

EDGEWOOD PARK AND NATURAL PRESERVE MASTER PLAN

APPENDIX A

SITE RESOURCES

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SITE RESOURCES

1. NATURAL RESOURCES

A. Physical Resources

1. *Topography*

Much of Edgewood consists of rugged topography with pronounced hills, swales and steep ravines (see Figure A-1) ranging from 240 to 873 feet above mean sea level. The variable topography of the site is dominated by a northwest-southeast trending ridge with several prominent knolls or hills. To the south of this central ridge, the land consists of a dome-shaped hill, gentler slopes and some relatively flat ground. To the north of the central ridge is a flat-topped, steep-sided formation known as the North Hill.

2. *Geology*

Edgewood is situated on the northern half of a west-northwest trending ridge within the Coast Range Province of the San Francisco Peninsula. The Peninsula comprises of two major geological formations: the low, heavily eroded block of the Point Reyes-Montara Formation, which lies atop the granitic Sur Group, and the dirty sandstone San Francisco-Marin formation (referred to as the Franciscan formation). Much of the site is located within the northern portion of a large serpentinite intrusion which covers a surface area of approximately 6.5 square miles and is shaped like an irregular crescent. Information provided in this section is important for trail planning, use, and maintenance.

a. Composition and Importance of Franciscan Formation for Edgewood.

Although the Santa Cruz Mountain Range is comparatively young and consists of sedimentary and metamorphic rock, the Franciscan formation is the second oldest sedimentary series of rocks on the San Francisco peninsula. The Franciscan formation contains a potpourri of marine sandstone, dark gray sandstone (graywacke), and volcanics, with metamorphic rocks: serpentinite and serpentinitized peridotite. Other typical materials associated with the Franciscan formation include black shale with pyrite, red radiolarian chert, greenstone (an altered volcanic), limited portions of grey limestone, blue schist, green chlorite, red garnet, and green jadeites.

FIGURE A-1 -- TOPOGRAPHY



Serpentinite and peridotite are considered to be ultramafic rocks because more than 70% of their composition consists of ferro-magnesium (iron-magnesium silicate). The resultant soils characteristically are highly variable, and highly alkaline as well. Serpentinite rock and its derived soils are significant features of western North American mountains because they exert an influence best described as "profound," affecting the patterns of vegetation, the species components of plant communities occurring on serpentinite, and the very physiognomy of the vascular flora.

California serpentinites are noted for their remarkable characteristic of supporting endemic species highly restricted in range. Many of Edgewood's rare and endangered species (which will be discussed in a later section) include some serpentinite endemic species with highly restricted range.

In general, the edaphic (soil-related) influence of serpentinite on plant growth and community development is complex. In addition to the inhibiting effects of the soil's alkalinity, the presence of magnesium inhibits plants from utilizing any calcium that may be present. This soil type gives rise to the "serpentine syndrome". The foliage can be tough, reduced in size, with differences in hair density and coloration; overall height of plants is reduced, root systems are increased. Size reduction can be caused by slower growth rates in habitats stressed by edaphic conditions.

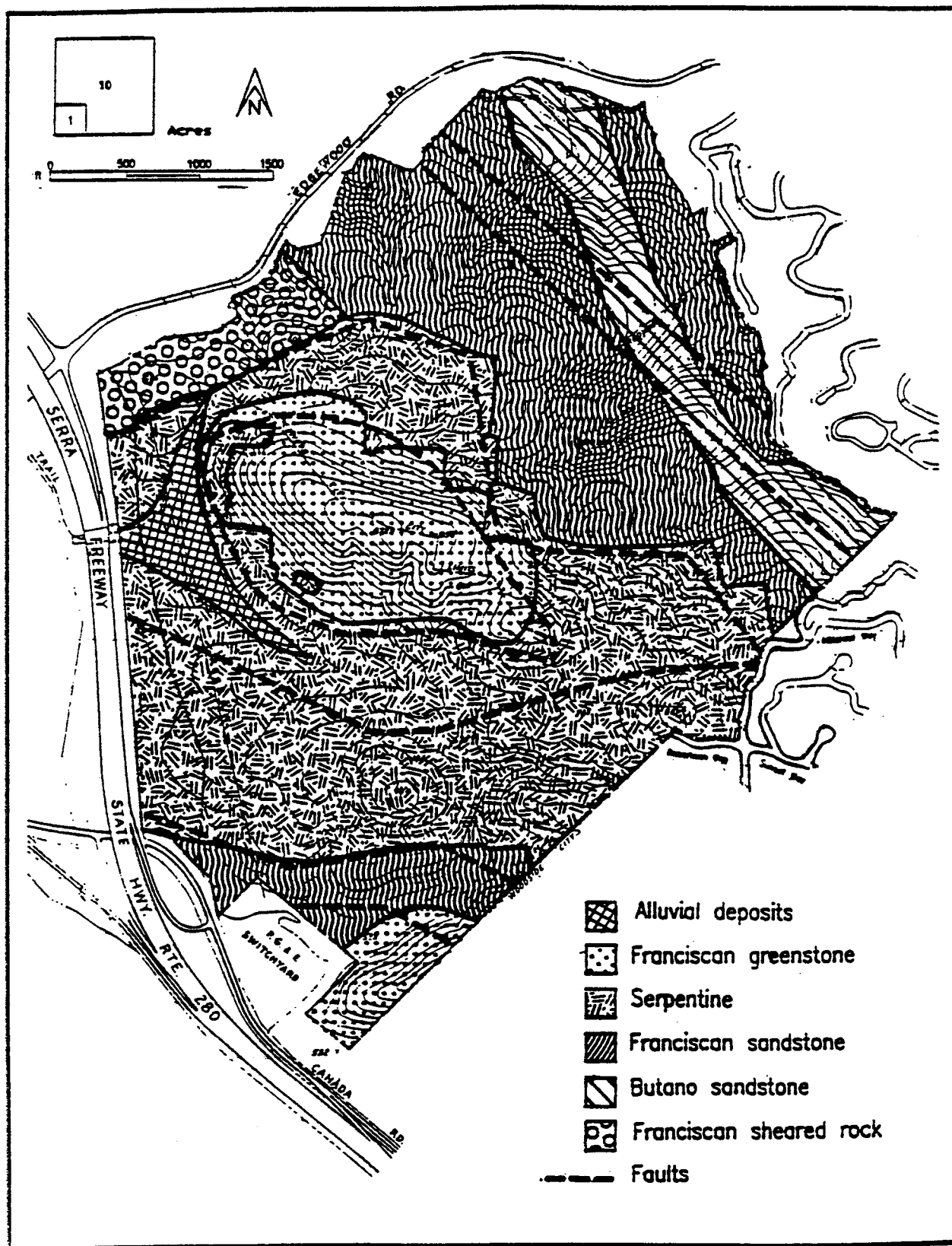
At Edgewood, some of the serpentine soils differ from the foregoing general description:

- Levels of iron, nickel and chromium are higher and the calcium to magnesium ratio is low, due to low concentration of calcium and very high concentration of magnesium.
- Nickel and manganese are low in concentration, with a high concentration of chromium in claylike soils, where soil field capacity of water retention is high.
- In areas of depression or gouge, soils have a 50% greater water-holding capacity than other local serpentinites.

The serpentine clays at Edgewood form an A-horizon topsoil unique among serpentine soil types. The A-horizon is the surface horizon of a mineral soil having maximum biological activity or eluviation (removal of materials dissolved or suspended in water), or both.

b. Rock Composition. The following six rock types are mapped within Edgewood (see Figure A-2):

FIGURE A-2 -- GEOLOGY AND SEISMICITY



- * Franciscan sandstone, mainly graywacke sandstone with imbedded shale and siltstone, is exposed both along Edgewood Road and the southwestern boundary. Along Edgewood Road 1:1 (horizontal to vertical) cuts in this sandstone appear stable. In general, cut slopes in this rock unit have a moderate, approaching high, stability except in areas of sheared shale.

The grain of this dark grey-to-buff colored sandstone ranges from fine to coarse. In general, the fracture patterns have moderate to close spacing.

- * Franciscan sheared rock is mainly graywacke, sheared and dark grey siltstone, and shale, sometimes highly sheared but also occurring in blocks. Some shallow landslides have occurred in the road cut slopes of this rock along Edgewood Road. Suggested stable cut slopes based on preliminary analysis are a maximum 2:1 (horizontal to vertical) and no greater than 30 feet high.
- * Franciscan greenstone, a hard basaltic, igneous (i.e., volcanic) rock forms the resistant crest of the ridge in the center of the site, and is surrounded by the serpentinite unit. Cut slopes have a very high average stability greenstone. Fresh greenstone is grey and green colored and weathers red and brown. Landslides observed in this rock were confined to the soil layer.
- * Franciscan serpentinite consists of somewhat rounded blocks up to 16.5 feet in diameter (5 meters) set in a soft, sheared, foliated matrix. The color ranges from greenish grey and blue-green to black when fresh, and dark grey when weathered or chemically altered. Serpentinities are characteristically highly fractured and somewhat slick, thus landslides can occur when hillsides underlain by this material are saturated. Cut slope stability for serpentinite is very low in soft material and higher in blocks.
- * Butano sandstone is interbedded with mudstone, siltstone and shale. When fresh, it consists of varying shades of grey; when weathered, it changes to a buff color. Cut slopes have moderate to average stability in bedrock and good bearing capacity.
- * Alluvial deposits are materials moved from other locations and deposited in drainages. A large deposit is found in two connected drainage areas on the western side of the site. Serpentinite and greenstone are the source materials for this deposition area. These areas of silts and clays would lose strength and bearing capacity when saturated (Reid, 1993:26).

3. *Seismicity*

The seismically active San Andreas fault zone lies less than 1,500 meters to the southwest of the site, demarcating the break between the Santa Cruz Mountains to the west and the hills and flats of the eastern San Francisco Peninsula. The San Francisco Peninsula segment of the San Andreas fault is approximately 3,000 to 4,000 feet southwest of the site.

The Hermit fault, also known as the Cañada fault, stems from the San Andreas fault zone, and parallels the main trace of the San Andreas fault in the site vicinity. The Hermit fault trends northwest along the southwestern boundary of Edgewood near the Cañada Road underpass of Highway 280. The extreme southern end of the site and the adjacent Watershed parcel are within the Alquist Priolo Special Studies Zone corridor that extends outward from the Hermit fault.

Though considered potentially active, displacement along this fault within the last 11,000 years has not been recorded and seismic information is insufficient to determine the recency of Hermit fault activity.

While all contacts between the serpentine rock unit and adjacent units appear to be faults, none are classified as “active” by the California Division of Mines and Geology. However, exposed contact points of the rock units show a slight oversteepening of the slope which could either indicate prehistoric movement or erosion of the contact area.

In 1986, the U.S. Geological Survey identified seven unnamed faults. They closely demark the diverse rock formations and associated soil types within the site. Of interest is the fault which lies at an oblique angle to the Cañada and San Andreas faults running northeast to the serpentinite. The drainage flowing into the Crystal Springs Reservoir along this fault forms one of the area’s major riparian corridors and ephemeral lake, or so-called frog pond which is discussed later.

a. Ground Shaking and Surface Rupture. According to the 1990 Working Group on the California Earthquake Probabilities, there is a 23% chance of a magnitude 7.0 earthquake occurring during the next 30 years along this segment of the San Andreas fault. The north-facing slopes of the central ridge have a high potential for seismically induced landslides which could be exacerbated by grading into the slopes. The area of alluvial deposits at the western end of the central ridge could experience much stronger ground shaking than the remainder of the site.

Also, depressions in the grassland areas and portions of the alluvial area are

typically saturated during the rainy season. Fortunately, liquefaction potential in these areas is low owing to the minimal areas of sandy soils.

4. **Soils**

Site soils are formed primarily by weathering of underlying parent rock. Figure A-3 (Soil Types) shows that the locations of the rock formations closely correspond to the distribution patterns of the following three predominant soil types at Edgewood. Table A-1 details some of their traits.

Table A-1

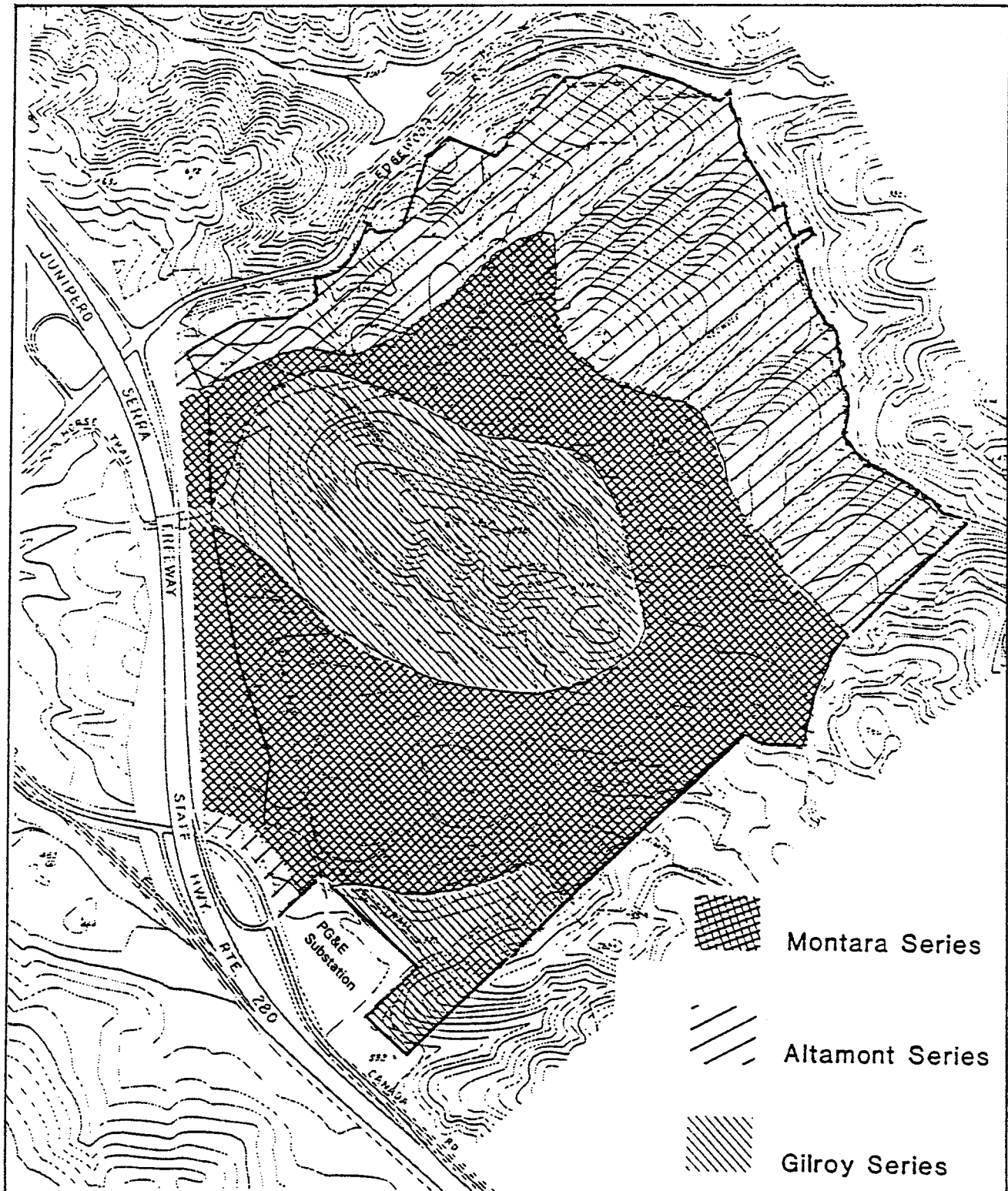
Selected Characteristics for Soil Series at Edgewood

SOIL CHARACTERISTICS	MONTARA	ALTAMONT	GILROY
Erosion hazard	Moderate to high	Moderate to high	Moderate to high
Surface texture	Gravelly	Clayey	Gravelly
Depth to bedrock	Shallow	Shallow to moderately deep	Moderate
Depth to seasonal water table	Slight	Slight	Slight
Subsoil permeability	Slow	Slow	Slow
Water holding capacity	Low	Slight	Slight

a. **Montara Series Soils.** These soils are derived primarily from weathering of the underlying serpentinite bedrock and almost entirely surrounds the Franciscan greenstone ridge. According to the 1986 General Plan, these serpentine-derived soils occur infrequently in San Mateo County, and undisturbed habitats as large as Edgewood's are quite rare. These soils are shallow and gravelly in texture, except in areas of depression or gouge, where clayey soils develop that are highly plastic and possibly expansive. Montara series soils are characteristically infertile, containing low amounts of soil enrichments such as calcium, phosphorus, potassium, and nitrogen, and high concentrations of heavy metals such as iron, nickel, chromium and magnesium, as well as a mineral, chrysotile asbestos. They are generally highly alkaline.

