SAN BRUNO MOUNTAIN
HABITAT CONSERVATION PLAN

Year 2007 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
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Left to Right: Callippe silverspot butterfly, Mission blue butterfly and San Bruno elfin butterfly.
Photos by: Patrick Kobernus, Coast Range Ecology.

VEGETATION MANAGEMENT AND RESTORATION

A. Invasive Species Control

The primary focus of habitat management activities on San Bruno Mountain since the inception of the San Bruno Mountain HCP in 1982 has been the control of invasive species infestations through hand removal, mechanical removal, and herbicide treatment. 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 2007 were conducted in accordance with the goals, objectives and success criteria established in the San Bruno Mountain Habitat Management Plan 2007 (San Mateo County 2007). Priority areas for management of invasive species are delineated in the San Bruno Mountain HMP.

The majority of the habitat management activities conducted on San Bruno Mountain are performed by West Coast Wildlands (WCW) under contact to the Habitat Manager, San Mateo County Parks Department. In addition, other contractors such as Shelterbelt Builders and Restoration Resources, and numerous volunteers working for San Bruno Mountain Watch and CNPS Heart of the Mountain, conducted invasive species control in 2007.

Due to the large area of the Mountain that is subject to invasive species control work (approximately 2,800 acres), and the expanding number of invasive species that require treatment, infestations must be prioritized as follows, based on their threat to sensitive habitat areas:

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 treatment has consisted of spraying targeted species with an herbicide solution containing either Garlon 4® (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 4® 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.

1. 2007 HCP Invasive Plant Treatment Summary

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. Invasive plants that were treated aggressively in 2007 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 discolor*), 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 microhabitat. These include species such as red valerian (*Centranthus ruber*), panic veldtgrass (*Ehrharta erecta*), and pin-cushion plant (*Scabiosa atropurpurea*).

Fennel is treated as one of the highest priority weeds on the Mountain and populations have been significantly decreased in some locations, such as on the slope above Hillside School. However, a high level of follow-up maintenance is required for management of fennel. Stands may require several treatments a year for many years before the plant is eradicated. Hence, significant resources are required for continued treatment of a site, thus limiting the total area that can be adequately treated.

In 2007, 628 acres of invasive plants were treated by hand or with herbicides (Figure 1). Many of these acres were treated 2 to 4 times for repeat control of various species. West Coast Wildlands maintains daily record sheets for all invasive species work conducted on the Mountain.

In 2007, the greatest efforts went into treating invasive species within key butterfly habitat areas on the Southslope, Northeast Ridge, Owl and Buckeye Canyons, the Saddle, 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 1).

The following invasive plant species were treated in 2007:

Table 1. Invasive Species treated on San Bruno Mountain by West Coast Wildlands in 2007.

