SAN BRUNO MOUNTAIN HABITAT CONSERVATION PLAN

YEAR 2013 ACTIVITIES REPORT FOR COVERED SPECIES

Endangered Species Permit PRT-2-9818

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January 2014

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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 (*Icaricia icarioides missionensis*, MB), callippe silverspot (*Speyeria callippe callippe*) and San Bruno elfin (*Callophrys mossii bayensis*) butterflies.

Of the three butterflies, only MB was monitored in 2013. This species was last monitored in 2011. Mission blue transects were monitored three to four times in late March to May. A total of 133 MB were counted in 2013 on the 13 transects surveyed, which is less than the number counted in previous years. Mission blue butterflies were observed on 10 of the 13 transects surveyed. No MB were seen on transects 1, 2 or 3.

Coastal scrub, including poison oak, has encroached on some transects, making complete coverage of these transects difficult if not impossible. Modifications in monitoring methodology were made to transects 2, 3, and 5-8.

The highest performing transects (highest sightings/hour) continue to be found on the Southeast Ridge and South Slope where grasslands are intact and vast. In addition, a high sightings/hour was calculated for transect 7, located on the Northeast Ridge (NER) and adjacent to the Toll Brothers Development. This is an increase from previous years. Areas where MB were seen in least density included transects 5 on the Saddle and transect 9 on the eastern side of the Northeast Ridge.

Recommendations for management are similar to those reported in 2012 and 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 densities 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.

Transects 2 and 3 are short in length and are not monitored with the frequency of the other 11 transects as they support only limited butterfly habitat. The Technical Advisory Committee to San Bruno Mountain may want to consider abandoning these transects and instead surveying areas not currently visited as part of the monitoring program. The presence surveys performed in 2012 and discussed in the 2012 annual report identified areas along the South Slope supporting MB habitat but not currently monitored. A new transect could be created here. Also, smaller islands of habitat could be incorporated on an annual basis to be surveyed for presence. It is not recommended that the current monitoring program of the 11 primary transects be altered in any way as consistency in methodology from year to year will allow for trends in butterfly distribution and abundance to be captured.

The grassland habitat above Hillside Boulevard consumed in the 2013 wildfires should be monitored by West Coast Wildlands to determine weed management needs. Lupines and other native wildflowers are expected to reemerge, as will an abundance of weeds aided by the increase in nitrogen to the soil. Weed control efforts can help to suppress the unwanted species and encourage reestablishment of natives.

Callippe silverspot and San Bruno elfin butterflies will be monitored in 2014.

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 2013 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. The original 1983 Section 10(a)(1)(B) Permit PRT 2-9818 was issued for 30 years and expired in March of this year. The County of San Mateo applied for and received permit renewal for another 30 years on March 29, 2013.

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 2013, 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, Senior Park Planner with the San Mateo County Parks and Recreation Division at (650) 363-1823.

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.

Established 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, efforts were 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 Parkway and Colma Creek. The newly established MB transects were monitored for the first time in 2007 and again in 2009, 2011, and 2013.

Due to concern for monitor safety, in 2009 transects 4 and 5 were reconfigured so that monitors were no longer crossing Guadalupe Canyon Parkway. 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 been monitored since 2009.

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 to 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 include the entire flight season for each butterfly species.

Ideally, each transect is monitored approximately 3 times over the peak of the flight season. 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 specific 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 average S/H on a given transect is calculated from the total number of butterflies counted on that transect during all surveys over the total minutes spent on the transect. The maximum value is the highest S/H recorded on a transect in a given year. The maximum S/H is a useful variable for analysis. By looking at only the maximum S/H, the S/H measurements captured at the beginning or end of the flight season that may be of lower value do not skew the data.

Survey Methodology Changes in 2013

Coastal scrub, including poison oak, has encroached on some transects, making complete coverage of these transects difficult if not impossible. Modifications made to these transects are described here. The original 13 transects are shown in Figure 1.

Transect 2: This transect originally looped first through a grassy knoll, then back through scrub to hit a small population of lupine that had been planted by the Point Pacific Homeowners Association. Because the scrub has become too dense to pass through, the grassy knoll was surveyed as an out and back in 2013 (Figure 2). Do to the alteration of the transect and the short time it took to survey, the survey was not timed, but instead was surveyed for presence.

Transect 3: The majority of MB habitat on this transect occurs at its eastern end. Only a small number of plants are found at the western end and the route between these areas above

the road cut supports coastal scrub. That scrub has become increasingly dense. As a result only the eastern end was surveyed in 2013 (Figure 2). Due to the significant alteration of the transect in only visiting the eastern end, the survey was not timed but instead was surveyed for presence.