In California, serpentine soils can form a type of mineralized clay containing montmorillonite, a mineral not found in serpentinite rock material. This clay occurs as a result of the magnesium in soils leaching out in an aqueous carbon dioxide environment.

FIGURE A-3 -- SOIL TYPES



Thus, the permeability of Montara series soils is moderately slow, and the water-holding capacity is very low; thus, runoff is rapid to very rapid. Much of the Montara soils areas have a slope less than 20%, and the erosion hazard is moderate to high, depending on the steepness of the slopes and absence of vegetation.

b. Altamont Series Soils. These soils are formed from the underlying Franciscan and Butano sedimentary bedrock units and consist of well-drained clays and clay loams. They are located on the northern and eastern sections of the site, with steep slopes generally exceeding 20% grades. Soil Conservation Surveys of 1941, 1974, and 1977 characterize the Altamont series soils as having a moderate to high erosion hazard factor, high potential for shrink-swell fluctuation, slow permeability, and medium to rapid surface runoff. The heavy erosion gives rise to steep and narrow canyons and riparian corridors. The surface soils are dark brown to brown clay loam and are underlain by lighter colored subsoils that may include gravel and rock fragments. The depth of these surface soils varies from 3 to 60 inches above the underlying bedrock. On slopes exceeding 20%, root penetration is moderately shallow (Torrey, p.49). This soil series supports the mixed evergreen, foothill and valley woodlands and non-serpentine native grassland.

c. Gilroy Series Soils. These soils are formed from the underlying igneous Franciscan greenstone rock unit in the central and southwestern areas of the site, and mainly consist of slopes greater than 30%. The shallow to moderately deep surface soils are reddish-brown clay loam and the subsurface soil contains gravel or rock fragments. Permeability is moderately slow; roots penetrate to a depth of 20 to 40 inches; runoff is medium to rapid; and erosion hazard is moderate to high, especially in barren areas. Native California grasslands, chaparral, and woodland types vegetate the Gilroy series soils. Gilroy soils underlying the southwestern portion of the site contain wetland-type vegetation supported by a stream or creek.

5. Slope Stability and Erosion Hazard

Brabb and Pampayan mapped a possible landslide deposit, approximately 700 feet wide, on the northeast-facing slopes of the central ridge. Other mapped slope failures have occurred along perimeter road cuts. In general, most of the site is rated as having a low potential for landslides, with the north-facing slopes of the central ridge having a moderate landslide potential, and the north-facing serpentinite and sheared rock slopes of the central hill and the small southern hill having a high potential for seismically-induced landsliding.

Following the winter storms of 1982, very few debris flows were mapped on the site. These few debris flows occurred in the serpentinite units or on roadcut slopes

in the Franciscan sheared rock. Since 1982, County Parks and Recreation added a culvert to the west side of the Ridgeview Loop to collect and prevent further erosion. A Bay Area study of debris flow incidents found that most of the rock units occurring at the site have a low incidence of debris flows, while Franciscan sandstone has a moderate incidence. The very wet seasons of 1994 and 1995 have not yet been measured for debris flows.

As illustrated in Table A-1 (page A-7), all soils on the site have slow infiltration rates and slow subsoil permeability when wet. This can increase the potential runoff and erosion. Erosion hazard is generally moderate to high depending on the degree of slope and absence of vegetation.

6. *Climate*

The climate at Edgewood is typically described as "Mediterranean", i.e., hot, dry summers and cool, rainy winters. Summer temperatures can reach 100 degrees F, but are usually tempered by coastal advection fogs that are produced when moist air is cooled by contact with upwellings of cold ocean water and condenses to form fog banks. Offshore winds generated by the heatsink effect inland then pushes over the coast range. Since summer rainfall is minimal, fogdrips provide significant moisture to Edgewood plant communities, especially in the northeastern portions of the site. Fogdrips are formed when summer fog condenses onto the trees and drips down to other drops below, picking up momentum and dropping to the ground like a regular rainfall. The winters are generally cool, rainy, foggy, and, during "El Nino" years, extremely dark and very wet.

Although no weather records are available specifically for Edgewood, several nearby locations such as Skylonda Guard Station, Division Dam - CWS, and Crystal Springs Cottage, have monitored temperatures and precipitation. Summer high temperatures average 90 degrees F. and winter low temperatures average at near freezing. The Bay Area receives its highest precipitation between October and March, and at Edgewood, the average rainfall is about 30 inches (Torrey, 1982:30). Precipitation rates increase with altitude, and temperature extremes become increasingly distinct above fogbelts (Barbour & Major, 1977).

7. *Air Flow, Current and Winds*

The prevailing wind at Edgewood flows from the northwest through the Crystal Springs Gap, into the San Andreas Fault Rift Valley and eastward to the San Francisco Bay. These winds are strongest during the late spring and summer months (Torrey, 1982).

Temperature inversions often result during the summer as warmer air is displaced to higher elevations by the cooler sea breezes and fog at ground level. These breezes are quite strong on the grassland portions of Edgewood and along the ridgeline. Strong winds during the late spring and summer tend to dry exposed vegetative areas due to increased evapotranspiration (water loss). On exposed serpentinite outcrops, excessive winds tend to dry the soils quickly.

8. *Air Quality*

Due to lack of significant upwind pollution, the prevailing northwest winds bring relatively clean air to the site. As an indication of air purity, several species of lichens colonize at Edgewood. Lichens, especially those that grow on trees, are generally intolerant of atmospheric impurities (FoE, 1996:39). Some air pollution is generated by traffic along the I-280 freeway and may be held by the inversion layer during certain times of the year. Although the air east of the site is polluted by industrial and urban sources, the wind moving toward Edgewood tends to reduce the air pollution level.

9. *Noise*

The western portion of Edgewood receives a significant amount of noise from the I-280 freeway. Prevailing winds tend to pull the noise further into the site. Although the noise levels have not been monitored, it can be expected that the noise impact may be of concern in areas immediately adjacent to the freeway. The eastern portion of the site, however, is relatively quiet due to its topography, protective vegetation and distance from major roadways.

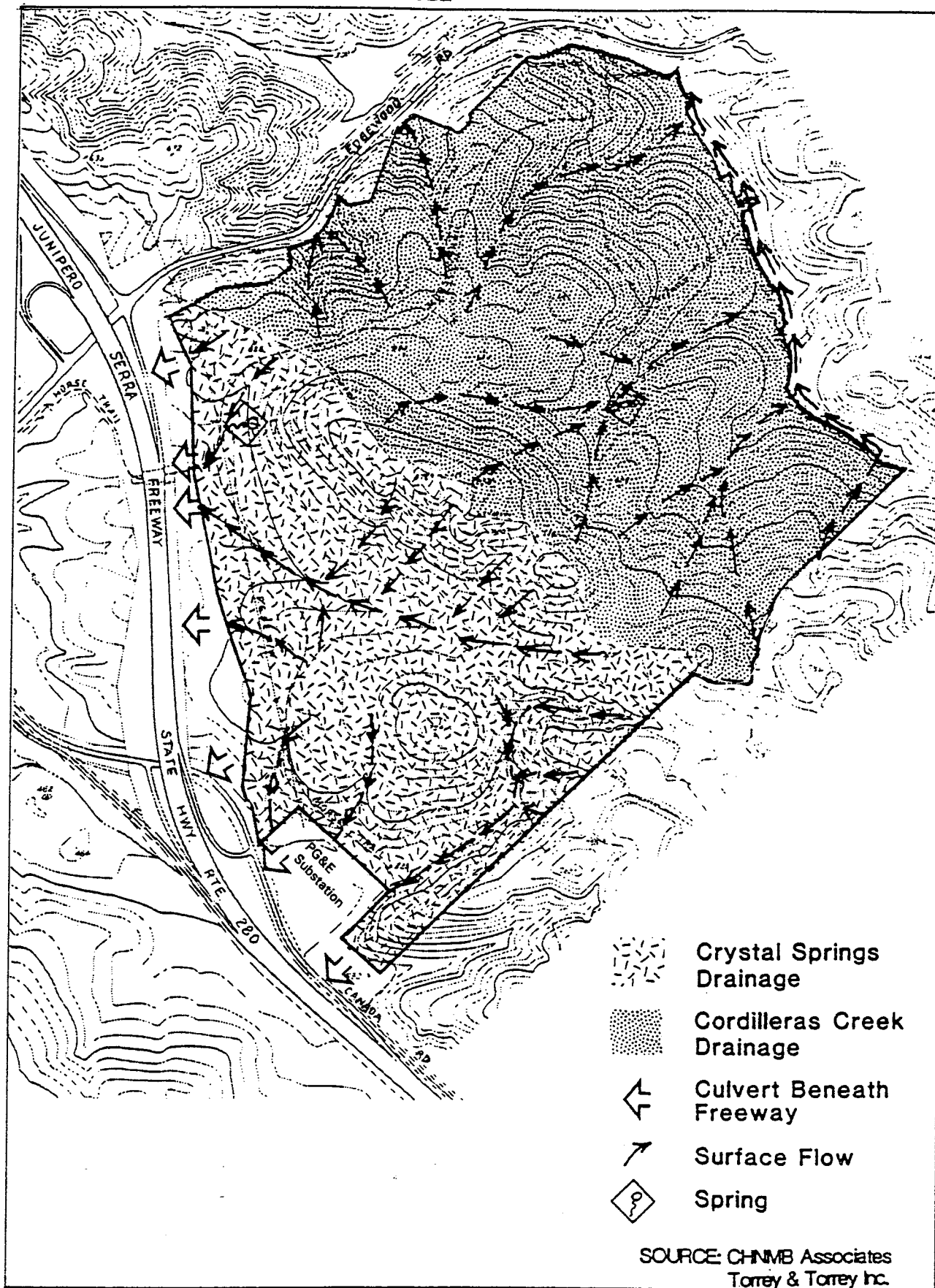
10. *Hydrology*

The site contains a freshwater marsh and several springs and seeps, all of which perennially support vegetation and wildlife.

Edgewood's 13 water courses drain either directly to the west into the Crystal Springs Reservoirs, or northeast into Cordilleras Creek which in turn drains into the estuaries of San Francisco Bay. Four of these creeks/streams are perennial while the balance is intermittent. In periods of drought, some surface drainage may become subterranean.

The largest creeks or streams flow west through the southern part of the site and through the earthquake fault that courses between the central ridge and the south hill. Directly along this corridor is a pond referred to as the 'frog pond' because it provides a significant breeding habitat for the Pacific tree frog (*Hyla regilla*). Two of

FIGURE A-4 -- SURFACE DRAINAGE



the 13 streams receive water flowing from perennial springs that drain through the Franciscan and Butano sandstone formations northeast of the central ridge to the Cordilleras Creek. Four minor riparian corridors flow northeast as well.

The ponds, seeps, springs, freshwater bog, and other riparian areas at Edgewood are fragile due to steep slopes, sedimentary soils, and the high-erosion potential of surface streams. Edgewood's hydrological network (Figure A-4, previous page) is complicated by the faults and fractured block formations in the serpentinite that create an intricate hydraulic capillary network.

B. Biological Resources¹

Edgewood is best characterized as mostly undeveloped land which supports an abundance of flora and fauna, and because of this richness, the site has attracted many visitors and scientists just to study its diversity. It is this range of floristic and edaphic diversity and richness that provides a broad range of habitats for various resident, migratory, and visiting fauna. Further, the presence of serpentine soils at Edgewood provides an opportunity for unique and unusual plants to occur, one of which is San Mateo thornmint (*Acanthomintha duttonii*), a species found nowhere else in the world. Such unique plants are primarily confined to the serpentine grassland and are discussed later in this section. Plant and animal species protected by laws include: San Mateo thornmint, Marin western flax, white-rayed pentachaeta, and Bay checkerspot butterfly. Edgewood's vast array of natural amenities, including its diverse biotic habitats and visually interesting land forms, also provide an opportunity to experience views of a unique natural setting.

This section first discusses the chief Federal and State legal entities that affect special habitats and species at Edgewood. Following that is a detailed description of the prime natural resources of Edgewood.

¹Scientific plant names are derived from The Jepson Manual - Higher Plants of California, ed. James C. Hickman. 1993, University of Calif. Press. The common names are derived from the same publication; however, lacking any common name, a common name is derived from Flora of the Santa Cruz Mountains of California, John H. Thomas, 1961, Stanford Univ. Press. It should be pointed out that plant common names vary for the same plant depending upon locality, local popularity, and usage; and unlike animal common names, there is no definitive authority governing such usage.

1. *Relevant Federal and State Laws Regarding Endangered Species and Sensitive Habitats*

Because of its unique qualities, Edgewood has been designated: (1) one of the top three of twelve Endemic Species Ensembles in California (CNPS, 1996), and (2) a Significant Natural Area by California Department of Fish and Game. The serpentine grassland habitat at Edgewood supports Federal and State listed plant and animal species. The following are laws which protect endangered species and sensitive habitats at Edgewood.

a. *Federal Endangered Species Act ("ESA")*. To harass, harm or kill, i.e. "take" a listed threatened or endangered species is prohibited under Section 9 and the implementing regulations of the Federal Endangered Species Act ("ESA") (16 USC 1531 et seq).

At Edgewood, U.S. Fish and Wildlife Service ("USFWS") expressed concern about possible effects of the Master Plan on Federally-listed endangered and threatened species, and the serpentine grassland (Attachment A-1, Nos.4 & 5). For example, regarding the threatened Bay checkerspot butterfly, removal of any serpentine grassland containing host plants of the butterfly, or activities which curtail butterfly movements through corridor areas, may be interpreted as a "take" (Reid, 1993:45).

In 1992, USFWS recommended "that destruction or damage to any areas containing serpentine habitat and potential movement corridors be avoided" (Attachment A-1, No.6). Without a permit or exemption (for incidental take) pursuant to Section 10(a)(1)(B) of the ESA, or authorization under Section 7 of the ESA, it is illegal for individuals, corporations, or governmental entities to take or authorize any activity resulting in the 'take' of even small amounts of a listed species. The Federal government can prosecute such entities for violation of the Endangered Species Act. Violations of the ESA could result in a \$50,000 fine and imprisonment for one year.

The conservation planning process by which a local land use authority can legally allow projects potentially resulting in the take of such species, is set forth, as follows, in Section 10 of the ESA:

The Secretary (of the Interior) may permit any act prohibited in Section 9 for scientific purposes. The Secretary may also permit any taking of fish and wildlife if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

According to the ESA, Section 10(a), or incidental take permit application, must be

supported by a habitat conservation plan ("HCP") that specifies:

- 1) impacts likely to result from the take;
- 2) measures to monitor, minimize, and mitigate such impacts;
- 3) funding to implement such measures;
- 4) alternative actions that would not result in taking;
- 5) reasons for not utilizing such alternatives;
- 6) responses to unforeseen circumstances; and
- 7) any additional measures considered necessary or appropriate, such as an evaluation of the extent and potential, but currently unoccupied habitat, for listed and candidate species.