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

Fig. 1. San Bruno Mountain Hand & Herbicide Control Work 2007

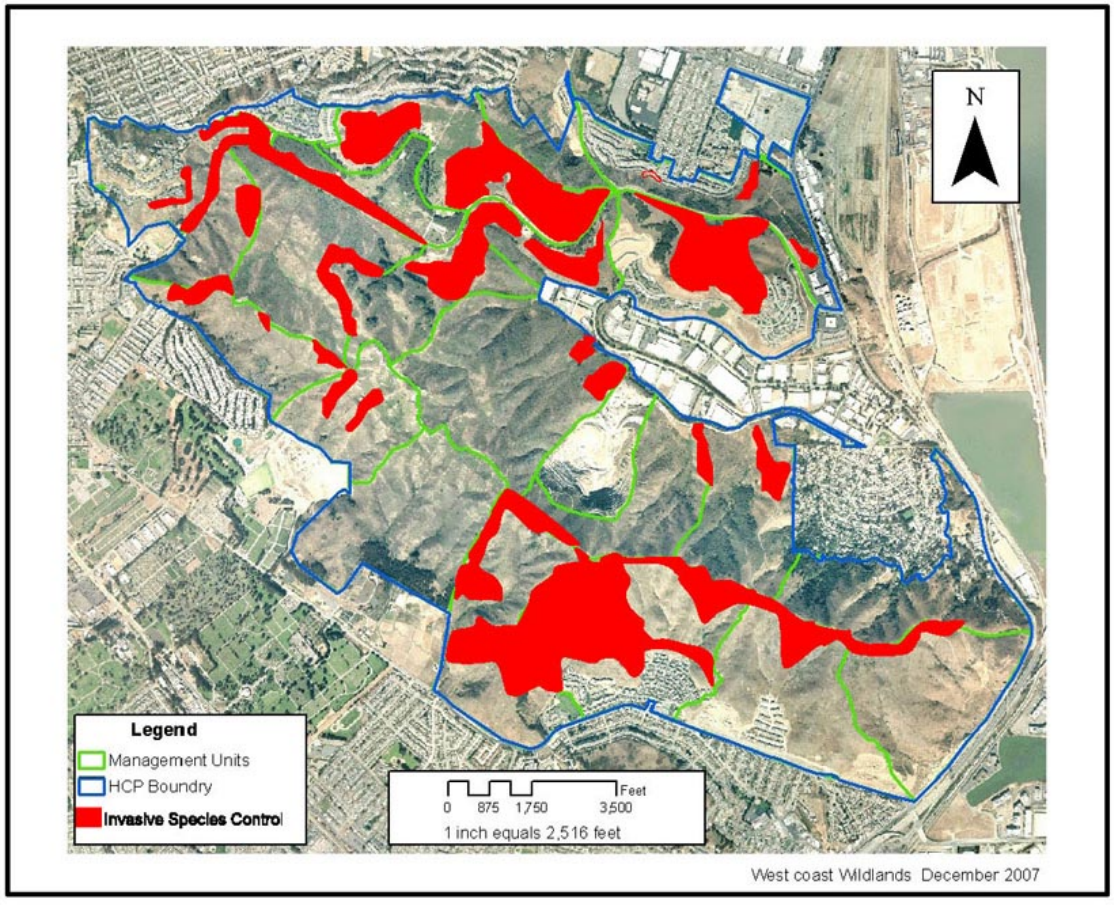


Table 1 includes species that were recorded on WCW daily record sheets. However, additional species that were not the focus of a particular day's control effort are occasionally treated by WCW and are not recorded. This is especially true when only a few individuals or a small patch are hand removed this minor amount of work doesn't warrant creating an additional data sheet. Additional invasive species are occasionally targeted by Shelterbelt Builders during habitat island maintenance (Section B below) and by volunteer groups during volunteer weeding days. These species are shown in Table 2.

Table 2. Additional Invasive Species treated on San Bruno Mountain in 2007 by Shelterbelt Builders and volunteer groups.

Avena spp. (wild oat)	*Hypochaeris radicata* (hairy cat's ear)
Briza maxima (quaking grass)	*Lactuca serriola* (prickly lettuce)
Bromus hordeaceus (soft chess)	*Lobularia maritima* (Lobularia)
Centaurea calcitrapa (purple star thistle)	*Lolium multiflorum* (Italian wild rye)
Centranthus ruber (red valerian)	*Lythrum salicaria* (purple loosestrife)
Chenopodium album (lamb's quarter)	*Myoporum laetum* (Myoporum)
Cirsium vulgare (bull thistle)	*Phalaris stenoptera* (harding grass)
Digitalis sp. (fox-glove)	*Plantago lanceolata* (plantain)
Ehrharta erecta (panic veldtgrass)	*Pyrocantha crenato-serrata* (pyrocantha)
Erechtites arguta (New Zealand fireweed)	*Rumex crispus* (curly dock)
Erodium cicutarium (filaree)	*Rubus discolor* (Himalaya blackberry)
Hedera helix (English ivy)	*Rumex acetosella* (sheep sorrel)
Helichrysum petiolare (licorice plant)	*Scabiosa atropurpurea* (pin-cushion plant)
Holcus lanatus (velvet grass)	*Solanum* ssp. (nightshade)

New invasive weed species found on the Mountain include yellow star thistle (YST), (*Centauria solstitialis*) along Radio Road, and gopher spurge (*Euphorbia lathyrus*) was found in Pointe Pacific. The YST plants consisted of only two plants in the bolting stage, and these were hand removed prior to seed set. The gopher spurge covered an area of approximately 1000 sq. ft (at approximately 1% density) and was treated twice with 2% Garlon in the spring of 2007. Follow up treatments for both species are scheduled for 2008.

