

SAN BRUNO MOUNTAIN HABITAT CONSERVATION PLAN



Year 2011 Vegetation Management Activities Report
For Endangered Species Permit PRT-2-9818

Submitted to
United States Fish and Wildlife Service

By

San Mateo County Parks Department
January 2012



FINAL REPORT



TABLE OF CONTENTS

SUMMARY VEGETATION MANAGEMENT.....	1
I. INTRODUCTION.....	2
II. INVASIVE SPECIES CONTROL BY MANAGEMENT UNIT.....	3
A. Southeast Ridge.....	3
B. Brisbane Acres.....	4
C. South Slope.....	4
D. Owl/Buckeye Canyon.....	5
E. Northeast Ridge.....	6
F. Carter/Martin.....	6
G. Hillside/Juncus Ravine.....	7
H. Devil's Arroyo.....	7
I. Dairy and Wax Myrtle Ravine.....	8
J. Southwest Slope.....	9
K. April Brook.....	9
L. Saddle.....	10
M. Reservoir Hill.....	10
III. ADDITIONAL TASKS.....	11
A. HCP Oxalis Control Project.....	11
B. Owl and Buckeye Canyons Wildland Burn Site June 2008.....	12
IV. Invasive Species Control Work (not funded by the HCP).....	12
A. Terra Bay Master Homeowners Association Invasive Control Project.....	12
B. Myers Peninsula Ventures, LLC., Office/Buffer Parcels Exotics Plan.....	13
C. San Bruno Mountain Watch Exotics Control and Restoration Plan.....	13
V. Restoration of Habitat	13
A. Restoration Guidelines for Mission Blue and Callippe Silverspot Butterflies...14	
B. HCP Habitat Islands.....	15
C. San Bruno Mountain Watch Exotics Control and Restoration.....	15
D. Habitat Restoration Work on Development Slopes.....	15
E. Grazing and Burning.....	16
VI. References.....	16

TABLES

Table 1. 2011 Invasive Species Treated on San Bruno Mountain by WCW, Inc.....	17
Table 2. Additional Species Treated on San Bruno Mountain by Volunteer Groups.....	17

FIGURES

Figure 1. San Bruno Mountain HCP Management Units.....	18
Figure 2. SBM Habitat Maintenance Daily Data Sheet	19
Figure 3. SBM Dedicated Parcels to San Mateo County Parks Dept.....	20
Figure 4. NE Ridge Treatment TOPO Map 1.....	21
Figure 5. Upper Valley Treatment TOPO Map 2.....	22
Figure 6. Owl & Buckeye Canyon Treatment TOPO Map 3.....	23
Figure 7. Southeast Ridge Treatment TOPO Map 4.....	24
Figure 8. South Slope Treatment TOPO Map 5.....	25
Figure 9. Hillside Treatment TOPO Map 6.....	26
Figure 10. Radio Ridge Treatment TOPO Map 7.....	27
Figure 11. Reservoir Hill Treatment TOPO Map 8.....	28
Figure 12. Saddle Trail Treatment TOPO Map 9.....	29
Figure 13. San Bruno Mountain Hand and Herbicide Control Efforts 2011.....	30
Figure 14. San Bruno Mountain Oxalis Treatment Sites.....	31
Figure 15. Owl & Buckeye Canyon Burn Site Photo Stations.....	32
Figure 16. Terra Bay Masters HOA Exotic Species Treatment Parcels.....	33
Figure 17. Myers Peninsula Ventures, LLC., Exotics Treatment Parcels.....	34
Figure 18. San Bruno Mountain Watch Working Aerial Map.....	35

Report Prepared by:

West Coast Wildlands, Inc.
PO Box 1057
Pacifica, CA 94044
(650) 355-3589

Cover photo:

View of *Lupinus albifrons* at Linda Vista Mission blue butterfly habitat management site. Photos by: Todd Shriener, West Coast Wildlands, Inc.

SUMMARY VEGETATION MANAGEMENT

The primary focus of habitat management activities on San Bruno Mountain State and County Park since the inception of the San Bruno Mountain HCP in 1982 has been the control of invasive species infestations that pose the greatest threat of displacing endangered butterfly and other native habitats. The majority of control is the use of hand removal, mechanical removal, and herbicide applications. The methods and scale of activities have shifted over time, however the overarching goal of protecting and enhancing as much endangered species habitat as possible with available resources has remained unchanged. Habitat management activities conducted on San Bruno Mountain in 2011 were conducted in accordance with the goals, objectives and success criteria established in the San Bruno Mountain Habitat Management Plan (San Mateo County 2011). Priority areas for management of invasive species are delineated in the San Bruno Mountain Habitat Management Plan.

The primary habitat management activities conducted on San Bruno Mountain are performed by West Coast Wildlands, Inc., (WCW, Inc.) under contract to the Habitat Conservation Plan Manager, The San Mateo County Parks Department. In addition, numerous volunteers working for San Bruno Mountain Watch conducted invasive species control and a native plant revegetation project on the Mountain

The infestations are prioritized by the size of the Mountain habitat within the San Bruno Mountain Management Units (Figure 1). The priorities are based on their threat to sensitive habitat areas, areas subject to invasive species control work (approximately 2,800 acres) and the expanding number of invasive species that require treatment are as follows:

- Priority 1: Small patches of invasive species within native habitat
- Priority 2: Small patches of invasive species at the periphery of native habitat
- Priority 3: Edges of large invasive species infestations
- Priority 4: Large invasive species infestations

Herbicide and hand removal are the main methods to control the invasive plants. The target species treated with an herbicide solution containing either Garlon 4 Ultra® (triclopyr ester) or Aquamaster® (glyphosate). These herbicides are used due to their high effectiveness, low toxicity rating and short half-life in the soil. Garlon 4Ultra® herbicide is the preferred chemical since it does not harm monocots (grasses). Herbicide is applied one to four times per year in suitable weather (low wind, low humidity) for maximum plant uptake. The plants are left to decay in place, a process that takes from one to five years depending upon the size of the plants. In sensitive areas (near butterfly habitat and within 150 feet of private property) mature stands of invasive plants are removed by hand control, chainsaw or mowing followed by stump herbicide treatment.

The primary focus of non-native species control is on invasive shrubs and herbaceous species that pose the greatest threat of displacing butterfly habitat and other native habitats.

In 2012, emphasis will continue to be placed on those areas and weeds that pose the greatest threat to grassland butterfly habitat, and in areas that have been receiving previous efforts. Only with continued follow-up treatment and maintenance can an invasive infestation be managed. However, when small populations or isolated individual species of concern are discovered in an area where they had previously not seen or treated, they are noted and WCW either diverts funds to treat these species when possible, or the plants are monitored and identified for control in the following year's budget. In addition, recommendations made by the Technical Advisory Committee that meets quarterly (section IV. B below) will help guide weed control efforts. Preventing the establishment of new highly invasive weeds such as YST on the Mountain should be the highest priority.

I. INTRODUCTION

Invasive plants (Table 1) treated aggressively in 2011 include gorse (*Ulex europaeus*), French broom (*Genista monspessulana*), Portuguese broom (*Cytisus striatus*), cotoneaster (*Cotoneaster ssp.*), eucalyptus (*Eucalyptus globulus*), fennel (*Foeniculum vulgare*), radish (*Raphanus ssp.*), field mustard (*Hirschfeldia incana*), Himalayan blackberry (*Rubus armeniacus*), jubata grass (*Cortaderia jubata*) and Oxalis (*Oxalis pes-caprae*). A growing amount of attention is also being paid to weeds that are not as pervasive as those listed above, but that are capable of altering community composition through competition within their micro habitat. These include species such as red valerian (*Centranthus ruber*), panic veldtgrass (*Ehrharta erecta*), and pin-cushion plant (*Scabiosa atropurpurea*). An aggressive Oxalis treatment was added to the FY2011/2012 San Bruno Mountain Habitat Management Plan that includes newly discovered sites on the north facing slopes of the Ridge Trail (Figure 14).

Fennel is one of the highest priority weeds on the Mountain and populations have been significantly decreased in many locations on the South Slope, above Hillside School, Southeast Ridge and Juncus/Tank Ravines. A high level of follow-up maintenance was conducted on the fennel using brush cutters to remove duff and stimulate secondary growth that is treated with a selective herbicide when the plant leafs out prior to seed production. Polaski hand tools are used to dig out tap roots adjacent to endangered butterfly host and nectar. This same method was used on the newly acquired parcels (Figure 3) at the south-eastern grasslands in management units within the South Slope and the Southeast Ridge with the addition of 185 acres at Tank & Juncus Ravine and 3 parcels between The Woods and Mandalay Point Development along Sisters Cities Blvd.

In 2011, 695 acres of invasive plants were treated by hand or with herbicides (Figure 13). Many of these acres were treated 2 to 3 times for repeat control of various species. West Coast Wildlands, Inc., maintains daily record sheets for all invasive species work conducted on the Mountain.

The treatment sites are noted on the daily worksheet (Figure 2) with the

treatment method, work effort, weather data and work site. The back of the daily worksheet is a Topo Map showing the treatment areas highlighted in red (Figures 3-12).

The Owl and Buckeye Cyn burn Site was monitored for coastal scrub reduction to improve the the coastal grassland south of the Ridge Trail East. These areas are considered prime habitat for the Mission Blue and Callippe Silverspot Butterflies.

The greatest efforts went into treating invasive species within key butterfly habitat areas on the South slope, Northeast Ridge, Owl and Buckeye Canyons, the Saddle area, Juncus Ravine, the Ridge Trail, Pointe Pacific, the Hill West of Quarry, West Peak, and Wax Myrtle Ravine. In addition, roadside and trailside areas along Radio Road, Old Ranch Road and Guadalupe Canyon Parkway were treated due to the high rate of recurring weed invasions of these disturbed areas (Figure 12). The expanded monitoring and treatment sites added to this years scope included South East Ridge(Callippe Silverspot habitat) and Preservation Parcel (Ohlone Indian archeological site and wetland habitat) both located at the eastern section of the Park.

II INVASIVE SPECIES CONTROL BY MANAGEMENT UNIT

A. Southeast Ridge (191 acres)

The Southeast Ridge is located on the far eastern edge of the San Bruno Mountain and is bordered by Bayshore Boulevard and Highway 101 on the east and south, and the ridge trail on the north. The unit has expansive areas of grassland on steep slopes and narrow bands of coastal scrub and some woodland vegetation within the ravines.

The unit has significant *Lupinus albrafrons* and *L. formosus* that are host plants for the endangered mission blue butterfly and *Viola pedunculata* the host plant for the endangered Callippe fritillary butterfly along the upper ridge lines and on the northern slopes between Bayshore Boulevard and the ridge. Significant patches of mission blue habitat are located along the ridge trail and on fire roads, rocky outcrops and slumps within the unit. The lower northern slope of this unit includes the Preservation Parcel, which is an Ohlone Native American midden site.

The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were Cotoneaster (*Cotoneaster* sp.), Fennel (*Foeniculum vulgare*), Mustard (*Hirschfeldia incana*), W. radish (*Raphanus* ssp.) and F. Broom (*Genista monspessulana*) (Figure 7). The species density was highest in Fennel, W. radish and Mustard along the Ridge Trail. F. broom had 2 sites that totaled 3 square meters and the Oxalis pes-caprae increased to 5 square meters in Preservation Parcel. The Preservation Parcel is one of the areas added to the aggressive Oxalis treatment sites.

B. Brisbane Acres (152 acres)

The Brisbane Acres management unit is bordered by the Southeast Ridge management unit on the south side and the City of Brisbane on the north. Steep slopes, ravines and ridge lines compose a significant amount of the topography

in the area. The lower northern slopes are typified by non-native Monterey cypress, Monterey pine, French broom and Eucalyptus forests interspersed with native coastal scrub and coast live oak woodland.

Residential development rims the northern boundary of the unit. Upper ridge areas are native perennial grassland and a lesser amount of northern coastal scrub. The unit has significant mission blue and callippe silverspot habitat along the upper ridge lines.

Significant patches of mission blue habitat are located along the ridge trail and on fire roads, rocky outcrops and slumps within the unit. There are a few rocky outcrops supporting *Sedum spathulifolium* within the unit, which may provide very marginal habitat for San Bruno elfin. A few ridge line locations also support populations of rare plants including Diablo helianthella and one documented location of San Francisco campion (FE).

This management area contains private residences, infrastructure (including paved and unpaved roads, water tanks, drainage systems, etc.) and close proximity as a view-shed for the City of Brisbane. The area also contains a PG&E easement and is crossed by San Francisco Water District water supply lines.

The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were Birstly ox-tongue (*Picris echioides*), Fennel (*Foeniculum vulgare*), Mustard (*Hirschfeldia incana*), W. radish (*Raphanus ssp.*) and F. Broom (*Genista monspessulana*). The species density was highest in Fennel, W. radish and Mustard along the Ridge Trail while the F. broom was scattered along the north-eastern section adjacent to water tank to the foot trail.

C. South Slope (477 acres)

This area is bordered by the ridge trail on the north and the Terrabay development on the south. The South Slope management unit is dominated by grasslands on steep, south facing slopes and ravines. Small areas of coastal scrub and with rocky intermittent drainage that occur within the ravines. Higher quality of native perennial grasslands are found on undisturbed middle and upper slope elevations. This unit has significant callippe silverspot and mission blue habitat throughout the unit, with important habitat along the Ridge Trail. There are small foot trails and old fire trails along some of the ridges.