San Mateo County is familiar with the ESA Section 10(a) process because it received the first such permit issued. The 1982 permit was for the incidental take of the Endangered Mission blue butterfly on San Bruno Mountain. The permit allowed the County and Cities of Brisbane, Daly City and South San Francisco to approve permits which resulted in the construction of residential and commercial development on limited portions of the Mountain containing habitat of the endangered species. As mitigation for the take, private landowners had to dedicate land to the public and pay annual mitigation fees in perpetuity to cover costs of maintaining and monitoring the habitat.

ESA Section 7 is used instead of Section 10(a) if the site is within the jurisdiction of a federal agency and the agency requires a permit for project approval. In the case of Edgewood, U.S. Department of Defense, Army Corps of Engineers ("USACE") has jurisdiction over the wetlands and the National Park Service ("NPS") has jurisdiction over land adjacent to Edgewood, on the west side. Both agencies would require a Section 7 permit if the County were to develop this land. In either case, the Federal agency having jurisdiction must consult with USFWS and receive a biological opinion as to whether the proposed action would jeopardize the long-term existence of the protected species. USFWS must always evaluate "reasonable and prudent alternatives" to a project in order to eliminate a taking.

USFWS recommends that, as provided under Section 10(a)(1)(B) of the Act, a permit for incidental take be obtained for any project undertaken in areas containing Federally-listed endangered and threatened species (i.e., the serpentine grassland) (Attachment Nos.4 and 5). The Parks and Recreation Division would need to prepare a Habitat Conservation Plan (HCP) for Edgewood and apply for the incidental take permit, which has an application fee of \$25.00. The HCP would be

similar to the Master Plan, but would focus on the selected alternative management plan and would provide a more detailed analysis of the Plan's likely impacts on special-status species. An HCP is prepared by the local agency (by contract, usually, with a competent consultant) in close working relationship with USFWS (Endangered Species Branch) as well as CDFG; ultimate approval and issuance of a Section 10(a) permit is by USFWS.

For resource management, and operation/maintenance activities occurring in the serpentine grassland at Edgewood, USFWS notes that it will be difficult to entirely eliminate the likelihood of small amounts of 'take' to the Bay checkerspot butterfly. "... a take would be difficult if not impossible to avoid completely, and would result from trampling, inadvertent uprooting or disturbance of host plants, and inadvertent harassment of butterflies." (Attachment A-1, No.4). In the case of incidental "takes", appropriate monitoring (every 5 years) and mitigation procedures would also have to be identified.

b. Federal Migratory Bird Protection Act (50 CFR 20, et seq)

Regulations on taking of migratory birds allow for only the taking of migratory game birds. Non-game migratory birds may not be taken, with very few exceptions. The complete list of migratory birds covered by the Migratory Bird Protection Act is found in 50 CFR 10.3.

c. California Department of Fish and Game ("CDFG") Statutes. Under the Native Plant Protection Act and the California Endangered Species Act, State-listed rare, threatened, endangered, or candidate for listing plant and animal species cannot be taken or possessed unless specifically authorized by CDFG. Authorization is obtained through a mitigation agreement.

Before applying for a Mitigation Agreement, an applicant must demonstrate to the Department that it is not feasible to avoid adverse impacts to the sensitive resources. The process would begin after project review under the California Environmental Quality Act ("CEQA"), and after the CEQA lead agency accepts another mitigation strategy. Mitigation activities must be designed to reduce adverse impacts to a level of insignificance.

In response to a previous feasibility study for a golf course at Edgewood, the Department stated that:

"The Department views avoidance as the only appropriate mitigation for loss of species on serpentine habitat... Evaluation of the environmental constraints on the site would include consideration of not only the status of

the resources of the site, but law and Department policy in regard to appropriate mitigation of impacts to identified sensitive resources. Edgewood Park is considered by the Department as one of the most sensitive areas in the State, primarily due to the presence of the serpentine bunchgrass community and the unique suite of rare plants and animals that occur in conjunction with this community. In recognition of the unique qualities of the Edgewood Park area, the site is designated by the Department as a Significant Natural Area (SNA)." (Attachment A-1, No.7)

d. Protection of Migratory Birds. In addition to the two above-mentioned acts, the State of California, by agreement with USFWS, administers the limitations provided under the Federal Migratory Bird Treaty Act, discussed above.

California Fish and Game Code (Section 3513)

"§3513. Migratory nongame birds; protection.

It is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act."

e. California Environmental Quality Act. The California Environmental Quality Act (CEQA) is not intended to be a "protective" mechanism, but it does provide special means by which local, State, and Federal agencies are notified when animals or plants of concern are affected by some kind of development. Thus, CEQA becomes a "full disclosure" document. Should any plant or animal, which is listed or even being considered for listing (usually including a plant listed in the Rare Plant Inventory of the California Native Plant Society²), be in some way identified as part of a development study, there is a requirement that the lead agency provide appropriate means for the protection (mitigation measures). Resource agencies, such as the Department of Fish and Game, usually provide input on mitigation for the protection of a plant or animal. In the case of Edgewood, the environmental document prepared for any future project would be distributed to all responsible agencies, including agencies of the Federal government. Thus, even though neither USFWS, Corps of Engineers, National Parks Service, nor the Environmental Protection Agency are specifically a part of the CEQA process, they do have the authority to review CEQA documents.

²The California Native Plant Society (CNPS) was instrumental in the late 1960's in preparing rare plant inventories. In 1973, the State Secretary for Resources provided a grant to the Society to complete such an inventory, and since its completion there have been four more editions. This list, "CNPS Inventory of Rare and Endangered Vascular Plants of California" has been recognized statewide as the authority regarding the rarity of native plants.

f. San Mateo County Ordinance Code. Sections 3.2.40.080 (a), (d) and (n) of San Mateo County's Ordinance Code deal with the appropriateness of taking any plants or animals in any of the County parklands, including "reserves" and "preserves". In accordance with Section 3.2.40.010, any violation of these sections is subject to a misdemeanor action.

g. Wetland Resources. Wetland resources are also protected under several Federal and State laws administered by various agencies. The Department of Fish and Game maintains a policy that no net loss of wetland shall occur. Any activities which may result in the alteration of a stream course would be subject to the requirements of the Department of Fish and Game under a Stream Alteration Agreement. Otherwise, the Department would exercise its jurisdiction over the project as a Responsible Agency during CEQA review to require mitigation measures that protect wetland resources. The following are some of the agencies protecting wetlands:

- * U.S. Department of Defense, Corps of Engineers ("USACE"). Wetland resources are protected under the Federal Clean Water Act, as administered by USACE (Section 404). The agency maintains a policy of no net loss of wetlands. Filling or modifying a wetland may require a USACE permit under Section 404 of the Clean Water Act depending, in part, upon the extent of the wetland or wetlands in question.

In certain circumstances, small wetlands may fall under the Nationwide Permit consideration of the Corps of Engineers rules; however, if USACE determines that the Edgewood wetlands are, in fact, "jurisdictional wetlands" (a predetermination made by the USACE, or by other appropriately USACE-certified "Wetlands Delineator"), a Section 7 (ESA) consultation with the US Fish and Wildlife Service would be required. At such time, the full range of listed and candidate species would be considered in the consultation. Streams are similarly protected by the USACE; however, in addition to Section 404 requirements, the USACE is also bound by the Rivers and Harbors Act of 1899, found to include "all waters of the United States".

- * U.S. Department of Environmental Protection ("EPA"). EPA is an "overseer" of the Section 404 process as assigned to the USACE and could intercede as part of the process, if determined necessary.
- * U.S. Department of the Interior, Fish & Wildlife Service ("USFWS"). Under Section 7 (Federal Endangered Species Act), any action by a federal agency which could affect a Federally-listed endangered or threatened species

requires that formal consultation take place. With certain rare exceptions, USFWS must issue a "No Jeopardy Opinion" for a project to proceed.

- * California Department of Fish & Game ("CDFG"). The State Fish and Game Code is administered by CDFG. The State maintains a policy that no net loss of wetland shall occur. Any activities which may result in the alteration of a stream course would be subject to the requirements of the CDFG under a Stream Alteration Agreement. CDFG would also exercise its jurisdiction over a project as a Responsible Agency during CEQA review recommending mitigation measures that protect wetland resources.
- * California Department of Water Resources ("DWR"). Under agreement with the USACE, California DWR must certify any mitigation program prior to the USACE issuance of a permit under Section 404, Clean Water Act.

2. *Vegetation*

Vegetation is dependent upon a great number of often unquantifiable environmental variables including climate, soils, slope, fire, water, etc. Although much has been studied about Edgewood, there has been very little put together which deals with the ecosystem as a whole. There has been some analysis regarding the serpentine grassland, and again, because of its uniqueness, the focus is on that specific vegetation type rather than the whole of the site.

The Edgewood vegetation has been studied by several botanists over the last decades; accordingly, checklists of about 460 plant species (representing 75 plant families) has been prepared and are found in Attachment A-2.

As indicated earlier, the vegetation in portions of Edgewood is influenced by the underlying serpentinite soils and rock formations as shown in Table A-2. The result is a higher diversity of plant communities than occurs in other nearby open space areas in San Mateo County. Susan Sommers, Diane Steek, Professor Bruce M. Pavlik (Mills College), and Niall F. McCarten have independently made studies on the nearly extinct San Mateo thornmint. In connection with the Bay checkerspot butterfly, staff at the Center for Conservation Biology at Stanford University has studied the support ecosystem for the butterfly within the serpentine grassland in and around Edgewood (as well as other areas where the butterfly is either extirpated or extant).

For the purpose of this document, the vegetation on Edgewood has been classified into four major vegetation types as illustrated in Figure A-5 (page 21). They

Table A-2

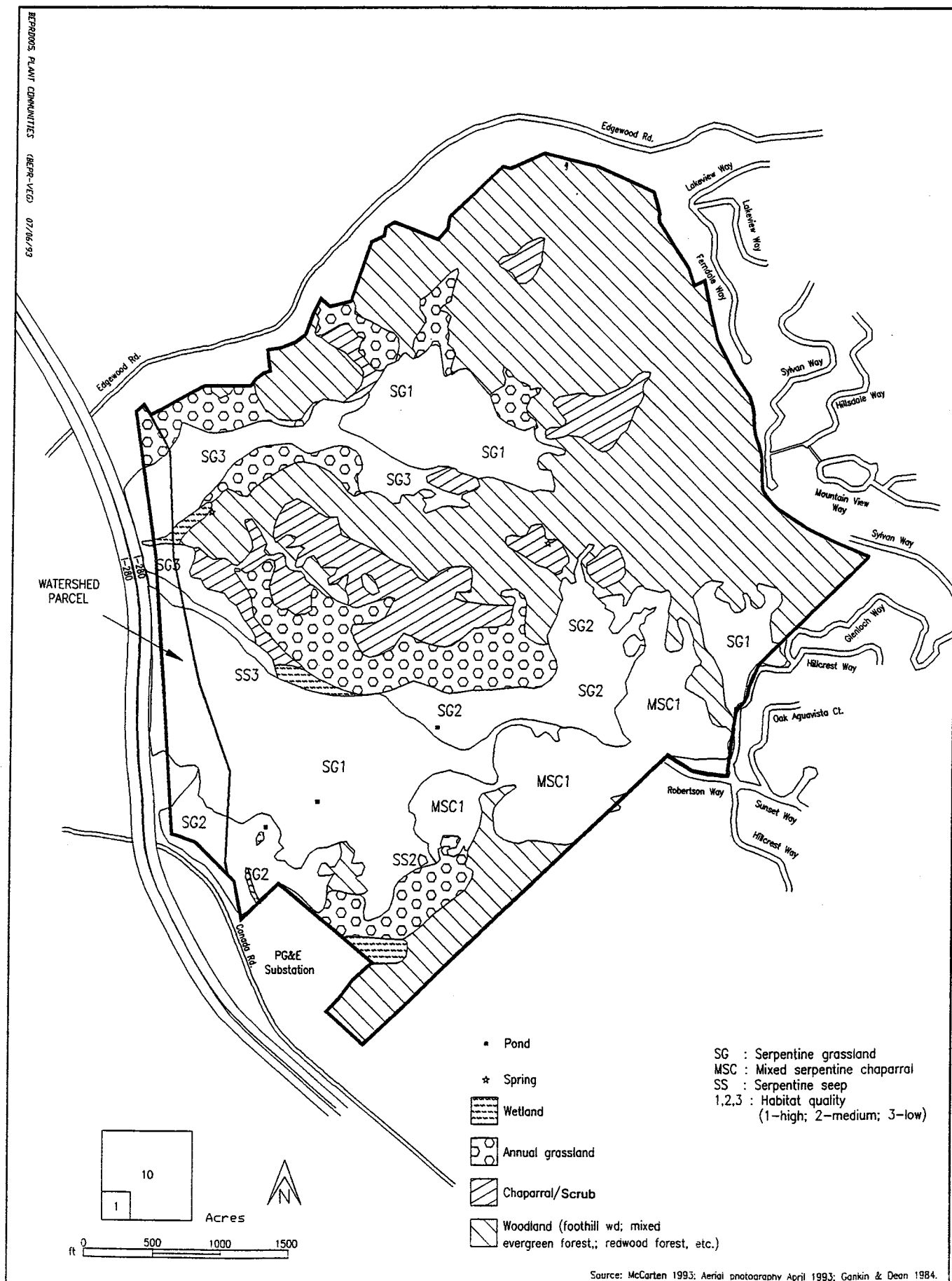
Rock Formations, Soil Series, Plant Communities

ROCK FORMATION	SOIL SERIES	PLANT COMMUNITY
Franciscan serpentine (serpentinite)	Montara	Serpentine bunchgrass grasslands, Mixed serpentine chaparral
Franciscan greenstone	Gilroy	Chamise chaparral, Mixed hardwood forest subgroup
Franciscan greenstone	Altamont	• Mixed hardwood forest subgroup • Foothill woodland subgroup • Non-native grassland dominant • Some native grass species present
Franciscan sheared rock	Altamont	• Mixed hardwood forest subgroup • Foothill woodland subgroup • Non-native grassland
Butano sandstone	Altamont	• Mixed hardwood forest subgroup • Foothill woodland subgroup • Non-native grassland dominant • Some native grass species present
Alluvial deposits from serpentine and greenstone debris flows	Altamont and Montara	Wetlands: freshwater marsh; willow thicket

include: grassland, shrub, woodland, and wetland. These types are further divided into distinct plant communities: non-native grassland, serpentine bunchgrass grassland, chaparral, mixed serpentine chaparral, chamise chaparral, mixed Northern California coastal scrub, oak foothill woodland, mixed hardwood subgroup of the mixed evergreen forest community, and wetlands. Because biologic communities are never static, no single community is absolutely pure and is, instead, a mosaic with patches of other communities intersticed, or can exhibit a combination of species representing several types of communities some of which may well have been infested by non-native plants. The following is a description of the various plant communities observed on Edgewood.

a. Grassland Vegetation. The grassland vegetation consists of native serpentine grassland and non-native grassland. The latter is the result of the invasion of the native grassland by non-native species. Some botanists now consider these non-native grasses to be established, inextricable components of the grassland community while others believe that with certain kinds of manipulation, it

FIGURE A-5 - PLANT COMMUNITIES



may be possible to return these to essentially native conditions.

- * Serpentine Bunchgrass Grassland. This is an open grassland dominated by perennial bunchgrasses. Total cover is typically low. Edgewood has one of the largest of the few rare and undisturbed serpentine grasslands in the Bay Area. Edgewood's bunchgrass grassland is replete with diverse and abundant plant and animal species, including significant endemics. Table A-3 lists some rare and interesting plants found in this type at Edgewood.