In 2008, 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 individuals of particular concern are discovered in an area where they had not previously been seen or treated, it is noted and either WCW diverts funds to treat these if possible, or the plants are monitored and identified for control in the following year's budget. In addition, recommendations made by the newly established 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.

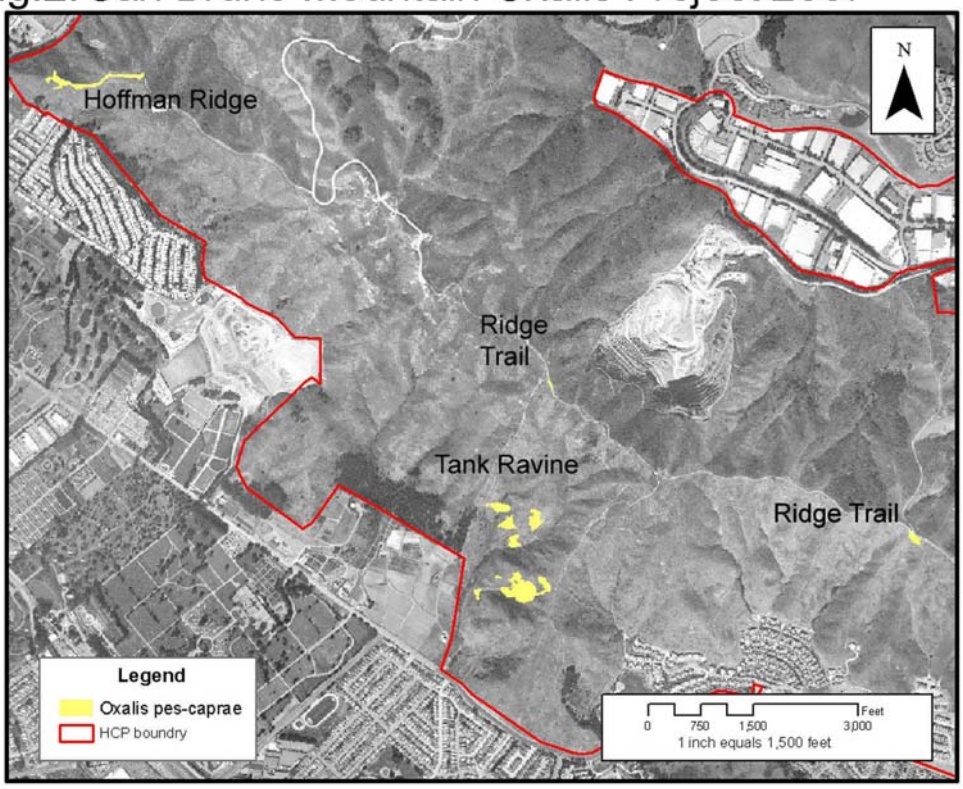
2. HCP Oxalis Control Project

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). On San Bruno Mountain, the greatest concentration of Oxalis is found in the Poison Oak Ravine and Hillside management areas (which includes the Tank Ravine management area). 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.

The funding for Oxalis control was extended through 2006/2007, and the remaining one-third of this budget was used in 2007 for follow-up treatment of the original control sites with some expansion of the mapped infestation (Figure 2). A total of approximately 47 acres have been treated thus far since inception of the project in 2005. An assessment made by WCW in early 2007 detected a kill rate ranging from 65 to 95%. Some of the areas that have been controlled of Oxalis have been colonized by coyote brush and wild oat.