Transect 5: Much of transect 5 follows an established trail. However, the transect departs from this trail and makes a U-turn through scrub in order to include MB habitat at the top of a road cut above Guadalupe Canyon Parkway. Coastal scrub on this route has become too thick to allow passage. In 2013, the U-turn was removed from the transect and it now continues along the Saddle Loop Trail (Figure 2). No time was added to our total survey time to correct for the removal of the U-turn leg of the transect as adding time would have assumed that zero MB detections would have occurred while surveying this leg. However, this leg intersects MB habitat above the road cut, and thus had this been accessible and surveyed, MB may have been detected here.

Transect 6: Most of this transect is accessible and supports high quality MB habitat. Only the northern end of the transect has become impassible with scrub and poison oak. Therefore, monitors have modified the transect to end right before the impassable scrub (Figure 2). Five minutes were added to the total survey time in order to correct for the shorter transect length and to account for that section of the transect that was not surveyed and that supports only scrub habitat. In past years it took an additional five minutes to survey this end of the transect. As no MB would occur here, zero detections can be assumed had this area of scrub been surveyed.

Transect 7: The northwest portion of this transect is within the Toll Brothers development, and since 2011 has been fenced off and then later disturbed by grading. Transect 7 now ends at the Toll Brothers fence as shown on Figure 2. No time was added to our total survey time to correct for shortened transect as adding time would have assumed that zero MB detections would have occurred while surveying the part of the transect within the Toll Brothers fence. However, this area is adjacent to MB habitat along the Guadalupe Parkway road cut, and thus had this been accessible and surveyed, MB may have been detected here.

Transect 8: When last monitored in 2011, the middle of this transect had become difficult to pass due to scrub, including non-native gorse and French broom. In 2013, the transect was monitored in two sections, one on either side of the impenetrable scrub (Figure 2). Time was not kept due to the short length of these surveyed areas. Butterflies observed were recorded and mapped.

Results

A total of 133 MB butterflies were observed in 2013, which is less than the number counted in previous years (2011: 209 MB, 2009: 188 MB, and 2007: 200 MB). Figure 3 displays the locations of the 133 MB sightings and data is provided in Appendix A. Transects 1 and 4 to 13 were surveyed either three or four times. Transect 2 was surveyed once and transect 3 was surveyed twice.

Details of findings for each transect are described below. Overall, despite having many good weather days (temperature of at least 65 degrees F and wind speed less than 10 miles per hour), fewer mission blue butterflies were observed this year than in the three past monitoring years. Table 1 provides the average sightings/hour (across all survey dates for each transect) and maximum sightings/hour (survey date with the greatest number of MB observed for each transect) for the past four monitoring years of 2007, 2009, 2011 and 2013.

Mission blue butterflies were observed on 10 of the 13 transects surveyed. No MB were seen on transects 1, 2 or 3. Therefore these transects have a zero value for both average and maximum sightings/hour. Figures 4 and 5 display the average and maximum sightings/hour calculated at each transect in 2013. The sightings/hour for transect 8 is not applicable (N/A) as time was not recorded on this transect as described above.

Table 1. Average and Maximum S/H on each Transect: 2007 - 2013

Year/ Transect	Average Values					Maximum Values			
	2007	2009	2011	2013		2007	2009	2011	2013
1	2.4	3.57	3.9	0		10.3	5.8	5.7	0
2	0	3	-	0		0	3	-	0
3	7.1	22.5	0	0		7.1	22.5	0	0
4	N/A*	0	2.7	4.86		N/A*	0	4	12
5	N/A*	0	1.7	1.32		N/A*	0	1.8	3.16
6	2.8	9.68	15.3	4.02		6.3	12.4	18.1	6.92
7	3.9	6.18	0.8	13.04		10.3	9.5	2.4	20
8	0.6	0	0	N/A		3.5	0	0	N/A
9	4.6	4.5	2.7	1.31		7.6	6.9	5.6	3.33
10	4	1.15	7.6	5.27		8.7	1.2	14.4	7.74
11	11.3	15.04	15.2	10.73		20.6	25.8	21.3	29.41
12	6.5	14.21	5.1	6.32		14.1	20.4	7.4	9.38
13	2.2	13.33	11.1	12.52		6.0	20.0	19.4	17.89

* transects 4 and 5 were reconfigured in 2009 and thus cannot be compared to 2007 data

As described under methodology above, six transects were modified in 2013. This includes transects 2, 3, 5-8. No mission blue butterflies were observed on transects 2 and 3. Time was not recorded on transect 8 due to the significant modification of the transect. Transects 5, 6, and 7 were modified as described above and shown on Figure 2. These transects were also surveyed by timing the period spent on the transect and calculating a sightings/hour. The distance of these three transects was shorter in 2013 than in previous years, and thus the time to walk these transects was shorter as well.

Mission blue transects have been monitored four times starting in 2007 (2007, 2009, 2011, and 2013). This is too few years to allow for a statistical analysis of the data, and trying to tease out a trend from four 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.

