

6.21 BERNAL HILL

GENERAL DESCRIPTION AND LOCATION

The Bernal Hill Natural Area is located in the Bernal Heights neighborhood of San Francisco (Figure 1-1). Elevations within the area range from approximately 275 to 475 feet above sea level. A microwave radio transmission station is located in a fenced enclosure at the summit of Bernal Hill; it is not owned by San Francisco Recreation and Park Department (SFRPD). A paved limited access road provides pedestrian access to the summit of Bernal Hill. The remainder of this approximate 24-acre Natural Area is primarily grassland. Bernal Heights Boulevard circumnavigates the Natural Area and forms the eastern and southern boundaries of the park. A portion of Bernal Heights Boulevard is closed to vehicle traffic and is used extensively for recreation (Figure 6.21-1). A designated Dog Play Area (DPA) exists on and above Bernal Heights Boulevard. Bernal Hill has high recreational and natural resource values for San Francisco citizens that include: excellent City views; high levels of recreational use; good raptor foraging habitat; extensive grasslands providing habitat for butterflies and other insects; populations of sensitive plant species; and suitable habitat for a variety of bird species.

GEOLOGY, HYDROLOGY, AND TRAILS

This Natural Area is underlain by Franciscan chert and “greenstone” bedrock. Greenstone is an altered volcanic rock. At Bernal Hill, it is mostly buried under slope debris, but is known from observations in nearby quarries. These quarries are mostly now redeveloped, but the remnants of one can be seen at the south side of the Natural Area. Most of the bedrock is chert, appearing in outcrops around the lower edges of the park, but generally mapped in its decomposed stage as “thin rocky soil over bedrock” (Figure 6.21-2). There is a large soil slip in the northwest corner of the Natural Area that faces Bernal Heights Boulevard. The disrupted surface of the slide has revegetated and generally is now stable. The ancient terrace at the east end of the park is underlain by chert, but has a fairly thick cover of sandy soil developed on slope debris.

There is no permanent surface water at the site. Drainage of the area is by overland flow and through a series of gullies on each hillside. Some rainfall percolates into fissures in the rock, but runoff generally is rapid, forming gullies as deep as 3 feet in areas denuded of vegetation. Some of the percolation comes out as seeps at road cuts along the north side.

An extensive network of very well defined earthen trails has developed throughout the park, with many trails closely paralleling each other over the same terrain. Extensive foot and animal traffic has worn most of the trails through the thin soil and into the underlying bedrock. Runoff channeled along some of these trails greatly increases erosion problems.

VEGETATION

The vegetation of Bernal Hill was classified into 10 series (Table 6.21-1; Figure 6.21-3). These series are within four sub-formations: approximately 82 percent of the area is grassland; 6 percent is forest; 2 percent is scrub; and 11 percent is classified as “other” (developed and rock outcroppings). Two of these series, willow scrub and purple needlegrass prairie, are dominated by native species.

Forest and Scrub

Unlike many other Natural Areas, forests do not dominate the landscape at Bernal Hill. Only two forest series, mixed exotic (0.77 acres) and blue gum forest (0.56 acres), were mapped at Bernal Hill. Two scrub series, including a small patch of native willow scrub (0.12 acres), were mapped in the Natural Area. The other scrub series, invasive Himalayan blackberry scrub, is found in isolated pockets through the Natural Area.

Grassland

Bernal Hill is a grassland-dominated Natural Area where four grassland and herbaceous series were mapped and cover just under 20 acres. The majority of the acreage was mapped as wild oat grassland (19.27 acres). There were small areas of wild radish (0.24 acres) and fennel (0.09 acres). Purple needlegrass prairie (0.07 acres), a series dominated by native vegetation, occurs within Bernal Hill. Point count data within the grasslands at Bernal Hill revealed that 42 of 75 species observed were native and native plants represented 51 percent of the grassland cover.

Other

Two series were mapped as “other” habitats at Bernal Hill: developed areas and rock outcrops. Developed areas account for the largest coverage within this series (1.46 acres) and include all of the roads and other human structures. The rock outcrops (1.25 acres) are mostly the result of road cuts and historic quarrying activities that exposed the underlying bedrock.

Sensitive Plant Species

Six sensitive plant species have been reported from Bernal Hill (Table 6.21-2). Most of the sensitive species are found on the north west grassland slope below the microwave towers (Figure 6.21-4). These include shooting star (*Dodecatheon clevelandii*), Johnny-jump-up (*Viola pedunculata*), muilla (*Muilla maritima*), and star lily (*Zigadenus fremontii*). Johnny-jump-up serves as a larval food plant for the San Francisco silverspot butterfly (*Speyeria callippe callippe*), a federally endangered species, and is therefore considered a sensitive species. Fragrant fritillary (*Fritillaria liliacea*), a California Native Plant Society List 1B species, is found on the far eastern point of the Natural Area. A single occurrence of hummingbird sage (*Salvia spathacea*) can be found along the southern boundary of Bernal Hill. It is located on the downhill side of Bernal Heights Boulevard in a small parcel owned by SFRPD. Big squirrel tail

(*Elymus multisetus*) is also reported from the grasslands of Bernal Hill, but the specific location is not known. The California Natural Diversity Data Base (CNDDDB) does not report the occurrence of any sensitive plant species at Bernal Hill (CNDDDB 2005).