The Oxalis control project was renewed for the 2007/2008 fiscal year and treatment is scheduled for all previously treated sites, as well as three new sites observed downslope of the Ridge Trail east of Juncus Ravine. The three new infestations are each approximately 10 to 20 square meters in size.

Fig.2. San Bruno Mountain Oxalis Project 2007



West Coast Wildlands December 2007

3. Weed Control Performed by CDF Prison Crews

CDF Prison Crews from the Ben Lomond Camp were not available for work on San Bruno Mountain in 2007 due to scheduling conflicts with the work camp. As a result, West Coast Wildlands was contracted to provide follow up control work within some of the high priority habitat areas managed by the CDF work crews. WCW did hand removal of French Broom for 2 days within the Linda Vista restoration site, with work being concentrated around Mission blue butterfly host plants.

B. 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.

1. Saddle Gorse Control Project

Through a California State Parks Grant, a four-year project was initiated in 2004 to control gorse in the Saddle. The lead consultant for this work is Shelterbelt Builders, with May and Associates, Restoration Resources and West Coast Wildlands contributing as subconsultants. The overall objective of the project is to reduce gorse and Himalayan blackberry cover within treatment areas to 5% or less by the end of the project, such that only minimal maintenance will be required to keep these species from returning to the project area. In 2007, West Coast Wildlands treated 27 acres of gorse regrowth and seedlings 3 to 4 times (Figure 3).

Fig. 3. Saddle Gorse Control Project: 2007 Treatment Sites

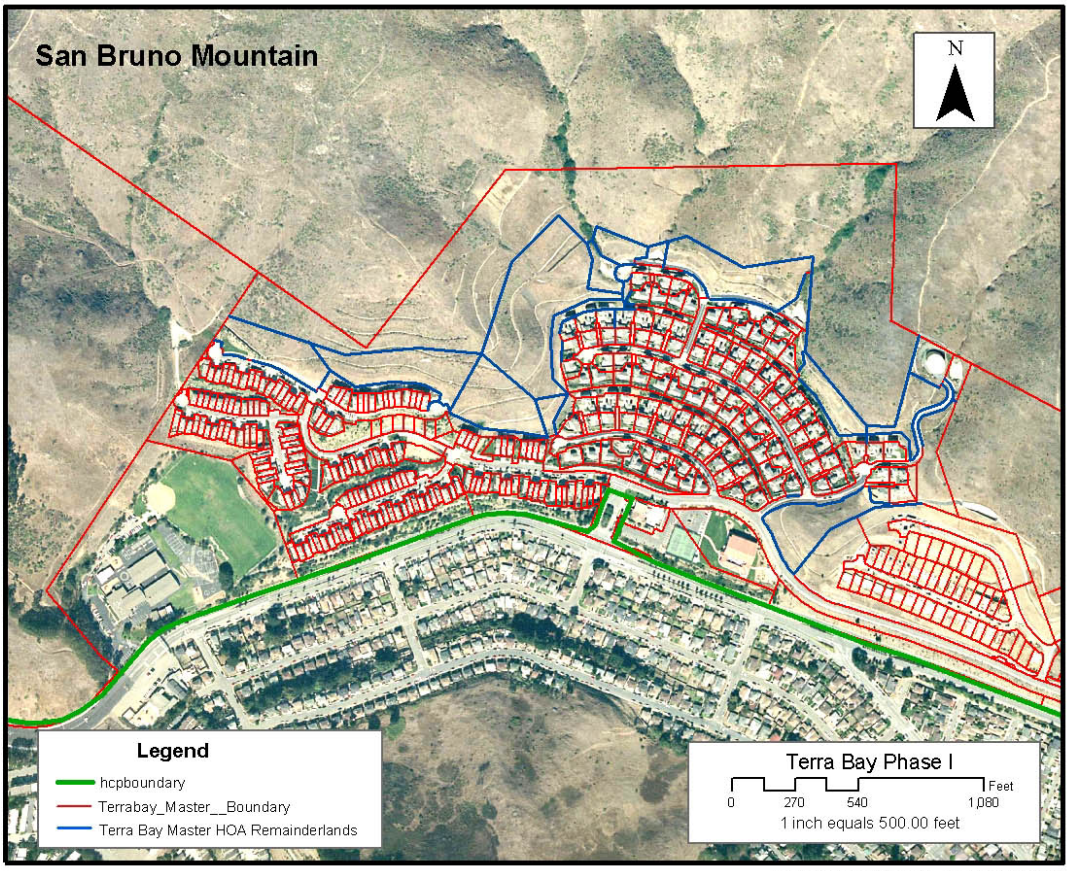
2. Terra Bay Master Homeowners Association Invasives Control Project