No MB were found on transect 1 which is located near the Ranger Station near West Peak. MB had been detected on this transect in 2009 and 2011. The PG&E access road along which a portion of this transect is located was graded in 2012 and approximately 30 mature lupines were destroyed. PG&E replanted at a 3:1 ratio in a location above the access road, however the grading of the road and disruption to the lupines here may have impacted butterfly usage of this area. No MB were seen along the paved driveway to the Ranger Station, where a vigorous stand of lupines persist.

Transect 2 was visited once in 2013. It is a short transect located within the Pointe Pacific development area. Due to scrub making the original path of this transect impassible, the transect was walked as an out and back, rather than a loop (Figure 2). No MB were seen during the one survey in 2013. The last time MB were recorded here was in 2009 when one MB was seen. This site may still be used by MB, although presumably infrequently or in low numbers. Lupines do persist in the grassland areas.

No MB were observed on transect 3, nor were any seen in 2011. Transect 3 is a short transect that captures an area that was planted with lupines and nectar plants in 2000. Due to an increase in scrub, only the east end of the transect could be accessed in 2013. Only a handful of lupine plants are found in this small area of grassland. Surrounding vegetation in this area between Guadalupe Canyon Parkway and Colma Creek is riparian and scrub habitat. It is possible 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.

Transect 4 includes an area that was restored (planting island) in Dairy Ravine in 2000 and a dirt service road that supports lupines. This transect was surveyed four times in 2013, and a total of six MB were observed. Two MB were seen on transect 4 in 2011, and no MB were seen in 2009.

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 originally included a road cut above the Parkway, but due thick scrub, this can no longer be accessed. In 2013, this transect was modified to exclude the route to and from the road cut. Instead, the transect continues to follow the Saddle Trail (Figure 2). This transect was surveyed four times in 2013, and a total of two MB were seen. This is the same number recorded on this transect in 2011. No butterflies were seen along this transect in 2009, and in 2007, one butterfly was observed.

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. In 2013, 7 MB were observed on this transect over three surveys, with an average S/H of 4.0 and a maximum S/H of 6.9. This is lower than the average and maximum S/H recorded in 2011 when 34 MB were observed, but within the range of the S/H calculated in 2009 and 2007. Transect 6 supports a variety of wildflowers and a vigorous lupine population to the west of the water tank. The eastern end of the transect has been modified and shortened due to an increase in scrub.

Transect 7 is located on the Northeast Ridge, a portion of which has undergone habitat alteration including the loss of butterfly habitat as part of the Toll Brothers development. Transect 7 includes Arnold Slope and Callippe Hill. The transect has been modified to end at the Toll Brother's fence, as shown in Figure 2. A total of 15 MB were observed on transect 7, with a maximum S/H of 20. This is up from 2011, when only a single MB was observed, representing a maximum S/H of 2.4. The grassland habitat along transect 7 (outside of the Toll Brothers 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.

Transect 8 is located above the Linda Vista residential community. Two MB were observed on transect 8, both in a lupine patch located on a slope behind homes. No MB were seen on this transect in 2011 or 2009. This site was at one time a restoration site that was replanted with lupines in the mid-1980's. The last time a MB was recorded here was 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, and as described under methodology above, a portion of this transect was excluded from monitoring in 2013.

Transect 9 is also located on the Northeast Ridge southeast of transect 7. Mission blue butterflies were observed during two of the four surveys on transect 9, with a total of 3 MB observed. The maximum S/H calculated in 2013 is 3.3. Since 2007, the maximum S/H has declined each year. However, with only four data points, this does not necessarily represent a downward trend in MB abundance. The grassland habitat along transect 9 is not threatened by scrub habitat, however over most of the transect, lupines are sparsely distributed. An exception is at the northern end of the transect where a robust population of lupines are found around the PG&E tower, and at the southeast corner of the transect, where again numerous lupines are found.

Transect 10 is located at the foot of Owl and Buckeye Canyons. A total of 8 MB were observed over the three surveys, and a maximum S/H of 5.3 was calculated. This is similar to the average of the maximum S/H of the previous three years. Transect 10 traverses open grassland habitat with diverse nectar sources and scattered lupines along both ridgelines.

As was found in 2011, the greatest number of mission blue butterflies observed and the highest maximum S/H was on transect 11, where a total of 49 butterflies were observed over four surveys, with a maximum S/H of 29.4. 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 and includes a portion of the Brisbane Acres. The transect intersects some of the Mountain's best lupine habitat and nectar sources are abundant. Transect 11 was also the most productive transect in 2011, 2009 and 2007. In 2011, a maximum S/H of 21.3 was calculated for transect 11.

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. A maximum S/H of 9.4 was recorded, which is slightly higher than the 7.4 recorded in 2011. Similar to other locations along the South Slope and Southeast Ridge, the habitat here is extensive and continues to support annual grasses, nectar sources, and lupine host plants.

