SAN BRUNO MOUNTAIN
HABITAT CONSERVATION PLAN

YEAR 2007 ACTIVITIES REPORT FOR SPECIAL-STATUS SPECIES

Endangered Species Permit PRT-2-9818

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For:
The County of San Mateo

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

SUMMARY

In 2007, the mission blue (MB) butterfly monitoring transects were modified, increasing the transect length and quantity of butterfly habitat intersected from the 50-meter transects that were monitored from 1998 to 2004. A total of 13 transects were established, 11 of which are to be monitored on a regular basis. These 11 transects combine to nearly 15,000 linear meters and traverse both historic and restored habitat and grasslands that support a significant portion of the MB habitat on the Mountain. These modified transects will provide a more comprehensive picture of MB abundance and distribution on the Mountain and will also allow for collection of a dataset with less variance than that collected on the 50-meter transects.

The transects were monitored 5 times during the 2007 flight season, with the first survey on March 22 and the last on May 22. A total of 200 MB were observed on all of the transects combined. The transects with the highest number of MB seen and the highest sightings/hour were transects #12 and 13, both on the Southeast Ridge/South Slope. MB were observed in three planting islands where the butterfly had not yet been detected in the past, including an island in Dairy Ravine, one island below the Northeast Ridge water tank, and a third island located on the Northeast Ridge above Mission Blue Drive and Callippe Court.

The number and distribution of mission blues observed in 2007 on San Bruno Mountain indicates that this species continues to be found in a wide variety of microclimates and slope exposures on the Mountain. The installation of longer transects that intercept more mission blue habitat appears to provide a better, more robust data set than the previous transect system for year to year comparison of mission blues over time. The longer transects also allow monitors to evaluate a much greater proportion of the butterflies habitat and communicate potential habitat threats (i.e, human disturbance, weed infestations and/or coastal scrub succession) to the Habitat Manager.

Recommendations include increasing the budget for monitoring MB so that surveys can be extended to capture both early and late flying butterflies, visiting transect #2 (Pointe Pacific) more frequently to determine MB presence, reconfiguring transects #4 and 5 to make data collection more efficient, and incorporate weather data (from a weather station that will be installed on the Mountain in the winter of 2007/2008) into future butterfly data analysis.

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 southfacing 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 habitat will continue to slowly decline in total area on San Bruno Mountain.

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 2007 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 2007, 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 it's habitat (*Viola pedunculata*) has occurred or been authorized since the CS was listed as federally endangered in 1997.

Special-status species that are monitored on San Bruno Mountain include the three listed butterflies. Special-status plants have been monitored approximately every 3-5 years on the Mountain, but are not included in the current monitoring program due to funding constraints. 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 even years, callippe silverspots and San Bruno elfin butterflies are monitored, and in odd years, mission blue butterflies are monitored. In 2007, mission blues were monitored.

Appendices containing data collected in 2007 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*)

Mission blue butterflies use three larval host plants: silver lupine (*Lupinus albifrons var. collinus)*, summer lupine (*L. formosus var. formosus*) and varied lupine (*L. variicolor*). Adult butterflies that emerge early in the spring (March-April) are associated with *L. albifrons*, and late flying MBs (May-June) are associated with *L. formosus*. *Lupinus variicolor* is used less commonly. Typically, MB butterflies begin adult flight in March, are most abundant in April, and 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. MB 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.

<u>Transect Modification</u>

Mission blue butterfly monitoring conducted from 1982 to 1997 as part of the San Bruno Mountain

HCP was performed using a wandering transect method (TRA 1983-1998). In 1998, monitoring was revised to a fixed transect methodology (TRA 1999, Figure 1). These fixed transects were 50 meters long and were comparable to the National Park Service's MB monitoring transects at Milagra Ridge within the Golden Gate National Recreation Area. It was found however that monitoring 50-meter transects on San Bruno Mountain resulted in low counts of individuals and therefore high variance in the data, resulting in limitations in analysis.

In 2006, the US Fish and Wildlife Service made recommendations on the HCP monitoring program after receiving peer reviews on this program by ecologists Steve Courtney (Sustainable Ecosystems Institute) and Travis Longcore (University of Southern California). The Service received peer reviews also on Travis Longcore's proposed monitoring program by ecologists Stuart Weiss (Creekside Science) and Erica Fleishman (Stanford University) in January 2005. These reviews are discussed in the San Bruno Mountain 2004 Activities Report (TRA 2005). Based on the reviews, the Service recommended in 2006 that the current set transect monitoring system be continued, with a modification made to the mission blue transects that would lengthen the transects from 50 meters to no less than 250 meters.

In the winter of 2006/2007, 13 new transects were established on San Bruno Mountain for mission blue butterflies (Figure 2). 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. Of the 13 transects, 11 were established with the intention of being regularly monitored. Two transects (#2 located on Reservoir Hill near Point Pacific and #3 located near Colma Creek on the south side of Guadalupe Canyon Parkway) were established as transects to be visited less frequently. Transects #2 and 3 are included as we are interested in studying MB usage of these sites, but these sites are not considered of highest importance in terms of measuring MB abundance on the Mountain. Future minor revisions to the transects may be necessary to improve the efficiency of data collection and/or statistical power of the data.

Table 1 provides a description of the 13 transects. It should be noted that originally there were 14 transects, but transects #6 and 7 were combined to form one transect (transect #6).

Table 1. Mission Blue Transects Established in 2007

Transect	Location	Length (m)	Characteristics
1	West Peak	1149	This transect includes a portion of the road cut west of the rangers station (old MB transect #17) and habitat alongside the paved road (old MB transect #18) leading to the ranger's station. Host Plant: *Lupinus albifrons*.
2	Reservoir Hill	298	This transect is located east of the Pointe Pacific housing development. This area was protected by elimination of a portion of the original planned development, and was dedicated as conserved habitat. It incorporates old MB transects #26 and 27. Host Plant: *L. albifrons*.
3	Colma Creek	256	This transect is located on the south side of Guadalupe Canyon Pkwy between the Pkwy and Colma Creek. It includes a planting island that supports *L. albifrons* as well as old MB transect #21. Mission blues have been recorded utilizing the planted lupines since 2002.