The Terra Bay Master Homeowners Association (TBMHOA) was deeded the Remainder lands in 2006 (Figure 4: Terra_Bay_Master) 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 2007 and ending in the Spring 2010. 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 fall 2007 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 remaining mowed annual and perennial weed species will be treated in late winter to early spring 2008.

Fig. 4. Terrabay Village & Park Master HOA Parcel Map



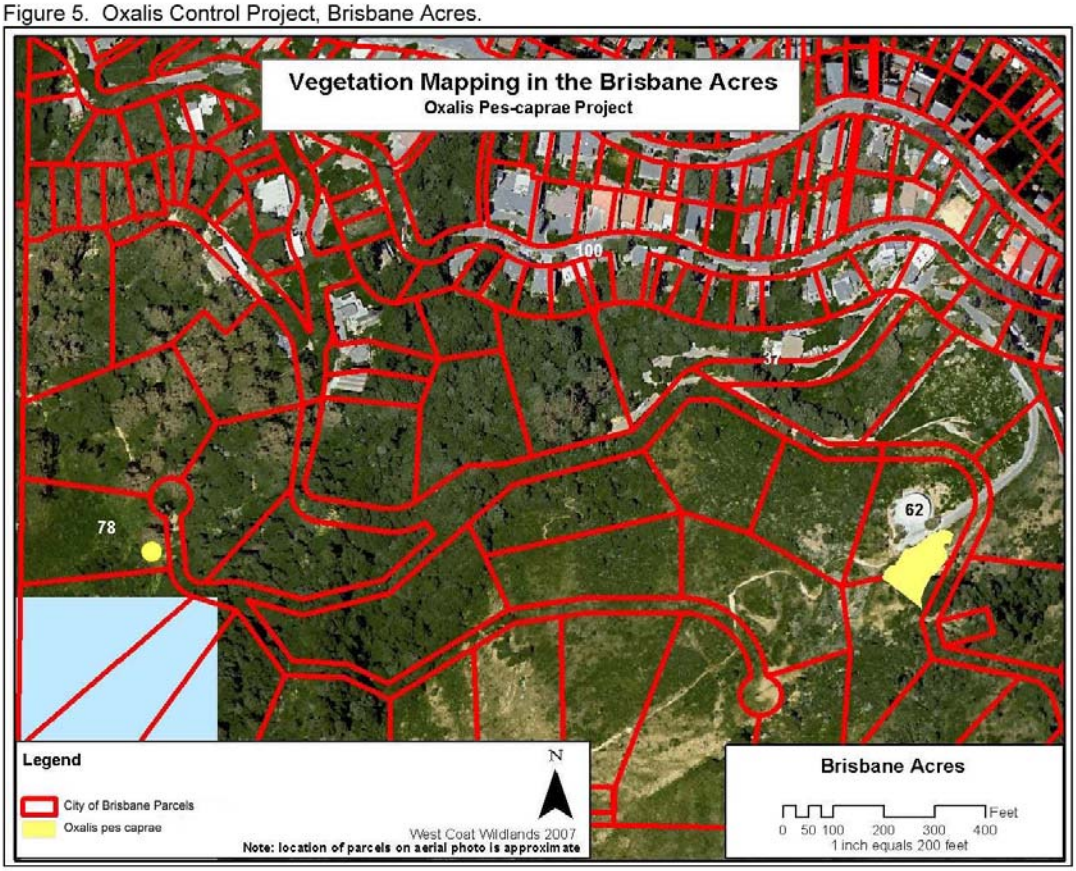
West Coast Wildlands - December 2007

3. City of Brisbane Oxalis Control Project

The City of Brisbane contracted West Coast Wildlands to treat infestations of Oxalis (*Oxalis pes-caprea*) on two City-owned parcels (parcel 62 and parcel 78). Parcel 62 had approximately ten thousand square feet of Oxalis (one-quarter acre), and Parcel 78 had approximately 10 square feet. Both sites were treated