Invasive Plant Species

Six vegetation series dominated by invasive species account for more than 22 acres of the land cover within the Natural Area at Bernal Hill. Wild oat grassland (19.27 acres) covers the largest area of vegetation within the Natural Area. The remaining five series (mixed exotic forest, blue gum forest, Himalayan blackberry (*Rubus discolor*), fennel, and wild radish (*Raphanus sativus*)) are all scattered through the Natural Area, and individually they all cover less than an acre of land.

WILDLIFE

Birds

Bernal Hill provides some foraging, nesting, and roosting habitat for birds. The grassland and scrub habitats of Bernal Hill provide foraging habitat for raptors such as the frequently observed American kestrel (*Falco sparverius*) and the western meadowlark (*Sturnella neglecta*). Habitat for smaller birds (passerines) is limited by the available scrub habitats throughout the area, but this Natural Area likely supports sparrows such as white-crowned sparrow (*Zonotrichia leucophrys*) and savannah sparrow (*Passerculus sandwichensis*) that forage in the grasslands.

Sensitive Bird Species and Important Bird Habitat

Two species considered sensitive for purposes of this plan have been observed at Bernal Hill. Say's phoebe (*Sayornis saya*), a flycatcher, is a winter resident that forages over the grasslands. Wilson's warbler (*Wilsonia pusilla*) is also reported from Bernal Hill and likely occurs in the small areas of willow and blackberry scrub. No other sensitive species have been documented on Bernal Hill (CNDDDB 2005). A single area of important bird habitat has been identified for Bernal Hill that encompasses the entire grasslands of the Natural Area (Figure 6.21-4).

Mammals, Reptiles, and Amphibians

To date, no small mammal surveys have been conducted at Bernal Hill. A focused survey for reptiles and amphibians of the Bernal Hill area did not locate any of these animals (EIP field visit, May 3, 1999). The CNDDDB does not report the occurrence of any sensitive species within the Natural Area (CNDDDB 2005). However, the grasslands likely support populations of gophers, California meadow vole (*Microtus californicus*), and western fence lizard (*Sceloporus occidentalis*). Larger mammals such as raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*) and Virginia opossum (*Didelphis virginiana*) are typical of urbanized parks in general and are expected to occur within the Natural Area.

Invertebrates

Sensitive Invertebrate Species

At least four special-status species of butterflies potentially occur within the City of San Francisco: mission blue butterfly (*Icaricia icarioides missionensis*), bay checkerspot butterfly (*Euphydryas editha bayensis*), San Bruno elfin butterfly (*Incisalia mossii bayensis*), and San Francisco silverspot. Larval host plants for the mission blue and bay checkerspot butterflies are relatively common (various lupines, plantain, owl's clover, etc.) (Garth and Tilden 1986). The larval host plant for the San Bruno elfin butterfly is stonecrop (*Sedum spathulifolium*). The larval host plant for the silverspot is Johnny-jump-up. However, due to high levels of recreation use and dogs on Bernal Hill, none of these species are expected to occur there.

MANAGEMENT AREAS

Management Areas (MAs) at Bernal Hill are mapped based mainly on the occurrence of sensitive species and habitats (Figure 6.2-5). Four MA-1 areas occur on the slopes of Bernal Hill where the native grasslands and sensitive species are found. Surrounding each MA-1 area is a single MA-2 area which may also contain sensitive species and habitats, but which provides a buffer between the extensive urban forests and the MA-1 areas. The MA-3 areas at Bernal Hill are those portions of the Natural Area that do not support populations of sensitive species or diverse native grasslands, but do contain habitat for wildlife. The following text presents issues and recommended management actions by Management Area.

ISSUES AND RECOMMENDATIONS

Several conservation and recreation-related issues have been identified for the Bernal Hill Natural Area. Recommendations developed for each of these issues will guide restoration, enhancement, and maintenance work. In the following discussion, system-wide issues and recommendations (GR-1 for example; see Chapter 5) that apply to the entire Natural Area at Bernal Hill are presented first within each topic area, followed by site-specific issues and recommendations. Site-specific recommendations are keyed to the Management Area in which they should occur.

Site Improvements – Implementation of management recommendations at Bernal Hill would not change significantly the overall look of the park and would result in:

- preservation and enhancement of native grasslands;
- increased habitat complexity that benefits wildlife populations;
- improved educational opportunities;
- decreased bluff erosion;
- improved public access on designated trails;
- partially modified off-leash DPA; and

- continued off-leash dog use of Bernal Hill, while protecting sensitive habitat areas by reconfiguring and reducing the existing DPA by 17 percent.

Over the life of this management plan, implementation of the following recommendations is expected to result in expansion of native grasslands and scrub mosaic habitats. These changes to the Natural Area will be visible to visitors, but will not result in substantial changes in access or allowed uses. In the long run, the grasslands and coastal scrub at Bernal Hill may be compared to those of the eastern slope of San Bruno Mountain.