Non-native plant species are usually unable to survive in nutrient-poor serpentine soils. Nevertheless, highly invasive exotic species including annuals such as yellow star thistle (*Centaurea solstitialis*), and perennials such as perennial ryegrass (*Lolium perenne*) are adapted, although poorly, to these poor soil conditions.

For the purpose of serving as a guideline for park maintenance, Edgewood's serpentine grassland communities have been further evaluated and categorized as having high, medium, and low floristic quality. The following are, however, qualitative and have little bearing upon the floristics or habitat value except as a guide for potential restorative activities:

- High. The high quality plant areas contain, serpentine bunchgrass, serpentine endemic plants, a high proportion of native plants, and no invasive exotic species. These need protection.
- Medium. The medium quality plant areas contain some serpentine bunchgrass, a fair proportion of native plants, and a higher percentage of non-native plant species. These could be identified as those areas which should receive immediate study for restoration.
- Low. The low quality plant areas are found where the serpentine soils are mixed with other soils. There is a higher proportion of non-native plant species, serpentine endemics are not present, and serpentine bunchgrass is rare. Although not lost to the cause of restoration, these areas will require more in-depth analysis to determine the appropriate remedial measures. Of greater concern is that these areas are sources of infestation of non-native plants.

- * Non-Native Grassland has almost completely replaced the native serpentine grassland in the valleys and foothills of California. Typically, non-native during the drought months of summer and fall; as the plants dry out, the soils desiccate along with them. Unlike perennial grasses, annual grasses do

Table A-3

**Special, Showy, or Dominant Species of Edgewood's
Serpentine Bunchgrass Grassland**

COMMON NAME	SCIENTIFIC NAME	COMMENTS
ANNUALS		
San Mateo thornmint	<i>Acanthomintha duttonii</i>	Listed-endangered
Serpentine linanthus	<i>Linanthus ambiguus</i>	Uncommon; showy; CNPS-List 4
Marin western flax	<i>Hesperolinon congestum</i>	Listed-threatened
White-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	Listed-endangered
Woolly-headed lessingia	<i>Lessingia hololeuca</i>	Uncommon; not showy; CNPS-List 4
Owl's clover	<i>Castilleja densiflora</i>	Showy; obligate larval food plant for Bay checkerspot butterfly.
Purple owl's clover	<i>Castilleja exserta</i>	Formerly <i>Orthocarpus purpurascens</i> ; showy
Tidy tips	<i>Layia platyglossa</i>	Common; showy wildflower
Goldfields	<i>Lasthenia californica</i>	Common; showy wildflower
California poppy	<i>Eschscholzia californica</i>	Common; showy wildflower. Can be a perennial plant; State flower
California plantain	<i>Plantago erecta</i>	Common; not showy; obligate larval food plant for Bay checkerspot butterfly
NATIVE PERENNIAL BUNCHGRASSES		
Purple needlegrass	<i>Nassella pulchra</i>	Proposed as the State grass
Foothill needlegrass	<i>Nassella lepida</i>	
Big squirreltail	<i>Elymus multisetus</i>	
California brome	<i>Bromus carinatus</i>	
Pine bluegrass	<i>Poa secunda</i>	
Junegrass	<i>Koeleria micrantha</i>	
NATIVE PERENNIAL FORBS		
Large-fruited lomatium	<i>Lomatium macrocarpum</i>	Flowers not conspicuous, but interesting in fruit
Fragrant fritillary	<i>Fritillaria liliacea</i>	Uncommon; showy, CNPS List 1B
Royal larkspur	<i>Delphinium variegatum</i>	Common; short stalks of dark royal blue flowers; showy
Yampah	<i>Perideridia kelloggii</i>	Not showy. Native American food source
Blue dicks	<i>Dichelostemma capitatum</i>	Showy, bulbous plant. Native American food source
Ithuriel's spear	<i>Triteleia laxa</i>	Showy, bulbous plant. Native American food source

not retain soil moisture, and persist as seeds and not as living plants.

Characteristic species are slender wild oat (*Avena barbata*), wild oat (*A. fatua*), soft chess (*Bromus mollis*), red brome (*B. rubens*), long-beaked filaree (*Erodium botrys*), ryegrass (*Lolium spp.*), and burr clover (*Medicago polymorpha*).

- * Wildflower Field. Although this is not a static "plant community", it is a very important adjunct in the California flora. The colorful wildflower bloom attracts many visitors to Edgewood's serpentine grassland from March through June. The field not only forms a primary visual component for visitors, but it also serves as food for many diverse flying insects, especially solitary bees. Such a community is not stable and will fluctuate in size from year to year and from place to place depending upon the maturation ability of the plants. It is an herb-dominated community with conspicuous vernal displays of varying species of wildflowers. Characteristic species are California poppy (*Eschscholzia californica*), bird's eye gilia (*Gilia tricolor*), tidy tips (*Layia platyglossa*), Lindley's annual lupine (*Lupinus bicolor*), common owl's clover (*Castilleja exserta*), gold fields (*Lasthenia californica*), and *Phacelia* spp.

b. Shrub Vegetation. Shrub communities include: chaparral, mixed serpentine chaparral, chamise chaparral and Mixed Northern California coastal scrub. The canopies of shrub communities can be either irregular or uniform. Those with uniform canopies are sometimes referred to as scrub.

- * Chaparral. Chaparral communities at Edgewood consist of approximately 32 acres of dense shrub, scrub, and brushlands. The chaparral habitat is primarily located on the hot, dry southern exposures of the hills and ridges, frequently growing next to oak woodland. Chaparral habitat is highly susceptible to fire, and its species are dependent on fire for regeneration. It appears from the density and general height of vegetation in some areas of Edgewood that a fire has not occurred for some time, thus increasing the risk of a wildfire that could severely impact other natural resources by diminishing species diversity, and reducing food and cover for wildlife; yet fire is this community's most important adjunct, and lacking fire it will ultimately senesce, lose viability and give way to other vegetation types such as oak woodland.

Dominant species include the shrubs buckbrush (*Ceanothus cuneatus*) and chaparral pea (*Pickeringia montana*), the subshrubs California sage (*Artemisia californica*), coyote brush (*Baccharis pilularis*), yerba santa (*Eriodictyon*

californicum), golden-yarrow (*Eriophyllum confertiflorum*), deerweed (*Lotus scoparius*), and bush lupine (*Lupinus albifrons*).

- * Mixed Serpentine Chaparral. Mixed serpentine chaparral is found on approximately 41 acres of southeasterly facing serpentine terrain on Edgewood. This chaparral type is classified by the California Native Plant Society as threatened. The soils vary from well-drained rock to gravels and shallow soils. This community forms a continuous, fluctuating vegetation belt from the lee side of the south hills toward the northeast, covering most of the 805-foot hill by the Sunset Way entrance. The mixed serpentine chaparral plant communities are characteristically shrubby exhibiting reduced, curled, or thickened leaves. They often have little leaf litter and contain appreciable intershrub areas in which small grasses or annuals grow. The area is mostly dominated by a serpentine endemic oak, the leather oak (*Quercus durata*). Leather oaks can eventually become senescent without fire to regenerate this type of chaparral, although it is not fully understood what interval between fires is necessary for optimum survival of the species; however, specimens of leather oak have been seen to be over 3 meters tall which probably indicates the shrubs are well over 100 years old from acorn having withstood a multitude of fires.
- * Chamise Chaparral. This plant community is dominated almost entirely by chamise (*Adenostoma fasciculatum*), a fire-dependant species found mostly on rocky, shallow, mostly sterile soils of the hot south- and west-facing slopes and ridges of the site. Other species may occur amongst it, but tend not to exceed 10% of the vegetation cover. Chamise chaparral forms dense, extensive stands up to 3 meters high, has scanty litter, and a lack of understory, due in part to the allelopathic compounds in the litter of chamise. It is a component species in the mixed serpentine chaparral vegetation east of the south hill on the site. It is also found predominantly on the upper slopes of the western portion of the central ridge. Chamise is considered the most dominant species in chaparral throughout much of California. Typically, the woody plants which occur in this community can withstand fire regenerating from an underground caudex or burl. Those which are killed outright by fire have seed triggered to germinate after having gone through a high heat such as a fire, and often that seed can lie dormant in the soil or duff for decades.
- * Mixed Northern California Coastal Scrub. Sometimes referred to as soft chaparral, this plant community can be found on the north and northeast sides of the site on the steep terrain of the Franciscan and Butano sandstone, and to some extent, on Franciscan sheared rock formations. A

dense belt of coyote brush grows as a narrow belt along the riparian corridor -fault between the central ridge and the south hill. Indicator species are coyote brush (*Baccharis pilularis*), sticky monkey flower (*Mimulus aurantiacus*), coffeeberry (*Rhamnus californica*), California sagebrush (*Artemesia californica*), and western poison oak (*Toxicodendron diversilobum*); blackberry (*Rubus spp.*), bedstraw (*Galium spp.*) and clematis (*Clematis spp.*) intertwine above California bee plant (*Scrophularia californica*) and yerba buena (*Satureja douglasii*).

c. **Woodland Vegetation.** At Edgewood, woodland vegetation consists of oak woodland and foothill woodland subgroup, mixed evergreen forest and mixed hardwood forest subgroups, and willow thicket. The oak woodland community is estimated to cover between 102 acres to 165 acres of the site and is most prevalent in the north and northeast facing slopes of the mostly sheltered canyons.

- * **Oak Woodland (including Foothill Woodland Subgroup).** This community occurs as transition zones to grassland and mixed evergreen type. The foothill woodlands are dense (with at least 30% tree canopy), or can be open savannas that consist of large areas of grasslands with wide spaces between oak trees. Indicator species are coast live oak (*Quercus agrifolia*), blue oak (*Quercus douglasii*) and western poison oak (*Toxicodendron diversilobum*). Perennial forbs include Indian warrior (*Pedicularis densiflora*); native perennial grasses include slender needlegrass (*Nassella lepida*). Annual forbs include miner's lettuce (*Claytonia perfoliata*), smooth mule's ears (*Wyethia glabra*), and most of the grassland type species.
- * **Mixed Evergreen (including Mixed Hardwood Subgroup).** This type is characteristic of California mountain communities and includes temperate evergreen conifers, evergreen sclerophyllous (tough-leaved) understories, sclerophyllous broad-leaved forests, and evergreen broad-leaved woodlands. The woodland type at Edgewood, however, contains no conifers even though gray pine (*Pinus sabiniana*) occurs in the nearby Emerald Lake Hills area, and there is some conjecture that redwoods might have naturally grown in the more mesic habitats along lowland tributaries of Cordilleras Creek; those which are found at Edgewood have been planted as part of landscaping. The mixed hardwood subgroup includes stands of coast live oak (*Quercus agrifolia*), valley oak (*Quercus lobata*), madrone (*Arbutus menziesii*), buckeye (*Aesculus californica*), and California bay (*Umbellularia californica*) which is dominant along the Sylvan Trail.
- * **Willow Thicket.** Although willows are physiognomically trees or large shrubs, they are at the same time obligate wetland plants; this community is

discussed under "Wetlands", below.

d. Wetland Vegetation. Edgewood's wetlands (also discussed under 'Hydrology') consist of freshwater marsh, ponds, seeps, springs, willow thickets, and riparian corridors. Wetlands are defined specifically by the Corps of Engineers to include aspects not only of the vegetation but also of the nature of the water table and soils (hydric). For purpose of early definition, wetlands are more easily determined on the basis of existing vegetation by indicator species that are termed 'obligate' wetland plants (i.e., those plants that must have wetland conditions in order to become established and survive in the long run).

Wetlands are generally considered to contain important wildlife resources and may often provide highly sensitive habitats for various fauna. Interruption of Edgewood's on-site, or nearby hydrological network, particularly upstream from it, could result in reduction or disruption of wetlands, the native vegetation, and the native wildlife that depend on them.

- * **Freshwater Marsh.** A large freshwater marsh is located at the western base of the central ridge. It is a result of a perennial spring draining slowly through the level alluvial deposit which ultimately ends up in the Crystal Springs Reservoirs. Species include spike rush (*Eleocharis montevidensis*), rush (*Juncus spp.*), sedge (*Carex spp.*), San Francisco willow herb (*Epilobium franciscanum*), and northern willow herb (*E. adenocaulon* var. *occidentale*).
- * **Ponds.** There are three ponds located at Edgewood: 1) along the Serpentine Loop trail, 2) between the central ridge and the south hill (the frog pond), and 3) on the south hill. At the frog pond, the iris-leaved rush (*Juncus xyphioides*) forms a significant stand in the serpentine meadows, and the pond provides a significant breeding habitat for the Pacific tree frog. Plants found at other pond sites include rushes and sedges.
- * **Springs.** In addition to the above-described spring located at the western base of the central ridge, others at Edgewood occur primarily in the redwood stand at the base of the western edge of the central ridge, and in the north-northeastern oak woodland and mixed hardwood forest. Diverse species occupy these perennial outflows of water due to diverse soils and differing forest type vegetation.
- * **Seeps.** Seeps are a less prominent form of spring, usually vernal, and usually occurs on hillsides where water escapes (seeps) from the soil due often to a perched layer of impervious clay that causes the water to break to

the surface of the soil. Seeps are mostly vegetated by perennial herbs, especially rushes, sedges and grasses that form a complete but low vegetation cover. Seeps may also be attendant with willows. At Edgewood, seeps occur often in grassland type vegetation areas where the soils are kept permanently moist. Serpentine seeps are considered sensitive habitats for highly water-dependent species, and are found on the south hill at the 600-foot elevation level. The fountain thistle (*Cirsium fontinale* var. *fontinale*), now extirpated at Edgewood, requires such seeps and is found in similar habitats elsewhere in serpentine soils on San Francisco Watershed lands.

- * Willow Thickets. Willow thickets are dependent upon the presence of water at either a spring, seep, or along a riparian corridor. Because these are comprised mostly of woody plants, however, it is often best to separate them out as a distinct wetland sub-type. Willow thickets can be found throughout California, especially notable where seeps occur, often to the near exclusion of most other wetland species. At Edgewood, this community features a shrubby overstory in the more open spaces around the spring and freshwater marsh of the western end of the central ridge. Indicator species include willow (*Salix spp.*) and rush (*Carex*).

- * Riparian Corridors. Riparian corridors are usually considered to be those lands immediately adjacent to streams and rivers and their associated vegetation. These corridors may be fragile when adjacent to soils that are subject to erosion. Steep slopes and high erosion potential can often be affected by higher than usual water runoff which not only can scar stream sides, but also can gouge into the stream bottom. Streams provide important moisture for wildlife, as well as typical riparian plants in order that they may survive. To date, the extent of Edgewood's riparian corridors and accompanying plant species have not been fully inventoried.

e. Invasive Plant Species. At Edgewood, several particularly invasive exotic species have either invaded or overtaken many native plant communities. The exotic pest plants seriously threaten native species and sensitive habitats. They include, but are not limited, to slender wild oat (*Avena barbata*), wild oat, acacia (*Acacia decurrens*), eucalyptus (*Eucalyptus globulus*), olive (*Olea europaea*), tree of heaven (*Ailanthus altissima*), German ivy (*Senecio mikanioides*), pampas grass (*Cortaderia spp.*), canary grass (*Phalaris spp.*), rye grass (*Lolium spp.*), purple and yellow star thistle (*Centaurea calcitrapa* and *Centaurea solstitialis*), teasel (*Dipsacus fullonum*), foxtail (*Hordeum murinum* subsp. *leporinum*), Medusa head (*Taeniatherum caput-medusae*) and other annual barleys (*Hordeum spp.*), bellardia (*Bellardia trixago*), Italian thistle (*Carduus pycnocephalus*), and bristly oxtongue

(*Picris echioides*). Erradication efforts at Edgewood are discussed under 'Operating and Maintenance Practices at Edgewood'.

f. Wildlife. The wildlife observed or reported on Edgewood (Attachment A-3, "Wildlife at Edgewood"³) depend extensively upon the oak woodland, grassland and scrub/chaparral plant communities at the site. Some of the animal species found at Edgewood are rare because they are limited to the habitat provided by the serpentine grassland. These species of concern are discussed in the next section. Although Edgewood is adjacent to the San Francisco State Fish and Game Refuge, the I-280 freeway, as well as Cañada Road, prevent significant wildlife migration between the two areas. Three freeway underpasses permit some migration of larger mammals, but major wildlife movements are unlikely.