Transect	Location	Length (m)	Characteristics
4	Dairy Ravine/ Saddle	1382	This transect is located in the west Saddle area and includes areas within Wax Myrtle Ravine and Dairy Ravine. The transect begins at a planting island in Dairy Ravine, crosses through Wax Myrtle Ravine and ends at planting island in the Saddle. It incorporates old MB transect #28. Host Plant: *L. albifrons* and *L. formosus*.
5	Saddle/Carter Street	905	This transect follows the east ridgeline of the Saddle. It includes old MB transect #25. Host Plants: *L. albifrons* and *L. formosus*.
6	NER Water Tank	1065	This transect 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. It incorporates old MB transects #22 and 23 and a planting island. Host Plants: *L. albifrons and L. formosus*.
8	Callippe Hill, NER	1169	This transect is located along the west side of the main ridgeline of the NER, connecting Arnold Slope and Callippe Hill. This transect incorporates old MB transect #2. Host Plants: *L. albifrons* and *L. formosus*.
9	Linda Vista	552	This transect occurs along the cut slope above the Linda Vista housing development. The dominant lupine is *L. albifrons* and most lupine host plants on site were planted. Also present are *L. formosus* and *L. variicolor*. This transect incorporates old MB transect #24. Mission blues have been recorded utilizing the planted lupines for several years.
10	Transmission Line, NER	1276	This transect is located on the east side of the NER, and follows the Transmission Line. The transect intersects a planting island above the intersection of Mission Blue Drive and Callippe Court. Host Plants: *L. albifrons* and *L. formosus*.
11	Buckeye/Owl Canyon	1275	This transect is located in Buckeye Canyon, and includes the subridge between Owl and Buckeye Canyons. This transect incorporates old MB transects #6, 7 and 8. Host Plants: *L. albifrons* and *L. formosus*.
12	Southeast Ridge	2166	This transect 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. This transect incorporates old MB transects #9 and 10. Host Plants: *L. albifrons* and *L. formosus*
13	South Slope	1793	This transect is located on the South Slope and follows a ridgeline from the Terrabay water tank to the Ridge Trail. Host Plants: *L. albifrons* and *L. formosus*
14	Hillside	2937	This transects picks up where new MB transect #13 ends on the Ridge Trail, and follows a ridgeline down to Hillside Blvd. This transect incorporates old MB transect #14. Host Plants: *Lupinus albifrons* and *L. formosus*.

As illustrated in Figure 2, these new transects cover a significant portion of the Mountain and will provide a broader view of MB distribution and abundance than the data collected on the older transects. All three of the lupine host plants occur within the areas intersected by the transects, and monitoring of these transects will capture both early and late flying butterflies. One challenge with this however is that in monitoring MB over the entire length of the flight season, transects will be visited and data collected at times when MB may not be present at a particular transect. For example, transects on the south slope support early flying MB, and therefore will presumably have a higher number of butterflies in the season's first surveys. Later in the spring, MB will no longer be flying on the south slope, and therefore surveying here would result in zero sightings, hence increasing variability in the transect's dataset. One way to counteract this would be to throw out the first or last survey efforts at a particular transect depending on that transect's flight season. This is discussed further under *Results*, below.

Survey Methodology

The transects are monitored approximately every 10 days to coincide with the average life span for adult MB, which is 7-10 days. Monitoring can only be performed during warm, calm weather, and therefore the actual timing of surveys varies. One complete survey effort is usually completed in one to two days. If weather conditions are unsuitable on the second day, completion of that survey effort is put on hold until weather conditions improve.

Air temperature, wind speed and time are recorded at the start of each transect. The surveyor then walks the length of the transect and records all MB that are encountered. The location of each MB observed is marked on a topographic (orthophoto) map. Butterfly behavior and gender (if identifiable) are recorded. All MB butterflies observed outside of the transect or in the transect vicinity during travel between transects are recorded as incidental observations. At the end of the transect, the air temperature, wind speed and time are again recorded. Temperature and wind speed are then averaged for the transect and the total time to complete the transect is calculated.

For detection of year to year changes in the butterflies relative abundance on San Bruno Mountain, multiple years of data are needed. As this is the first year of data collection on the new mission blue transects, comparison across years, for either individual transects or all transects combined, is not possible. The monitoring is conducted on an every other year schedule and therefore several years may be required to detect a significant change in butterfly numbers (if a significant change occurs). Monitoring of the transects however does provide immediate qualitative data such as the distribution of the butterflies along the transects and the threat of weed infestations to the butterfly habitat. This information, which is also recorded by the monitors, provides important information to manage the butterflies' habitat more effectively.

Results

Beginning in March, the Mountain was visited weekly on sunny, warm days to determine if the MB flight season had begun. On March 22, the first MB were observed and transect monitoring was initiated. Surveying of the 11 main transects was performed five times, on March 22-23 (survey 1), April 2 and 10 (survey 2; poor weather conditions resulted in the break up of this single survey effort), April 26-27 (survey 3), May 7-8 (survey 4), and May 21-22 (survey 5). Transects #2 and #3 were visited once during the 2007 monitoring season. Inclement weather conditions (primarily

fog and/or cool, windy conditions) in April and May resulted in greater than 10 day gaps between transect surveys. Mission blue butterflies were still observed on May 22, however no further surveys were scheduled after this date. Mission blues were no longer flying by May 22 at the transects where *Lupinus albifrons* is dominant, however the MB flight season likely extended longer in areas where *Lupinus formosus* is the dominant host plant.

Monitoring of the new lengthened transects requires more time than the previous 50-meter transects as a much greater area of the Mountain is being covered. This change has made the MB transects more consistent with the longer callippe silverspot transects, however the MB flight season is longer than the callippes, and the life-span of the Mission blue is shorter (6-10 days for mission blue versus 2-3 weeks for callippe), therefore mission blues require more surveys to be conducted per year. When MB are monitored again in 2009, more money will need to be allocated to allow for at least two more rounds of surveys to encompass the flight season.

A total of 200 MB butterflies were observed in 2007. Figure 3 displays the locations of the 200 MB sightings recorded in 2007. In the last year MB were monitored on the old transects (2004) a total of 81 butterflies were seen on 18 transects. In 2007, during a single day a total of 22 MB were seen on transect #12 alone. Thus as expected, the new transects provide higher butterfly counts which should allow for less variance and more robust data analysis than was previously permitted.

As this is the first year monitoring these new transects, a discussion of what was observed on each individual transect follows. Data cited in the discussion below can be found in Appendix A. Figure 4 displays graphically the sightings/hour calculated for each transect.