The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were Birstly ox-tongue (*Picris echioides*), Fennel (*Foeniculum vulgare*), Mustard (*Hirschfeldia incana*), Pampas grass (*Cortaderia jubata*), W. radish (*Raphanus ssp.*) and F. Broom (*Genista monspessulana*). The species density was highest in Fennel, W. radish and Mustard along the Ridge Trail. There were F. broom and Fennel scattered up-slope of the Terra Bay Phase II Project drainage and old fire trails.

D. Owl/Buckeye Canyon (294 acres)

The Owl and Buckeye Canyons management unit is partially owned by the California Department of Fish and Game and is managed by the County of San Mateo.

It is located along the southern and western border of the City of Brisbane. The area is characterized by steep canyons and ridge lines. Intermittent drainage are present in the larger canyons and associated ravines. Slopes are typified by native grasslands, and coastal scrub and Coast live oak woodland occupies ravines and slopes at mid-slope positions. Upper ridges are typified by native grassland and prairie communities and a significant amount of northern coastal scrub. The canyons contain a dominance of native, undisturbed communities and a more diverse variety of habitats (coast live oak woodlands, riparian woodlands, seasonal marsh, and coastal scrub).

A gravel road (Army Road) connects the Quarry Road to the Ridge Trail. Older road cuts are found on the upper slopes on the west side of Owl Canyon, some of which provide habitat for the San Bruno elfin butterfly. The site maintains a high density of host and nectar plants for endangered species within the grassland areas, and overall high ecological diversity.

The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were Birstly ox-tongue (*Picris echioides*), Fennel (*Foeniculum vulgare*), Mustard (*Hirschfeldia incana*), W. radish (*Raphanus ssp.*) and F. Broom (*Genista monspessulana*). The species density was highest in Fennel, W. radish and Mustard along the Ridge Trail while the F. broom was scattered along the north-eastern section adjacent to water tank to the foot trail. A new patch of *Oxalis pes-caprea* was located in west of Owl Canyon and included in the latest Habitat Management Plan.

This includes a 300 acre wildland burn site on San Bruno Mountain in 2008 that covered Owl and Buckeye Canyons as well as part of the East Ridge Trail. Buckeye and Owl Canyons burned in 2008 (Figure 15) resulting in a reduction of the coastal scrub vegetation that had migrated into the upper and lower grassland slopes of the unit. The site is walked and weed species are treated 2 times each year to improve the grassland habitat.

E. Northeast Ridge (214 acres)

The Northeast Ridge or the Guadalupe Hills area includes rolling hillsides, terraces and slopes. It is an important habitat area for the callippe silverspot and mission blue butterflies. Grasslands are the dominant community and abundant host plants for both the callippe silverspot and mission blue are present. Plant communities include valley needlegrass grassland, blue wild rye grassland, northern coastal scrub, non-native grassland, eucalyptus forest, and broom shrublands. The grasslands are dominated by non-native annual grasses and herbaceous weeds in many areas, yet the grasslands still support the rare butterflies and their host plants. Both mission blue and callippe silverspot habitat exists on the Northeast Ridge.

The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were Birstly ox-tongue (*Picris echioides*), Fennel (*Foeniculum vulgare*), Mustard (*Hirschfeldia incana*), W. radish (*Raphanus ssp.*) and F. Broom (*Genista monspessulana*). The species density was highest in Fennel, W. radish and Mustard along the Ridge Trail while the F. broom was scattered along the north-eastern section adjacent to water tank along the foot trail.

Control work on French broom, eucalyptus and fennel has been effective; however non-native annual grasses and weeds such as Italian thistle and wild radish pose potential threats to the grassland.

F. Carter/Martin (129 acres)

These rolling hills and steeper slopes have similar topography to the Northeast Ridge management area. The Brisbane Technology Park and Bayshore Boulevard form the southeast border of this management area, while the Guadalupe Canyon Parkway forms the southwestern border. These slopes range from north to south facing, but have predominately northeastern exposure.

Plant communities include northern coastal scrub, valley wild rye grassland, non-native grassland, broom shrubland, and eucalyptus forest. Grassland communities dominate the most acreage within the unit. Though pockets of grassland enriched with a high percentage of native grasses and forbs occur in the area, there is a prominence of grasslands dominated by non-native annual grasses and other invasive herbs and shrubs.

The unit contains habitat for mission blue and callippe silverspot. Areas of restoration (planting islands) are present and providing mission blue habitat within this management unit. This management area has connectivity to other Northeast Ridge grasslands and has a high density of endangered butterfly habitat and butterfly populations..

The slopes above the Bay Ridge development on the west are exclusively dominated by thick stands of gorse, while the slopes above the Bay Vista and Linda Vista developments are a mixture of native and non-native scrub (French

broom) along with non-native herbaceous infestations including oxalis, pampas grass and fennel and Italian thistle. A high priority for this area is reversing the establishment of gorse, broom and coastal scrub.

Our main focus this year has been to maintain the established mission blue butterfly habitat located behind the Bay Vista and Linda Vista Development. The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were Fennel (*Foeniculum vulgare*), Mustard (*Hirschfeldia incana*), Pampas grass (*Cortaderia jubata*), W. radish (*Raphanus ssp.*) and F. Broom (*Genista monspessulana*). The species density was highest in F. broom within the established butterfly host and nectar sites and the adjacent cut slope. Control work on French broom is maintained primarily by hand removal surrounding these plants.

G. Hillside/Juncus Ravine (217 acres)

The parcel west of Hillside School is a combination of areas of low quality habitat adjacent to Pacific Nursery and Holy Cross Church coupled with steeper, rocky ravines and slopes (Juncus Ravine and Tank Ravine). There are PG&E Transmission lines through Tank Ravine.

Plant communities include northern coastal scrub, coastal terrace prairie, valley needlegrass grassland, central coast riparian scrub, valley wild rye grassland non-native grassland, and eucalyptus forest. The habitat sustains a high level of mission blue butterfly habitat and moderate level for callippe silverspot butterflies.

The parcel has received extensive control work primarily on fennel in recent years funded by Myer's development and the HCP prior to be dedicated to The San Mateo County Parks District

Fennel infestations that spread throughout the lower slopes in Tank and Juncus Ravines, has moved upslope into grasslands from the Pacific Nursery. The mature Fennel was mowed from the roadside upslope to the Ridge Trail followed with polaski hand tools to remove all the remaining tap roots. Any secondary growth resulting in 2011 will be treated with an herbicide application. The Bermuda buttercup (*Oxalis pes-caprae*) is treated during the Winter months prior to flowering as part of the Optional Task project (Figure 14).

H. Devil's Arroyo (268 acres)

Devil's Arroyo represents large expansive slopes covered mostly by dense coastal scrub. The Summit Trail forms the southern boundary, the Guadalupe Valley Quarry forms the eastern boundary, the Brisbane Industrial Park the northern boundary, and the eastern ridgeline adjacent to Dairy Ravine forms the western boundary. Steep north-facing slopes and ravines extend from the base of the slope near the Brisbane Industrial Park to the Summit Trail. Plant communities include blue blossom chaparral, northern coastal scrub,

coastal terrace prairie, valley needlegrass grassland, central coast riparian scrub, eucalyptus forest, broom shrubland, and nonnative grassland.

The habitat for San Bruno elfin butterflies is high, and moderate for mission blue and callippe silverspot butterflies. Manzanita Dike, the largest colony of San Bruno manzanita (CE, CNPS 1 B) is found in Devil's Arroyo. Montara manzanita (CNPS 1 B) is also found within this management unit.

The primary focus at this site surrounds the *L. formosus* located at the base of the ravine. The fennel is mowed, hand removed and secondary growth treated at a later date. The gorse and broom species are treated with herbicides to maintain a buffer zone for the butterfly host and nectar plants

I. Dairy and Wax Myrtle Ravine (214 acres)

Dairy and Wax Myrtle Ravines have a combination of high quality native habitats and disturbed restoration areas. Most of the parcel is owned by the County of San Mateo, with lower elevation portions of the unit owned by McKesson, Inc, and Brookfield Homes. The unit consists of steep slopes that extend from the Brisbane Industrial Park along Guadalupe Canyon to the summit of the Mountain

and includes a variety of vegetation types and slope exposures, with coastal scrub being the dominant plant community. Radio Road forms the northern and western boundary of this unit, Devil's Arroyo and the city of Brisbane form the eastern boundary, and Guadalupe Canyon Parkway forms the southern boundary. The Friends of San Bruno Mountain established a native plant 'Botanic Garden' area on the south side of Radio Road within this unit. Over 30 acres of the site was logged in 1995, and restoration work has been focused on returning this area to native habitats. Important habitat for mission blue, callippe silverspot, and San Bruno elfin is found in this unit.

The grasslands on the north side of Wax Myrtle Ravine have the highest densities of mission blue and callippe silverspot host plants and populations in this unit. The unit has high quality San Bruno elfin habitat located near nine-fern rock and within upper Dairy Ravine. A controlled burn that escaped fire lines resulted in a wildfire that burned 72.5 acres of this unit in July 2003. The burn has significantly improved the condition of this management unit by removing dense stands of gorse and eucalyptus slash, which has provided access into the ravine for management crews.

Our focus of control has been the eucalyptus, gorse, Himalayan blackberry, F. broom, P. grass, oxalis and other weeds throughout the unit. The gorse, H. blackberry, F. broom, oxalis and P. grass are treated with a 2% aquatic herbicide. The Eucalyptus regrowth are treated with the hack-and-squirt method using machetes to access the cambian layer and sprayed with 25% Trichlopyr herbicide. The eucalyptus is left to decay onsite.

J. Southwest Slope (436 acres)

Southwest Slope is composed of steep south facing slopes on the west side of San Bruno Mountain. Summertime coastal fog strongly influences the vegetation, which is dominated by coastal scrub with patches of native grassland along ridgelines and isolated side slopes. The management unit is bordered by the Cypress AMLOC landfill, the Cypress golf course, Tower Corporation (that maintains communication equipment at the top of Radio Road) and a residential development within the City of Colma. The County Park ranger station is located on the west peak. This management unit is composed of steep, rocky slopes and ravines dominated by coastal scrub vegetation.

The western low elevation grasslands are dominated by purple needlegrass and fescue bunchgrasses.

The federally endangered San Francisco Campion (*Silene verecunda* ssp. *verecunda*) is located within this unit on the upper slopes near Radio Road. Mission blue habitat is scattered within patches of grassland and on fire roads along ridgelines. This unit has only very small patches of habitat for the San Bruno elfin and callippe silverspot butterflies.

The weeds of concern treated during 2011 using hand work, mowing and herbicide applications methods were *Ehrharta erecta* (panic veldt grass), Birstly ox-tongue, P. grass, Fennel, Mustard, W. radish and F. Broom.

The species density was highest in Fennel, W. radish and Mustard from the Ridge Trail to the Residential and AMLOC properties. The F. broom was scattered along the north-eastern section adjacent to the transmission tower. The remaining control were to the sub-ridges that are mainly perennial grassland habitat with mission blue and callippe fritillary butterfly host and nectar plants.

K. April Brook (273 acres)

The April Brook management area is characterized by a mosaic of native grasslands, coastal scrub and rock outcrops occurring over a range of topography from rolling hills to relatively steep slopes and ravines. The Guadalupe Canyon Parkway forms the northern border of this unit. The April Brook area covered by coastal prairie and moist scrublands. The Summit Trail loops through this management area. The lower slopes are typified by riparian forests and scrub along Colma Creek and associated drainages, while vegetation on the upper ridges are typified by fescue dominated prairies and rocky outcrops. Colma Creek flows westward and through the Colma Creek restoration site.

This management area has very limited mission blue and callippe silverspot habitat but, it provides moderate San Bruno elfin habitat and a single dune tansy (*Tanacetum camphoratum*) plant is present within this unit. The Colma Creek restoration site has two mission blue habitat islands, and a mixture of grassland, coastal scrub, and arroyo willow riparian plant communities.

There has been continuous control of weeds such as gorse, cotoneaster, Italian thistle, Poison hemlock from the April Brook Trail to Bitter Cherry Ridge. The mature gorse plants have absent for years and the seedlings are still emerging every year. The efforts have been reduce to 2 visits per year to maintain the site's invasive weed control. The yellow star thistle (*Centaurea solstitialis*) found in 2007 are still absent from the site.

L. Saddle (320 acres)

The Saddle is bordered by Guadalupe Canyon Parkway on the south and east, and the City of Daly City on the north and west. Due to the large infestation of gorse once present in this unit, the unit has been the site for intensive gorse control treatments including herbicide, brushing, and burning since the inception

of the HCP in 1982. The eastern slopes provide important grassland habitat for the callippe silverspot and mission blue butterflies. The north saddle is mostly made up of steep, inaccessible slopes primarily covered by gorse. The headwaters of Colma Creek and the botanically-rich Saddle bog area are located on the western side of the unit bordering Guadalupe Canyon Parkway. Extensive freshwater marsh and riparian wetlands occur in the central portion of the bog. Colma Creek drains southward and under the Guadalupe Canyon Parkway.