Vegetation

Issues relating to vegetation management at Bernal Hill involve the protection of sensitive species and habitats, typically through the control of invasive plants (GR-1) and management of sensitive species and vegetation series of limited distribution (GR-2). Grassland management is also necessary to ensure that the existing grasslands do not become substantially degraded (GR-3). Issues relating to the general safety of visitors and surrounding homes, fire hazards posed by vegetation and trees, and illicit activities must be considered during management of the Natural Areas (GR-13). In addition to these general recommendations, the following site-specific issues should be addressed.

Issue BH-1: Bernal Hill supports populations of sensitive plant species and grassland habitat. Because of habitat loss and invasive species, these areas and species are at risk of diminishing in number and diversity and could even become locally extinct.

Recommendation BH-1a: To help protect native grasslands and sensitive plant species, reduce and contain woody and herbaceous invasive plants such as radish, Himalayan blackberry, Italian thistle (*Carduus pycnocephalus*), bur clover, and sweet fennel, within all Management Areas. To help preserve grassland habitat, recruitment of invasive tree species should not be allowed in any Management Area except for MA-3b. All of the approximately 100 trees in the Bernal Hill Natural Area will remain. Within the MA-3 areas, allow some invasive plants such as radish, thistles, plantain, and fennel that are important nectar, seed and larval habitat for wildlife to persist; however, they shall be monitored to ensure that they are not encroaching on sensitive habitats, and managed accordingly.

Recommendation BH-1b: To maintain and enhance existing grasslands in MA-1, MA-2, and MA-3 areas, revegetate using appropriate native plants where invasive plants have been removed. Existing grasslands shall be enhanced and diversified as appropriate. Using diversity, cover, and density targets generated from reference sites within and around San Francisco, plant native grassland species (see Appendix B). No sensitive species will be planted in MA-3a areas.

Recommendation BH-1c: Focus sensitive plant species management and conservation in existing habitat areas MA-1a and MA-1b. To further enhance the biodiversity of the Bernal Hill Natural Area and to help maintain diverse populations of sensitive species through the Natural Areas System, consider augmenting existing sensitive plant species such as big squirrel tail, shooting star, star lily, fragrant fritillary, Johnny-jump-up, and bladder parsnip (*Lomatium utriculatum*) (MA-1a and MA-1b). In order to contribute to countywide conservation efforts, consider the reintroduction of species such as San Francisco collinsia (*Collinsia multicolor*) (MA-1a), broadleaf aster (*Aster radulinus*) (MA-1a and MA-1b), meadow white (*Cerastium arvense*) (MA-1a and MA-1b), California saxifrage (*Saxifraga californica*) (MA-1b), yellow mariposa lily (*Calochortus luteus*) (MA-1a), western goldenrod (*Euthamia occidentalis*) (MA-1b), farewell-to-spring (*Clarkia rubicunda*) (MA-1c, MA-1d, and MA-2a), and California fescue (*Festuca californica*) (MA-2a).

Recommendation BH-1d: To help preserve the overall diversity of this Natural Area, in MA-3b, maintain the urban forest-grassland mosaic. There are an estimated 100 trees in the Bernal Hill Natural Area. No trees are proposed for removal anywhere on Bernal Hill. In the tree-dominated areas of MA-3b, follow the urban forest recommendation (GR-15), which outlines tree preservation and replacement and urban forest enhancement activities. For grassland maintenance see BH-1a and BH-1b.

Wildlife

Wildlife issues at Bernal Hill involve the protection and enhancement of habitat, food sources, and shelter. Vegetation management during the breeding season can impact nesting birds (GR-4); however, vegetation management also can provide materials to create artificial habitat for ground-dwelling birds, small mammals, and reptiles (GR-9). Installation of plants required by California's native butterflies can help increase these populations (GR-10). Finally, reduction in predation pressures will benefit all animals within the Natural Area (GR-7). Implementation of the general recommendations for wildlife when coupled with the vegetation management issues discussed previously will help preserve and enhance wildlife habitat at Bernal Hill.

Soils, Erosion, and Public Use

The erosion and soil issues at Bernal Hill all relate to the trail system and public use. A network of earthen trails winds through all Management Areas at Bernal Hill (Figure 6.2-5). The issue of erosion and habitat impacts related to social trails is addressed through implementation of GR-11 and GR-12. Interpretive signs regarding the ecosystem of Bernal Hill should also be considered (GR-14).

Issue BH-2: The primary, secondary, and social trail system at Bernal Hill is approximately 12,239 feet long; part of this system is a paved loop that follows an old road around the perimeter of the Natural Area. There are numerous informal access points from this road up into

the grassland. Many of these go directly up the slope and have eroded channels in the bank that are several feet deep. Within the interior of the Natural Area, there is a very dense network of social trails (4,544 feet), that meander through the grassland (Figure 6.21-2). Many of these trails closely parallel one another through similar terrain and have resulted in loss of vegetation and erosion of topsoil. Runoff channeled along these trails greatly increases erosion problems. One of these erosion gullies has created a hazardous condition for Natural Area users. A trail on the north east side of the hill (MA-1a) is dangerously close to a cliff. Overall, a total of 8,159 feet of designated trails will remain and 4,544 feet of social trails will be closed.

