by non-native scrub, primarily French broom and gorse. Although there are still lupine plants here, many of which are robust, the presence of scrub adjacent to these lupine patches may hinder MB movement to these areas. Mission blue butterflies have not been recorded here since 2007 and the area has historically experienced low number of MB. This area would benefit from weed management, and should be considered in the work plan of the weed management contractor if resources permit. Gorse and French broom require year after year of treatment, and thus funding would have to allow for ongoing management in order to justify the effort.

The area of Guadalupe Hills in and around transects 4 or 5 saw few mission blues observations in 2011, while no MB were seen on these transects in 2009. The species is still utilizing grassland habitat in the vicinity of transects 4 and 5, but in low numbers as suitable grassland habitat occurs only in patches among more marginal (scrub or weedy) habitat. Transect 4 is a short transect and the area supporting host plants is within a restoration area that is part of the ongoing weed management program implemented on the Mountain. As the habitat area traversed by this transect is small, MB density is low and individuals may not be encountered during monitoring. Transect 5 includes more of a mosaic of grassland patches within an area that is becoming increasingly dominated by scrub. These grassland patches may diminish with the spread of coastal scrub on the Saddle. The lack of sizable grassland in the vicinity of transect 5 presumable contributes to the infrequent use by MB. Over the 30 years of HCP implementation, this area of Guadalupe Hills has always experienced low numbers of MB.

Within the area of Owl and Buckeye Canyons where a fire took place in 2008, an increase in MB were recorded on transect 10 in 2011. The grassland is regenerating and numerous lupine were seen flourishing in the burn area. The fire helped to reduce coastal scrub, which replaces grassland habitat when not managed. Wildfire has a long-term benefit to grassland dependent species by reducing woody vegetation while favoring the regeneration of grassland species, including lupines. Scrub habitat is also regenerating however, and management of scrub will be needed to preserve the grassland that opened up after the fire.

Mission blue habitat areas on moist, (typically north-facing) slopes are continually being lost to coastal scrub succession (TRA 2007). This process is also occurring on south-facing slopes, but at a much slower rate. As coastal scrub succession continues unchecked on the Mountain without a comprehensive grazing and/or controlled burning program, mission blue and callippe silverspot habitat will continue to slowly decline in total area on San Bruno Mountain.

Recommendations

Recommendations for management include continued weed control in areas of historical and restored grassland, and coastal scrub control (as funding permits) on north-facing slopes where scrub is encroaching on grassland habitat. Areas where MB are found in lower density and where the habitat could benefit from scrub management include the ridges and slopes between Owl and Buckeye Canyons, areas within the Saddle, lower Dairy Ravine, and the slope north of Guadalupe Canyon Parkway where transect 8 is located. In the location of transect 8, continued, annual control of gorse and French broom is needed.

Small eucalyptus stands located at the end of transect 9 and 13 should be visited regularly to control for eucalyptus saplings.

The 2008 fire opened up some habitat in Owl and Buckeye Canyons by removing scrub. The scrub is regenerating, and only periodic fire or human management will allow for a mosaic of grassland and scrub in these north-facing slopes. If funding permits, this area should be visited with the weed management contractor and TRA to determine if scrub management in this location should be incorporated into the weed management work plan.

Mission blue host plants have not been mapped on a mountain-wide basis since 1981 (TRA 2007). Mapping the current distribution would be highly beneficial for focusing conservation and restoration work. It is recommended that a mapping of mission blue habitat be initiated in the near future.

Mission blue butterflies will be monitored again in the spring of 2013. Of particular interest will be the restoration of the Northeast Ridge in the area that was disturbed for the Toll Brothers development (assuming restoration has been completed by 2013). It will be important to monitor MB distribution at areas in and adjacent to areas that were disturbed and then restored.

To date, most mission blue habitat areas that have been lost to coastal scrub succession have been marginal habitat areas (TRA 2007), however it is important to protect as much potential habitat (both marginal and high quality habitat) for the species as possible. Due to year-to-year weather variation, changes in herbivore pressure, and other factors, habitat quality within lupine patches fluctuates (sometimes dramatically) year to year, with high quality patches declining to marginal and marginal habitat patches becoming high quality. Therefore providing as much alternative habitat areas as possible is important to buffer the species from population declines as a result of year-to-year fluctuations in habitat quality across the mountain.