twice in January and February of 2007 with excellent results. Both sites had less than 15% visible plants remaining in December 2007 (Figure 5). Follow up treatments are scheduled for winter 2008.

Figure 5. Oxalis Control Project, Brisbane Acres.



C. Restoration of Habitat

For purposes of clarity, the term “restoration” is used to refer to areas planted and/or reseeded 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.

Early attempts at large scale restoration on disturbed slopes on San Bruno Mountain were largely unsuccessful due to the difficulty in maintaining areas against a large influx of weeds. As a result, a strategy of creating small habitat islands (up to approximately ½ acre in size) was developed. Since 1997 this

approach has been implemented in several areas of the Mountain and has proven to be successful in Eucalyptus cut areas, former gorse patches, and on graded slopes disturbed by development. 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. Some San Bruno elfin habitat has also been restored (Appendix A). 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 2007), 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.

Growing and establishing Viola within restoration sites has been largely unsuccessful to date, however experimentation has continued on a small scale. Because the Callippe's habitat is typically found in much larger patches, and it is these patches that support the population on San Bruno Mountain, it is more important at this time to direct efforts into protecting the conserved grassland habitat that contains Viola than to direct significant funds into replanting Viola within restoration 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). This management approach has been in use since the inception of the HCP and the effectiveness of this approach has been documented in previous annual reports and is demonstrated through the continued persistence of the endangered species on San Bruno Mountain. It is imperative that this approach be continued in the future to manage the endangered species effectively.

1. 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.

2. 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. Work conducted in 2007 on the habitat islands is reported in Appendix A.

3. The Watershed Project / Heart of the Mountain

Under a State Parks Grant managed by the County of San Mateo, the Watershed Project is carrying out "Heart of the Mountain" directed by Joe Canon. The goal of Heart of the Mountain is to restore the Colma Creek headwaters to a native riparian plant community. The Heart of the Mountain project leads volunteer groups in weed removal and native planting. Priority invasive plants for removal include Cape ivy (*Delairea oderata*), English ivy (*Hedera helix*), Himalayan blackberry, and eucalyptus.

In 2007, members of the Heart of the Mountain, San Bruno Mountain Watch and West Coast Wildlands salvaged a number of Juncus patens and Carex from an impoundment area at Mandalay Point (Southeast Ridge, San Bruno Mountain). These plants (approximately 30 rushes (*Juncus patens*) and 20 sedges (*Carex ssp*.) were planted at the Colma Creek headwaters project area. Additional information on volunteer efforts conducted through the Watershed Project can be obtained from Joe Canon with Heart of the Mountain.

4. Habitat Restoration Work on Development Slopes

Shelterbelt Builders and previous restoration contractors working on San Bruno Mountain have created habitat restoration sites on various private properties within the HCP. Habitat Restoration sites are located on Brookfield Homes property, San Francisco Water District property, Myers Development and

property, Pointe Pacific HOA property, TBMHOA property, and Linda Vista (D.R. Horton) property.

D. Grazing and Burning

No grazing or burning projects were conducted on San Bruno Mountain in 2007. Burning and grazing are identified as important habitat management tools in the San Bruno Mountain HCP and the San Bruno Mountain Habitat Management Plan, 2007. A grazing project is being formulated by the Habitat Manager and is proposed for implementation within the County Park in 2008.

E. References

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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.

All San Bruno Mountain HCP documents/ resources available on-line at http://www.traenviro.com/sanbruno/ or from County of San Mateo Parks Department.