Recommendation BH-2a: In addition to the implementation of GR-11, which discusses trail designation, trail improvements, closure of social trails, and restoration methods, at Bernal Hill people and dogs should be encouraged to stay on designated trails and discouraged from climbing the steep slopes and causing erosion on the north side of the Natural Area. Install signs directing people to designated trails and requesting owners to keep dogs off of steep cliffs and slopes. Install temporary erosion control measures to slow erosion and discourage use of erosion-prone gullies. If barriers and signs are not effective at controlling use of these banks, install low fencing in site-specific erosion-prone spots along Bernal Heights Boulevard (MA-1a). Reroute the lowest trail through MA-1a to eliminate the hazardous condition there. This reroute would create approximately 460 feet of new trail.

Issue BH-3: The existing DPA at Bernal Hill is described as the top of the hill and includes 21 acres. However, all the areas on, above, and below Bernal Height Boulevard are extensively used as off-leash areas. Several sensitive plant species occur on the steep north side of the hill (see Figure 6.21-4). Off-leash dog activities, especially running up and down slopes and digging, cause erosion and loss of plant habitat (GR-8).

Recommendation BH-3a: On- and off-leash dog use of Bernal Hill should remain throughout the entire Natural Area. There are no areas where access by dogs would be prohibited. However, off-leash activities should be limited to the flat and less-steep areas on and around Bernal Hill. These relatively flat areas are currently the most heavily used off-leash areas and are most suitable for the run-around use associated with DPAs. These off-leash areas include: 1) the quarry at the southwestern portion of the park; 2) the quarry at the eastern end of the park; 3) the closed portion of Bernal Heights Boulevard; and 4) the terrace on top of the hill east of the radio tower. An off-leash trail loop, linking all of these off-leash areas, should remain. Areas with steep slopes, some of which contain locally significant plants, should be converted to on-leash/on-trail areas in order to prevent erosion caused by dog running. Dogs and people would still be able to experience the trails, views, and wildflowers in these areas but would be required to remain on-trail. This recommendation would reduce the existing off-leash DPA at Bernal Hill by 6 acres (from 21 acres to 15 acres). Of these 6 acres above the road, approximately 2.5 are largely inaccessible with slopes between 45 and 90 degrees.

Therefore the accessible acreage of current off-leash that would be converted to on-leash use is 3.5 acres. In addition, there are 4.5 acres below Bernal Heights Boulevard that could be converted to off-leash use to help offset the reduction. Although portions of this area below the road are also very steep, some areas could be developed with trails to accommodate public use and access.

Table 6.21-1. Vegetation series mapped at the Bernal Hill Natural Area.

	Vegetation Series	Total Acreage
Forest	blue gum forest	0.56
	mixed exotic forest	0.77
	Subtotal	1.33
Scrub	willow scrub*	0.12
	Himalayan blackberry scrub	0.29
	Subtotal	0.41
Grassland	wild oat grassland	19.27
	purple needlegrass prairie*	0.07
	Subtotal	19.34
Other Herbaceous	fennel	0.09
	wild radish	0.24
	Subtotal	0.33
Other	developed	1.46
	rock outcrop	1.25
	Subtotal	2.71
Grand Total		24.12

* Indicates vegetation type is dominated by native species.

Table 6.21-2. Sensitive species presently and historically known to occur at the Bernal Hill Natural Area.

Species	Common Name	Status Federal, State, CNPS	Occurrence Status
ANIMALS			
<i>Sayornis saya</i>	Say's Phoebe	SLC	Winter resident
<i>Wilsonia pusilla</i>	Wilson's Warbler	SLC	Presently occurs
PLANTS			
<i>Elymus multisetus</i>	Big Squirrel Tail	LS	Presently occurs
<i>Dodecatheon clevelandii</i>	Shooting Star	LS	Presently occurs
<i>Muilla maritima</i>	Common Muilla	LS	Presently occurs
<i>Salvia spathacea</i>	Hummingbird Sage	LS	Presently occurs
<i>Fritillaria liliacea</i>	Fragrant Fritillary	CNPS 1B	Presently occurs
<i>Zigadenus fremontii</i>	Star Lily	LS	Presently occurs

Status Key:

Federal Status

- FE* Endangered. Species in danger of extinction throughout all or significant portion of its range.
- FT* Threatened. Species likely to become endangered within foreseeable future throughout all or a significant portion of its range.
- FPE* Proposed for listing as endangered.
- FC* Candidate for listing as endangered. Candidate information now available indicates that listing may be appropriate with supporting data currently on file.
- FSC* Species of Concern. Former Category 2 Candidate for listing as endangered.
- FPD* Proposed de-listing.