On transect #1, located at the ranger's station, MB were detected only during survey 2. *L. albifrons* plants are located along the road cut below the ranger's station and alongside the roadway that leads to the station. The five MB that were seen during survey 2 were all found along the roadway (which includes what was old MB transect #18).

Transect #2 was visited once on May 8. No MB were observed on this short transect located within the Pointe Pacific development area. There is limited lupine habitat, and if present, more frequent visits to this site may be required to detect presence.

On May 7, transect #3 was surveyed and two butterflies were observed. This transects includes a planting island and MB have been recorded here in the past.

Both *L. albifrons* and *L. formosus* are found on transect #4, located in the Dairy Ravine and Saddle units. A total of four MB were observed on transect #4, two during survey 2 and two during survey 4. One of these butterflies was observed on a *L. albifrons* within the Dairy Ravine planting island. This is the first time MB have been detected utilizing this planting island. The number of MB counted on transect #4 is too low to reveal much information on abundance over time at this location. However, all butterflies sighted were at different locations along the transect, illustrating the range of habitat within the Saddle and Dairy Ravine that are utilized by MB (Figure 3).

Transect #5 also supports both *L. albifrons* and *L. formosus* and is located in the Saddle, east of the intersection of Guadalupe Canyon Parkway and Carter Street. No butterflies were seen in either of the first two surveys of transect #5. In the remaining three surveys (surveys 3, 4 and 5),

one butterfly was observed on each of these days. 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 were observed on transects #4 and 5.

A total of eight mission blue butterflies were observed on transect #6 in surveys 2-5 (sightings/hour equals 2.8). During survey 3, a female MB was observed ovipositing on a *L. albifrons* within the planting island intersected by the transect. This is the first time a MB butterfly has been recorded utilizing this planting island.

Transect #8 is located on the Northeast Ridge and includes Arnold Slope and Callippe Hill. No MB were seen during survey 1, and a total of 10 butterflies were observed over the next four surveys, corresponding to a sightings/hour value of 3.9. Transects #6 and #8 have colonies of MB associated with both *L.formosus* and *L.albifrons*.

Only a single MB butterfly was observed (during survey 1) on transect #9, located above the Linda Vista residential community. This site is a restoration site that was replanted with lupines in the mid-1980's.

Four surveys (surveys 1 and 3-5) were completed for transect #10. A total of 16 butterflies were observed during the first three surveys. No MB were detected during survey 5. The MB sightings/hour on transect #10 averages at 4.6. A mission blue butterfly was seen within the planting island intersected by transect #10, and this is the first time MB have been recorded using this island.

No MB were seen on transect #11 in the first two surveys. A total of 16 MB were seen during surveys 3-5. The sightings/hour for this transect averages to 4.

Transect #12 on the Southeast Ridge was the highest performing transect, with a total of 88 MB observed and an average sightings/hour of 11.3. This transect was surveyed a total of 6 times as it was visited on both dates (April 2 and 10) of survey 2. MB were seen on all of the six surveys, and a double bell-shaped curve is visible when the data is plotted (Figure 5), which may represent peaks for each of early and late flying MB. More years of data collection will determine if this is in fact an abundance pattern, or just a chance reflection of this year's data. The locations of the MB observations on transect #12 are evening distributed across all of the transect, excluding the lowered northern segment where scrub begins to dominate the vegetation.

Transect #13 was the second highest performing transect in 2007, with MB observed on all survey dates, and a total of 35 butterflies seen (Figure 6). The sightings/hour for this transect averages to 6.5. Observations were recorded equally on both the Ridge Trail and on the south slope of the transect.

Twelve MB were recorded on transect #14. As with transects #12 and #13, this transect was also surveyed a total of 6 times, including both April 2 and April 10. Butterflies were observed on all survey dates with the exception of the last survey on May 21, which may have been after the end of the flight season in this southern location. The sightings/hour for transect #14 averages out to 2.2.

Conclusion

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 2007 on San Bruno Mountain indicates that this species continues to be found in a wide variety of microclimates and slope exposures on the Mountain. The installation of longer transects that intercept more mission blue habitat appears to provide a better, more robust data set than the previous transect system for year to year comparison of mission blues over time. The longer transects also allow monitors to evaluate a much greater proportion of the butterflies habitat and communicate potential habitat threats (i.e. human disturbance, weed infestations and/or coastal scrub succession) to the Habitat Manager. For instance on transect 13, a French broom infestation was observed to be impacting Mission blue habitat and was reported to the Invasives Control Supervisor (West Coast Wildlands), for immediate control.

Mission blue habitat areas on moist, (typically north-facing) slopes (i.e. transects 4, 6, 9, 11 and the northern section of 12) are continually being lost to coastal scrub succession (TRA 2007). This process is also occurring on southfacing 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 habitat will continue to slowly decline in total area on San Bruno Mountain.

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.

Recommendations

Mission blue butterflies will be monitored again in the spring of 2009. It is recommended that in 2009, sufficient funding resources be allotted to MB monitoring to allow for surveys to extend through the entire flight season, capturing both early and late flying MB. At transects that favor early flying butterflies, surveys can be discontinued in the late spring once the lupines have gone to seed, as this corresponds to the timing of the end of the adult phase. Transects that favor late flying MB should be included in the early season surveys so that the start of the flight season on these transects is accurately measured. In data analysis, surveys on a given transect that reflect conditions at the very start or end of the flight season (evidenced by the phenology of the host plants on that transect, either not yet in bloom or having died back) shall be excluded from analysis so as to limit variance within the dataset.

If possible, it is recommended that transect #2 be surveyed at least twice in 2009 as it has yet to be determined if MB are utilizing this site.

It is recommended that transects #4 and 5 be reconfigured. Currently, transect #4 includes portions of Dairy Ravine and the Saddle, with the transect crossing Guadalupe Canyon Parkway. In order to eliminate the danger to monitors in crossing the Parkway, it is recommended that transect #4 end at the south side of Guadalupe Canyon Parkway (Figure 7). Transect #5 can then be reconfigured to head east and meet up with that portion of transect #4 that is on the north side of the Parkway (Figure 7).

A weather station will be installed on San Bruno Mountain in the winter of 2007/2008. The location of the weather station will be on the southeast of the Mountain above the Brisbane Acres. Data collected from this station will be used in butterfly data analysis beginning in 2008.