Appendix A

2007 Butterfly Island Year End Report
SAN BRUNO MOUNTAIN

Prepared by Shelterbelt Builders

2007 Butterfly Island Year End Report
SAN BRUNO MOUNTAIN

October 22, 2007

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2006/07 Island Planting Summary

Colma Creek Watershed

The Colma Creek planting islands continue to establish on their own with little need for additional management. Lupine seedlings have been observed establishing from parent plants at CC1 and mission blue butterfly larvae have been observed at CC2. After the excellent survivorship of lupine in the first year (1999/2000), we planted additional host and nectar plants at each site in year 2 (2000/2001) and year 3 (2001/2002). Subsequent years have required no additional plants, as each island is sufficiently dense with butterfly host and nectar plants. Six species of nectar plants were planted at both sites; they include Chilean aster (*Aster chiloensis*), brownie thistle (*Cirsium quercetorum*), seaside daisy (*Erigeron glaucus*), coast buckwheat (*Eriogonum latifolium*), golden aster (*Heterotheca sessiflora*) and CA horkelia (*Horkelia californica*). Coast buckwheat and golden aster established very well at each of the sites.

In 2006/07 a lupine census was taken and the plants were monitored for health and vigor. Annual grasses in the islands were mown during the spring growing season to help suppress their growth. Reducing the height and density of annual grasses helps the native perennials grow longer and stronger throughout the growing season. An additional summer mowing was also completed to for thatch reduction.

Colma Creek 1

Lupinus albifrons	*Lupinus formosus*	Total
1	81*	82

(*Minimum 23 individuals appeared to have recruited within the last year.)

Colma Creek 2

Lupinus albifrons	*Lupinus formosus*	Total
14*	48**	62

(*Minimum 2 individuals appeared to have recruited within the last year.)
(**Minimum 15 individuals appeared to have recruited within the last year.)

Dairy Ravine

The Dairy Ravine butterfly island sites are scattered throughout the Dairy Ravine restoration area. Dairy Ravine 1 (DR1) is situated on a saddle with shallow, rocky soils and it has become a model for the area. Chilean aster, brownie thistle, seaside daisy, coast buckwheat and CA horkelia have been planted at DR1. Coast buckwheat and

seaside daisy have both established very well throughout the island.

Dairy Ravine 2 and 3 (DR2/DR3), which were created in 2000 and 2001, have both been abandoned. Annual grass competition was so severe that very few lupine were able to establish in these islands. Dairy Ravine 4 (DR 4 - or sometimes called Elfin Ridge) is the only San Bruno elfin butterfly habitat island installed to date. This island now has very dense stands of moss stonecrop (*Sedum spathulifolium*), both naturally occurring and planted. The enhancement planting of moss sedum extended the San Bruno elfin butterfly habitat up along the ridge separating Dairy Ravine from Wax Myrtle canyon. There are very few invasive weeds impacting this moss sedum population so no annual monitoring or weed control is done at this site. As of 2004, this island has been considered stable and established.

Two new mission blue islands were created in 2002/03. Dairy Ravine 5 (DR5) was created downslope from DR1. This island , like DR1, has shallow rocky soils along a ridge line with little annual grass competition. Dairy Ravine 6 (DR6) was created in the Friends of San Bruno Mountain Botanical Garden in lower Dairy Ravine. Both islands had high survivorship during their first year. Two new weed maintenance techniques were incorporated into these islands. Thick rice straw mulch was applied around lupines in DR5 and pre-emergent herbicide was used at DR6. Each method provided excellent annual grass control during the first year establishment period.

As in previous years, the butterfly islands were mowed and monitored in spring of 2007. The mowing was primarily to reduce the annual grass cover, as well as to limit the establishment of various species of invasive thistle (*Cirsium* sp.), radish (*Raphanus* sp.) and *Picris*. While the number of remaining lupine has decreased (at least in DR5; we are lacking original planting figures for DR1), those that have survived generally appear healthy and well-established. Additionally, the lupine seem to be self-recruiting. At minimum, twelve lupine in DR1 and four lupine in DR5 appear to be new seedlings.