Also similar to 2011, transect 13 had the next greatest number of MB and highest maximum S/H, with a total of 29 observed over three surveys and a maximum S/H of 17.9. Transect 13 follows the Ridge Trail and then drops down a ridgeline to Hillside Blvd. In 2011, 46 MB were recorded on transect 13 with a maximum S/H of 19.4. 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 mostly 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 2013 surveys. In the early fall of 2013, the lower portion of transect 13 burned in a wildfire, as described below.

2013 Wildfires

In early September 2013, two fires occurred on San Bruno Mountain. There was a small fire approximately 1/8 acre in size caused by a PG&E switch box. This fire was located at the Tank Ravine gate power pole. The second and larger fire took place at the Tank/Juncus Ravine area just west of Mills School above Hillside Boulevard near the intersection of Hillside and Chestnut. This fire was approximately 42 acres in size. The larger fire burned the lower part of mission blue transect 13, and consumed butterfly habitat supporting lupines and nectar sources. A eucalyptus stand located adjacent to Mills School was also burned, although the vast majority of trees survived.

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 2013 on San Bruno Mountain indicate that this species continues to be found in a wide variety of microclimates and slope exposures on the Mountain, although in significantly varying densities. The total observed number and calculated sightings/hour of MB in 2013 was lower than that of the previous 3 years of monitoring, but does not necessarily signal a downward trend in MB abundance as year to year variation has been observed on San Bruno Mountain since 1981 when studies of this species began. The Golden Gate National Recreation Area has also found significant variation in MB abundance from year to year on their lands (Mission Blue Butterfly Symposium, Fort Mason, 2/7/2012).

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.

Several transects had to be modified in 2013 due to scrub, including poison oak, causing passage to be infeasible. Transect 3 supports so little lupine habitat that the Technical Advisory Committee to San Bruno Mountain may wish to consider removing this transect from the monitoring program. Likewise with transect 2. The modification made to transect 5 in 2013 will likely become a permanent change as scrub management to facilitate monitor access to the road cut for surveying in this location may not be justifiable. Butterfly habitat along transects 6 and 8 would benefit from scrub control work, and this is described below under recommendations.

With the exception of areas where scrub has moved in, overall grassland habitat observed along the transects continues to be high quality for mission blue butterflies, with a robust population of host plants and nectar plants. The weed management program implemented by County consultant West Coast Wildlands includes removal of weed infestations in the areas of high quality butterfly habitat including the large patches of lupines and wildflowers that persist along ridges, south facing slopes, and grassy outcrops.

Smaller grassland areas, particularly those already adjacent to scrub habitat, are decreasing in their value for butterflies as woody species, primarily coyote brush, as well as poison oak and non-native species such as French broom and gorse, displace herbaceous species. 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 on the Mountain without a comprehensive grazing and/or controlled burning program, mission blue and callippe silverspot habitat will continue to slowly decline in some areas on San Bruno Mountain.

Recommendations

Recommendations for management are similar to those reported in 2012 and 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, ongoing annual control of gorse and French broom would be required in order to restore grassland habitat.

Transects 2 and 3 are short in length and are not monitored with the frequency of the other 11 transects as they support only limited butterfly habitat. Scrub has increased around these transects, and they can no longer be monitored along the same route as originally designed. The Technical Advisory Committee to San Bruno Mountain may want to consider abandoning these transects and instead surveying areas not currently visited as part of the monitoring program. The presence surveys performed in 2012 and discussed in the 2012 annual report identified areas along the South Slope which support MB habitat but are not currently monitored. A new transect could be created here. Also smaller islands of habitat could be incorporated on an annual basis to be surveyed for presence. It is not recommended

that the current monitoring program of the 11 primary transects be altered in any way as consistency in methodology from year to year will allow for trends in butterfly distribution and abundance to be captured.

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 were recorded here this year which was the first time since 2007. This area would benefit from weed management, however gorse and French broom require treatment year after year, and thus funding would have to allow for ongoing management in order to justify the effort.

The grassland habitat consumed in the 2013 wildfires should be monitored by West Coast Wildlands to determine weed management needs. Lupines and other native wildflowers are expected to reemerge, as will an abundance of weeds aided by the increase in nitrogen to the soil. Weed control efforts can help to suppress the unwanted species and encourage reestablishment of natives.

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 may be capable of dispersing to and from San Bruno Mountain 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. When first discovered, the type locality for the callippe was Twin Peaks. 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 2013, and was last monitored in 2012. Detailed findings are provided in the 2012 annual report. In summary, the number and distribution of CS observed in 2012 indicated that no perceptible upward or downward trend was seen in the population data overall, and the CS population on San Bruno Mountain showed no significant change when all transects were combined. Transects on the southeast ridge continued to have the highest number of callippes observed. A trend in fewer butterfly encounters (lower S/H) had been detected on some transects, including transects 2 (Saddle), 3 (NER/Brookfield), 6 (water tower), and 8 (quarry). All of these transects had undergone visible habitat change, with an increase in velvet grass and scrub on transect 2, a loss of habitat due to the Toll Brothers development on transect 3, and an increase in scrub on transects 6 and 8. The movement of scrub into some of the CS transects was indicative of scrub encroachment into grassland habitat that is occurring at various locations throughout San Bruno Mountain, and which 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 2013. The species was last 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 was 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 in 2010. 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 2014.