California State Status

- SE* Endangered. Species whose continued existence in California is jeopardized.
- ST* Threatened. Species, although not presently threatened with extinction, that is likely to become endangered in the foreseeable future.
- SSC* Species of Concern.
- SFP* State Fully Protected under Sections 3511 and 4700 of the Fish and Game Code.
- Sens* Considered a sensitive species by the California Department of Forestry.

California Native Plant Society

- 1A* Plants presumed extinct in California
- 1B* Plants that are rare or endangered in California and elsewhere.
- 2* Plants that are endangered in California, but more common elsewhere.
- 3* Plants about which more information is needed.
- 4* Plants of limited distribution (a watch list).
- LS* Locally Significant.

Golden Gate Audubon Society

- SLC* Species of Local Concern

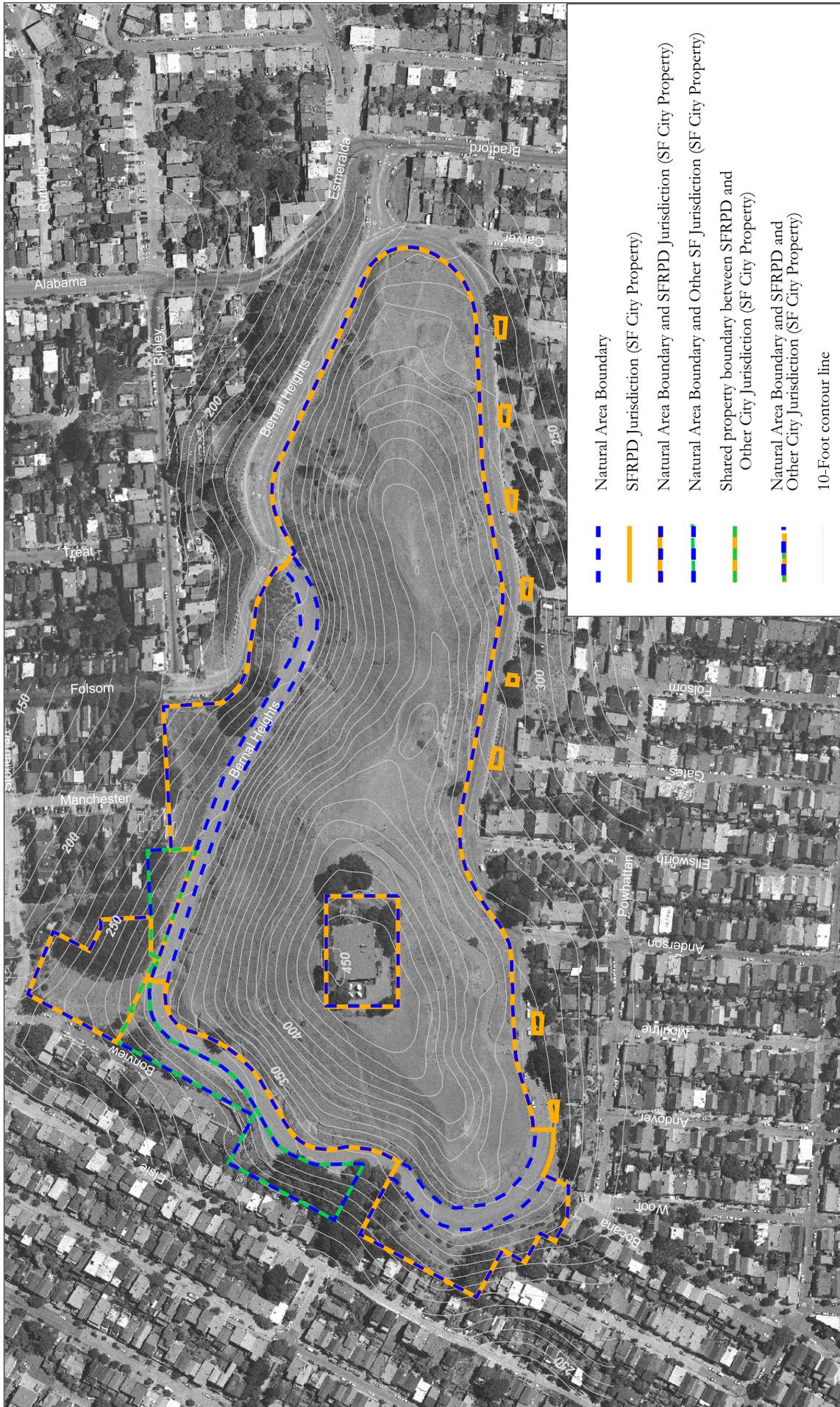
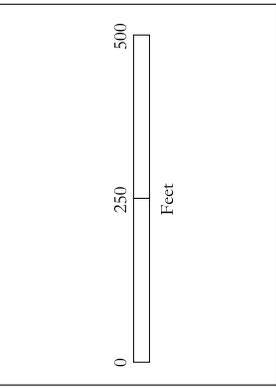
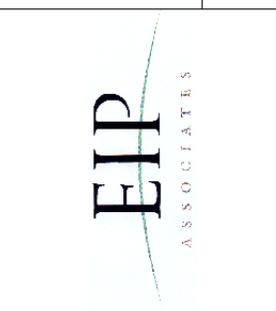


FIGURE 6.21 - 1
AERIAL PHOTOGRAPH, PROPERTY BOUNDARIES, AND NATURAL AREAS
Bernal Hill
 Significant Natural Resource Areas Management Plan
 San Francisco, California



Source: Aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1-foot resolution, 2001; property boundary data derived by San Francisco Recreation and Park Department (RPD) 2005 from data provided by San Francisco Department of Telecommunications and Information Services, 2002; natural area boundary data created by San Francisco State University Institute for GISc from information provided by RPD's Natural Areas Program (NAP), 2005; contour lines provided by San Francisco Department of Conservation; all data are California State Plane Zone III, NAD 83.