* **Mammals.** The primary mammals reported or expected on Edgewood are black-tailed deer, coyote, fox, bobcat, grey skunk, ground squirrel, pocket gopher, California vole, jackrabbit, raccoon, deer mouse and grey squirrel. Many of these are predators and depend upon the existence of other animal species as a source of food while others depend upon the vegetative productivity of the site.

* **Birds.** Attachment A-4 contains the Sequoia Audubon Society's checklist of migrant and resident species of birds sighted at Edgewood. About 70 species have been found including vultures, quails, owls, hummingbirds, woodpeckers and flycatchers. The majority of species can be found in the oak woodland habitat. Some birds are specialized feeders and can only be found in certain areas, while others frequent different habitats in Edgewood. In general, the birds utilize Edgewood for feeding, nesting or protection. All raptors, such as owls, vultures, and hawks, as well as many other migratory birds are protected by international treaty under the strict regulation of USFWS and California Department of Fish and Game.

* **Amphibians and Reptiles.** Those observed or expected on Edgewood include: California slender salamander, Western toad, Pacific tree frog, northern alligator lizard, western fence lizard, ring-neck snake, gopher snake, western garter snake, western rattlesnake, western yellow-bellied racer, and California kingsnake. These species are all predatory, relying on insects or small rodents for food.

* **Invertebrates.** Those observed at Edgewood include wasps, bees, ants, butterflies, moths, beetles, spiders, and arachnids. The most significant

³The reader is also referred to Attachment A-3 for scientific names.

invertebrates observed at Edgewood include: the Federally-listed rare Bay checkerspot butterfly, the blind harvestman, and the Edgewood microblind harvestman. These species are discussed under 'Animal Species of Concern'.

g. Species of Concern at Edgewood.

Federal and State Protected Plant Species

As shown on Table A-4, three of the rare plants at Edgewood are listed by the State and Federal governments as 'threatened' or 'endangered'.

Table A-4

Federal and State Protected Species Found at Edgewood

COMMON NAME	SCIENTIFIC NAME	AGENCY AND LISTING	DISTRIBUTION	HABITAT AT EDGEWOOD
ANIMALS				
Bay checkerspot butterfly	<i>Euphydryas editha bayensis</i>	Fed: Threatened State: None ⁴	San Mateo & Santa Clara Counties	Serpentine grassland
PLANTS				
San Mateo thornmint	<i>Acanthomintha duttonii</i>	Fed: Endangered State: Endangered	San Mateo County	Serpentine grassland
Marin western flax	<i>Hesperolinon congestum</i>	Fed: Threatened State: Threatened	Marin, San Francisco, San Mateo Counties	Serpentine grassland
White-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	Fed: Endangered State: Endangered	San Mateo County	Serpentine grassland

* San Mateo thornmint (*Acanthomintha duttonii*) is an annual plant found in three locations in San Mateo County, and which is currently found in one location at Edgewood.⁵ Historically, this species occurred in a number of

⁴The California State Fish and Game Code does not recognize invertebrates, specifically insects or arachnids.

⁵There are two naturally occurring communities of the thornmint currently known. By seeding, an additional colony was attempted to be established in 1991 as part of a study conducted by Prof. Bruce Pavlik and a student, Mills College. Further enhancement by seeding in the same place occurred annually through 1993. The current status of this seeded attempt for reintroduction is not known, but it is presumed that it has not succeeded by virtue of previous years' experiences. There has been no further interest in attempting to reintroduce the thornmint until matters dealing with microhabitat are better understood.

populations from the Menlo Country Club in the south, northward to the San Francisco Watershed lands. The San Mateo thornmint is listed as Endangered by the Federal and State governments.

- * White-rayed pentachaeta (*Pentachaeta bellidiflora*) is a small annual plant of the aster family. Historically, this species occurred in Marin, San Mateo, and Santa Cruz counties. The other populations have been destroyed by urbanization, off-road vehicles, or highway construction. The size of the population in Edgewood is small and fluctuates from year to year (Natural Diversity Database, 1996). The species is now known from only two natural occurrences, both in San Mateo County. It is listed as 'endangered' by the Federal and State governments.
- * Marin western flax (*Hesperolinon congestum*) is an annual plant endemic to serpentine soils from Marin County south to San Mateo County, a range of about 50 miles. Six populations are known from Marin County, one from San Francisco County, and seven from San Mateo County. Edgewood contains three populations in the serpentine grassland. The size of the Edgewood populations has fluctuated between 1986 and 1992 (Natural Diversity Database, 1996). This species is listed as 'threatened' by the Federal and State governments.

h. Other Plant Species of Concern.⁶ The following is a list of plants derived from materials and information provided by the California Native Plant Society (Santa Clara Valley Chapter). This list was excerpted from the Inventory of Rare and Endangered Vascular Plants of California, 5th ed. and has several categories⁷, none of which has any operation of Federal or State law; however, this list can be referred to by State or Federal resource agencies when considering the listing of any species. Thus, even though CNPS might indicate a particular species is a sensitive species, until the plant has been listed there is no protection provided to it by those agencies. It should be noted, on the other hand, that California Department of Fish and Game strongly urges local agencies consider the information provided by the CNPS in its "Inventory" when providing CEQA

⁶Three plants occurring at Edgewood have been dropped from consideration as species of concern due to either a change in rare status or taxonomic clarification. These are valley oak (*Quercus lobata*) and, farewell-to-spring (*Clarkia rubicunda rubicunda*), both of which are no longer in the CNPS Inventory. The third plant, scrub oak (*Quercus dumosa*), has undergone taxonomic reclassification and according to the Jepson Manual, the scrub oak that occurs in Edgewood is scrub oak (*Quercus berberidifolia*) which has never had any protection.

⁷The categories of rarity which the CNPS has adopted were originally derived from recommendations by the staff of the Smithsonian Institution who were mandated by Congress to prepare a nationwide list of plants (Section 9, ESA).

documentation for any proposed development. The categories of rarity, as now used by the CNPS, are as follows:

- 1A Plant species presumed to be extinct.
- 1B Plants which CNPS considers rare, threatened or endangered in California and elsewhere.
- 2 Plants of significant rarity in California; but which could be more common elsewhere.
- 3 Plants about which more information is needed, but which have enough information to continue to be considered.
- 4 Plants which are of limited distribution - a "Watch List" to see if over time there could be some change in the level of rarity which would warrant either placement of the species at some higher level of rarity or removal from any further consideration.

Because members of the CNPS (Santa Clara Valley Chapter) have been and continue to be instrumental in studying the flora of Edgewood, the following Table A-5 is included. It shows those plants found at Edgewood and included in the 5th edition of the CNPS Rare Plant Inventory. These plants are in addition to those variously listed by resource agencies.

The fragrant fritillary (*Fritillaria liliacea*) is a perennial plant which grows from a bulb. It occurs in both serpentine and non-serpentine soils in Sacramento, Sonoma, Marin, San Mateo, and Santa Clara Counties. The three populations of fragrant fritillary found at Edgewood are located in serpentine grassland. This plant is recognized as a "Species of Concern" by the Federal government, i.e. under consideration for listing, and while being in such a category, it warrants no protection unless it is in the "proposed listing status", i.e., an official proposed listing has been published in the Federal Register.

The status of several other plant species known to occur at Edgewood is under investigation. These plants are currently listed on the CNPS List 1B, List 3 and List 4 and do not as yet have State or Federal status. They include: (1) three populations of serpentine linanthus (*Linanthus ambiguus*) that occurs in serpentine grassland, (2) one population of woolly-headed lessingia (*Lessingia hololeuca*) that occurs in serpentine grassland, (3) a population of San Francisco collinsia (*Collinsia multicolor*) that occurs in woodland, (4) western leatherwood (*Dirca occidentalis*) that also occurs in woodland at four locations, and (5) chaparral mallow (*Malacothamnus arcuatus*) that occurs in chaparral in one location.

A serpentine plant reported by the CNPS to occur at Edgewood is the fountain thistle (*Cirsium fontinale* var. *fontinale*), Federally-listed as 'endangered'. The

Table A-5

**Plant Species of Concern Listed by the California Native Plant Society
(in addition to those plants formally listed by resource agencies)**

COMMON NAME	SCIENTIFIC NAME	CNPS LIST	OTHER AGENCY LISTING	HABITAT
Kings Mtn. manzanita	<i>Arctostaphylos regismontana</i>	4	None	Franciscan sandstone in coniferous and evergreen forests. ⁸ Its habitat at Edgewood is a disturbed site, formerly part of a ranch building site.
San Francisco collinsia	<i>Collinsia multicolor</i>	4	None	Moist shady evergreen woodland
Western leatherwood	<i>Dirca occidentalis</i>	1B	None	Moist shady evergreen woodland
Fragrant fritillary	<i>Fritillaria liliacea</i>	1B	Fed: Species of Concern	Moist areas in serpentine grassland
Woolly-headed lessingia	<i>Lessingia hololeuca</i>	3	None	Serpentine grassland
Serpentine linanthus	<i>Linanthus ambiguus</i>	4	None	Serpentine grassland
Arcuate bush mallow	<i>Malacothamnus arcuatus</i>	4	None	Chaparral

fountain thistle is a perennial plant restricted to perpetually moist clay openings in riparian or serpentine chaparral. According to the Federal Register (Feb. 1995), a single plant growing in a serpentine seep, adjacent to the Clarkia Trail, was sighted in 1987 and 1992. However, recent surveys in July and August 1996 (by T. Peterson, Thomas Reid & Associates, and Dr. W. Savage, San Jose State University, respectively) failed to show any evidence of the plant, or seedling material. Dr. Savage noted, however, that in the long term (greater than 5 years), the area presents a favorable habitat for the return of the fountain thistle⁹.

The California Natural Diversity Database Rarefind records also indicate that a plant Species of Concern which may occur at Edgewood is the Crystal Springs lessingia

⁸The occurrence of Kings Mtn. manzanita at Edgewood is very unusual in that it would appear there is no likely habitat there for its successful colonization. The species is best known at much higher elevations directly to the west in the Santa Cruz Mountains and has never been otherwise found at such a low elevation as at Edgewood.

⁹One reason which may explain the lack of this rare plant currently at Edgewood is that records show there to have been only a single plant known in the past. Because many members - over 80% - of the sunflower family are self-incompatible, i.e. they cannot self-pollinate in order to set seed (Don Kyhos and John Strothers, pers. comm.) and pollen from another plant close by is then needed to produce seed to perpetuate it.

(*Lessingia arachnoidea*). Thus far, there has been no record of this species at Edgewood, but it should be looked for, nonetheless.

The following list of plants were believed at one time to have occurred at Edgewood, but because there are no verified vouchers and because no one has seen them in recent years, they have been dropped from the list of plants found at Edgewood (see Attachment A-5 for CNPS explanation). This, however, does not mean that such plants are not to be found, and they need to be looked for more thoroughly. Until such time that they have been located, they are not included in any listing:

San Francisco campion
Dudley's lousewort

(*Silene verecunda verecunda*)
(*Pedicularis dudleyi*)

The Tiburon buckwheat's (*Eriogonum luteolum* var. *caninum*) presence at Edgewood has not been confirmed, and currently it is thought that the species may not extend south of Marin County. A specimen of an unknown buckwheat collected at Edgewood is at the UC Herbarium at Berkeley with Barbara Ertter, Curator and is undergoing taxonomic investigation to determine if Edgewood has a population of the Tiburon buckwheat.

Federally Protected Animal Species at Edgewood

Bay Checkerspot Butterfly. The Bay checkerspot butterfly (*Euphydryas editha bayensis*) occurs in the serpentine grassland at Edgewood. Because of its limited distribution and existing threats to its survival, in 1987, USFWS listed the Bay checkerspot butterfly as a 'threatened' species. Until recently, it was also known to exist at Jasper Ridge¹⁰ (Stanford University lands) in San Mateo County and at locations north of Morgan Hill in Santa Clara County. Accordingly, Edgewood is considered to be "vital to the survival of this butterfly species" (D.Wright).

The Bay checkerspot colonies at Edgewood were first studied in depth by Stanford University graduate student Michael Singer in the late 1960's. The Stanford studies have identified 6 subareas containing Bay checkerspot butterfly colonies within Edgewood. A status report on the butterfly at Edgewood between 1979 and 1993 has been prepared by the Center for Conservation Biology at Stanford University and is included as Attachment A-6.

¹⁰Recent field information has shown that very likely the Bay checkerspot butterfly no longer occurs on Jasper Ridge; however several more seasons will be needed to verify the absence of it from that population.

The following is excerpted from the status report:

"The Bay checkerspot butterfly is restricted to patches of native California grassland containing a mixture of larval host plants ... and adult nectar sources the only areas that presently support this mixture of grassland forbs are found on the patchily distributed serpentine-derived soils As a result, the Bay checkerspot butterfly is currently restricted to remnant patches of native grasslands that are limited in area and isolated from one another."

"Variations in the timing of the adult flight period and hostplant senescence makes the Bay checkerspot butterfly highly prone to weather-induced population fluctuations. ... The topographic configuration of species patches of serpentine soil-based grasslands plays a critical role in determining the ability of an individual habitat patch to support Bay checkerspot butterfly populations through extreme weather years. Variations in aspect, slope and elevation across hillslopes create distinct solar exposure regimes, which result in distinct microclimates ... This microclimatic variation affects the timing of both butterfly and hostplant development.... The spatial pattern of prediapause survival, and hence, distribution of postdiapause larvae, across the microclimatic gradient changes from year to year... The ever-shifting patterns of larval survival emphasize the importance of topographic diversity in maintaining populations of the Bay checkerspot butterfly. A variety of microclimates across a habitat patch apparently acts to buffer the population from weather fluctuations, and greatly increases the chances of long-term persistence."

"... the Bay Checkerspot butterfly survives as a single metapopulation ... The extinction of local demographic units within this metapopulation and the subsequent recolonization of temporarily unoccupied habitat batches seems to be a common occurrence. ... records, ... indicate that during periods with average or slightly greater than average seasonal rainfall, the size of individual populations and the total number of populations tend to increase and the geographic range of the butterfly tends to expand ..."

"At the present time, only two populations of the butterfly are known to exist on the San Francisco Peninsula (Jasper Ridge Area H and Edgewood County Park). ... Until the late 1980's the butterfly was found on at least four other Peninsula serpentine soil-based grasslands, including those located at San Bruno Mountain [ed. note: soils not formed on serpentinite, although having similar properties], northeast of the Highway 280 and 92 interchange, south and west of Farm Hill Boulevard, and Jasper Ridge Area C. While poorly documented, it is generally assumed that several other populations of the Bay checkerspot butterfly existed on the Peninsula until the 1960's."

Observations made since 1979 indicate that all serpentine grassland in Edgewood

have been used at one time or another by Bay checkerspot butterflies. Studies have shown that there is some movement of butterflies between subareas at Edgewood. The rate of interchange, although low, is sufficient to tie the subpopulations together genetically providing for adequate heterogeneity to keep them viable, but low enough that the subpopulations, during most years, are probably independent demographic units.