The lupine population in DR6 crashed down to only 5 remaining plants in 2004/05 and is now reduced to only three individuals in 2006/07, all of which are *Lupinus formosus*. This was probably due to the reestablishment of the *Lolium* and *Picris* at the site, though other factors may be responsible as well. Currently, *Picris* is the dominant species in DR6.

Dairy Ravine 1 (DR1)

Lupinus albifrons	***Lupinus formosus***	**Total**
72*	1	73

(*Minimum 7 individuals appeared to have recruited within the last year.)

Dairy Ravine 5 (DR5)

Lupinus albifrons	*Lupinus formosus*	Total
73	49*	122

(* Minimum 4 individuals appeared to have recruited within the last year.)

Dairy Ravine 5 (DR5) Survivability

Total Lupine Planted	Size	Years Planted	Current Surviving Lupine	Survivability
311	D16	5	122*	39%

Dairy Ravine 6 (DR6)

Total Lupine Planted	Size	Years Planted	Current Surviving Lupine	Survivability
100	D16	5	3	3%

Saddle

After two years of great lupine establishment without much weed competition, annual grasses and other exotic annuals continue to increase at the Saddle island (S2). The thick gorse mulch that prevented the annual weed establishment for the first two years is breaking down rapidly and allowing many weedy annuals to establish. The spring of 2003 revealed that annual grasses could be problematic at the island and they continue to spread within the island. Hand weeding, selective mowing and the additional planting of native perennial grasses will be the short-term solution until the island can establish good native cover.

Native cover is critical for the long term success of this island. During the first 2 years we took advantage of the lack of annual weeds to outplant hundreds of native perennial bunch grass plugs and sow native grass seed. 750 additional grass plugs were installed in 2002/03 to fill in gaps in previous year's planting and seeded areas. The grasses have established very well. 89 additional lupine were added in 2002/03 to supplement previous year's plantings. The lupine and nectar plants were very robust and grew very quickly in the nitrogen enriched post-gorse soils. CA phacelia (*Phacelia californica*) and coast buckwheat were the two top performing nectar plants at the site. Natural recruitment was recorded for both nectar species and lupine during the second year.

The early heat spell in 2004 resulted in much plant stress and die back in this island. Many of the lupine and nectar plants examined in the summer of 2004 appeared dead. Many had been well established plants that were several years old. In 2006/07 the plants were monitored and annual grasses in the islands were mowed during the spring growing season to help suppress their growth. While most appeared healthy, there were few - if any - that had grown to the same size as the largest individuals at the other sites. Here again, recruitment was observed in the form of seedlings.

The annual control of gorse with herbicide by West Coast Wildlands appears to be preventing the spread of emerging gorse plants within the island.

Saddle Islands

Lupinus albifrons	*Lupinus formosus*	Total
40*	4	44

(* Minimum 5 individuals appeared to have recruited within the last year.)

Weed management and Stewardship

The restored coastal scrub between CC1 and CC2 continues to mature. Seven successive years of weed management have reduced the amount of radish, mustard (*Brassica* sp.), hemlock (*Conium maculatum*), and thistle (*Cirsium* sp.) on the site and allowed for extensive in-fill of native scrub. The reduction of weeds in this area insures the Colma Creek butterfly islands continue to remain free of large competitive exotic populations. In 2006/07 native coyote brush (*Baccharis pilularis*) had established to the point that it began to crowd the planted butterfly islands. In limited instances, the *Baccharis* was cut and stump treated to ensure continued lupine habitat. Additionally, a small patch of cape ivy (*Delairea oderata*) was found and contained, but should be monitored for expansion.

The other sites have been mowed to reduce annual grass cover and hand weeded as needed to prevent radish (*Raphanus sativa*), mustard (*Brassica* sp.), hemlock (*Conium maculatum*), and thistle (*Cirsium* sp.) establishment. This should be continued into the future to maintain the integrity of the butterfly islands.