Created by Debra Dwyer, San Francisco State University
 Institute for GISc, May 4, 2002, revised October 12, 2005.



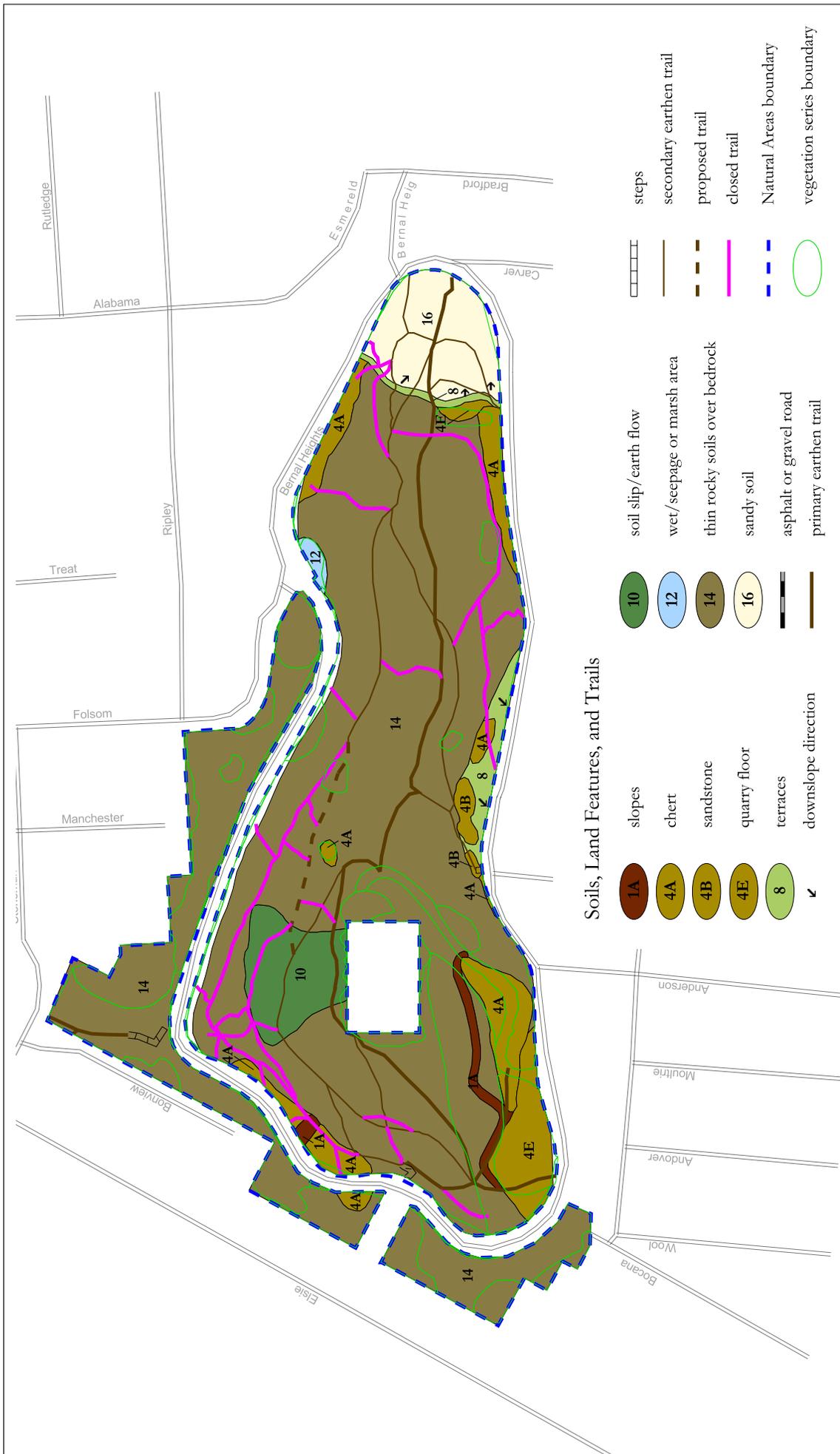
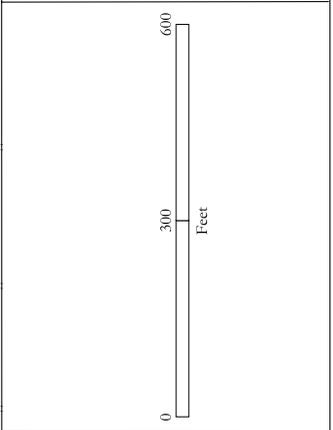