The status report provides the following conclusion regarding the Bay checkerspot population at Edgewood:

“Individually, each of the subareas at Edgewood County Park is of limited topographic diversity, hence, each subarea by itself probably does not provide enough environmental buffering necessary for the long-term persistence of a butterfly population. However, when all the subareas are viewed as supporting components of a single, albeit somewhat diffuse, population, then there is considerable topographic diversity present and a large buffering capacity. Non-native grasslands located between the serpentine soil-based grasslands probably act to facilitate Bay checkerspot butterfly dispersal between subareas ... the subpopulations at Edgewood ... should be considered components of a single population. Each of these components and dispersal routes between the subareas are probably necessary for the long-term persistence of the butterfly at Edgewood County Park. In addition, the Bay checkerspot butterfly populations at Edgewood County Park are undoubtedly key to the long term persistence of the San Francisco Peninsula metapopulation as the only other known population, at Jasper Ridge Area H, declined to approximately 30 individuals in 1993. Population reaching this low level are highly susceptible to extinction.”

Other Animal Species of Concern

Invertebrates. Edgewood supports two other species of invertebrates which are under consideration for listing by USFWS as ‘threatened’. They are: blind harvestman (*Calicina minor*); and Edgewood microblind harvestman (*Microcina edgewoodensis*). Both are in the same animal order as daddy-longlegs spiders (Phalangidae). These species are Federally-listed as ‘Species of Concern’. Some species of harvestman are usually found clinging to the underside of rocks near permanent springs, in the moist, open serpentine grassland, on slopes of 0 to 20 degrees.

Amphibians and Reptiles. The California Department of Fish and Game expressed that certain Edgewood areas were potential habitats for the (Federal and State listed) ‘endangered’ San Francisco garter snake (*Thamnophis sirtalis tetrataenia*). It was considered also possible that this snake utilized and depended on the small wetland and spring area immediately east of the freeway underpass. Thus, wetland

areas such as the frog pond, had been classified as primary and secondary habitats for the snake. However, when these areas were surveyed by Dr. Sam McGinnis between Fall 1983 and Summer 1984, he found no San Francisco garter snakes at Edgewood. Dr. McGinnis concluded that the site's wetland areas do not provide suitable habitat for this snake. Nevertheless, because the last survey was conducted over 10 years, USFWS recommends that Edgewood be resurveyed for sensitive amphibian and reptile species.

In November 1992, USFWS raised concern that Edgewood may support western spadefoot toad (*Scaphiopus hammondi* - Species of Concern status), California tiger salamander (*Ambystoma tigrinum californiense* - Category 1 candidate to become a 'proposed' species), and the 'threatened' California red-legged frog (*Rana aurora draytoni*). The wetland areas at the site may provide breeding habitat for these amphibian species of concern; however, a survey would be necessary to verify their existence. With respect to the red-legged frog, a preferred prey species of the San Francisco garter snake, it was not found at the site during the garter snake survey nor was it likely due to the lack of perennial standing water.

Birds. In November 1992, USFWS stated that Edgewood may support the California horned lark (*Eremophila alpestris actia*; Candidate 2), and the Loggerhead shrike (*Lanius ludovicianus*; Candidate 2). The presence of these two birds has not been identified thus far by members of the Sequoia Audobon Society. These birds, while no longer being considered by USFWS, however, must be given some consideration as 'Species of Concern'.

The Horned Lark is a ground nester, and prefers barren, open habitat with low, sparse, or overgrazed vegetation. The grassland at Edgewood may have too high a cover to be suitable for horned lark.

The Loggerhead Shrike prefers open habitat with scattered shrubs, trees, posts, fences, utility lines, or other perches. Such suitable habitat for the loggerhead shrike occurs at Edgewood. The bird nests in trees or shrubs. Further surveys would be required in the future should any suitable potential habitats be jeopardized by planned development.

3. Other Natural Resources

Scenic and Aesthetic Resources. Edgewood offers users an opportunity to experience a variety of visual resources in a setting which is comparatively close to urban centers. Views into the site, as well as from the site, are possible from various locations. The site has a vast array of natural amenities: diverse habitats,

visually interesting land forms, and colorful array of native wildflowers (from March to June).

The land is in a relatively natural state although serious degradation has taken place in the past when off-road vehicles and motorcycles eroded hillside slopes. To date, some areas have been successfully restored to their natural state; in other areas, however, regrowth efforts have been limited.

High power lines and towers on the western portion of Edgewood and the adjacent utility substation and gas lines are all highly visible and slightly detract from the overall natural appearance.

The most striking views into the site are from the freeway, Cañada Road and from a scenic overlook to the north. Southbound traffic on the freeway has direct views of the serpentine grassland and the western exposure. Northbound vehicles have views which are somewhat blocked by the PG&E substation, a steep bank and a grove of eucalyptus trees adjacent to the roadway. Views from Cañada Road at the southwest boundary of the site are limited by slope embankments and the substation. A scenic overlook off I-280 has views into the northern exposure of the Edgewood. The rolling grassland and the central ridgeline are also prominent features.

Viewpoints within Edgewood are identified by Points A to K on Figure A-6. The views are described in detail on the accompanying page (Table A-6), and are primarily to the west, north and east. Although several of the viewpoints are accessible by authorized trails, there are others which visitors access through presently unauthorized trails, some of which cross sensitive habitats. The broadest panoramas are from the ridgeline, and knolls and hills. Views atop areas in the central ridge, such as Inspiration Heights (see Viewpoint A), are popular. North and west views through the San Francisco Watershed (Crystal Springs Lake) are dominated by natural landscapes, while east views from knolls and hills on the site are characterized by developed suburban and urban environments and San Francisco Bay in the distance.

FIGURE A-6 -- DIRECTION OF VIEWS FROM EDGEWOOD

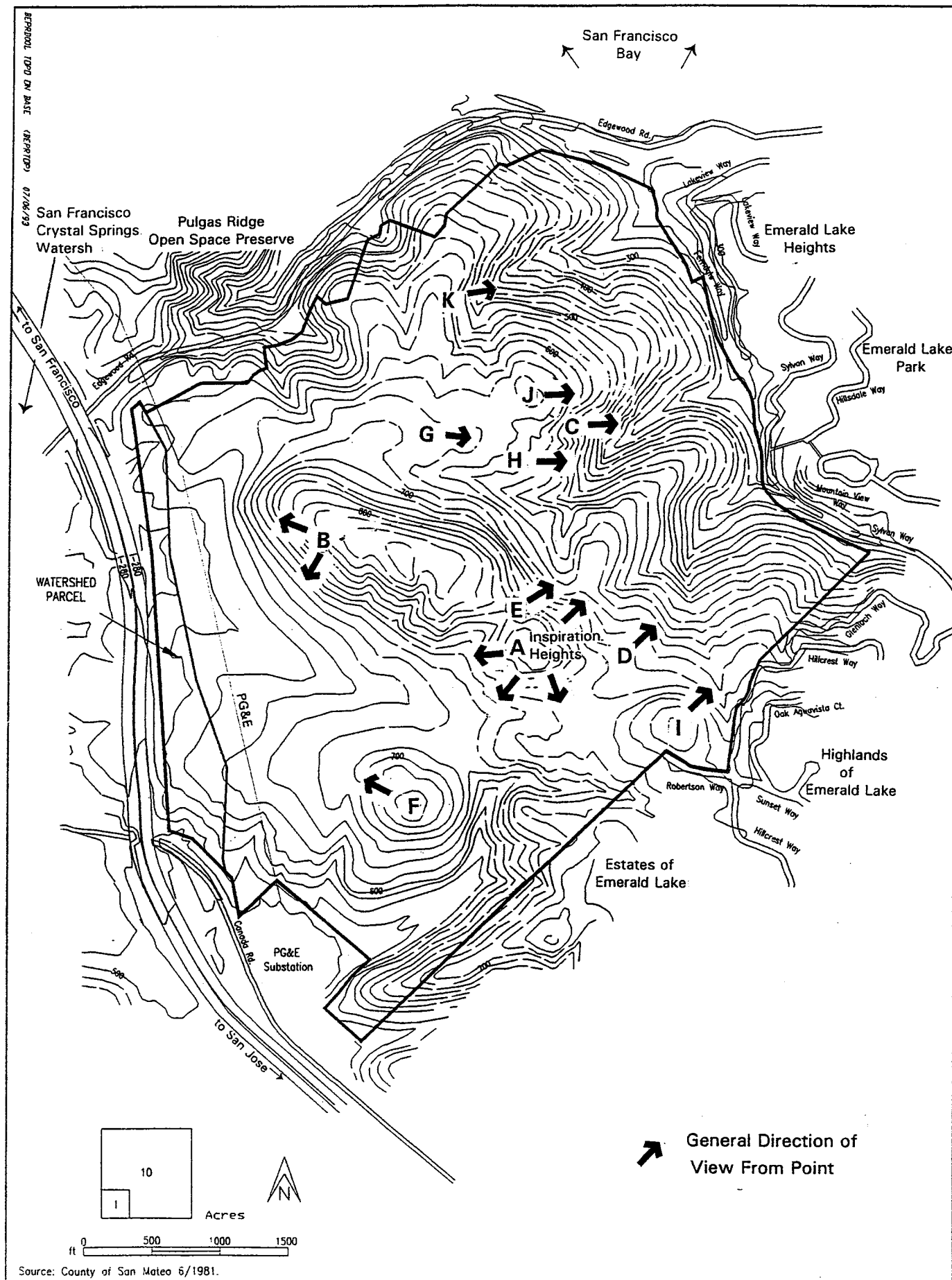


Table A-6

Description of Views from Edgewood

Viewpoint

- A Inspiration Heights offers best views from three directions; to the east toward the Bay and East Bay hills, to the west out to Crystal Springs Reservoir, and south toward the South Bay. Viewpoint is accessible off Ridgeview Trail by Inspiration Heights Trail. **Access is authorized.**
- B On the north end of the central ridge along the Ridgeview Trail is a spectacular view of the reservoirs and S.F. Watershed. **Access is authorized.**
- C This is one of two existing bench sites and is located along the Sylvan/Franciscan Trail. It also has an outstanding view to the east of the Bay Area. **Access is authorized.**
- D Situated along the Serpentine Trail in the serpentine grassland, this viewpoint offers the second best view of the Bay and the East Bay hills. Popular viewing spot for July 4th fire works. Previously, a proposed bench site (the Harry Dean Memorial bench). **Access is authorized.**
- E Situated on the southeast side of the Ridgeview Trail in the grasslands. It looks northeast out at the Bay and the Greater Bay Area. **Access is authorized.**
- F Grassland and serpentine shrub knoll on the south side of Edgewood. The view is north across grasslands, looking into the Crystal Springs Reservoirs. **Access is unauthorized.**
- G Located in the grassland section of the Service Road, views of the Greater Bay Area, the East Bay and Handley Rock are possible. **Access is authorized.**
- H "Coyote Rock" is east of Viewpoint G and located in grassland. It is a poplar because it is isolated. **Access is unauthorized.**
- I "Sunset Hill" just east of Sunset entrance from Emerald Hills neighborhood. There is a northeast facing view of the Bay. This knoll is a serpentine chaparral shrub area surrounded by fragile serpentine habitat and is railed off. **Access is unauthorized.**
- J On a knoll shaded by oak trees, this location offers a view of the greater Bay Area. **Access is unauthorized** and is through butterfly habitat.
- K This is along the Franciscan trail, looking east over the Bay Area. **Access is authorized.**
-

2. MAN-MADE RESOURCES

A. Cultural Resources

A site and literature survey of Edgewood by Basin Research Associates in 1981 found no evidence of any archeological or historical resources at the site. However, two Native American sites exist within a two-mile radius of the Edgewood boundary: (1) a large midden/mound located southwest of the intersection of Edgewood and Cañada Roads and (2) a shell midden northwest of the first site.

B. Land Uses

The current land uses at Edgewood are recreational open space and preservation of the natural environment. The County has begun implementing approved portions of the 1982 Master Plan by installing hiking trails, a day camp, picnic and passive recreation areas, and a parking area. Plans for an interpretive center, to date, have not materialized. The primary recreational activities include day and overnight camping, hiking, jogging, horseback riding, picnicking, nature observation and docent-led tours. Although not accurately monitored, visitor use at Edgewood appears to be heaviest during the spring months.

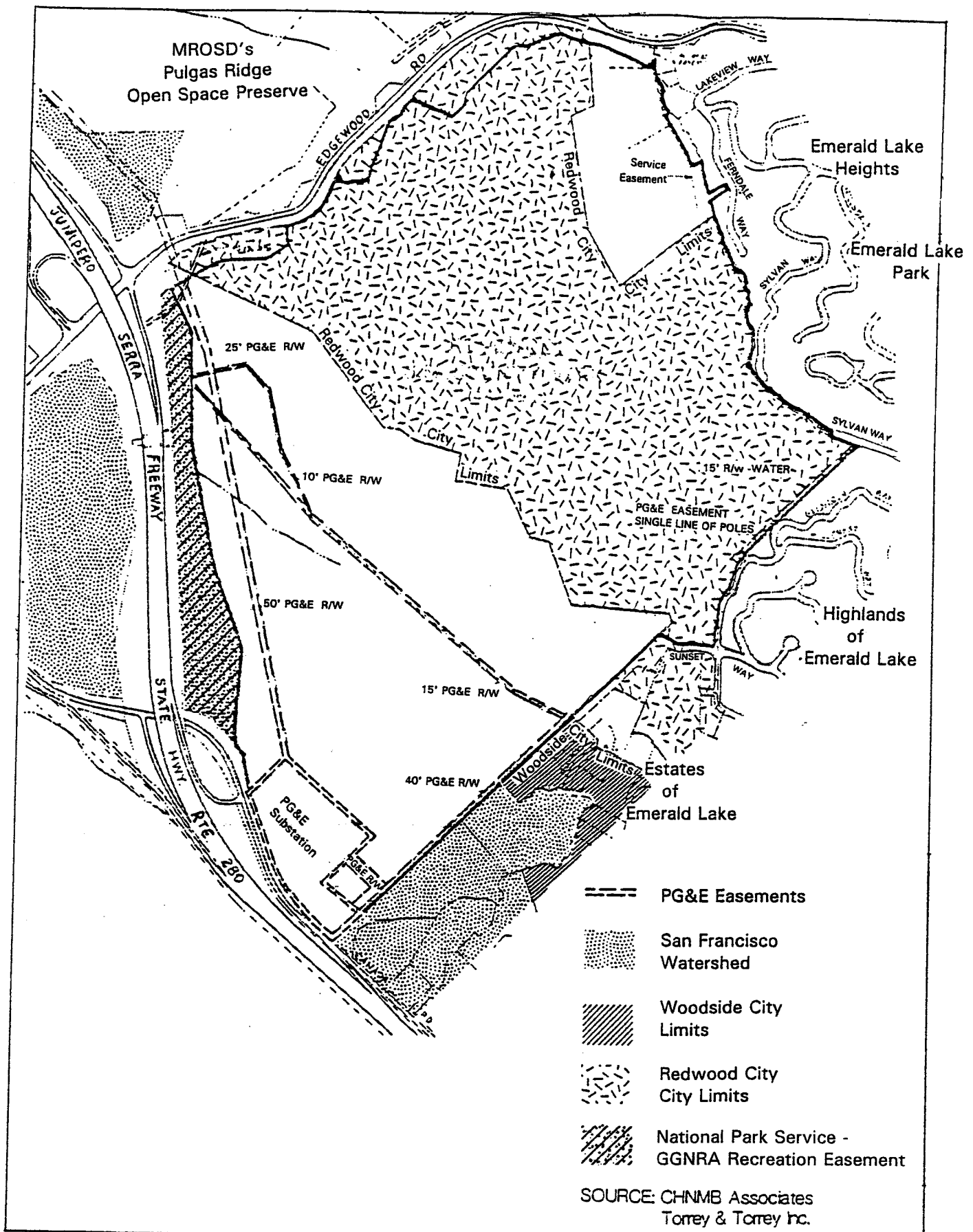
Between 1993 and 1995, the yearly attendance at Edgewood ranged from 60,000 to 96,000 persons, with hikers followed by joggers and picnickers, accounting for the majority of visitors. In addition, Edgewood attracts numerous visitors each year who come to see the serpentine wildflower displays between mid-March and mid-June. The California Native Plant Society conducts wildflower tours of the site on weekends during the spring months. To a lesser extent, field trips are also conducted by Sierra Club, Audubon Society, MROSD, as well as museums, academic institutions, and garden clubs.