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

Callippe silverspot butterflies were not monitored in 2007. The species was monitored in 2006, and a summary of 2006 findings follows. The 2006 monitoring period for CS lasted from May 24 to July 18. Transects were surveyed 5 times with a grand total of 443 CS observed (this number does not include incidental observations). This corresponds to a sightings per hour (S/H) of 14.5. This is identical to the S/H figure calculated for 2005. An ANOVA test found a significant difference in S/H between all years surveyed since 2000 ($F=4.154$, $p<0.0005$). This difference was primarily due to the relative abundance of CS in 2001. When data from 2001 are removed from the analysis, there is no significant difference between years ($F=1.35$, $p<0.24$). No trends in butterfly relative abundance have been detected to date.

Callippe silverspot butterflies will be monitored again in 2008.

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

San Bruno elfin butterflies were not monitored in 2007. The species was monitored in 2006, and a summary of 2006 findings follows. In 2006, SBE larvae were monitored at 8 sampling point locations. Each point was visited one time on May 29 or 30. A total of 388 SBE larvae were observed at the 8 locations. This is similar to the number found at these same eight points in 2003 (336 larvae) and 2002 (330 larvae), which are the most recent years prior to 2006 in which SBE was monitored. No significant difference in larvae numbers at the eight points sampled was found among the years in which larval data has been collected (2000, 2001, 2002, 2003 and 2006; $p=0.31$, $F=1.24$). However, more years of data may be needed to detect a change in the population if occurring.

San Bruno elfin butterflies will be monitored again in 2008.

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 2007. 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 2007. There have been no confirmed observations of SFGS on San Bruno Mountain in the 24 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 2007. There have been no confirmed observations of CRLF on San Bruno Mountain in the 24 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 2007. 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 is shown in Figure 8. This work was performed as part of a project requested by American Tower and was not conducted with HCP funds.

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 (1999-2003) for maps showing the distribution of these rare plants on San Bruno Mountain.

III. REFERENCES

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

Thomas Reid Associates, 1983-2005. San Bruno Mountain HCP Annual Activities Reports. Prepared for the County of San Mateo.

TRA Environmental Sciences. 2006. San Bruno Mountain HCP 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 and Patrick Kobernus of TRA Environmental Sciences.

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

V. GLOSSARY

ANOVA - A statistical procedure called Analysis of Variance. ANOVA is used to test hypotheses about differences between two or more means without increasing the Type I error rate. ANOVA is employed to test whether the mean (or average) for butterfly abundance for a given year or on a given transect is statistically different than another year or transect.

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

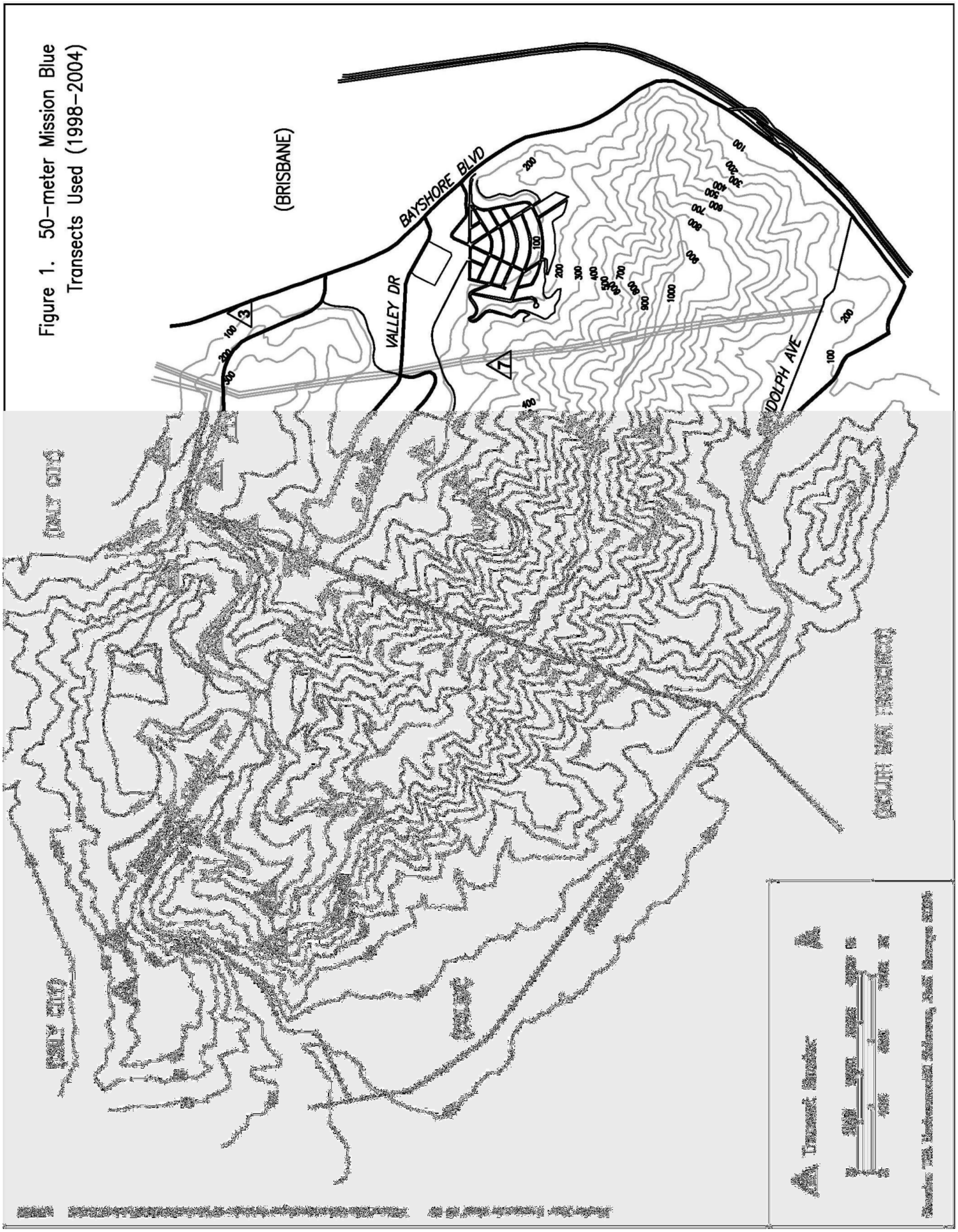


Figure 1. 50-meter Mission Blue Transects Used (1998-2004)