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 utilize 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, 1982), but likely can move further in multiple movements. Callippe silverspots are capable of dispersing to and from San Bruno Mountain and from 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 not monitored in 2011, with the exception of limited monitoring within burn areas (described below). The species was last monitored in 2010 and detailed findings are provided in the 2010 annual report. In summary, the number and distribution of CS observed in 2010 indicated that no perceptible upward or downward trend is seen in the population data overall, and the CS population on San Bruno Mountain shows no significant change when all transects are combined. Transects on the southeast ridge continue to have the highest number of callippes observed. A trend in fewer butterfly encounters (lower S/H) has been detected on some transects, including transects 2 (Saddle), 3 (NER/Brookfield), 6 (water tower), and 8 (quarry). All of these transects have undergone visible habitat change, with an increase in velvet grass and scrub on transect 2, a loss of habitat due to the Brookfield development on transect 3, and an increase in scrub on transects 6 and 8. The movement of scrub into some of the CS transects is indicative of scrub encroachment into grassland habitat that is occurring at various locations throughout San Bruno Mountain, and continues to be of concern to mission blue and callippe habitat.

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 sedum patches 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.

San Bruno elfin butterflies were not monitored in 2011. The species was monitored in 2010 and monitoring details were provided in the 2010 annual report. A summary of 2010 data follows. San Bruno elfin larvae counts were performed two times at 8 fixed points. A total of 308 larvae were counted during the first round of surveys, and 364 were counted during the second round of surveys. The second round corresponded most closely to the peak of the sedum flower bloom. There is an upward trend in the larvae count from 1999 to 2010, which may indicate an increase in population size. The condition of the habitat at and around the 25-meter elfin monitoring points was

evaluated. The sedum and associated vegetation all appeared vigorous and no threats were found. No recommendations for vegetation management outside of continued monitoring of weed populations were needed.

San Bruno elfin butterflies will be monitored again in 2012.

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 2011. 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 2011. 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 (CRF) shares similar aquatic habitat with SFGS. Though it was not identified as a sensitive species at the time of the HCP, CRF has since been listed as a Federally Threatened species. No CRF were observed on San Bruno Mountain by field crews while conducting biological activities and overseeing development activities in 2011. There have been no confirmed observations of CRF 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 2011. 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

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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

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2011 TRA Environmental Sciences Field Crew: Autumn Meisel, Aaron Gabbe, and Megan Kalyankar