1. *Relevant Legal and Institutional Land Use Agreements*

Since Edgewood lies within two municipal jurisdictions (see Figure A-7), it is subject to the provisions of the San Mateo County General Plan and the City of Redwood City Strategic General Plan. It is also subject to the provisions of the 1993 Modified Grant of Park, Recreation, Scenic and Open Space Easement between the County, MROSD, and the GGNRA.

a. City of Redwood City Strategic General Plan. The portion of the site within the City of Redwood City is designated as Publicly-owned Park in the City's

FIGURE A-7 -- JURISDICTIONS & EASEMENTS



Strategic General Plan. The Plan states that this open space area should be preserved for its natural resources. It should be noted, however, that Redwood City does not contribute to the maintenance of Edgewood.

b. San Mateo County General Plan. The 1986 San Mateo County General Plan: (1) designates the unincorporated portion of the site as Public Recreation, (2) identifies parks and natural preserves as appropriate land uses for land designated Public Recreation, and (3) indicates that a natural preserve "may be contained within a County park".

A park is defined as:

A spacious area of outstanding scenic and natural character where outdoor recreation opportunities and facilities may be provided for public convenience and enjoyment, and within which special natural areas ... can be set aside. (Attachment A-1, No.8)

A natural preserve is defined as:

A scenic and natural area where outstanding features as well as significant wildlife habitats are preserved in their present state for the enjoyment, education and well-being of the public. (Attachment A-1, No.9)

This unincorporated portion of Edgewood is zoned Resource Management (RM). RM is the implementing zoning district for land designated as Public Recreation. The RM district allows public and commercial recreation land uses, subject to a use permit approval. These uses may include but are not limited to stables, campgrounds, dude ranches, and motorcycle riding.

c. Resolution Designating Edgewood County Park as a Natural Preserve under the Terms of the County General Plan. Resolution No.56062, passed by San Mateo County Board of Supervisors on May 5, 1992, designated the Edgewood site as a Natural Preserve, pursuant to the definitions, standards and planning and management guidelines set out under the "natural preserve" classification of the County General Plan, as described previously and as outlined in Attachment A-1, No.1. On May 20, 1997, the Board officially recognized Edgewood as a "park and natural preserve".

d. Modified Grant of Park, Recreation, Scenic and Open Space Easement. As previously discussed, in 1993 the amended 1980 Joint Powers Agreement ("JPA") and the Grant of Park, Recreation, Scenic and Open Space Easement with the MROSD were amended (and is on file at Parks and Recreation Division). According to the amendments, permitted uses within Edgewood are restricted to low-intensity

recreational uses. (It should also be noted that at Edgewood, as well as at all County open spaces, hunting, fishing and dogs are prohibited.). Moreover, any future developments in Edgewood must be discussed with both the MROSD and GGNRA.

According to the Easement, the "County shall manage and maintain Edgewood and provide rules and regulations for its uses, in accordance with acceptable practices of parks and recreation departments and agencies of the State of California." (p.2)

With respect to restrictions imposed on uses at Edgewood, the following are highlights of the Easement:

- new structures or improvements (without prior MROSD review), advertising signs, the planting of vegetation (without permission), specified resource management techniques, and excavation or other topographic changes are prohibited;
- public uses other than parks, recreation, scenic or open space uses are prohibited;
- motor bikes, bicycles, trail bikes, go carts and other motor-powered vehicles (except by County staff for daily operation purposes) are prohibited;
- every effort must be made to prevent damage, destruction or infringement upon areas currently occupied by rare and/or endangered plant species, except as part of an approved and recreation development plan which specifically address the ecologic importance of such colonies);
- development shall not include any high-intensity uses (such as: amusement or theme park, golf course, driving range, tennis court, swimming pool), residential, commercial or industrial structures (except for use in connection with County maintenance and patrol);
- County can maintain, use, construct, install, restore and make improvements necessary for public enjoyment of parks, recreation ... preservation, scenic, scientific or educational purposes;
- Improvements may include (but not limited to): parks, picnic areas, bridle paths, scenic lookouts, areas reserved for preservation, exhibits, roads, utilities, fences, shelters, on-site use only of sewage and disposal facilities, etc.;
- any improvement or development is subject to design review by

MROSD. This review does not pertain to the maintenance or improvement of presently existing structures;

- review and comment privileges granted to the MROSD are advisory only; thus the County shall consider, but shall be free to accept, reject or modify the recommendations of the MROSD.

The foregoing Resolution and Easement supersede any conflicting uses that were outlined in any of the preceding documents; if deemed to be incompatible, such uses are prohibited. The County is therefore obligated (and cannot violate) any of these agreements.

e. Utility Easements. The Pacific Gas and Electric Company ("PG&E") holds easements which grant PG&E the right to construct, operate and maintain their facilities at Edgewood. The easements allow for aerial power lines and towers, and underground natural gas lines to traverse the lower portion of the site. These lines connect with a PG&E substation just beyond Edgewood's southern boundary (see Figure A-7).

2. The Circulation System

This section describes Edgewood's existing network of roads and trails, as well as connecting points to bordering areas.

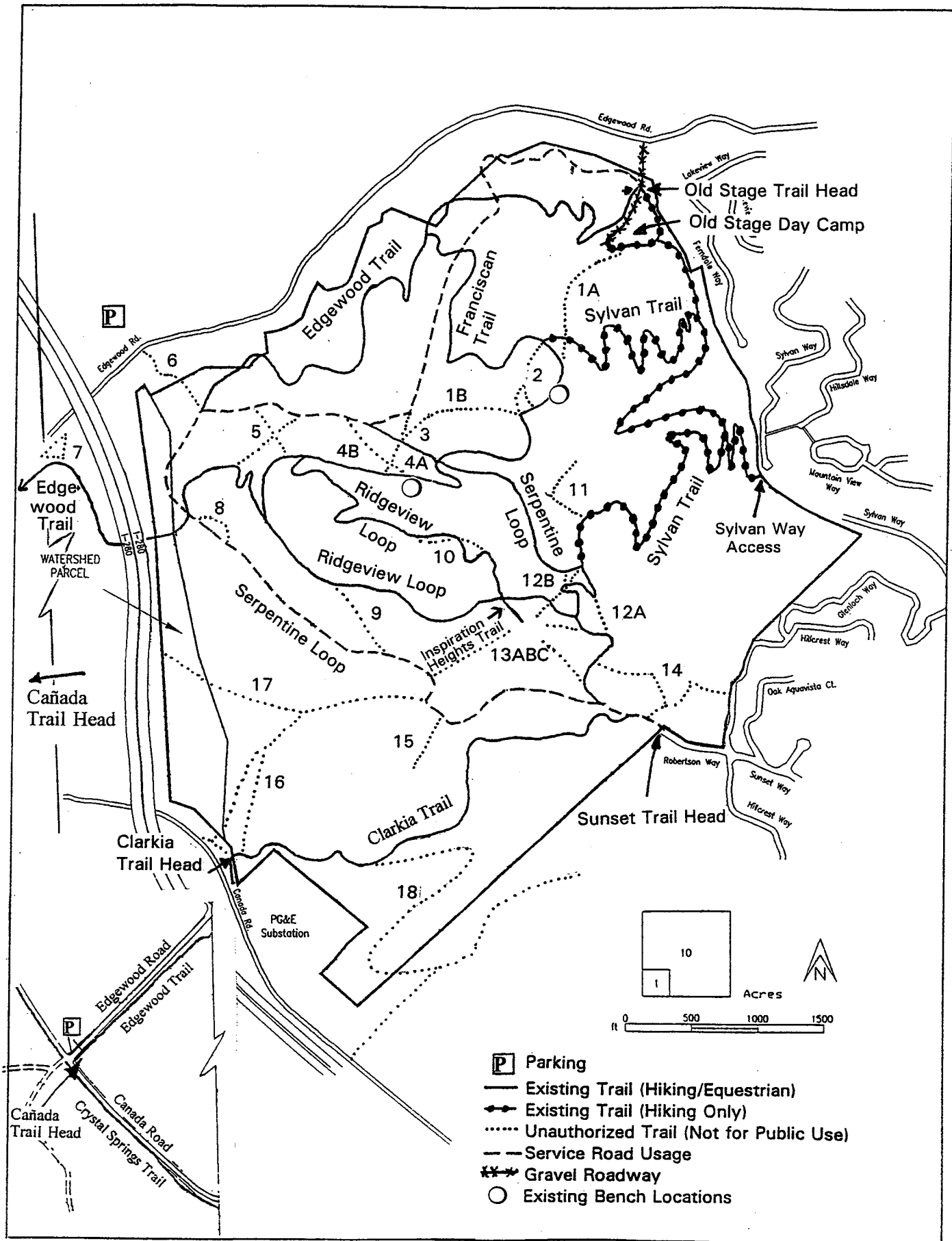
a. External Access. As shown on Figure A-8, the primary vehicular transportation routes providing access to the site are Edgewood Road, Cañada Road and the I-280 Freeway. Secondary access to the site is through the residential streets of the Emerald Hills subdivisions to the south and east. Cañada Road is designated as a bike route, and is extensively used by bicyclists.

Direct access to Edgewood was planned via an underpass when I-280 was constructed. The underpass was built, but is now only used by equestrians and hikers. It is unpaved and no roads connect the underpass with existing roadways.

b. Entry Points and Parking Facilities. Figure A-8 also shows four official entry points into Edgewood which are referred to as "trail heads", and are described as follows:

- * Old Stage Trail Head is situated on the northeast point of the site, near the Old Stage Day Camp, and provides access to the Edgewood and Sylvan Loop trails. Interpretive information (maps, trail information, etc.) is also available from this entrance. The adjoining on-site paved parking lot

FIGURE A-8 -- CIRCULATION, ACCESS, AND PARKING



contains a bicycle rack, and parking spaces for 14 cars, including one handicapped space. No parking spaces for buses are provided. Adjacent to the driveway, between the creek and Edgewood Road is an off-site unpaved (gravel) overflow area which can accommodate buses, or about 25 cars.

- * Sunset Trail Head is located at the southeast point of Edgewood, at the intersection of Sunset Way and Hillcrest Way. It provides access to the Serpentine and Clarkia Trails. Interpretive information is available at this entrance which is popular among residents of Emerald Lake Hills entering the site on foot or horseback. Parking is limited to streetside parking along residential streets.
- * Clarkia Trail Head is situated west of the PG&E substation property, just off Cañada Road, at the western endpoint of the Clarkia Trail. There is unpaved street parking along Cañada Road accommodating 10 to 20 cars.
- * Cañada Trail Head marks the point where the Edgewood Trail crosses into the site from along the south side of Edgewood Road, adjacent to the San Francisco Watershed lands. Parking at this entrance is available along the unpaved shoulders of Edgewood Road, at the intersection of Cañada Road. This parking area is shared by people using Cañada Road for bicycling, especially when Cañada Road is closed to automobile traffic on the first, third and fourth Sundays from March to October.

c. **Hiking and Equestrian Trail System.** Edgewood's trails are currently used extensively for hiking, jogging, and equestrian activities. They were originally constructed to the four-foot wide, 10 percent grade national standards for mixed-use trails. The layout of the trail system, which started around the turn of the century, had provided critical safety and transit corridors for surrounding residents. Although the exact lengths of the trails are not known, the trail system takes full advantage of the site's topography and allows maximum enjoyment of views of the surrounding region as well as the site's unique plant and wildlife habitats.

A key feature of the site's trail network is linkage to existing off-site community and county trail systems. The numerous hiking and equestrian trails serve as vital connecting links to the Fish and Game Refuge and Huddart Park trails. The trails enter the site from its four corners and utilize the freeway underpass to exit the site and gain access to other trail systems. As illustrated in Figure A-8, there are five named trails in Edgewood, which are believed to total over 8 miles. Including the only service road, the entire interior access system consists of approximately 10 miles.

- * Serpentine Loop is approximately two miles long. It circumnavigates the central ridge at an elevation of about 600 feet and passes predominantly through serpentine grassland. It is a loop trail, with an extension to the Sunset Trail Head. This trail is fairly wide and flat, admitting service vehicles over much of its length.
- * Clarkia Trail is about 3/4 mile long. Though regularly used by hikers and runners, it is favored by equestrians as the most direct route to the Town of Woodside. It extends from Cañada Road, traveling through serpentine chaparral and serpentine grassland, to the Serpentine Trail near the Sunset Trail Head. The trail is narrow and fairly winding, and intersects a natural seep.
- * Edgewood Trail runs from the Old Stage Day Camp along the northern boundary of Edgewood for about two miles, intersecting the Serpentine Trail at the northwest corner of the site. Much of this narrow and winding trail runs through oak woodland, grassland, and along the service road.
- * Sylvan Loop Trail runs for roughly 2.5 miles through oak woodlands and is designated as an exercise trail for hikers and runners only. This moderately steep trail winds its way up and then down a 300-foot slope, crossing a small creek with a three-foot waterfall. A portion of this Loop overlaps the Serpentine and Franciscan Trails which are used as equestrian routes.
- * Ridgeview Loop is just under 1.5 miles long and loops around the central ridge beside the highest point in Edgewood (872 feet). This winding trail passes through chaparral, serpentine chaparral, and oak woodland.
- * Service Road. Edgewood has one service road. It runs from the Old Stage Day Camp, past the on-site ranger residences, then through grasslands, following the west side of the Serpentine Trail, eventually exiting as the Sunset Trailhead in Emerald Hills.
- * Unnamed Trails. The following two unsigned trails are authorized:
 1. Between the Service Road and the Sylvan Trail is an unmarked but authorized trail, as shown on Figure A-8. This trail is currently being referred to as Franciscan Trail. There is a sign at the beginning of this trail which indicates that it leads to Edgewood Trail. Thus, some visitors following this trail tend to think that they are already on the Edgewood Trail.

2. Off Ridgeview Loop, this short trail is unmarked and is currently being referred to as the Inspiration Heights Trail as it leads to Inspiration Heights, a location which offers scenic views of the site.

d. Regional Trail Connections. The Edgewood and the Clarkia Trails link to regional trails within San Mateo County (see Figure A-9). Both trails link with the Crystal Springs Trail along portions of Cañada Road, and I-280, at the western and southern boundaries of the site, respectively. The Crystal Springs Trail continues west uphill from here to Huddart County Park, where it connects to the Skyline Trail that terminates at Wunderlich County Park. The Crystal Springs Trail also connects to Sheep Camp and Ralston Trails, north of Edgewood.