Weed management has focused on controlling gorse, Himalaya blackberry, pampas grass, and cotoneaster in habitat areas on the Saddle Trail for callippe silverspot and mission blue butterflies. A buffer zone has been established along the eastern parcel to hold the main infestation of gorse that extends from the trail to the Bay Ridge Developemnt.

M. Reservoir Hill (127 acres)

This management unit is bordered by Guadalupe Canyon Parkway on the east and the cities of Daly City and San Francisco on the west and north respectively. Plant communities include northern coastal scrub, coastal terrace prairie, Eucalyptus forest, central dune scrub, and non-native grassland (Figure 11). Special-status plants found on Reservoir Hill include San Francisco lessingia (*Lessingia germanorum*; FE, CE, CNPS 1 B), and San Francisco spineflower (*Chorizanthe cuspidata* var. *cuspidate*; CNPS 1 B). Reservoir Hill has a high habitat value for mission blue butterflies. The Pointe Pacific development, which was built in the early 1980's as part of the HCP occupies the central and western portions of the unit.

On the western side the unit has large expanses of coastal scrub with patches of grassland that extend from Guadalupe Canyon Parkway to the Pointe Pacific Development and Crocker Avenue to the north. The unit is composed of mostly steep slopes with the exception of the Pointe Pacific development, which is located on a plateau area. A large water tank is located on the highest peak within the development.

The existing butterfly habitat is maintained within portions of dune scrub and associated rare plant species. The weeds of concern we treated were birch, ox-tongue, fennel, iceplant, Mustard, W. radish oxalis pes-caprea and F. Broom. The species density was highest oxalis, iceplant and mustard along the roadside while the F. broom, mustard and fennel were scattered along the southern section adjacent to the residential properties. A 1M polygon of gopher spurge seedlings (*Euphorbia lathyris*) in Pointe Pacific was treated reducing the seed bank present in the soil. The gopher spurge originally covered an area of approximately 1000 sq. ft (at approximately 1 % density) and was treated twice with 2% Garlon4 Ultra in the spring of 2011.

III. ADDITIONAL TASKS

A. HCP Oxalis Control Project

As part of the 2005/2006 HCP fiscal year budget, special funding was approved for aggressive control of Oxalis (*Oxalis pes-caprae*). Oxalis has been proliferating on the Mountain and is of concern as it can form dense mats and out compete native plant species for light and space . Oxalis has also been found to inhibit the germination of some native plants (Brooks 2001). An aggressive plan was included in the FY2011/2012 San Bruno Mountain Habitat Management Plan to document and treat the new infestations (Figure 14).

The funding for Oxalis control was approved for 2011/2011 fiscal year by the HCP Trustees and applied to follow-up treatment of the original control sites with some expansion of the mapped infestation. The new sites observed downslope of the Ridge Trail east of Juncus Ravine, Hillside, Upper Tank Ravine and above Pacifica Nursery located on Hillside Dr, Daly City and Mandalay Point, So. San Francisco plus, Tank Ravine, Owl & Buckeye Canyon, South Slope and Southeast Ridge management areas.

Oxalis is also found along the Ridge Trail growing under scrub vegetation, and along a ridge trail from the Ranger's Station to nearby the terminus of Hoffman Street (Daly City). Other, smaller infestations (Dairy Ravine, Radio Road, and below Brisbane Water Tank) are already treated as part of the general budget and work plan.

Approximately 15 acres have been treated this year with small pockets emerging mainly on to south facing slopes of San Bruno Mountain . Some of the areas that have been controlled of Oxalis have been colonized by coyote brush and wild oat. An assessment made by WCW, Inc., in December 2011 we detected the Oxalis had been affected by the low rainfall and morning frost reducing the actual class cover by 25%.

B. Owl and Buckeye Canyons Wildland Burn Site June 2011

West Coast Wildlands, Inc. placed 5 photo stations (Figure 14) within the burn site to monitor the regeneration of native and non-native plants. Each monitoring station is visited every 6-8 weeks. There are two Buckeye Canyon photo stations

along west of Army Road, facing west, two photo stations overlooking Owl Canyon and one along Ridge Trail East.

West Coast Wildlands, Inc., has continued its efforts to the 2011 HCP Exotics Control budget to reduce the Coyote brush (*B. pilularis*) that has been gradually displacing the native perennial grassland habitat along Owl and Buckeye Canyons. Two methods are used to reduce the brush; 1) Cut stump treatment at the base of the larger (> 2 in DBH) brush removed by chainsaws and 2) Foliar application to secondary growth on smaller plants (<2 in. DBH).

IV. Invasive Species Control Work (not funded by the HCP)

Several supplemental invasive species control projects are currently being implemented on San Bruno Mountain in addition to the work funded through the HCP. Some of these projects are very large in scope, and have resulted in a significant reduction in invasive weeds.

A. Terra Bay Master Homeowners Association Invasive Control Project

The Terra Bay Master Homeowners Association (TBMHOA) deeded the Remainder lands in 2006 (Figure 16: Terra Bay Master) to the San Bruno Mountain Parks Department and are within the HCP boundary. There are 11 parcels totaling approximately 25 acres bordering the TBMHOA property, with San Bruno Mountain parkland located on the western, southern and eastern boundaries.

The TBMHOA accepted an Exotics Control Plan by West Coast Wildlands to treat invasive weed species for a period of three and one-half years beginning in the fall of 2008 and ending in the Spring 2011.

The listed weed species are Bristly Ox-tongue (*Picris echioides*), Fennel (*Foeniculum vulgare*), F. Broom (*Genista monspessulana*), Mustard (*Hirschfeldia incana*), Bermuda buttercup (*Oxalis pes-caprae*), Jubata grass (*Cortaderia jubata*) and radish (*Raphanus* ssp).

The 11 parcels were mowed during a three-week period in the Spring and Fall 2011 removing dead material to expose weedy root stems and initiate secondary growth for herbicide treatment. Weed species within 24 inches of mission blue and/or Callippe silverspot host and nectar plants were removed using hand tools with little disturbance to the soil. The Jubata grass was treated with 2% Aquamaster herbicide. The Winter mow of annual and perennial weed species are treated with herbicides in early spring to late Summer 2011. There is a 99% reduction of mature Fennel and Jubata grass.

The members of the TBHOA Council accepted a bi-annual maintenance program to remove additional weeds to be funded on an annual basis.

B. Myers Peninsula Venture, LLC., Parcels Exotics Control Project

In September 2009, Myers Peninsula Venture, LLC., hired West Coast Wildlands, Inc. to write a 3 year Exotics Control Plan and a contract was approved with WCW, Inc., to treat primary weed species on two parcels that are adjacent to San Bruno Mountain State and County Park through the Fall 2011. The two sites total 21 acres (Figure 17: Office & Buffer Parcels) and the treated area consists of 15 acres.

The main weed species WCW treated are Fennel (*Foeniculum vulgare*), mustard (*Hirschfeldia incana*), W. radish (*Raphanus ssp*), F. broom (*Genista monspessulana*), P. grass (*Cortaderia jubata*) and Bermuda buttercup (*Oxalis pes-caprae*).

The methods applied are hand control with polaski & machette hand tools with brush cutters and a follow up herbicide application using basal bark, foliar and thin line treatments. The current status of weed control is a 99% reduction of the primary mature weed species. This initial and follow-up treatment continued through the Fall 2011. The Mandalay Point property managers, Wilson, Meeny & Sullivan, LLC, accepted an bi-annual maintenance program to remove additional weeds to be funded on an annual basis

C. San Bruno Mountain Watch Exotics Control & Restoration Projects (SBMW)

South San Francisco Weed Warriors Program

In June, a weeding group was formed to work along Hillside Trail in SSF. The group intends to meet twice a month for three hours. The weeds targeted were: *Carduus pycnocephalus*, Italian thistle; *Raphanus staves*, Wild Radish; *Crepis viscera*, Hawksbeard; *Plantago lanceolata*, English plantain; *Erodium betrays*, Long-beaked storksbill; *Silybum marianum*, Milk thistle; *Sonchus oleraceus*, Sow thistle; *Hypochaeris radiate*, Woolly cat's ear; *Rumex acetosella*, Sheep sorrel; *Foeniculum vulgare*, Fennel; *Senecio vulgaris*, Common groundsel; and *Oxalis Pes-caprae*.

Mission Blue Native Plant Nursery

SBMW operates the nursery along with FSBM. The list of plants growing is available on our website – over 140 species. A dedicated crew of about 8 people comes out once a week to plant seeds, tend plants, and wash pots

Volunteer Hours.

In all three programs, there were 581 volunteer visits to the mountain, resulting in 1850 hours of work..

V. Restoration of Habitat

For purposes of clarity, the term “restoration” is used to refer to areas planted and/or re-seeded with native plant species. Restoration sites also receive invasive

species control through the use of herbicide, mowing, hand weeding and/or other tools to maintain the planted areas. As areas that are restored will generally require ongoing maintenance, “restored” is understood to mean that the goals and objectives of the restoration project were met, regardless if ongoing maintenance

will be required. Restoration is a measurement used by the County of San Mateo for their Outcome Based Management.

A strategy of creating small habitat islands (up to approximately 1/2 acre in size) was developed. Maintaining these sites over time requires ongoing management to control invasive species and brush succession. The primary goal of the restoration work has been to establish habitat for the endangered mission blue (MB) and callippe silverspot (CS) butterflies. The Planting Islands have been slow to germinate additional host and nectar plants from the seeds within the islands.

It should be noted that the Mission blue’s host plants (lupines) are often patchy in their distribution, and will colonize disturbed roadcuts, landslides, and trails. Mission blues utilize these patches, and can easily move between patches that are 100 meters apart (Arnold 1983), and have been recorded moving distances up to 0.25 miles (TRA 1981) between habitat patches. In contrast, CS utilize much larger areas of habitat due to their larger size and stronger flying ability. Callippes can move several hundred feet within less than a minute when traveling across terrain

searching for *Viola* and appropriate hilltopping habitat (San Bruno Mountain Habitat Management Plan 2011), and can likely travel as far as 0.75 miles between habitat patches ((TRA, 1981). The CS host plant, *Viola pedunculata*, typically occurs in much larger, denser patches than lupines do, though *Viola* can also on occasion be found in small patches and in disturbed areas.

Though restoration is important, the first priority should always be protecting the existing habitat, because that is the best use of funds for ensuring the long-term survival of both MB and CS on San Bruno Mountain (Biological Program, HCP Volume I, 1982).

A. Restoration Guidelines for Mission Blue and Callippe Silverspot Butterflies

HCP funded restoration work in the form of weed control, erosion control and planting has been ongoing on the mountain since the mid-1980's. The primary goal of the restoration work is the establishment of high quality habitat for the MB and CS butterflies.

Because the HCP does not specify what is required for successful restoration, (i.e. number of host plants established, percent cover of natives, etc.)

The Habitat Restoration Guidelines for MB and CS (TRA, November 2000) provide guidelines for restoring suitable MB and CS butterfly habitat, and assist restoration professionals with accomplishing the habitat goals of the HCP.

The guidelines include suggested methods on how to select appropriate restoration sites, recommendations on host plant densities to support the endangered butterflies, and host and nectar plant propagation methods.

They are to be used in conjunction with the *Standards for Acceptance of any Dedicated Lands by the County of San Mateo in Accordance with the San Bruno Mountain Area Habitat Conservation Plan*, prepared by the San Mateo County Parks Department.

B. HCP Habitat Islands

Since 1995, several habitat restoration islands have been created and managed within former eucalyptus and gorse sites within the HCP conservation area by Shelterbelt Builders, Inc. The planting islands are one of our tools in restoring habitat for the endangered butterflies.

Work was conducted in June 2011 on the habitat islands that have shown the best results in thriving with some required maintenance. Shelterbelt Builders, who planted the islands, removed exotics within those sites completing their 5 year monitoring project.

The islands maintained were Colma Creek (CC1) dairy Ravine (D1 & D5), N.E. Ridge Burns Sites (NER1 & 2) and N.E. Ridge Planting island (NERPI 3-6, 7a & 7b).

C. Colma Creek & Saddle Bog Trail Watershed Project

Under a state grant managed by the County of San Mateo, the Watershed project was carried out by "Heart of the Mountain", led by Joe Cannon. The goal of the project was to restore the Colma Creek Headwaters to a native riparian plant community. The project was completed in 2009, with follow-up activities by Joe Cannon and volunteers. In January and February, 2011, an additional 250 native plants were planted.

In the Fall of 2009 San Bruno Mountain Watch received a grant from the National Fish and Wildlife Foundation to do habitat restoration along the Bog Trail. Under the direction of Joe Cannon, volunteers have removed invasive plants, including Velvet grass, blackberry, mustard, radish, Italian thistle, and hemlock from along the trail and began planting native plants in their place, protected by a thick layer of weed free rice mulch. Planting will continue through the winter of 2011-2012. In 2011, 269 volunteers spent 807 hours over 19 days working on the Bog Trail.

D. Habitat Restoration Work on Development Slopes

Myers Peninsula Ventures, LLC., created habitat restoration sites on private properties within the HCP located at Mandalay point. Perennial grasses and butterfly host and nectar plants native to San Bruno Mountain that are thriving. West Coast Wildlands, Inc., has completed the 3rd year of a 3 Year Exotics Control Plan.