County Coordinators for San Bruno Habitat Conservation Plan: Sam Herzberg

FIGURES

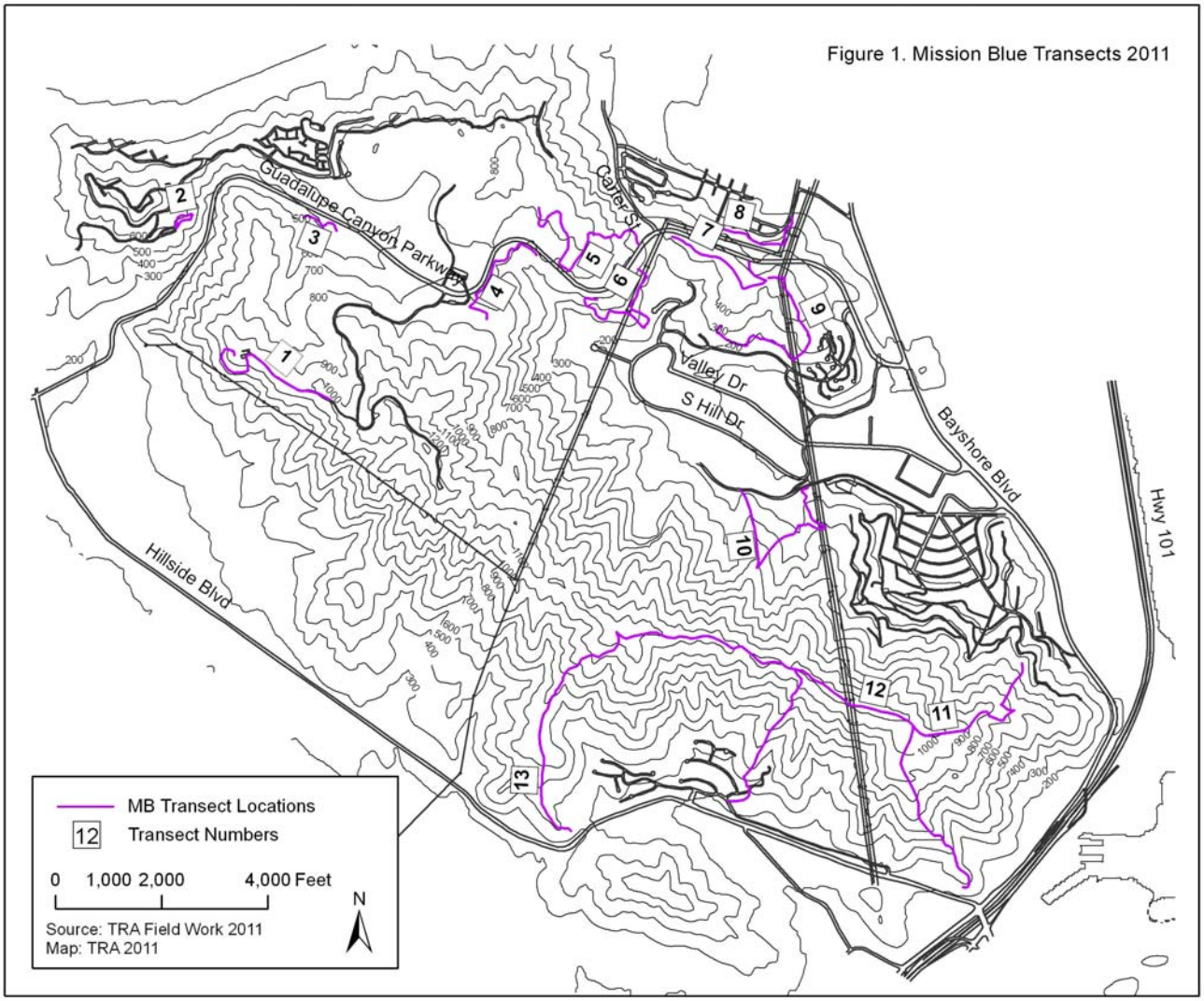

Figure 1. Mission Blue Transect Locations

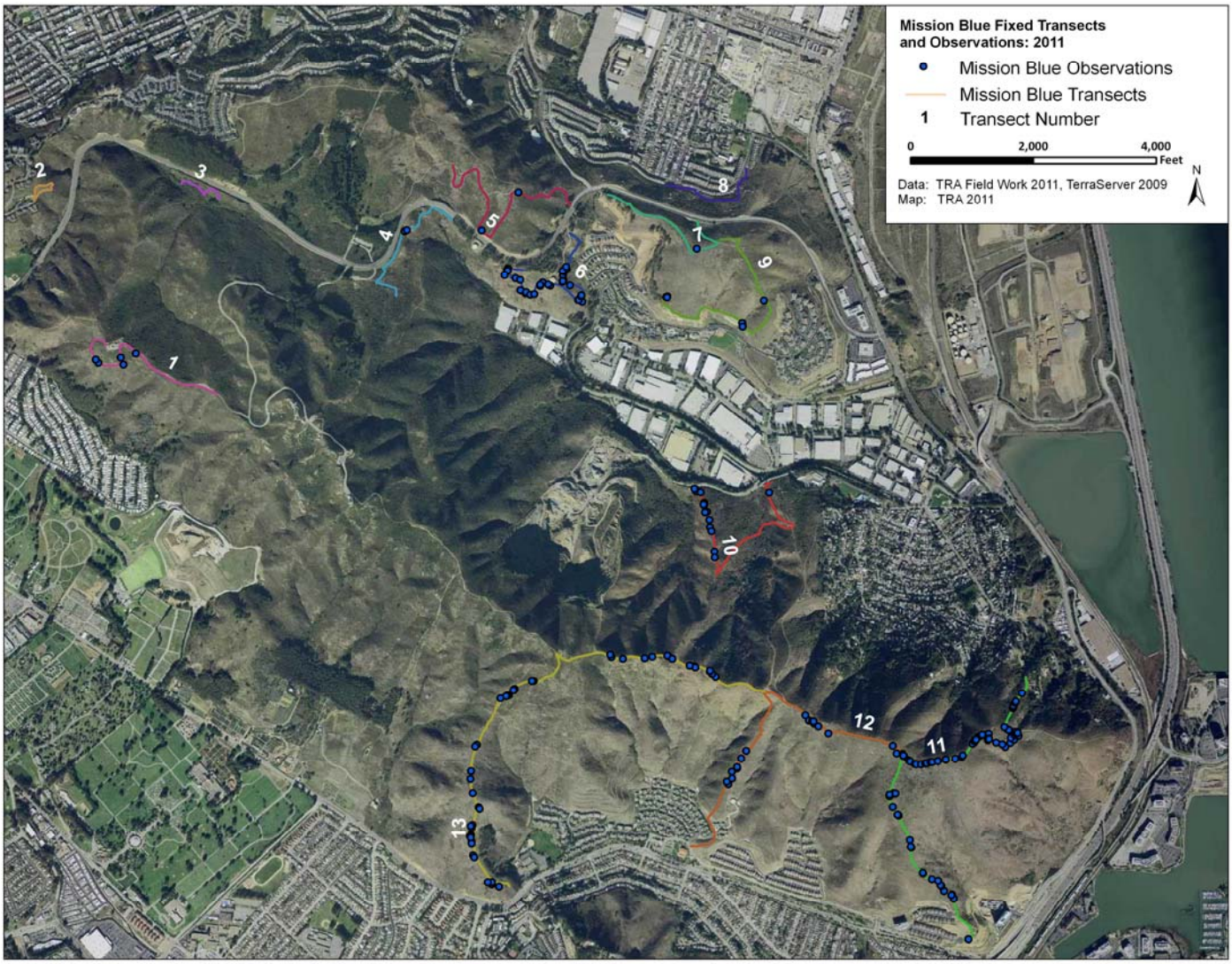

Figure 2. 2011 Mission Blue Observations

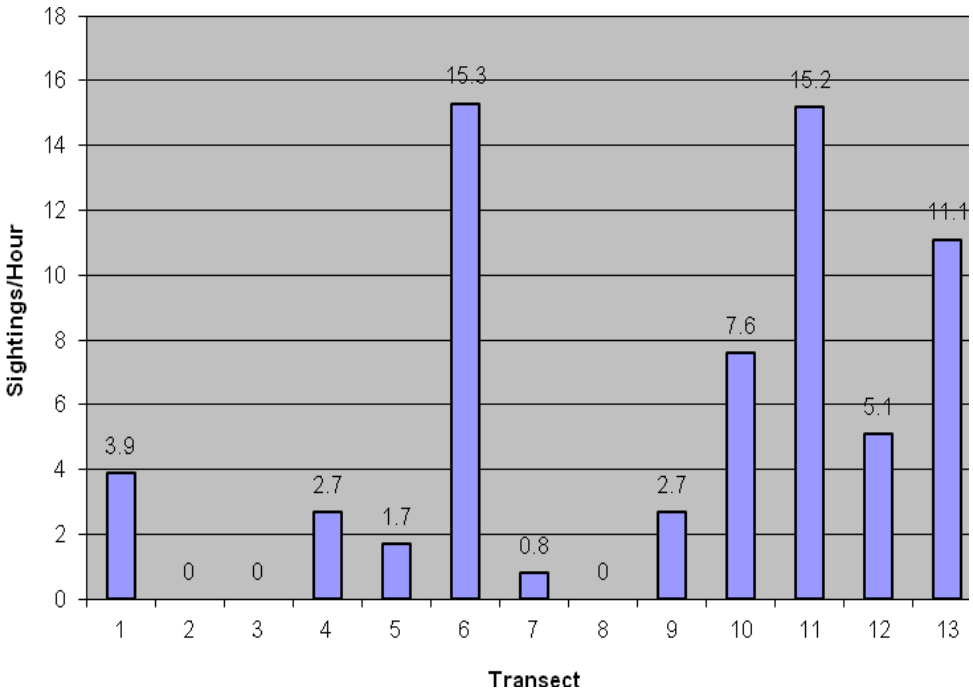

Figure 3. Average number of MB sightings per hour for each transect in 2011

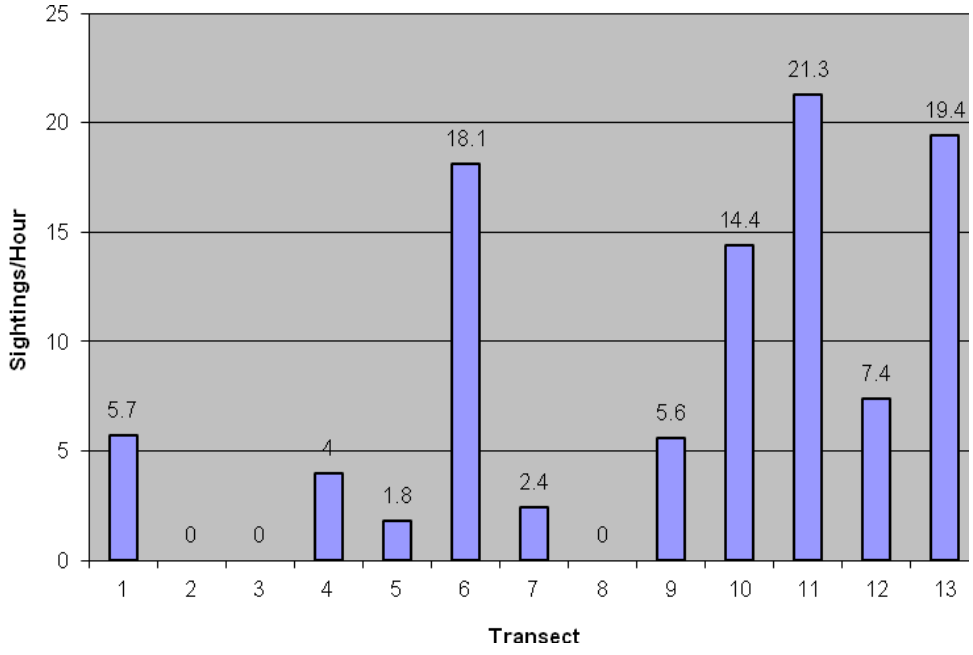

Figure 4. Maximum number of MB sightings per hour for each transect in 2011