Figure 2. Mission Blue Transects Established in 2007

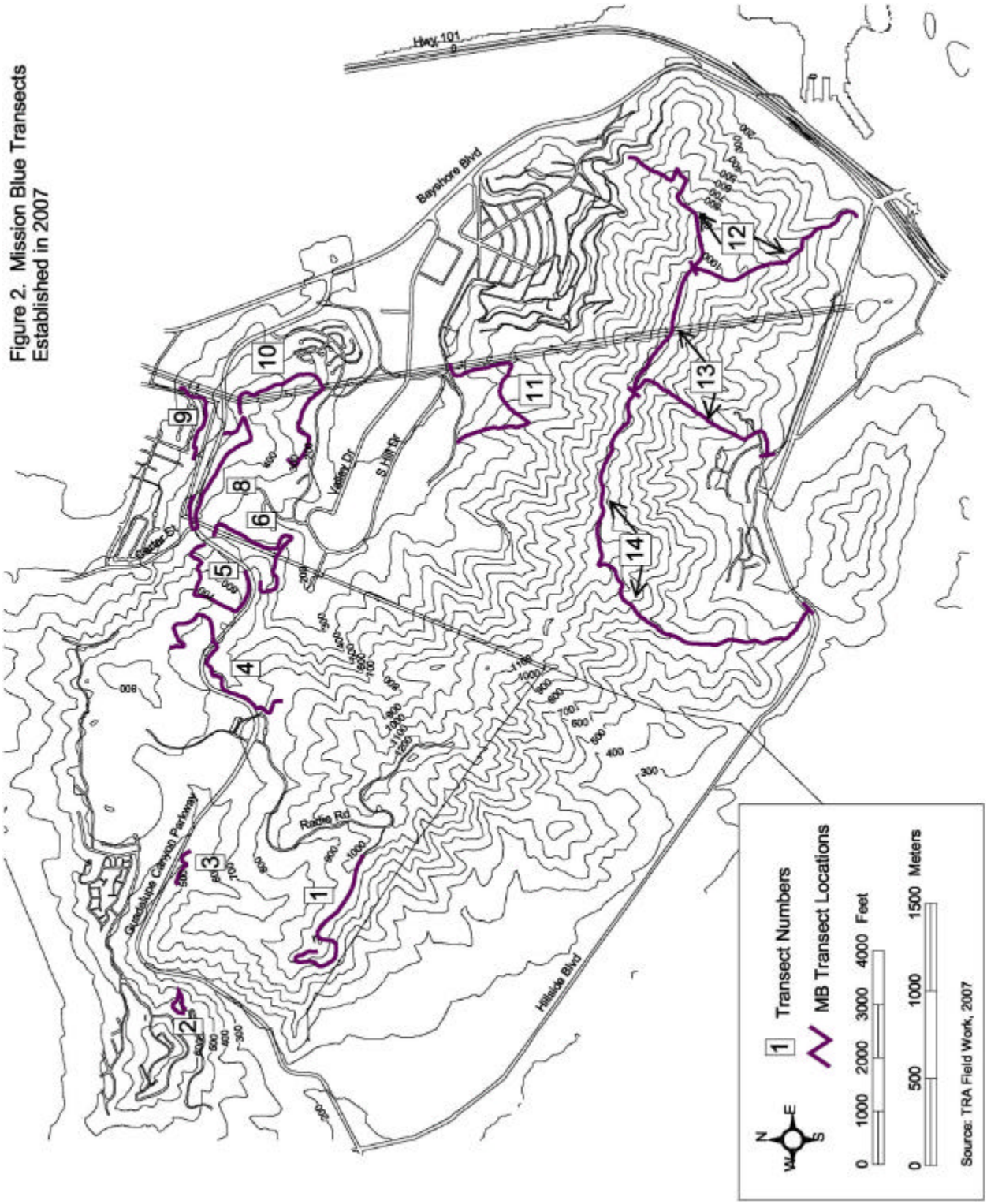
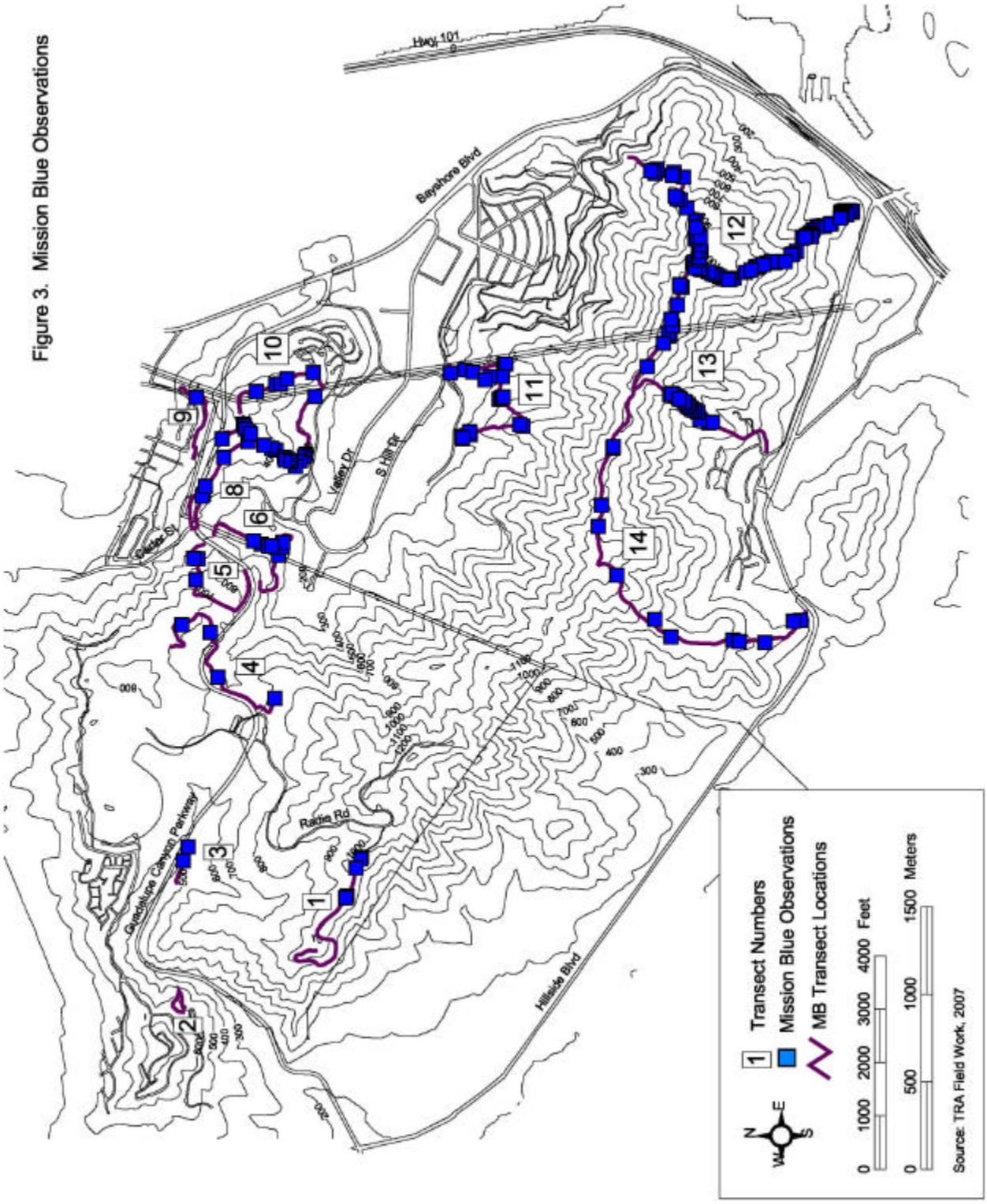