E. Grazing and Burning

No grazing or burning projects were conducted on San Bruno Mountain in 2011. Burning and grazing are identified as important habitat management tools in the San Bruno Mountain HCP and the San Bruno Mountain Habitat Management Plan, 2011. A Control Burning project as part of the Vegetative Management Plan (VMP) being formulated by the Habitat Manager and is proposed for implementation within the County Park in the near future.

VI. ¹References

- Brooks, K. 2001. Managing weeds in bushland: Soursob, fingerleaf & four o'clock. The Environmental Weeds Action Network (<http://members.iinet.net.au/~ewan/oxalis.pdf>). [Accessed: December 2005]
- County of San Mateo, 1982. San Bruno Mountain Habitat Conservation Plan, Volume I and II. Prepared by Thomas Reid Associates.
- San Mateo County Parks Department, 2011. San Bruno Mountain Habitat Management Plan 2011. Prepared by West coast Wildlands, Inc..
- San Mateo County Parks Department. Standards for Acceptance of any Dedicated Lands by the County of San Mateo in Accordance with the San Bruno Mountain Area Habitat Conservation Plan. Revised 2006.
- San Mateo County Parks Department. Habitat Restoration Guidelines for Mission Blue and Callippe Silverspot butterflies (revised November 2000). Prepared for the San Bruno Mountain Habitat Conservation Plan. Prepared by TRA Environmental Sciences.
- Thomas Reid Associates. November, 1981. Endangered Species Survey: San Bruno Mountain Biological Study.
- Thomas Reid Associates. September, 2007. San Bruno Mountain Habitat Management Plan 2007: Prepared by TRA Environmental Sciences: Patrick Kobernus.
- All San Bruno Mountain HCP documents/ resources available on-line at <http://www.traenviro.com/sanbruno/> or from County of San Mateo Parks Department.*

TABLES

The following invasive plant species were treated in 2011:

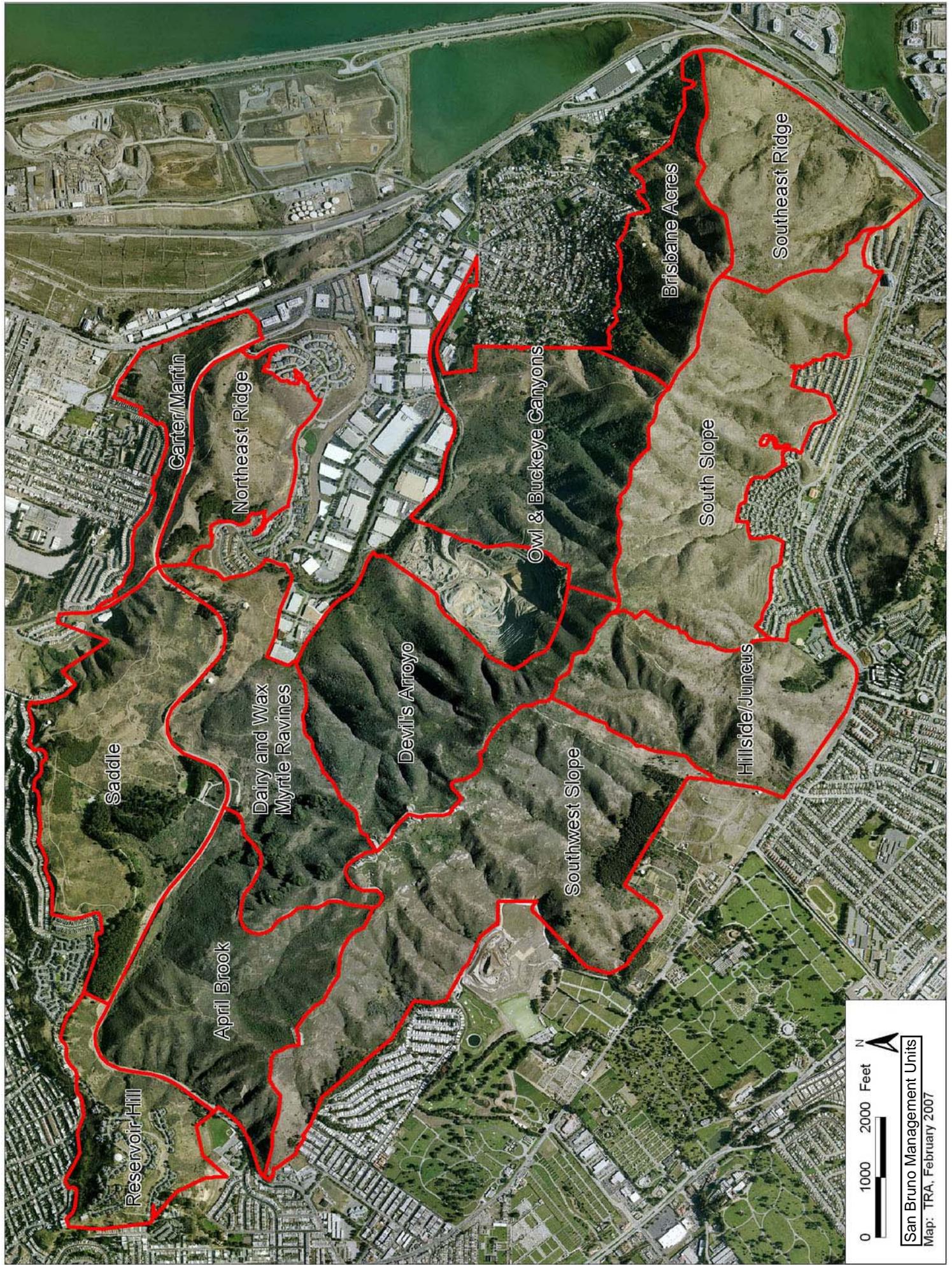
Table 1. Invasive Species treated on San Bruno Mountain by West Coast Wildlands in 2011.

<i>Acacia</i> sp. (acacia)	<i>Euphorbia lathyris</i> (Caper spurge)
<i>Carduus pycnocephalus</i> (Italian thistle)	<i>Foeniculum vulgare</i> (fennel)
<i>Carpobrotus edulis</i> (hottentot fig, iceplant)	<i>Genista monspessulana</i> (French broom)
<i>Centaurea melitensis</i> (Napa thistle)	<i>Hirschfeldia incana</i> (mustard)
<i>Conium maculatum</i> (poison hemlock)	<i>Lactuca virosa</i> (wild lettuce)
<i>Cortaderia jubata</i> (pampas grass)	<i>Leucanthemum vulgare</i> (ox-eye daisy)
<i>Cotoneaster</i> sp. (cotoneaster)	<i>Oxalis pes-caprae</i> (Bermuda buttercup)
<i>Cupressus macrocarpa</i> (Monterey cypress)	<i>Pinus radiata</i> (Monterey pine)
<i>Cytisus scoparius</i> (Scotch Broom)	<i>Picris echioides</i> (bristly ox-tongue)
<i>Cytisus striatus</i> (Portuguese broom)	<i>Raphanus</i> ssp. (radish)
<i>Delairea odorata</i> (Cape ivy)	<i>Rubus armeniacus</i> (Himalayan blackberry)
<i>Echium candicans</i> (Pride of Madera)	<i>Silybum marianum</i> (milk thistle)
<i>Eucalyptus globulus</i> (blue gum tree)	<i>Ulex europaeus</i> (gorse)

Table 2. Additional Invasive Species treated on San Bruno Mountain in 2011 by volunteer groups.

<i>Avena</i> spp. (wild oat)	<i>Hypochaeris radicata</i> (hairy cat's ear)
<i>Briza maxima</i> (quaking grass)	<i>Lactuca serriola</i> (prickly lettuce)
<i>Bromus hordeaceus</i> (soft chess)	<i>Lobularia maritima</i> (Lobularia)
<i>Cirsium vulgare</i> (bull thistle)	<i>Lythrum salicaria</i> (purple loosestrife)
<i>Ehrharta erecta</i> (panic veldt grass)	<i>Plantago lanceolata</i> (plantain)
<i>Erechtites arguta</i> (New Zealand fireweed)	<i>Pyrocantha crenato-serrata</i> (pyrocantha)
<i>Hedera helix</i> (English ivy)	<i>Rumex crispus</i> (curly dock)
<i>Holcus lanatus</i> (velvet grass)	<i>Rubus armeniacus</i> (Himalaya blackberry)
	<i>Scabiosa atropurpurea</i> (pin-cushion plant)

Figure 1. San Bruno Mountain HCP Management Units



DATE: ___/___/___
 HOURS: Prep ___:___ to ___:___
 Control ___:___ to ___:___
 Clean-up ___:___ to ___:___

NAME: _____
 WORKERS: _____

CASE CODE: _____
 HMAI _____
 HRES _____
 HWMR _____

TASK# _____
 EFFORT: ___1) MONITORING
 ___2) HERBICIDE
 ___3) HANDWORK
 ___4) RESTORATION

FC: _____ Hrs: _____

FS: _____

SR: _____

LOCATION: (MAP AREA on reverse side of page) _____ Initial Treatment _____ Mo. Follow-up Treat(2nd,3rd,etc.)

- ___1. Tank ravine
- ___2. Hillside
- ___3. Juncus Ravine
- ___4. Terra Bay Habitat
- ___5. SER\Canon sign
- ___6. Ridge Trail-East
- ___7. Ice House
- ___8. Preservation Parcel
- ___9. Owl/Buckeye Cyn
- ___10. Hill W. Quarry
- ___11. Red Tail Cyn
- ___12. Devil's arroyo
- ___13. Water Tank/Spumoni
- ___14. Callippe Hill/Arnold
- ___15. NER Fence line
- ___16. Linda Vista/E. End
- ___17. Linda Vista/SBM
- ___18. Brisbane Off. Park
- ___19. Old Ranch road
- ___20. Saddle Unit I, site(s) _____
- ___20. Saddle Unit II, site(s) _____
- ___20. Saddle Unit III, site(s) _____
- ___20. Bog Trail
- ___21. Radio Rd/Summit
- ___22. *Other Site
- ___23. Guadalupe Cyn. Pkwy
- ___24. Pt. Pacific/Village
- ___25. Bitter Cherry
- ___26. Ridge lines/W. Peak
- ___27. Ridge lines/Hoffman
- ___28. Colma Creek
- ___29. April Brook
- ___30. Dairy Ravine
- ___31. Wax Myrtle Ravine (Upper)
- ___32. Hoffman St.
- ___33. Kamchatka Ridge

WEATHER:
 Weather at start: _____ Weather at stop: _____
 Clear _____ Clear _____
 Overcast ___% Cloud Cover _____ Overcast ___% Cloud Cover _____
 Wind ___mph _____ Wind ___mph _____
 Vegetation: ___dry___ damp _____

*Other Site: _____

INFESTATION: _____

CONTROL EFFORTS: _____

SPECIES	DENSITY (L/M/H)	AREA (ft/acre)	TERRAIN (E/M/D)	MAP ID Site Treated	EQUIPMENT & TOOLS	# OF PLANTS REMOVED	CHEMICALS				
							HERBICIDE(S)		ADDITIVES		TOTAL SOLUTION
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal
								%	oz/gal	oz	oz/gal

MONITORING/ASSESSMENT DATA:

PHOTO(S) TAKEN: _____ ROLL # _____ NEGATIVE # _____
 (Describe appearance of vegetation. Include color(s), presence/absence of green stems/flags, presence of flowers, level of dessication, any other pertinent information regarding the effects of treatment on the vegetation. Also provide an estimate for follow-up treatment. Include type, # of persons, time, and amount of chemicals.)