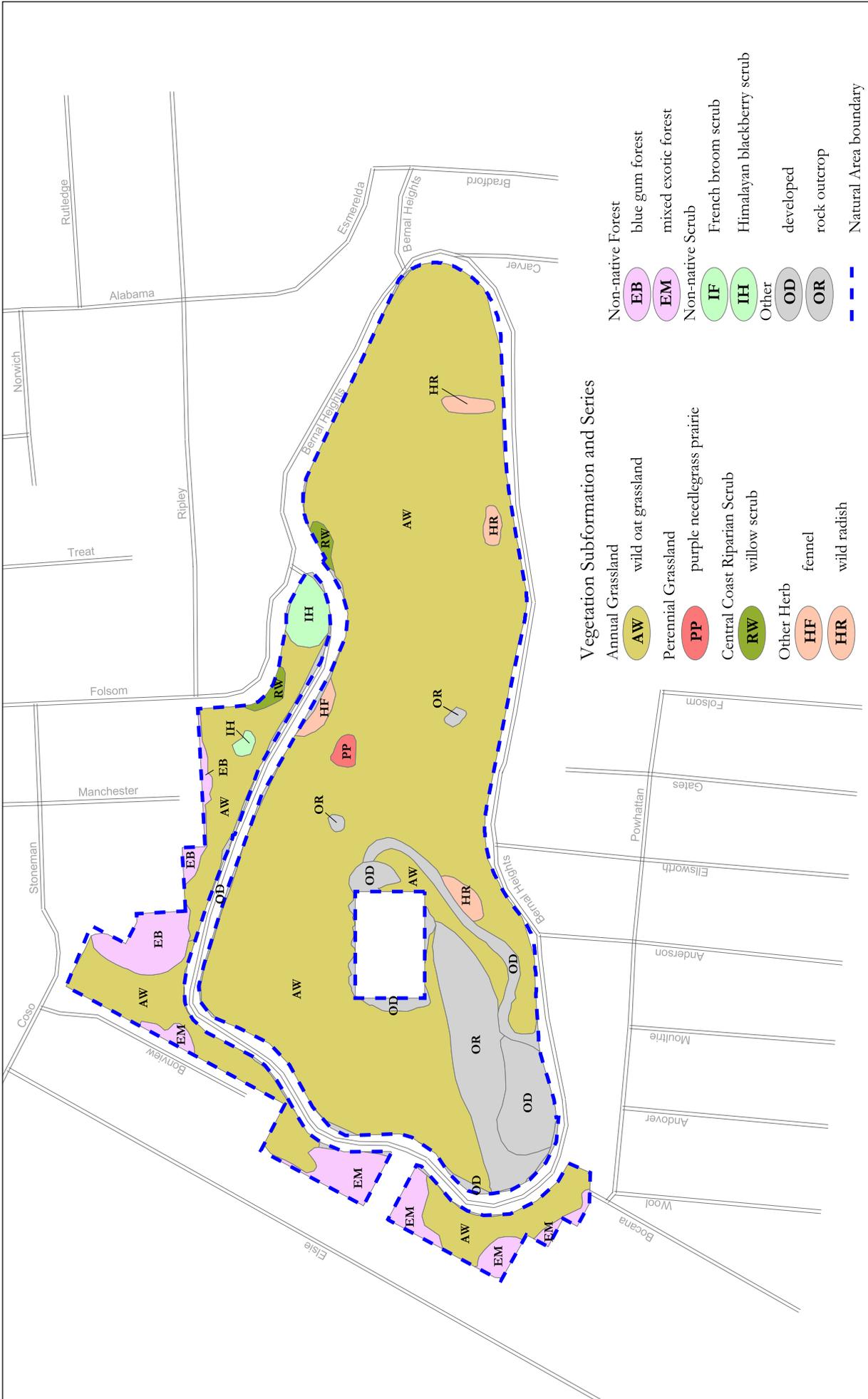
FIGURE 6.21 - 2
SOILS, LAND FEATURES, AND TRAILS
 Bernal Hill
 Significant Natural Resource Areas Management Plan
 San Francisco, California



Source: Vegetation data collected by San Francisco Department of Recreation and Parks Significant Natural Areas Program (NAP), San Francisco State University Biology Department, and EIP Associates, 1999-2000; soil and land features data collected by EIP Associates, 1999 - 2002; trails data collected by NAP, 2005; data layers digitized by Geotopo, Inc., 1999 - 2000; edited and corrected by San Francisco State University Institute for GISc (SFSU IGIS), 2000, 2005; trails data digitized by SFSU IGIS, 2005; natural area boundary created by SFSU IGIS from data determined by NAP, 2005; streets data excerpted from ArcView StreetMap 2000 Data, copyright 1998-2000, Environmental Systems Research Institute, Inc. (ESRI).