Figure 3. Mission Blue Observations



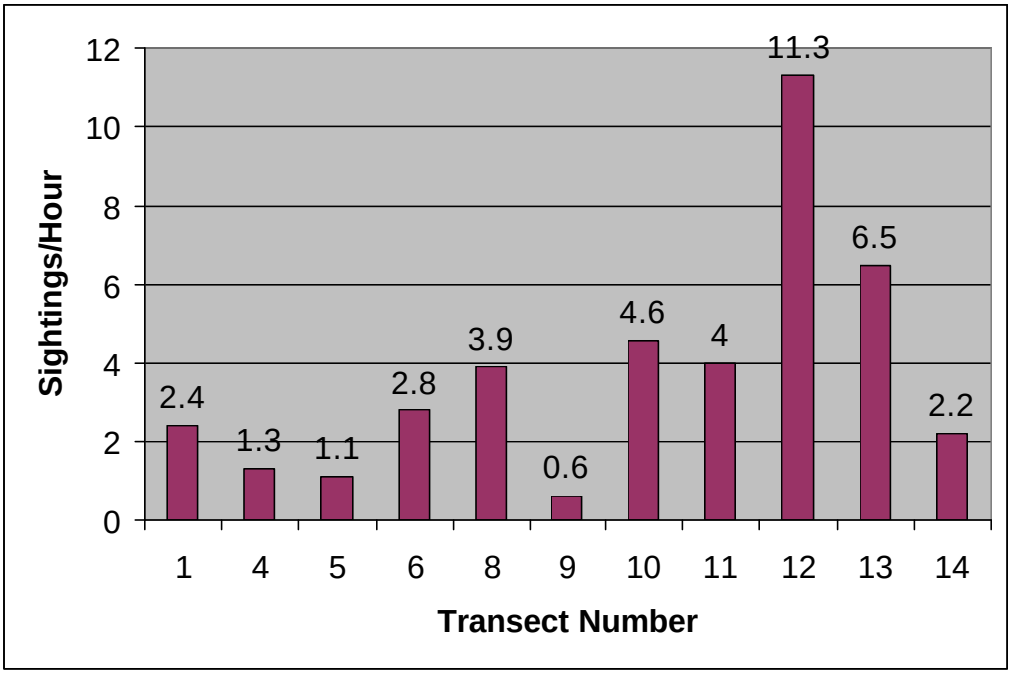


Figure 4. Average number of MB sightings per hour for each transect.

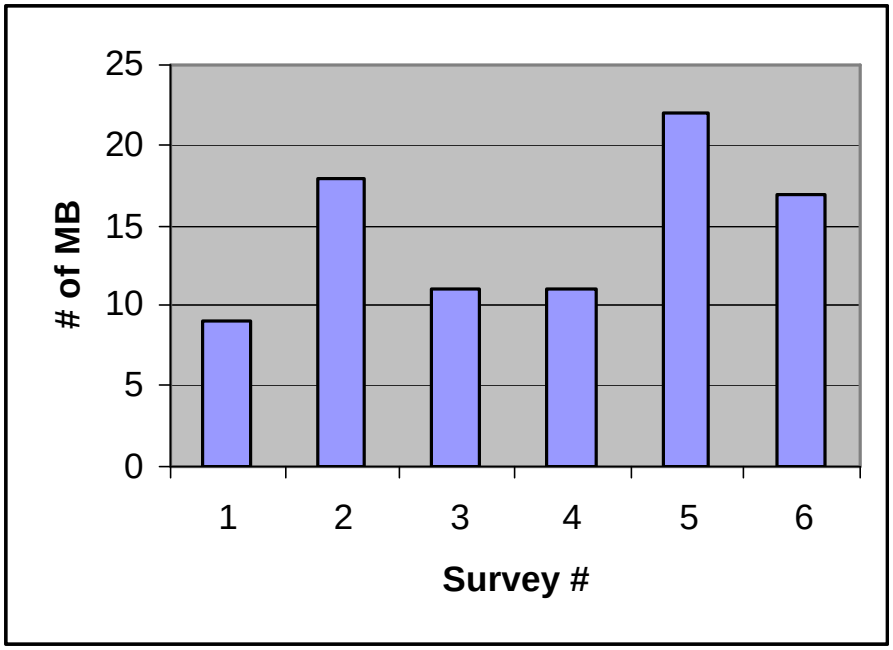


Figure 5. Transect #12 was the highest performing transect, with 88 MB observed.