FIGURE 3: Dedicated Parcels 3-5, 22 & 23 to San Mateo County Parks Department

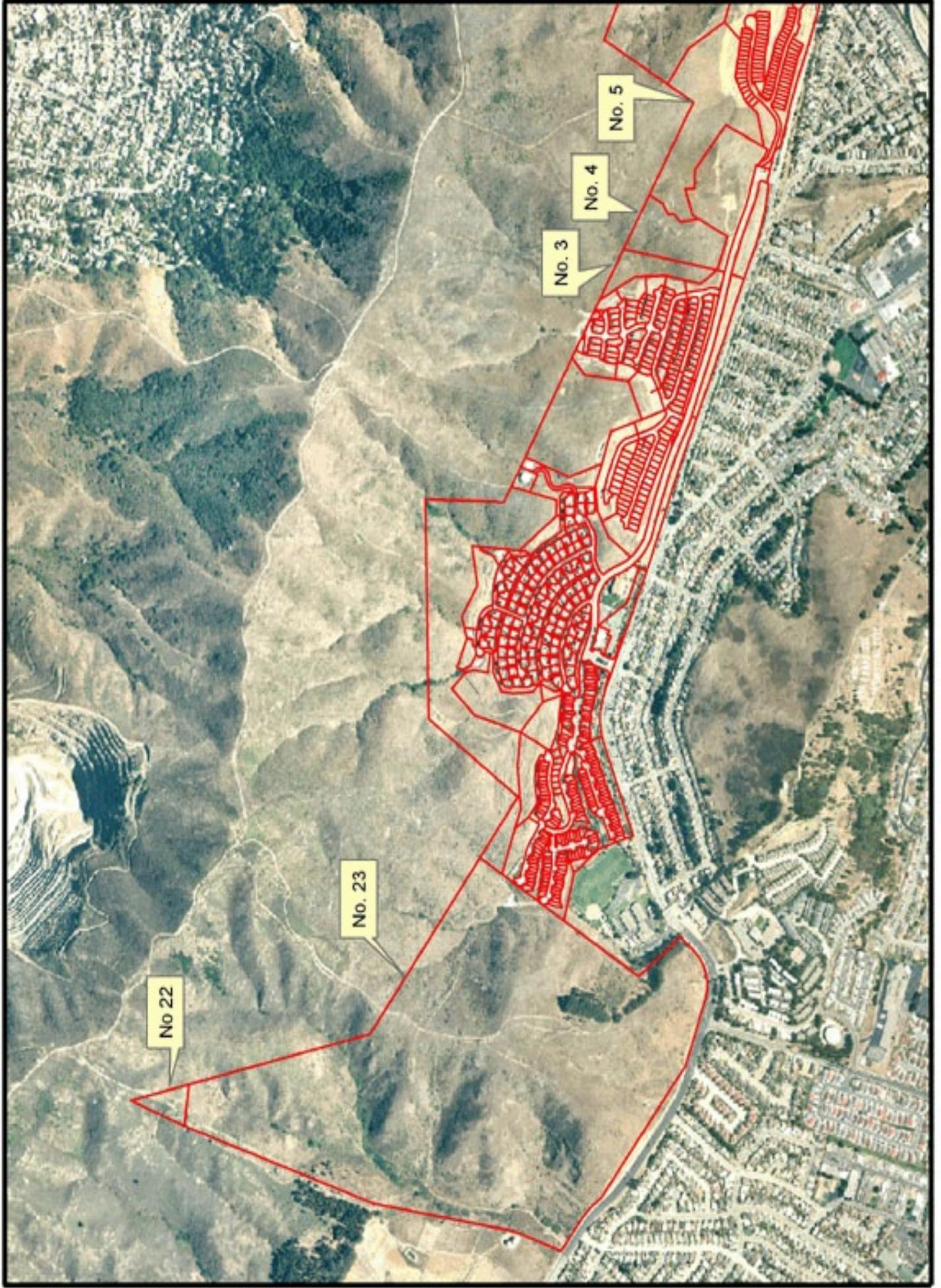


Figure 4: North East Ridge

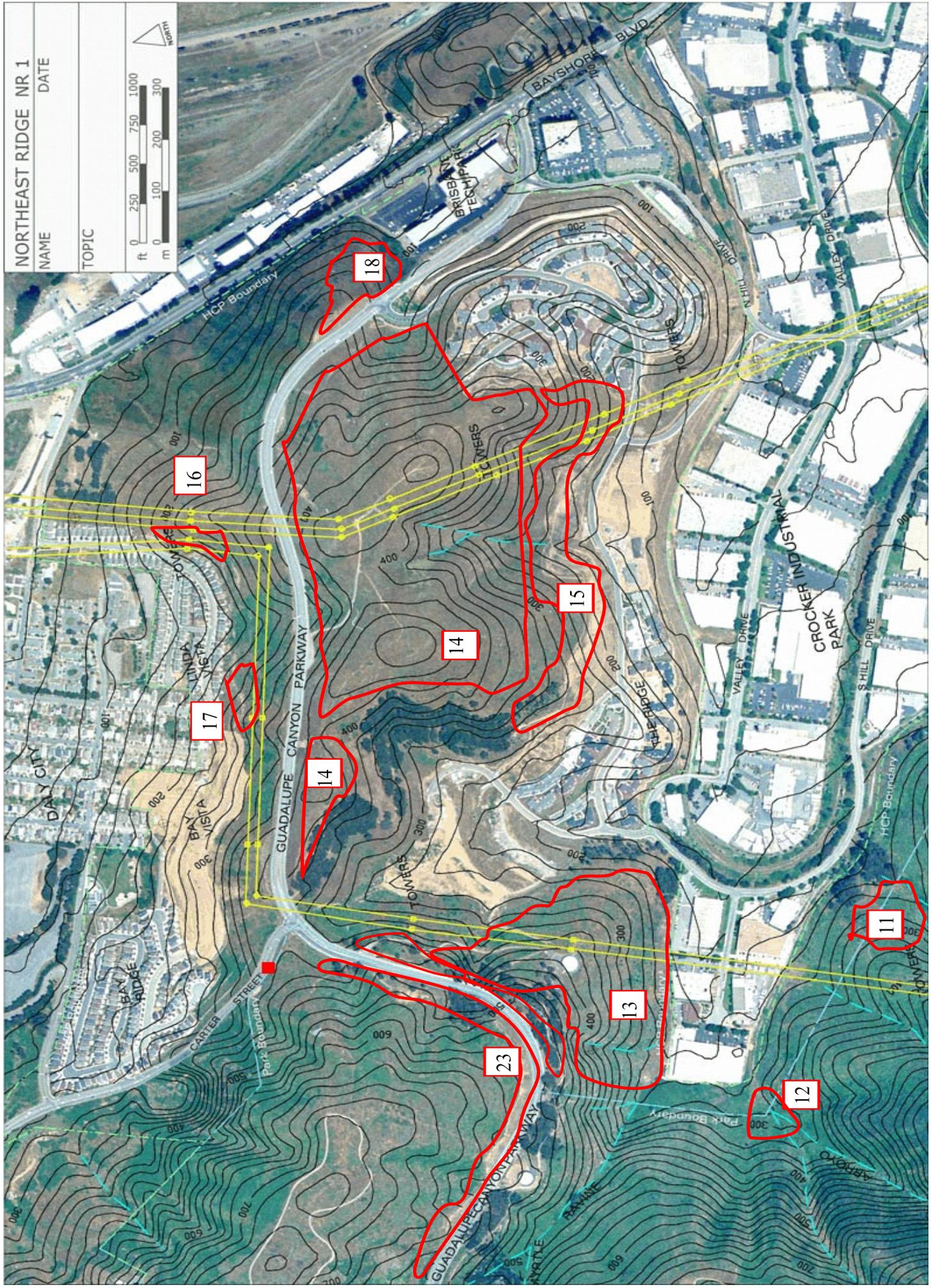


Figure 5: Upper Valley