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 25 years. No BCB larvae or adults were observed on San Bruno Mountain by field crews while conducting biological activities and overseeing development activities in 2013. 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 2013. There have been no confirmed observations of SFGS on San Bruno Mountain in the 30 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 2013. There have been no confirmed observations of CRF on San Bruno Mountain in the 30 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 are monitored with HCP funds. In previous years, some mapping of listed or rare plants sis occur (i.e. *Arctostaphylos imbricata imbricata*, *Lessingia germanorum*, *Silene verecunda ssp. verecunda*, and *Helianthella castanea*). 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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IV. STUDY PARTICIPANTS

Annual report prepared by Autumn Meisel of TRA Environmental Sciences.

2013 TRA Environmental Sciences Field Crew: Autumn Meisel and Sarah Daniels

County Coordinators for San Bruno Habitat Conservation Plan: Sam Herzberg

FIGURES

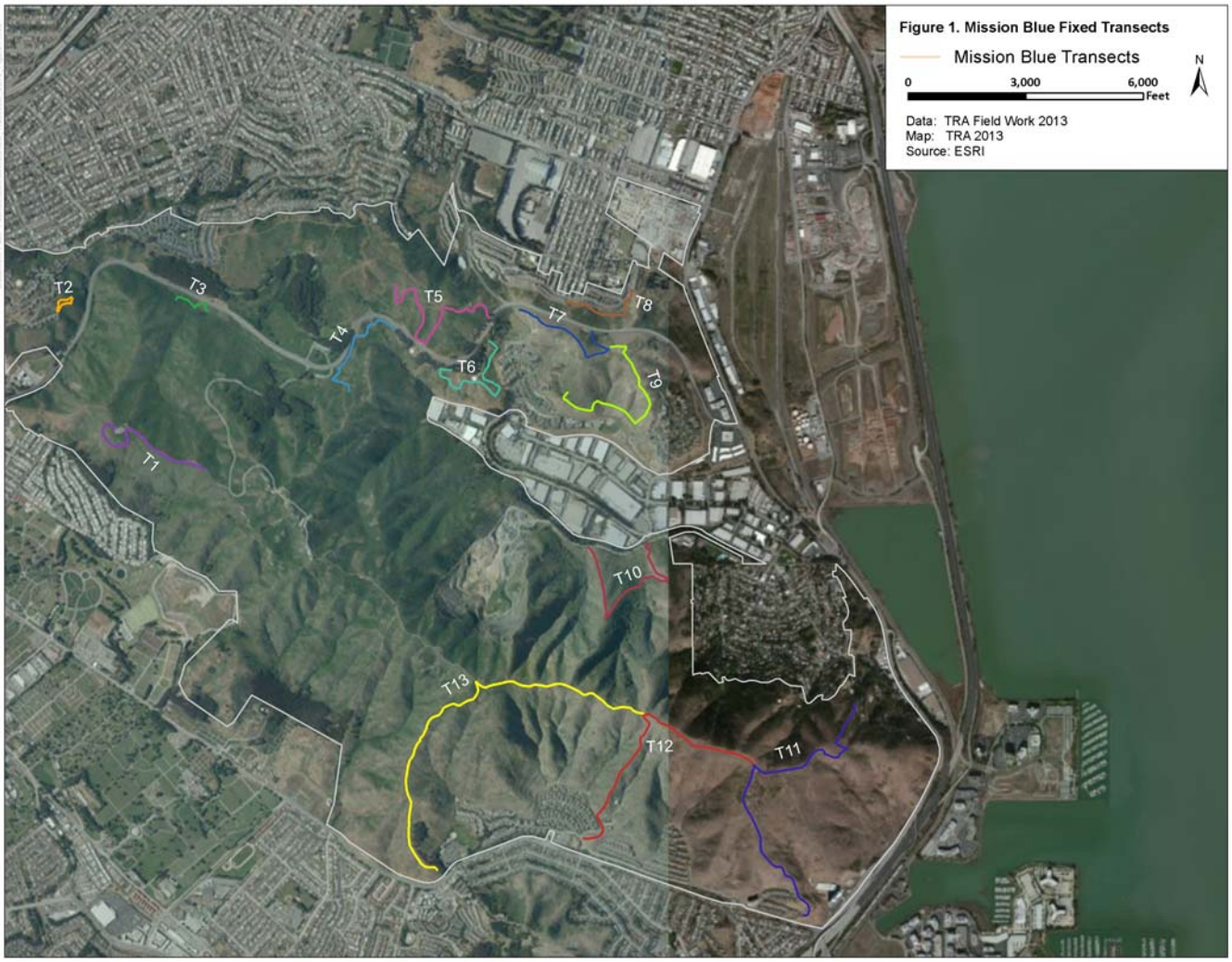

Figure 1. Mission Blue Transect Locations

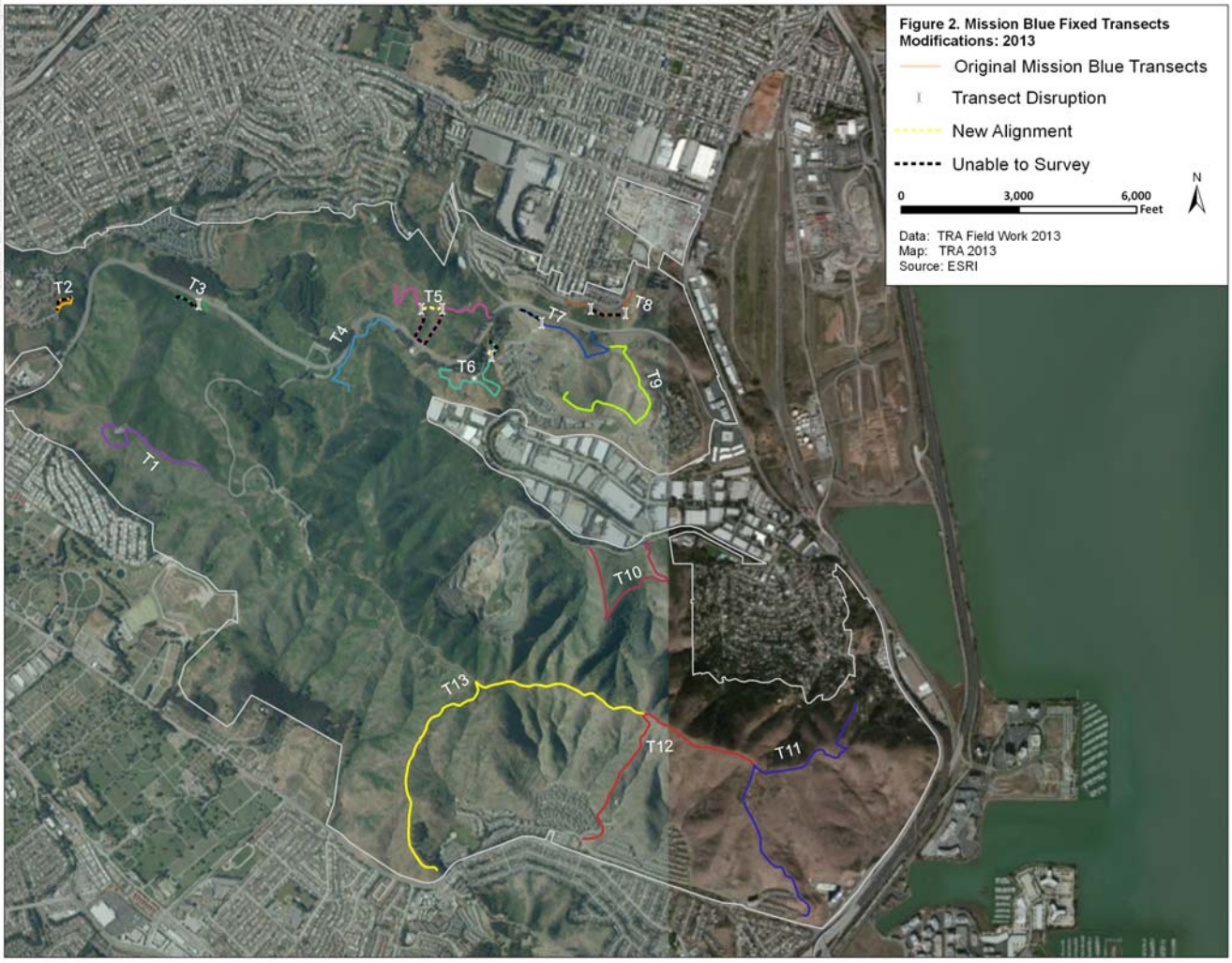

Figure 2. Mission Blue Transect Modifications made in 2013
Transect affected include 2, 3, 5, 6, 7 and 8.