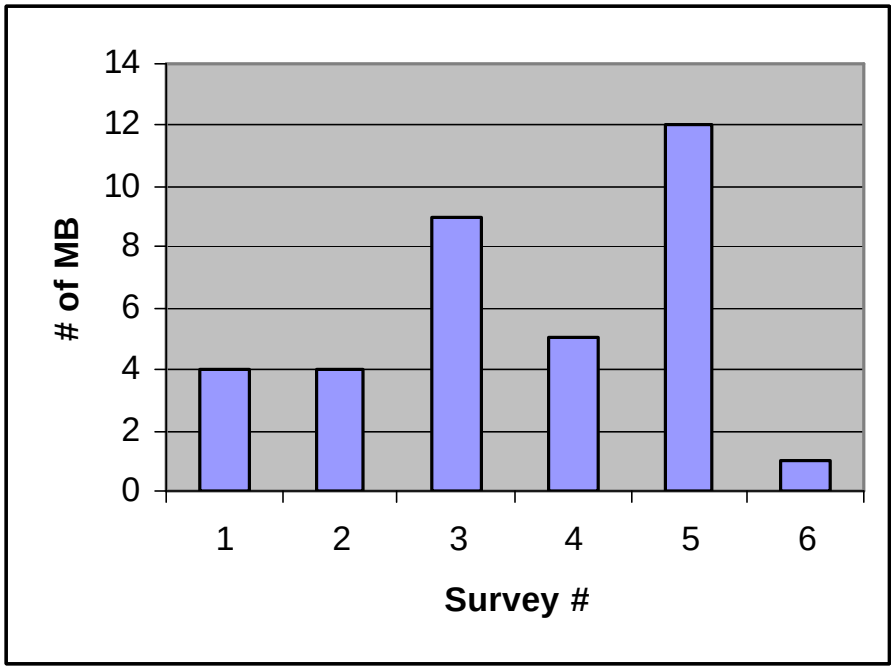
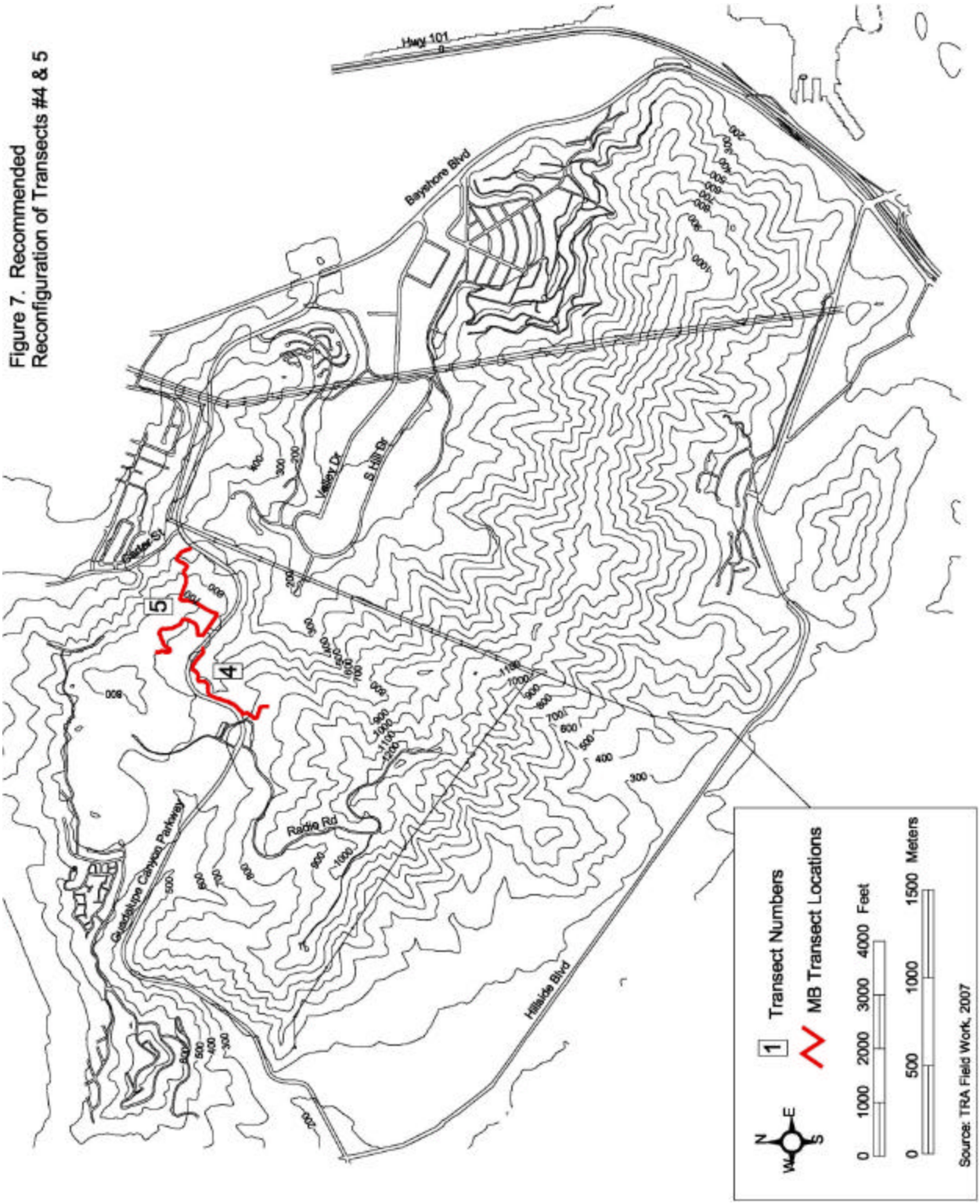


Figure 6. Transect #13 was the second highest performing transect, with 35 MB observed.