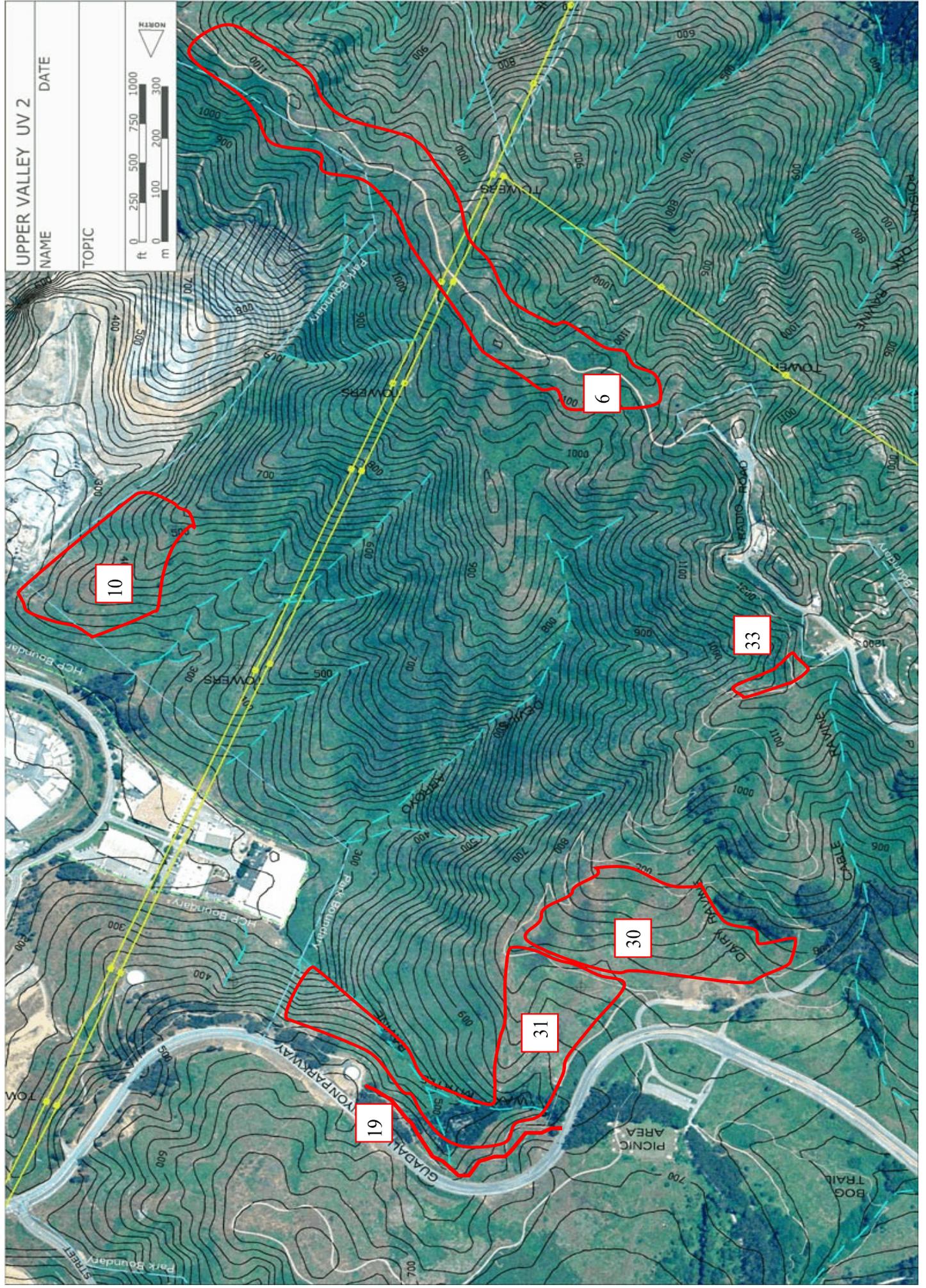


Figure 6: Owl & Buckeye Canyon

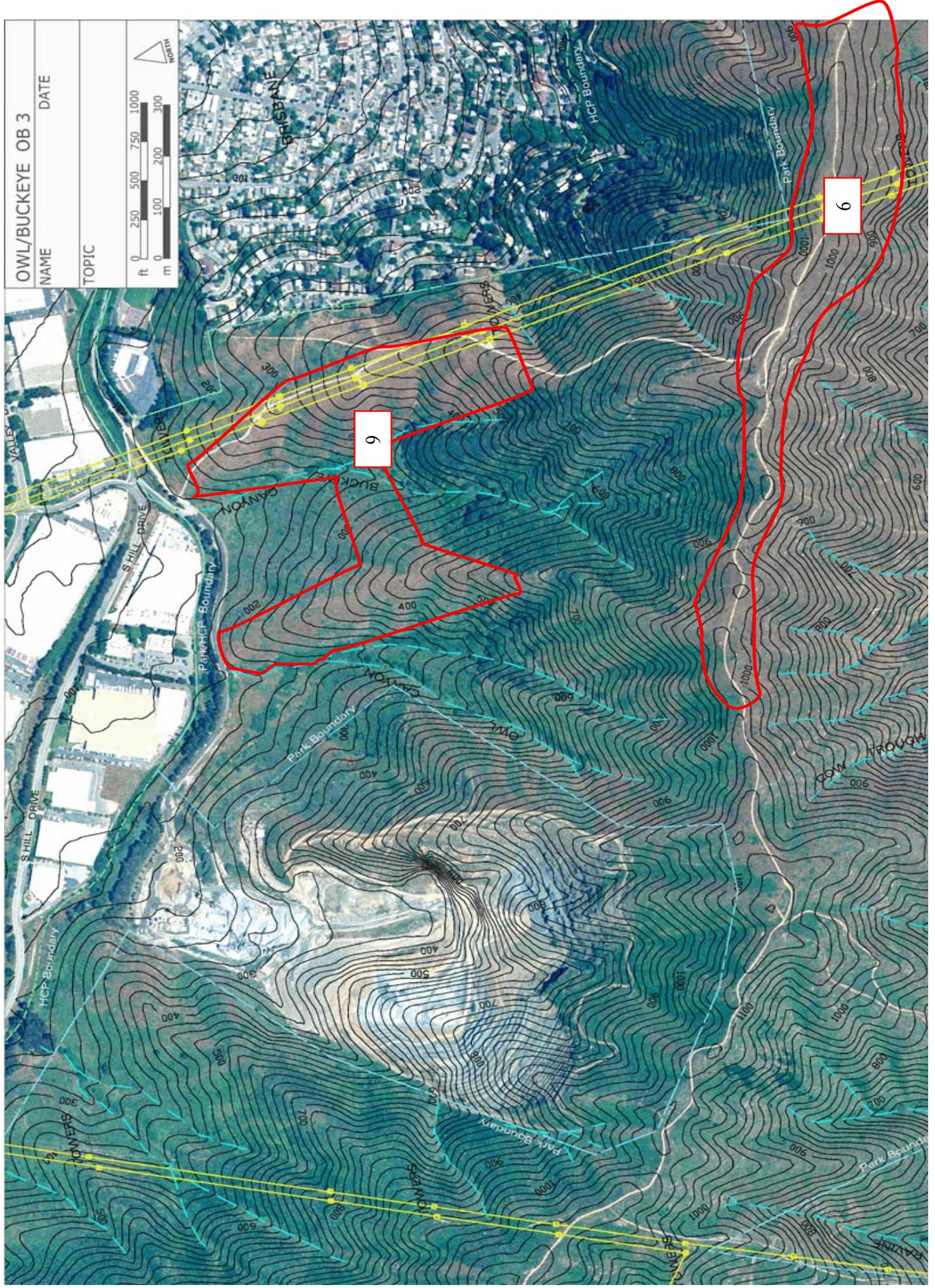


Figure 7: Southeast Ridge

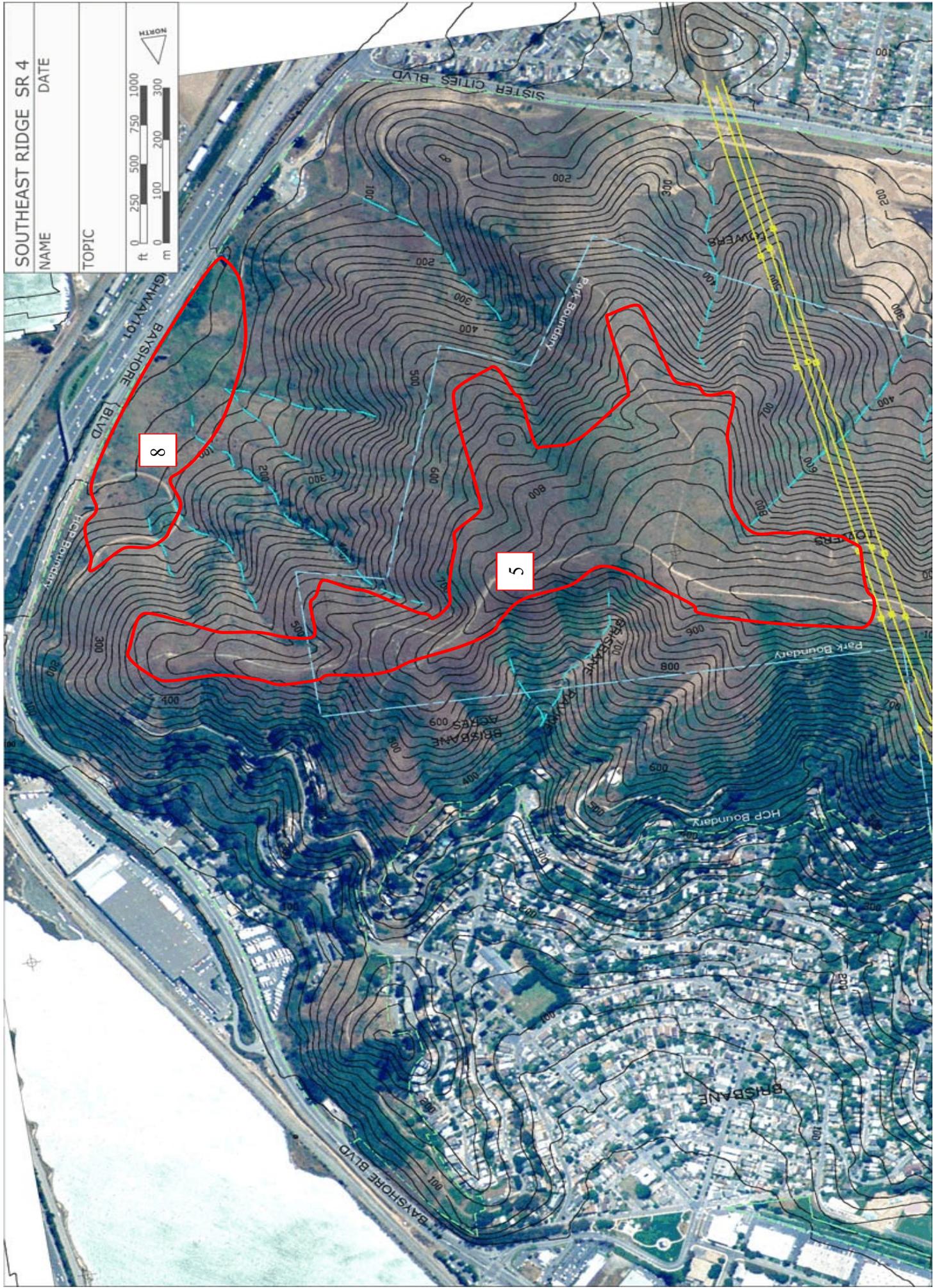
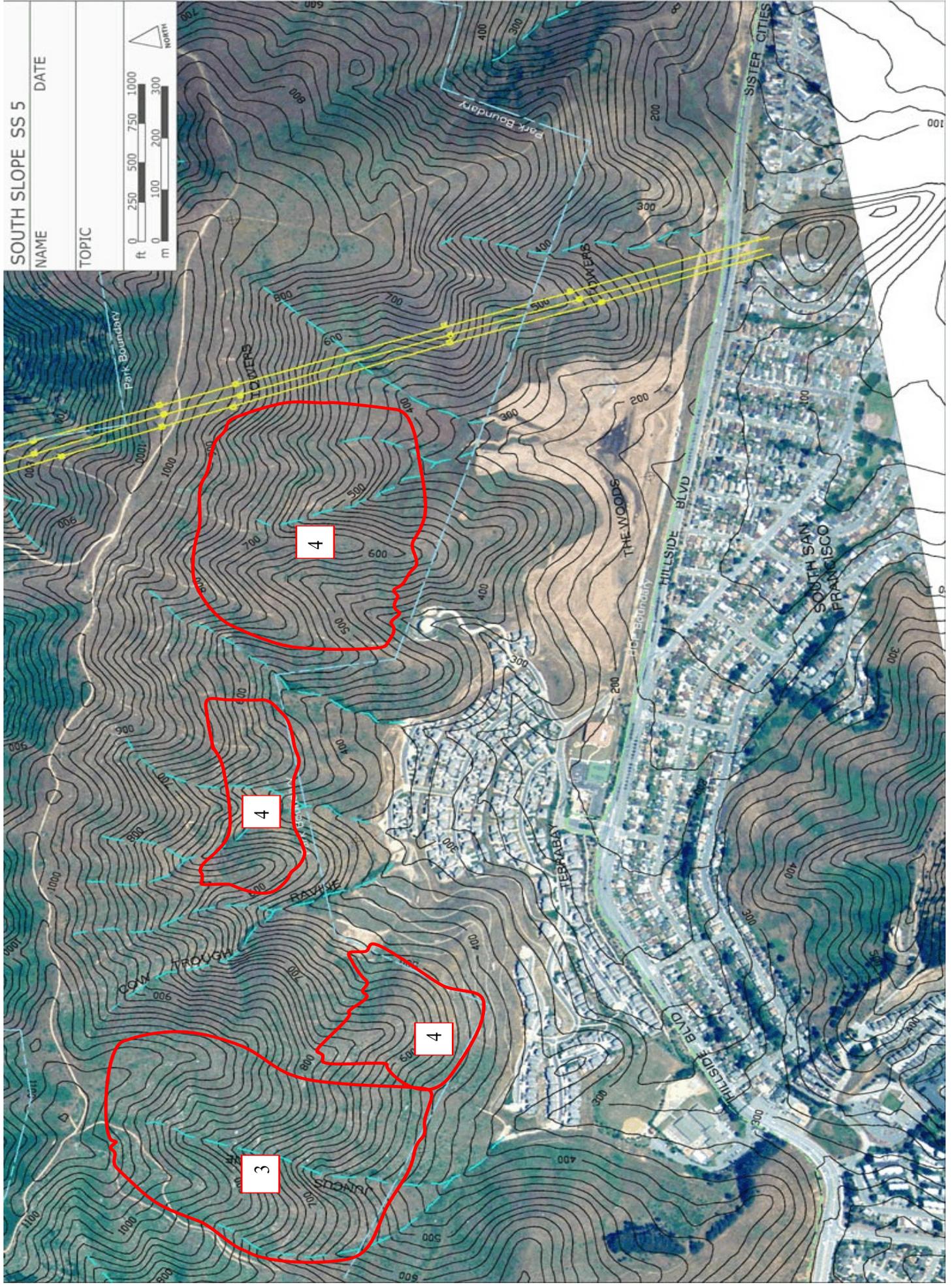