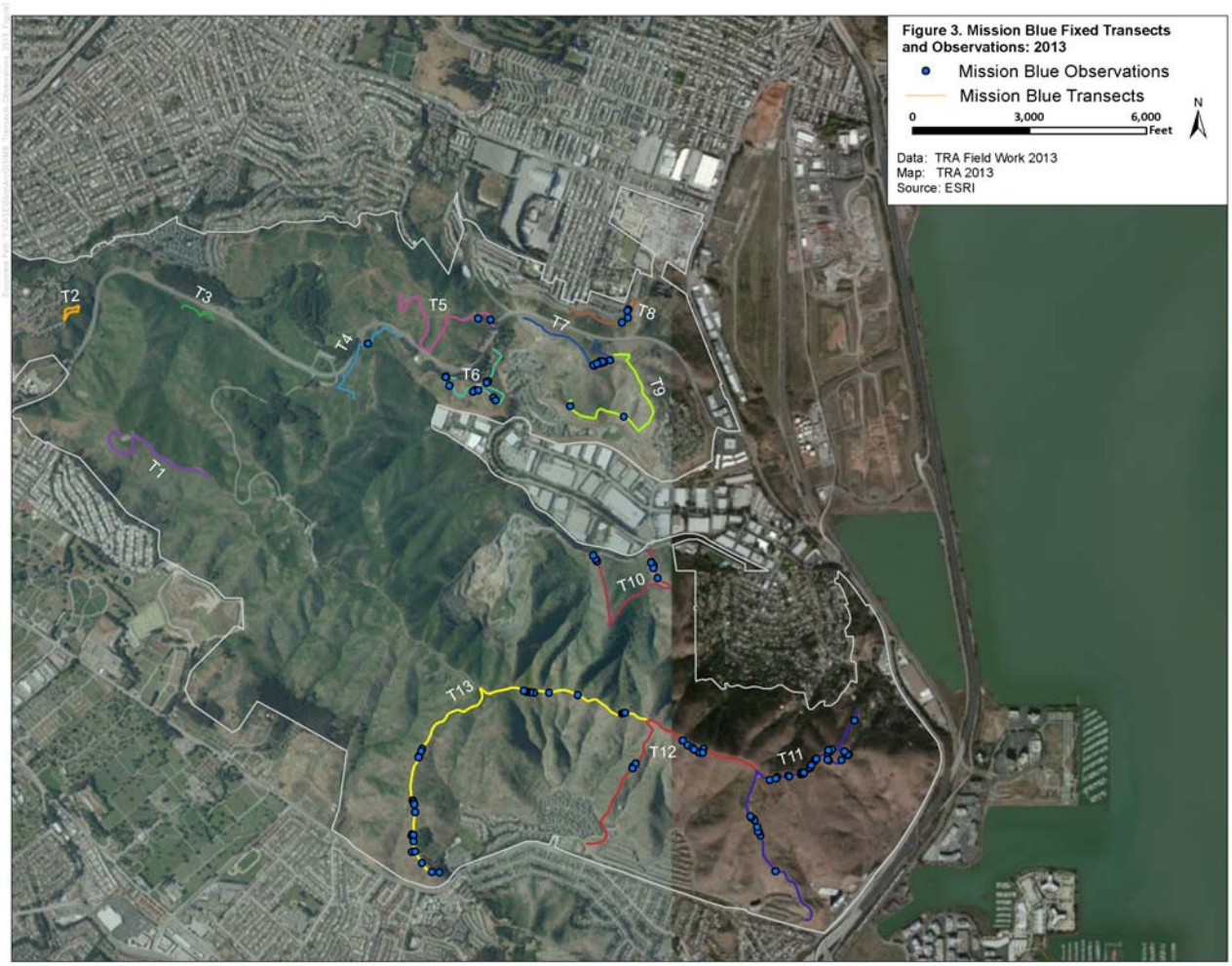

Figure 3. 2013 Mission Blue Observations

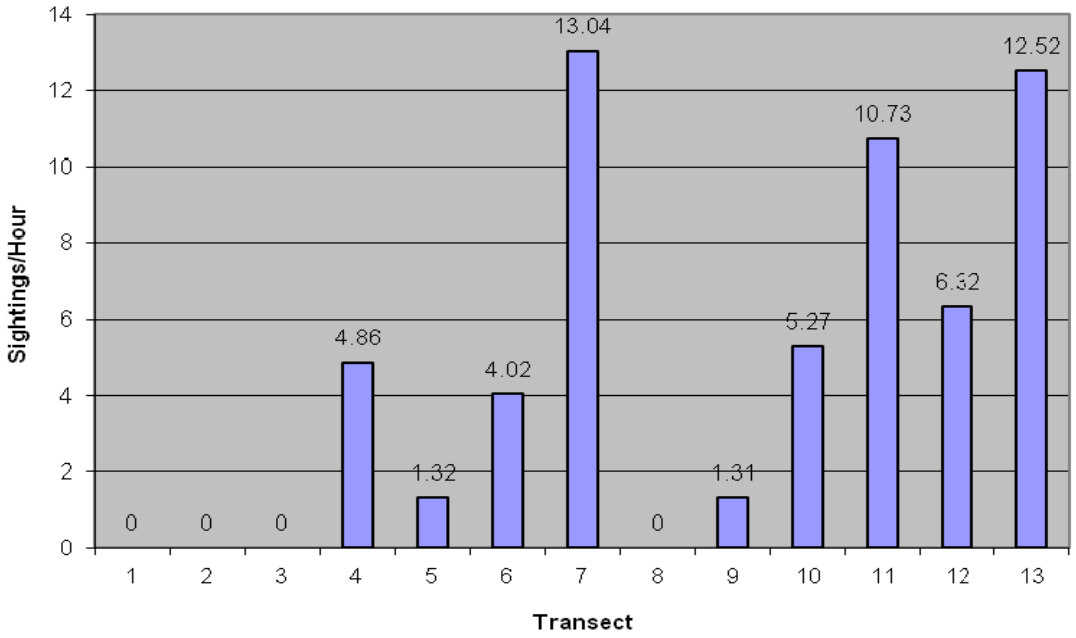

Figure 4. Average number of MB sightings per hour for each transect in 2013

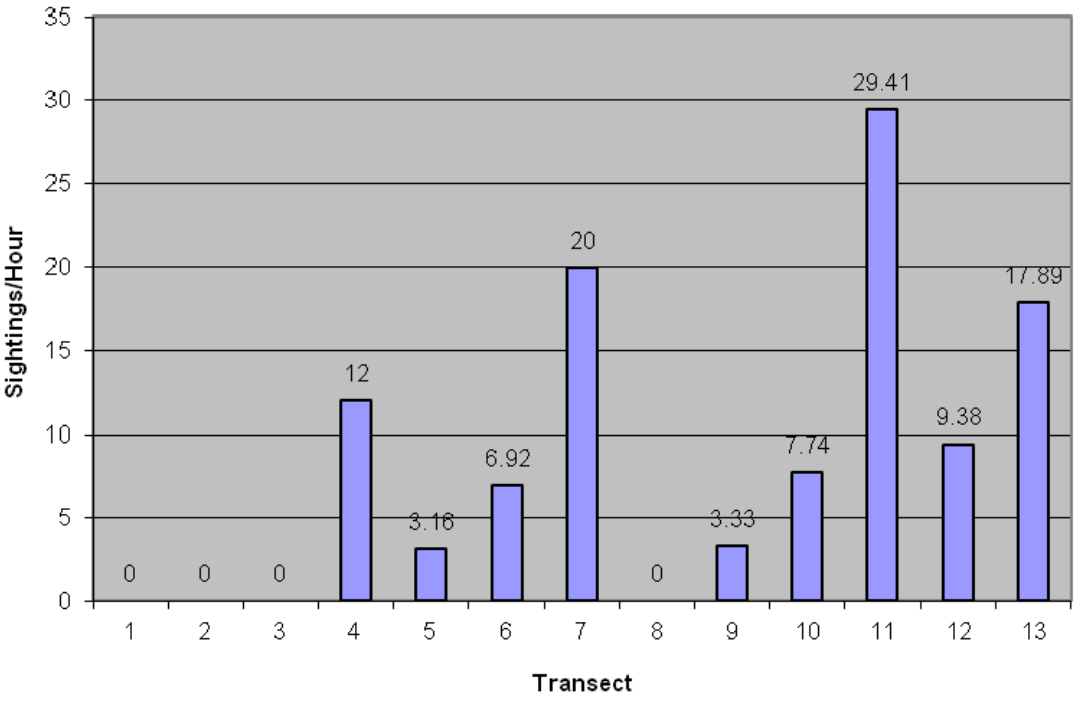

Figure 5. Maximum number of MB sightings per hour for each transect in 2013

Appendix A. 2013 Mission Blue Summary Data

Transect	Date	# of MB	Minutes spent on transect
1	4/12	0	23
1	4/19	0	20
1	5/2	0	19
	total	0	62
2	4/18	0	N/A
3	4/18	0	N/A
3	5/2	0	N/A
	total	0	
4	3/29	1	16
4	4/19	5	25
4	5/1	0	20
4	5/20	0	13
	total	6	74
5	3/29	0	29
5	4/19	0	15
5	5/1	1	28
5	5/20	1	19
	total	2	91
6	3/29	3	30*
6	4/30	3	26*
6	5/20	1	47*
	total	7	103
7	4/19	4	14
7	4/30	5	15
7	5/20	4	26
7	5/30	2	14
	total	15	69

Transect	Date	# of MB	Minutes spent on transect
8	4/12	0	N/A
8	4/18	0	N/A
8	4/30	2	N/A
	total	0	0
9	3/29	1	27
9	4/19	0	37
9	5/1	2	36
9	5/20	0	37
	total	3	137
10	4/12	1	34
10	4/18	4	31
10	4/30	3	26
	total	8	91
11	4/19	25	51
11	4/30	21	86
11	5/20	2	77
11	5/30	1	60
	total	49	274
12	4/18	6	47
12	5/2	5	32
12	5/29	1	35
	total	12	114
13	4/18	17	57
13	5/2	12	43
13	5/29	0	39
	total	29	139

*These are corrected times (5 minutes added). Time spent surveying was 25, 21 and 42 minutes.