Created by Debra Dwyer of San Francisco State University Institute for GISc October 24, 2001, revised December 10, 2005.

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Vegetation Subformation and Series

- | | | |
|-------------------------------------|--------------------------------------|--------------------------------------|
| Annual Grassland | AW wild oat grassland | EB blue gum forest |
| Perennial Grassland | PP purple needlegrass prairie | EM mixed exotic forest |
| Central Coast Riparian Scrub | RW willow scrub | IF French broom scrub |
| Other Herb | HF fennel | IH Himalayan blackberry scrub |
| | HR wild radish | OD developed |
| | | OR rock outcrop |
| | | Non-native Forest |
| | | OD developed |
| | | OR rock outcrop |
| | | EM mixed exotic forest |
| | | IF French broom scrub |
| | | IH Himalayan blackberry scrub |
| | | Other |
| | | OD developed |
| | | OR rock outcrop |
| | | Natural Area boundary |

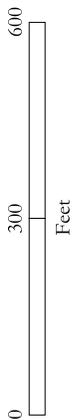


FIGURE 6.21 - 3
VEGETATION
Bernal Hill
 Significant Natural Resource Areas
 Management Plan
 San Francisco, California

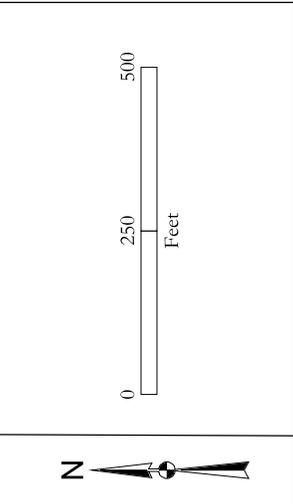
Source: Vegetation data collected by San Francisco Recreation and Park Department, Natural Areas Program (NAP), San Francisco State University Biology Department, and EIP Associates, 1999-2000; vegetation digitized by Geotopo, Inc., 2006; edited and corrected by San Francisco State University Institute for GISc (SFSUGIS), 2000; natural area boundary created by SFSUGIS from data determined by NAP, 2005; streets data excerpted from ArcView, StreetMap 2000 data, copyright 1998-2000, Environmental Systems Research Institute, Inc. (ESRI).

Created by Debra Dwyer of San Francisco State University Institute for GISc August 27, 2001, revised June 6, 2005.





FIGURE 6.21 - 4
SENSITIVE SPECIES AND IMPORTANT BIRD HABITAT
Bernal Hill
 Significant Natural Resource Areas Management Plan
 San Francisco, California



Source: Sensitive species data collected by San Francisco Department of Recreation and Parks Significant Natural Areas Program (NAP), 1999-2005; vegetation data collected by NAP, San Francisco State University Biology Department, and EIP Associates, 1999-2000; vegetation digitized by Geotopo, Inc., 2000; edited and corrected by San Francisco State University Institute for GISc (SFSUGIS), 2000; natural area boundary created by SFSUGIS from data determined by NAP, 2005; important bird habitat layer created by SFSUGIS from information provided to NAP by Golden Gate Audubon Society, 2005; streets data excerpted from ArcView StreetMap 2000 data, copyright 1998-2000, Environmental Systems Research Institute, Inc. (ESRI).
 Created by Debra Dwyer of San Francisco State University Institute for GISc, November 12, 2001, revised June 7, 2005.



Mgmt Area	Action	Mgmt Area	Action
MA-1a	<ul style="list-style-type: none"> Maintain diverse native grassland Augment sensitive plant populations Reintroduce sensitive plants Reroute lowest trail Create designated trails and access points. Install low fencing if necessary Partially modify existing Dog Play Areas to on-leash 	MA-3b	<ul style="list-style-type: none"> Maintain and enhance scrub-grassland-urban forest mosaic <p>Natural Area Wide Management Actions</p> <ul style="list-style-type: none"> Reduce and contain herbaceous and woody weeds No invasive tree removal unless specified above Prevent recruitment of invasive trees unless specified above Total trails to remain (including possible new trails): 8,159 linear-feet Provide access on designated trails only Social trails subject to closure Total invasive trees to remove: 0; Total invasive trees to remain: 100 Implement erosion control as required (GR-12) Implement wildlife enhancements as appropriate No change to existing Dog Play Area unless specified above
MA-1b	<ul style="list-style-type: none"> Maintain diverse native grassland Augment sensitive plant populations Reintroduce sensitive plants 		
MA-1c	<ul style="list-style-type: none"> Maintain diverse native grassland 		
MA-2a	<ul style="list-style-type: none"> Maintain and enhance grassland Reintroduce sensitive plants 		
MA-3a	<ul style="list-style-type: none"> Maintain and enhance native grassland Allow important nectar/larval/seed invasive plants to persist for wildlife 		



FIGURE 6.21 - 5
MANAGEMENT AREAS AND TRAIL PLAN
Bernal Hill
 Significant Natural Resource Areas Management Plan
 San Francisco

Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University, Institute for GISc (SFISU IGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1 Foot Resolution - 2001; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 28, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science. Revised August 23, 2005.

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