FIGURE 8: South Slope



SOUTH SLOPE SS 5

NAME

DATE

TOPIC

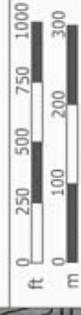


FIGURE 9: Hillside

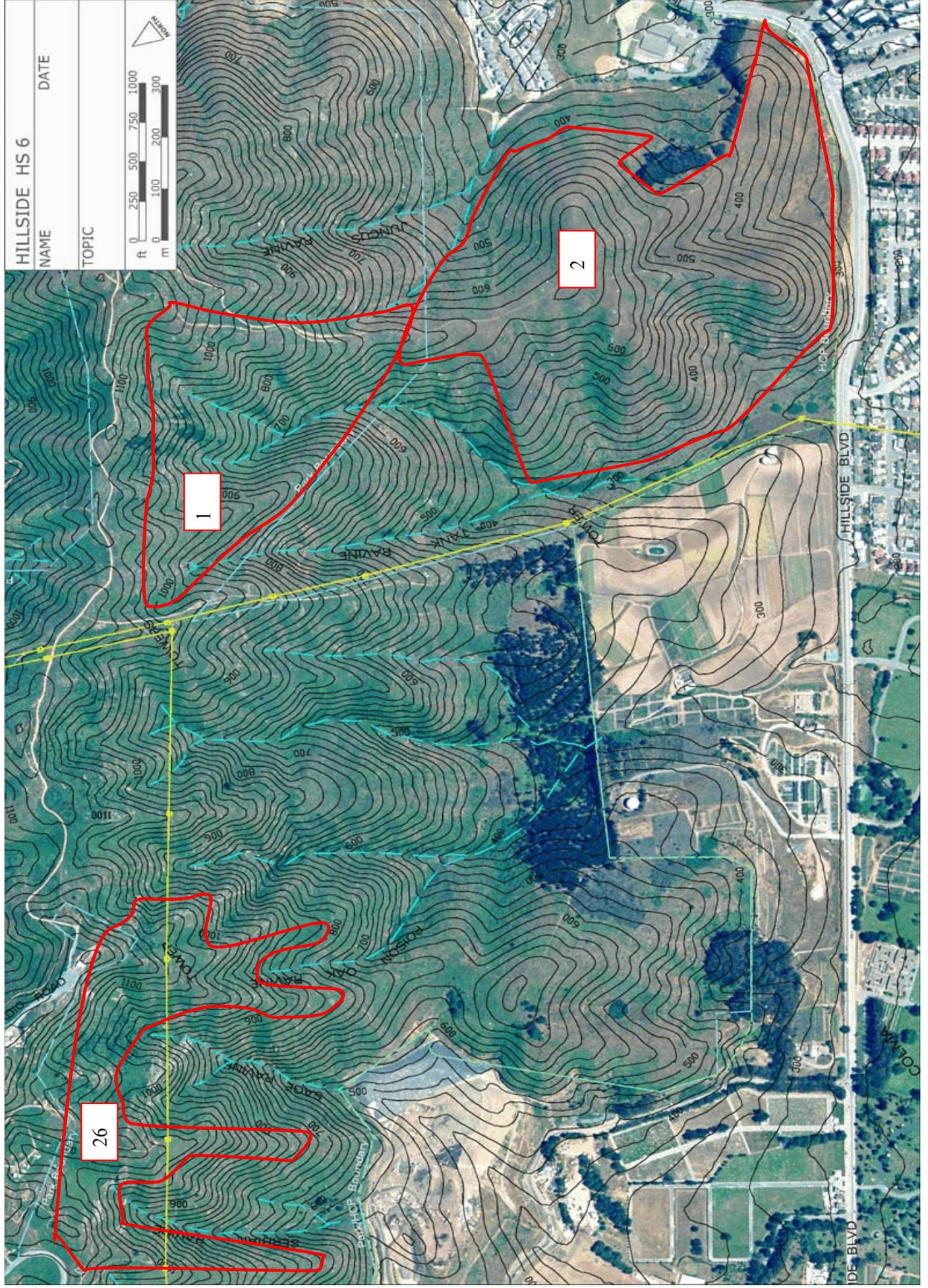


FIGURE 10: Radio Ridge

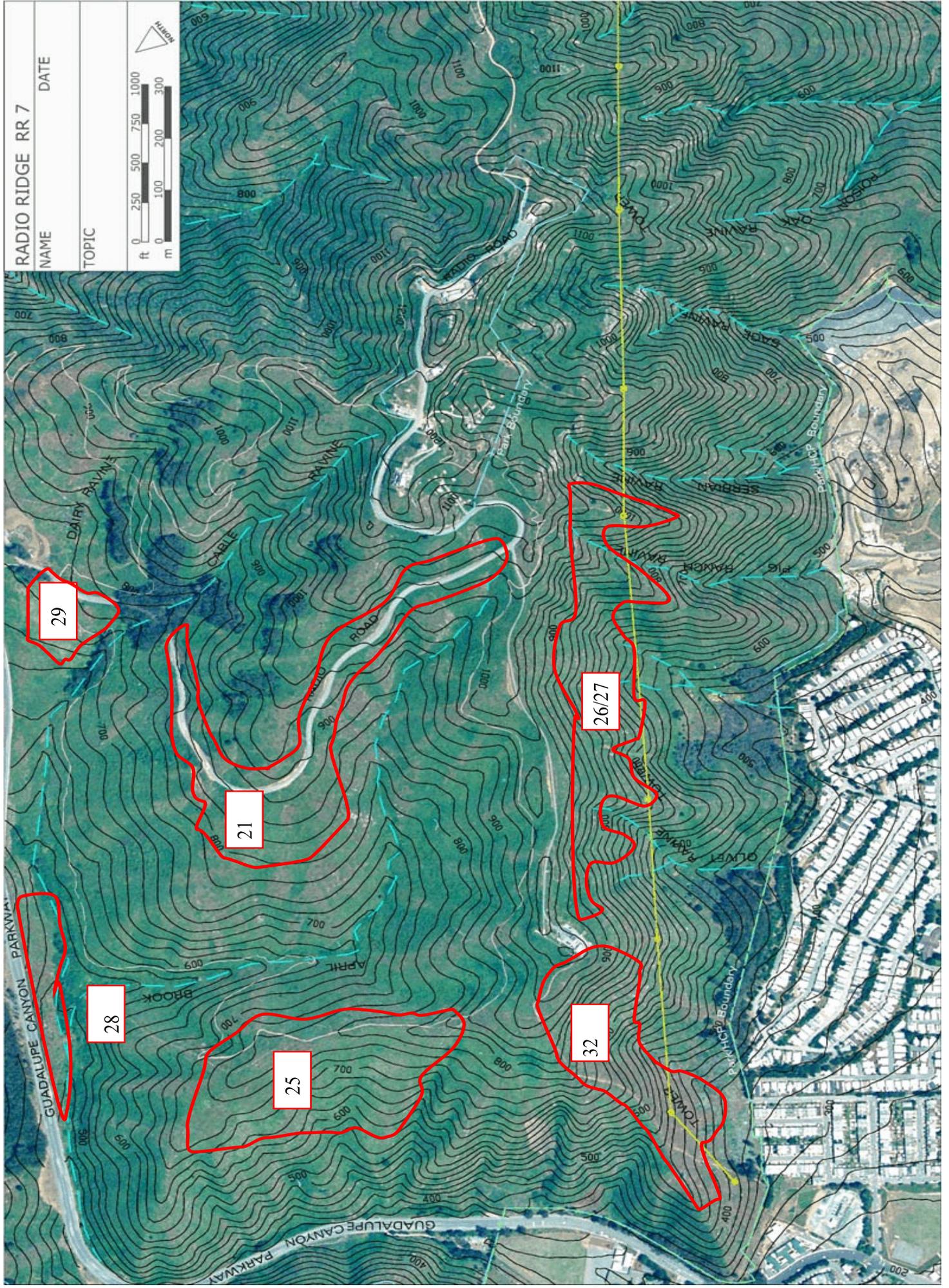


FIGURE 11: Reservoir Hill

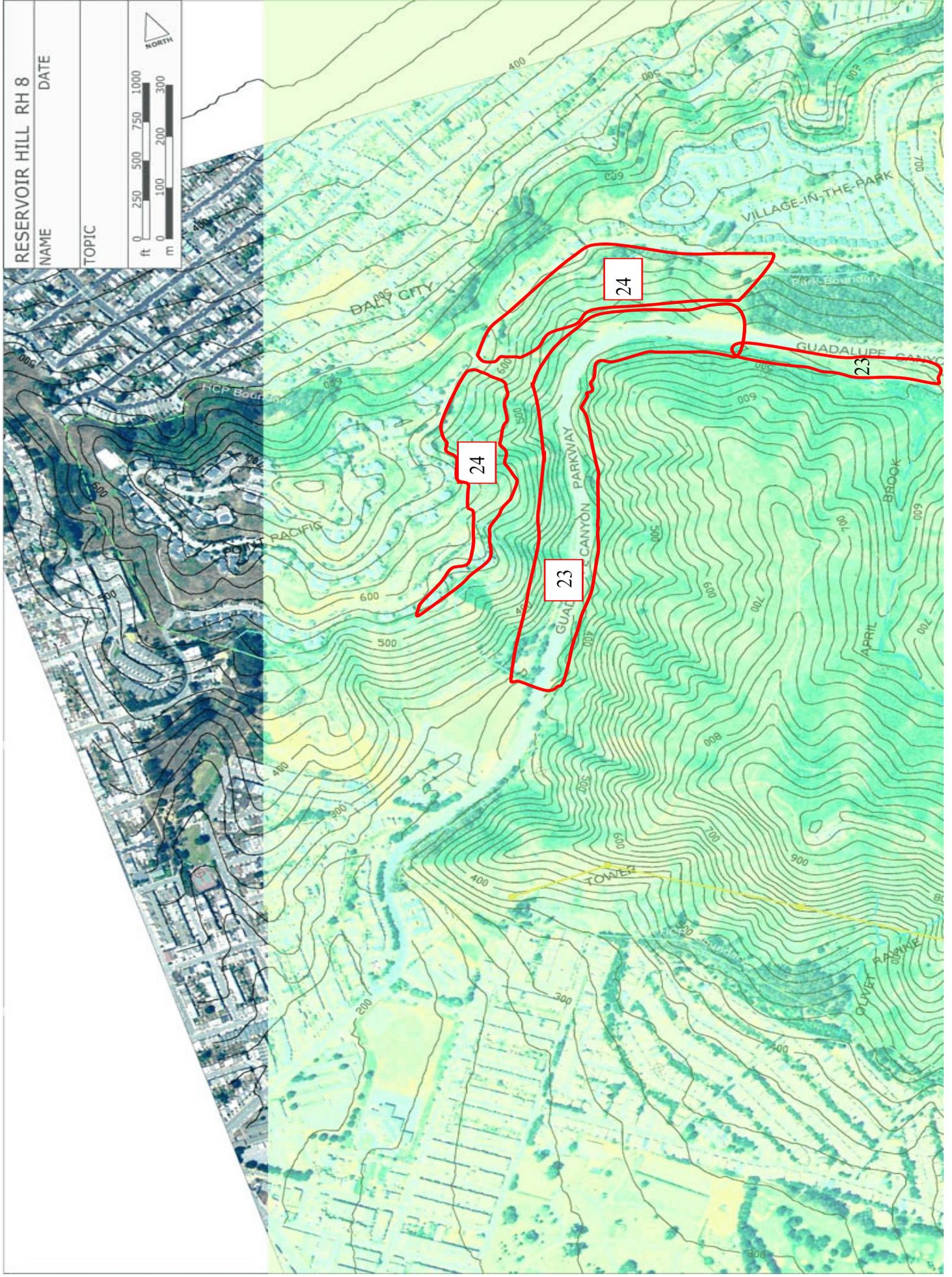
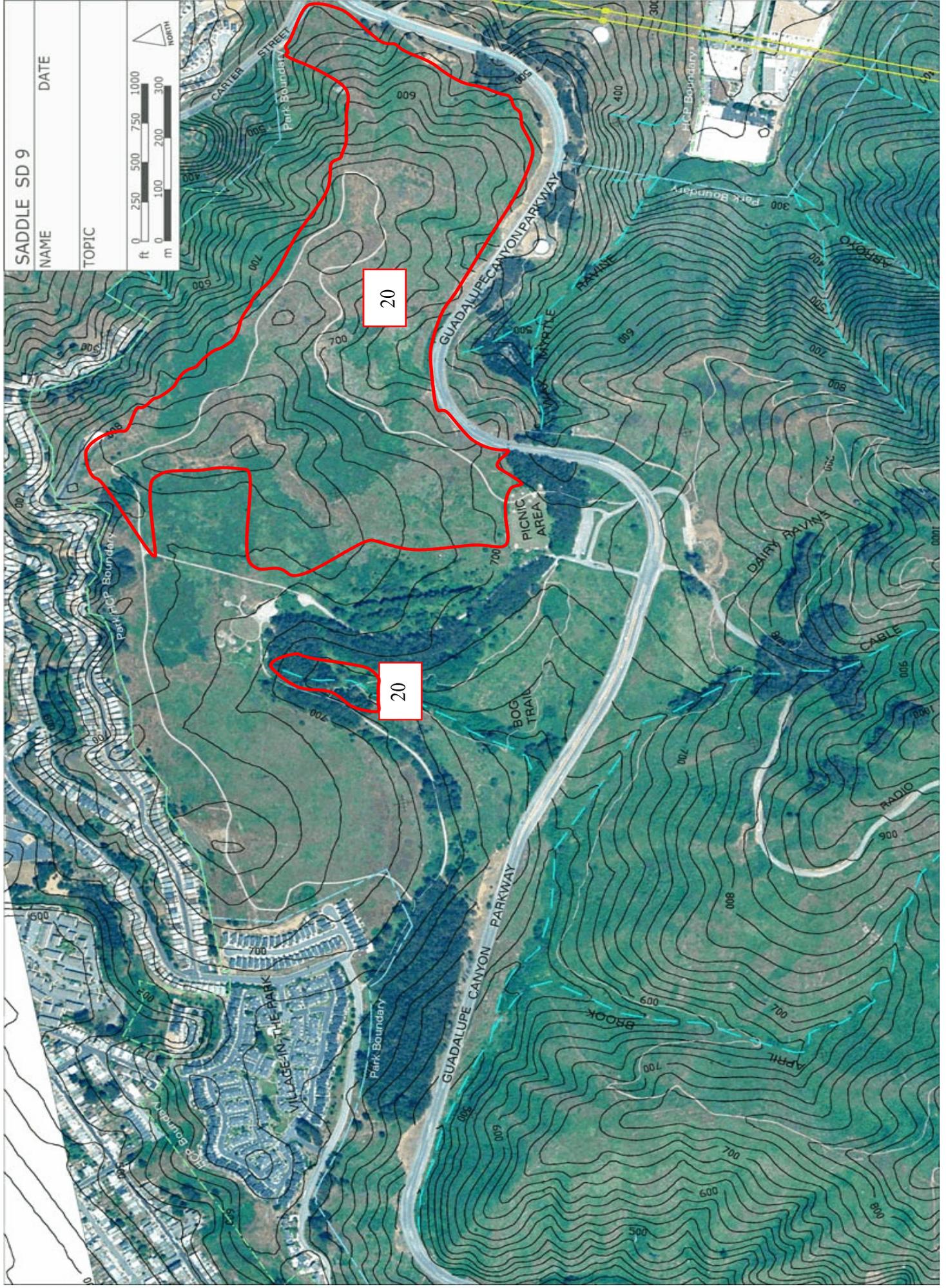