Figure 7. Recommended Reconfiguration of Transects #4 & 5



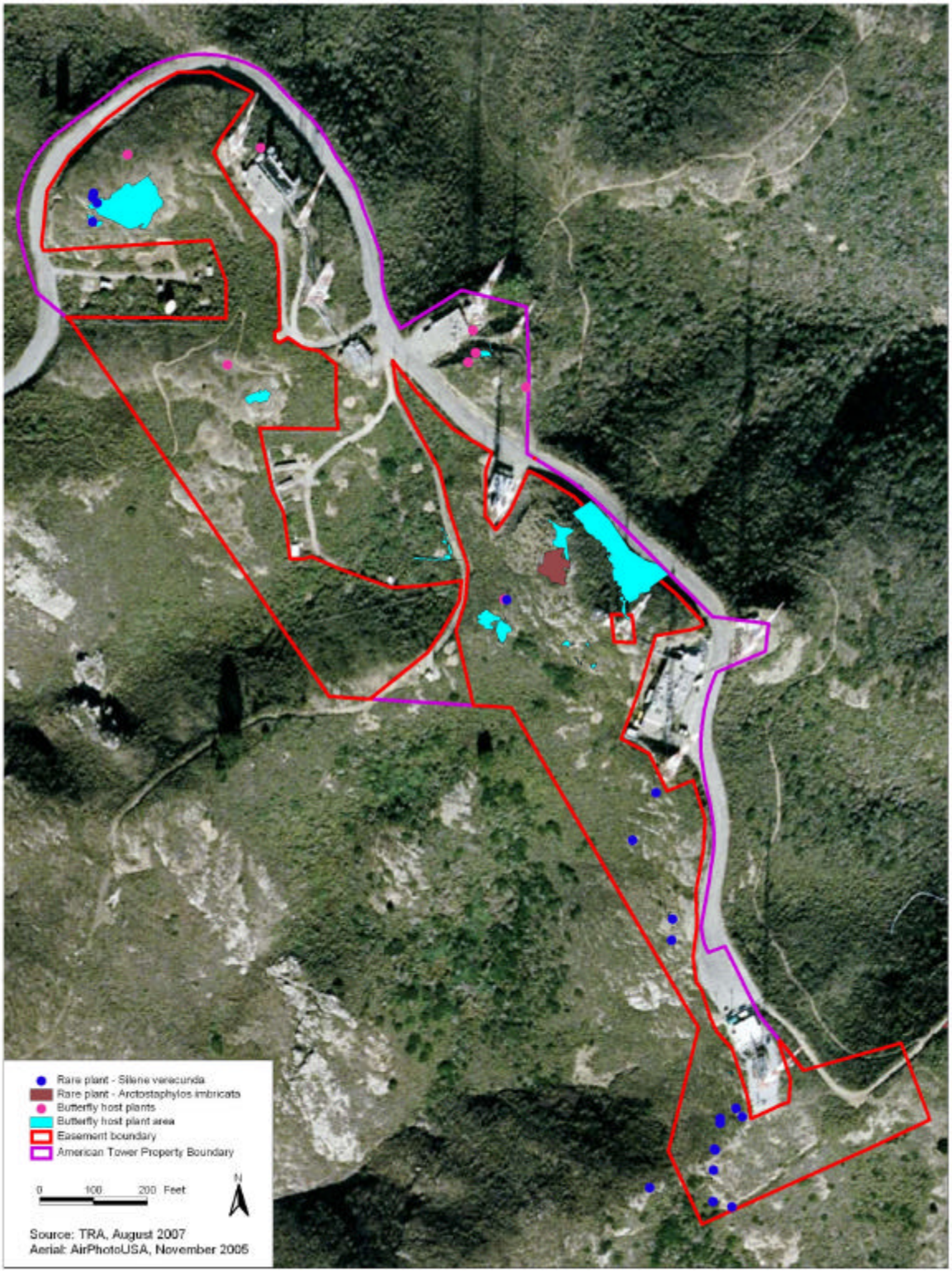


Figure 8. Special-status species within American Tower's property

Appendix A. 2007 Mission Blue Data

Date	Transect #	# MB	Minutes	S/H	Temp	Wind	Notes
23-Mar	1	0	27	0	65	1.6	
10-Apr	1	5	29	10.3	63	2.9	
27-Apr	1	0	22	0	68	1.8	
8-May	1	0	24	0	78	5	
22-May	1	0	25	0	71	2.3	
total			**127**	**2.4**			
8-May	2	0	10	0	75	3.4	Reservoir Hill
total							
7-May	3	2	17	7.1	82	1	Colma Creek
total							
23-Mar	4	0	35	0	65	3.7	
10-Apr	4	2	25	4.8	65	2.6	
27-Apr	4	0	32	0	80	2.5	
7-May	4	2	36	3.3	84	x	
21-May	4	0	27	0	66	3	
total			**155**	**1.3**			
22-Mar	5	0	37	0	65	4.1	
10-Apr	5	0	24	0	68	3	
27-Apr	5	1	33	1.8	73	4	
7-May	5	1	34	1.8	82	1	
21-May	5	1	37	1.6	64	3.2	
total			**165**	**1.1**			
22-Mar	6	0	34	0	75	1.5	Transects 6 & 7
27-Apr	6	2	33	3.6	69	3.2	“
7-May	6	4	38	6.3	85	3.5	“
	6	1	38	1.6	59	5.2	“
22-May	6	1	30	2	74	3.5	“
total			**173**	**2.8**			
22-Mar	8	0	36	0	69	2.2	
10-Apr	8	2	36	3.3	71	6.5	
27-Apr	8	5	29	10.3	69.5	1.4	
7-May	8	1	25	2.4	86	2	
22-May	8	2	28	4.3	75	2.8	
total			**154**	**3.9**			
22-Mar	9	1	17	3.5	65	1	
10-Apr	9	0	14	0	65	4.8	
27-Apr	9	0	14	0	68	5.4	
7-May	9	0	16	0	80	1.5	
22-May	9	0	14	0	78	2.9	
total			**75**	**0.6**			

Date	Transect #	# MB	Minutes	S/H	Temp	Wind	Notes
23-Mar	10	5	68	4.4	65	3	
27-Apr	10	7	56	7.6	81	1.1	
7-May	10	4	47	5.1	77	2.4	Plus 3 incidental MB
22-May	10	0	38	0	74	2.2	
total			**209**	**4.6**			
22-Mar	11	0	46	0	75	0.6	
10-Apr	11	0	50	0	80	0.6	
27-Apr	11	4	46	5.2	75	1.2	
7-May	11	8	55	8.7	86	2	
22-May	11	4	45	5.3	78	3.1	
total			**242**	**4**			
22-Mar	12	9	81	6.6	64	3.6	
2-Apr	12	18	84	12.9	65	3.5	
10-Apr	12	11	32	20.6	65	4	
26-Apr	12	11	90	7.3	67	4	
8-May	12	22	88	15	80	2.4	
22-May	12	17	92	11.1	76	2.9	
total		**88**	**467**	**11.3**			
22-Mar	13	4	59	4.1	70	1.6	
2-Apr	13	4	55	4.4	65	2.1	
10-Apr	13	9	57	9.5	65	1.7	
26-Apr	13	5	50	6	64	2.5	
8-May	13	12	51	14.1	81	1.8	
21-May	13	1	50	1.2	64	2.25	
total		**35**	**322**	**6.5**			
22-Mar	14	2	62	1.9	73	1.8	
2-Apr	14	1	60	1	67	2.2	
8-May	14	1	52	1.2	82	1.8	
10-Apr	14	6	60	6	66	2.2	
27-Apr	14	2	43	2.8	69	1.5	
21-May	14	0	50	0	66	4.2	
total		**12**	**327**	**2.2**			