Appendix A. 2011 Mission Blue Summary Data

Transect	Date	# of MB	Minutes spent on transect	S/H
1	4/11	4	42	5.7
1	4/27	1	34	1.8
	total	5	76	3.9
3	5/3	0	12	0
3	5/19	0	15	0
	total	0	27	0
4	4/11	0	13	0
4	4/21	1	15	4
4	5/3	1	16	3.8
	total	2	44	2.7
5	4/11	1	37	1.6
5	5/3	1	33	1.8
	total	2	70	1.7
6	4/11	13	47	16.6
6	4/21	13	43	18.1
6	5/3	8	43	11.2
	total	34	133	15.3
7	4/11	0	28	0
7	5/3	1	25	2.4
7	5/20	0	24	0
	total	1	77	0.8
8	5/3	0	20	0
8	5/10	0	20	0
	total	0	40	0
9	4/11	3	65	2.8
9	5/3	0	36	0
9	5/20	3	32	5.6

Transect	Date	# of MB	Minutes spent on transect	S/H
	total	6	133	2.7
10	4/14	1	40	1.5
10	4/27	2	33	3.6
10	5/19	13	54	14.4
	total	16	127	7.6
11	4/14	1	89	0.7
11	4/27	39	110	21.3
11	5/19	40	117	20.5
	total	80	316	15.2
12	4/14	1	69	0.9
12	4/27	8	68	7.1
12	5/19	8	65	7.4
	total	17	202	5.1
13	4/14	21	111	11.3
13	4/27	22	68	19.4
13	5/19	3	70	2.6
	total	46	249	11.1