FIGURE 12: Saddle Trail



San Bruno Mountain Hand & Herbicide Control Work 2011

FIGURE 13

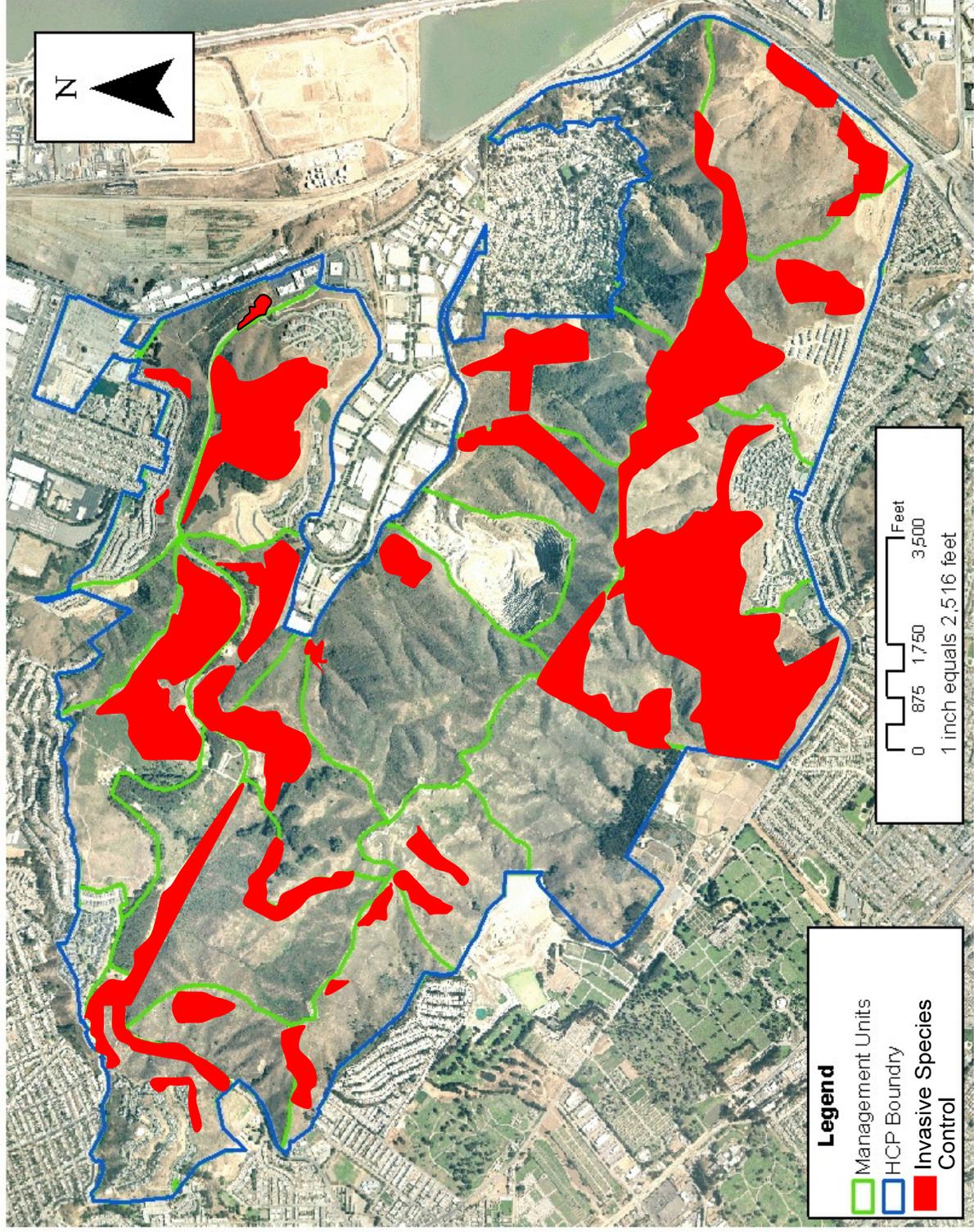


FIGURE 14: 2011 San Bruno Mountain Oxalis Pes-caprea Mapping

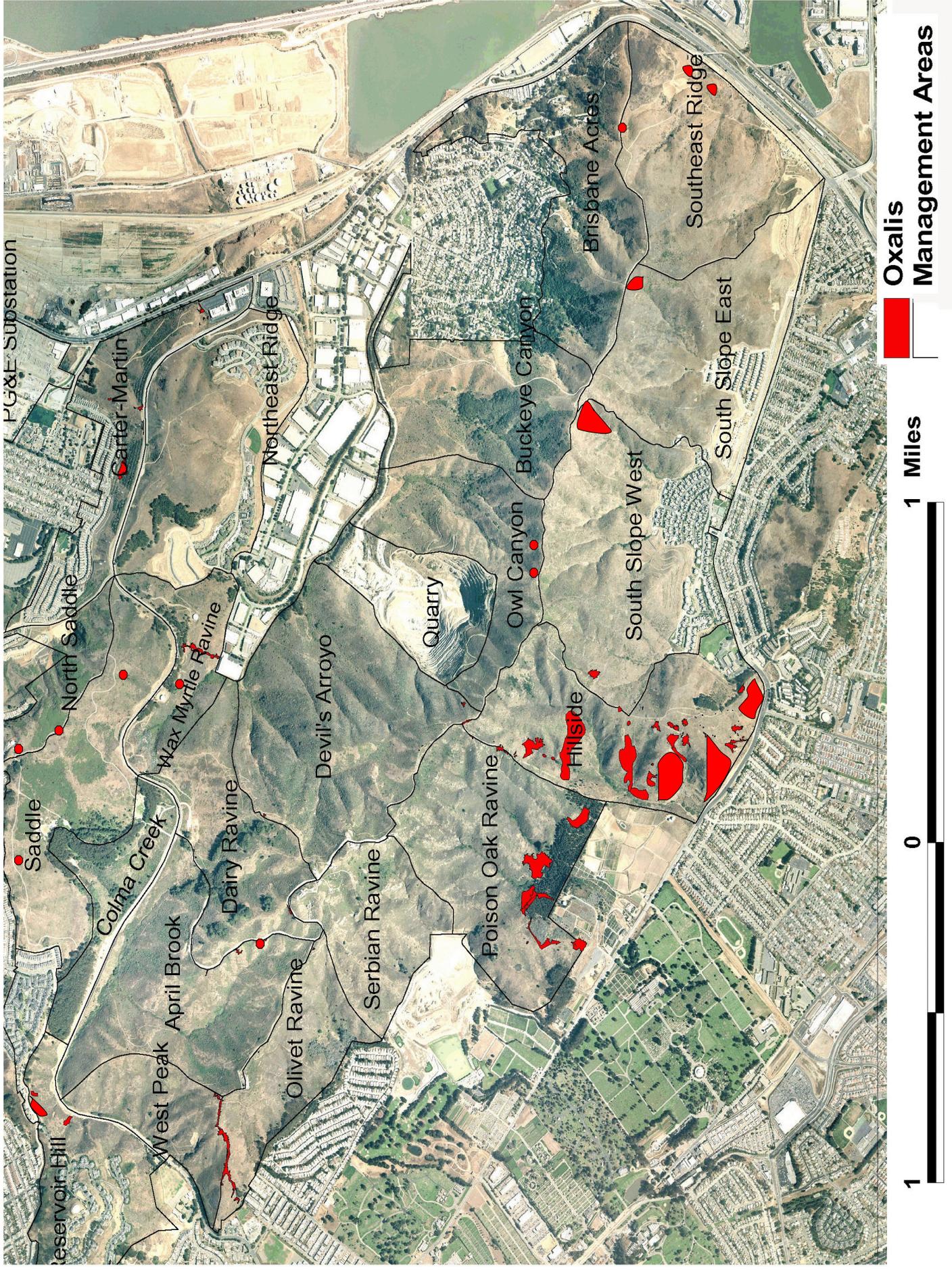


FIGURE 15: Owl & Buckeye Canyon 2008 Burn Site with Photo Stations

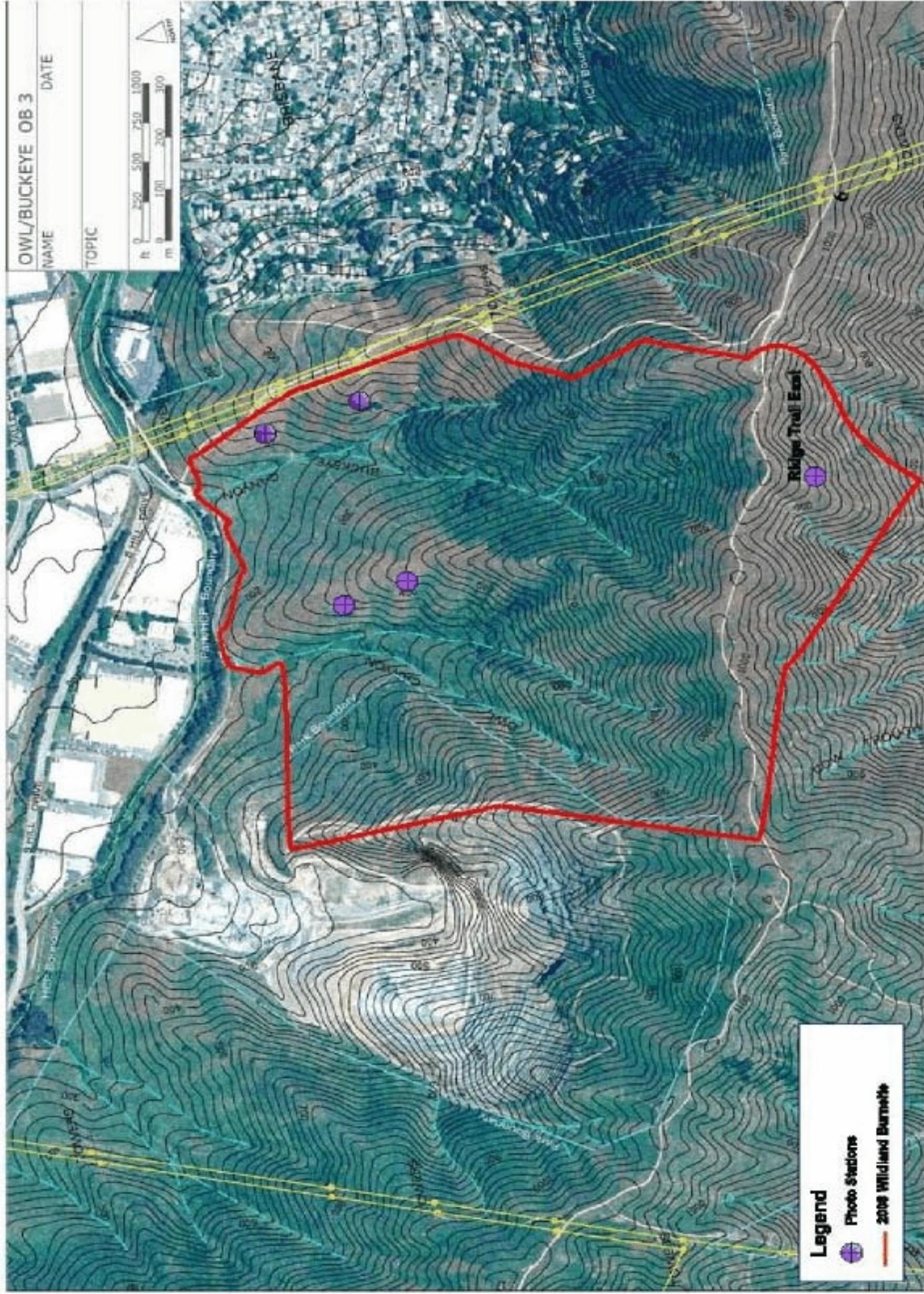


FIGURE 16: Terra Bay Masters HOA Exotics Treatment Parcels

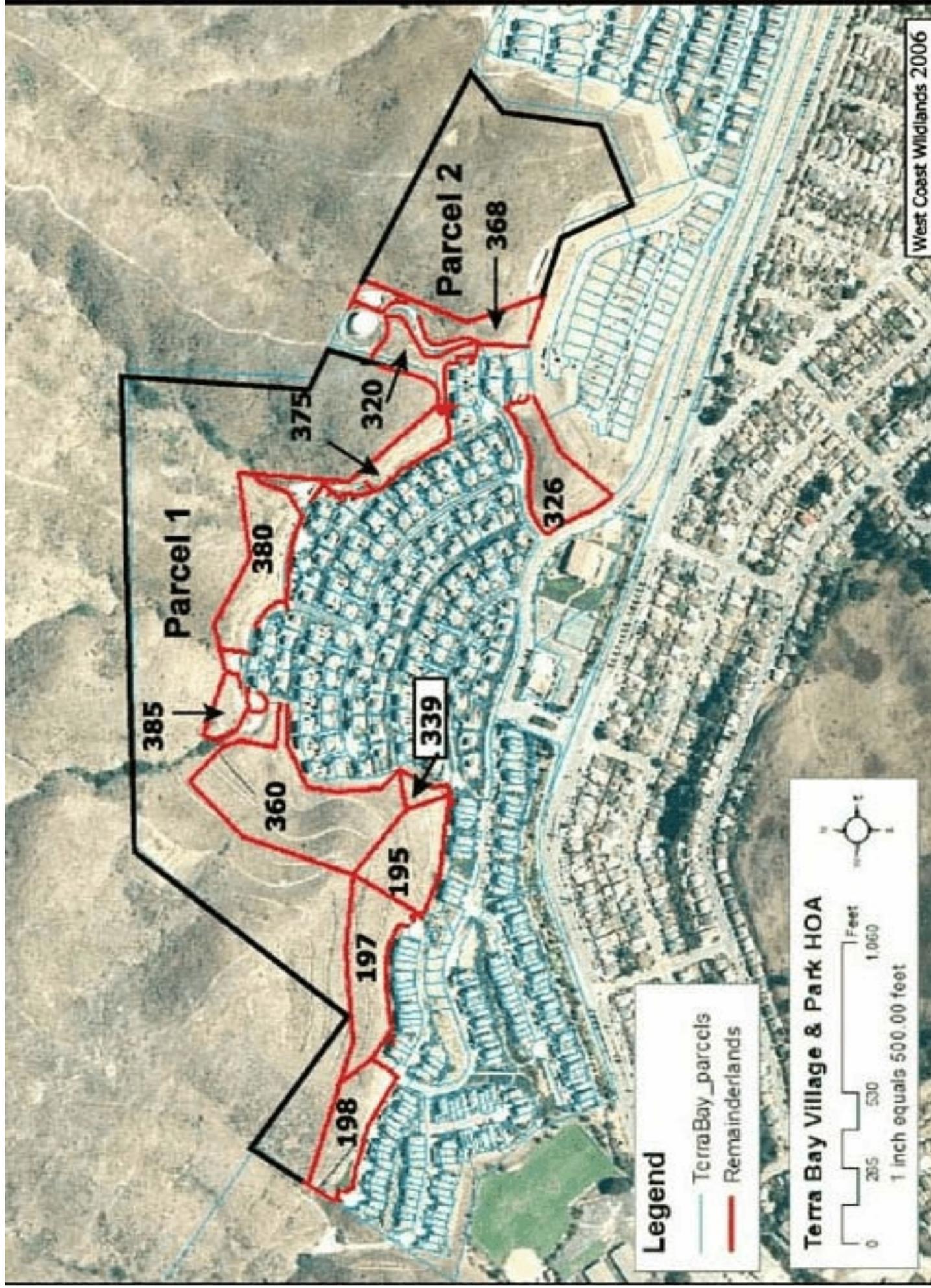


FIGURE 17: 2011 Weed Treatment Sites for Myers Peninsula Ventures, LLC



FIGURE 18: SBMW Weeding and Native Species Planting Sites