The Clarkia Trail also connects to the Cañada Trail, at the northwestern edge of the PG&E substation. Following the Cañada Trail in a southeasterly direction leads to the Town of Woodside. This trail is available for use by equestrians, hikers, pedestrians and cyclists.

e. Unauthorized Points of Access and Routes. Figure A-8 and the following Table A-7 also identifies and describes all routes within, and points of access to Edgewood which are unauthorized by the County. These unauthorized routes were primarily created by trail users who took shortcuts to visit new areas on the site, or who were simply unaware of restrictions and consequently trespassed to complete their desired trek. Some of these routes are located in highly sensitive areas; all, however, promote soil erosion to existing surfaces. Those warranting further discussion are as follows:

1. The Sylvan Way Access is situated in the east point of the site, south of the Old Stage Trail Head. It is a spur trail providing access to the Sylvan Loop from Sylvan Way. Although no parking facilities exist at this entry point, it is often used by nearby residents of the Emerald Hills subdivisions. The first 50 feet of this entry crosses private property, and is therefore not officially recognized. Thus, there is no information sign placed at this entry point. In addition to legal reasons, the Sylvan Way Access is not officially recognized because it was not built by the County and does not meet recognized trail standards; it is considered hazardous. At present, the County is in the process of attempting to secure an easement for this property. In the meantime, however, with the permission of the owner, access through this point will continue since the County plans to maintain the trail head and hold the property owner harmless from any liabilities which may occur on the property.
2. Trail 1B was previously part of an old ranch road and park service road. This

FIGURE A-9 -- REGIONAL TRAIL LINKAGES

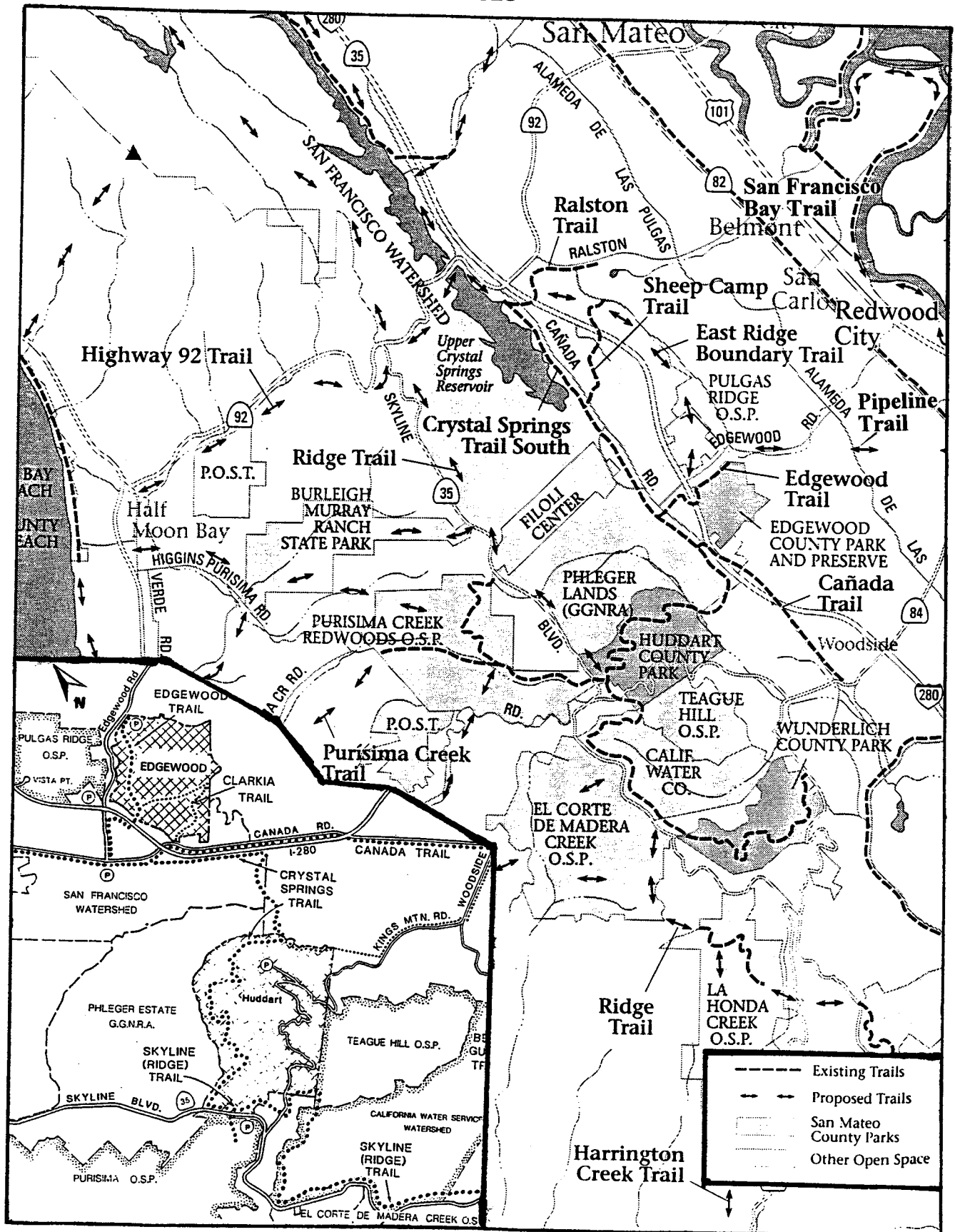


Table A-7
Description of Unauthorized Trails Shown on Figure A-8

Trail

- 1A. An old ranch road and abandoned park service road from Old Stage Day Camp to top of Sylvan Trail at the Franciscan Trail. Equestrians currently use the Edgewood Trail to access the Old Stage area.
- 1B. An old ranch road and abandoned park service road from Franciscan Trail to current service road. This unauthorized trail is in the open grassland and in butterfly habitat. It is heavily used by hikers as a shortcut across the meadow and leads to a desirable view spot.
2. Three unauthorized routes lead to a view site, and are located north of the grassland in the Oak woodland buffer. It provides a shady spot to stop and view the grasslands and the S.F. Watershed.
3. An unauthorized short cut spur trail. A short cut from Trail 1B to the Serpentine Trail.
- 4A. A series of unauthorized shortcut trails through grasslands on the north side of the Ridgeview that connects to the Serpentine Trail. Signs indicate that this area is closed to the public.
- 4B. Unauthorized shortcut trail through grassland from the north side of the Ridgeview Trail to the Serpentine Trail. It is unsigned.
5. Shortcut through sensitive grassland from the Serpentine on north side of Ridgeview to the Serpentine Loop on the west side.
6. Located off Edgewood Rd. across from Park & Ride Lot. This unauthorized and hazardous trail is on a steep, rocky hillside on Road Dept. property connecting to an unused Road Department service road, off the current service road. (For further description, see #3, next page.)
7. Trail passes through disturbed grasslands off Edgewood Road to the Edgewood Trail on west side of Highway I-280. This unauthorized route is used by hikers who park under the freeway or in the Park & Ride lot. Note: this is not in Edgewood but leads to County easement through SFWD property.
8. Unauthorized trails into the olive grove off the Serpentine Trail.
9. A less used unauthorized shortcut trail through annual grasslands from the west side of the Ridgeview Trail to the Serpentine Trail below it.
10. Unauthorized trail (intersecting Ridgeview Trail) on the top of the ridge crosses an old ranch road in several places.
11. Unauthorized trail drops off the Sylvan Trail in the oak woodlands and goes down to an open meadow then into an isolated ravine.
- 12A. Unauthorized trail located on an old off-road-vehicle road through serpentine area. It shortcuts the Serpentine Trail from a viewpoint to a section that can be seen below.
- 12B. A series of unauthorized shortcut trails on the Serpentine Trail through native grassland.
13. Unauthorized shortcut trails through fragile serpentine grassland. There is heavy foot and illegal bike use to get to and from the most popular view on the site.
14. Unauthorized trails lead to popular, illegal after-hour activity area adjacent to Emerald Hills neighborhood.

(continued)

Table A-7
Description of Unauthorized Trails Shown on Figure A-8
(continued)

Trail

15. Unauthorized trail through fragile serpentine grassland from Serpentine Trail to another view of native grassland and the Crystal Springs Reservoir.
 16. Unauthorized trail leads off the bottom of the Clarkia Trail, through fragile butterfly habitat, and connects to the Serpentine Trail. This trail was used before the Clarkia was built and was the originally proposed trail. The current alignment of the Clarkia trail was established around the originally planned golf course. This trail is still heavily used by hikers.
 17. Unauthorized trail is a spur off Trail #16 and leads to a northern access toward Cañada Road.
 18. Unauthorized trail passes through grassland and used by a few equestrians. It is a shortcut from Rocky Way in Woodside to the Clarkia Trail. It bypasses going out to Cañada Road.
-

trail stretches from the service road then curves eastward to touch the Serpentine Loop, and eventually leads to Viewpoint J. A large portion of Trail 1B is situated in the serpentine grassland, in a butterfly habitat. It is heavily used by visitors as a shortcut across the meadow because it leads to a desirable viewpoint on the knoll. Presently, there are neither signs, including restriction signs, nor fencing in this area.

3. Edgewood/I-280 Entry Point and Trail. This unauthorized entry point (Trail #6, Figure A-8) is at the Edgewood Road off-ramp of northbound Highway I-280 and is heavily used by pedestrians. Visitors park in the 30-car capacity Park and Ride lot located off-site, at I-280. This lot serves as a meeting place and starting point for many guided hikes and walks in Edgewood. This location is popular because it offers convenient parking and accessibility to the grassland and seasonal wildflower displays. Additional street side parking is sometimes available along Edgewood Road, near I-280. Entering Edgewood across from the Park and Ride lot is unauthorized and can be hazardous, as visitors cross traffic and walk on steep terrain.
4. Other Unauthorized Routes. In addition to the authorized Inspiration Heights Trail, there are many unauthorized pathways leading to Inspiration Heights (Figure A-8, #13); the path on the southwestern side of the Inspiration Heights is in native grassland and crosses a sensitive butterfly habitat area.

Other unauthorized routes link to the Serpentine Loop, and the Clarkia Trail,

and also cross the western edge of the PG&E substation to exit along the southern portion of the site. In the northeastern to central portions of the site, old service roads (identified as 1A and 1B) are also used as trails by pedestrians.

f. Utilities Maintenance Access. PG&E is allowed to access its facilities located on the site. PG&E performs routine inspections, maintenance and repairs of its facilities to ensure reliable operations and the health and safety of the general public. Routine inspections include physically inspecting all tower structures along the transmission line and the gas line at least twice a year. Unforeseen maintenance and emergency actions could also be required. Consequently, clear and unrestricted access to PG&E's facilities is critical during any of these activities. At present, access to service lines is via two routes at Edgewood's southwestern boundary, near the PG&E substation (identified as Trail 16, Figure A-8). This route cuts directly across the serpentine grassland into a habitat for the endangered Bay checkerspot butterfly.

PG&E instructs its crews about the need to perform their work in accordance with PG&E's environmental commitment and policy. This includes reinforcement of the need to utilize existing disturbed access roads where feasible, and to minimize disruption to the surrounding environment during the performance of their activities.

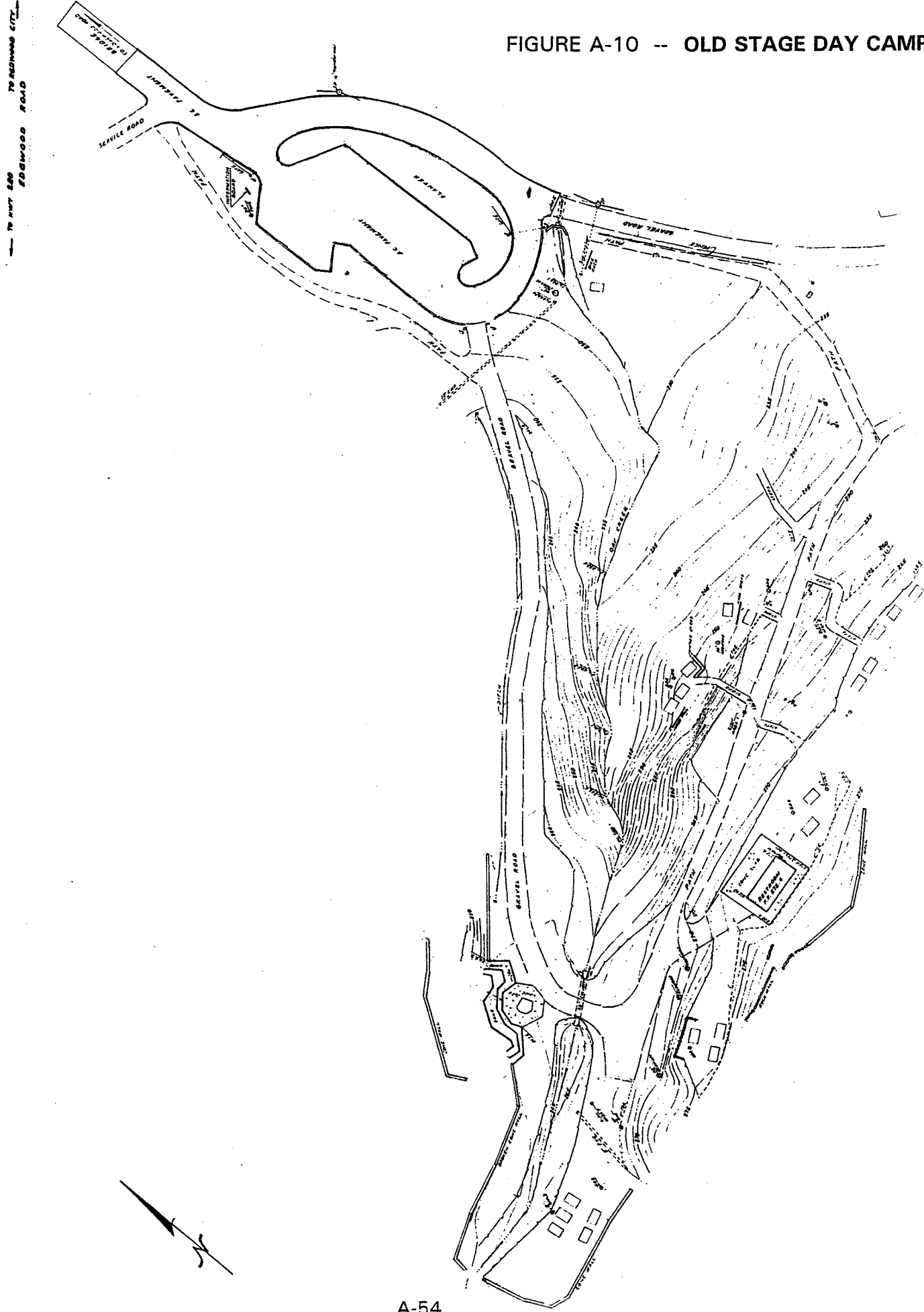
g. Access for the Physically Challenged. There is no wheelchair access from the Old Stage parking lot to Edgewood's trails or the picnic area. The picnic area is in a relatively gently sloping area of the site, whilst most of the trails at Edgewood are on steep topography. One disabled access restroom stall and one handicapped parking space are located at the Old Stage area, but there are no other facilities accessible to the physically challenged.

3. Old Stage Day Camp

The Old Stage Day Camp is the only area of Edgewood with structural development (i.e, buildings). The Camp is located in the northeast corner of Edgewood, in an oak woodland region that historically was disturbed by homes, and is distant from sensitive habitats. See Figure A-10.

The Old Stage facility was built to meet a growing demand for youth facilities in the south County. The camp can accommodate 100 to 150 day campers for nature and related activities (such as picnicking and craft projects) on a reservation basis. There were approximately 4 reservations for overnight use by small parties of youth groups in 1996.

FIGURE A-10 -- OLD STAGE DAY CAMP



Both on-site and off-site parking is available at the Old Stage Day Camp entry point, as previously discussed.

Although a path connecting to the Edgewood Trail and the service road lead into Old Stage, cyclists and equestrians are not officially permitted to bring their bicycles or horses to the area containing the Old Stage facilities.

There are five picnic areas at Old Stage. Three of the areas are available on a reservation basis and each can accommodate a maximum of 50 people; the other two picnic areas are available on a drop-in basis and can each accommodate a maximum of 35 people. Every picnic area is equipped with concrete tables, a water faucet, and a barbecue pit. Refuse containers are located nearby.

The Camp includes one 5-stall restroom which is designed as a unisex facility, with one stall accessible to the disabled. There is no electricity available for public use. Outdoor washbasins, a drinking fountain and a pay phone are situated near the restroom.

An amphitheatre is located adjacent to a picnic area, in the northwestern section of the Camp. The amphitheatre can seat between 75 and 100 patrons. A campfire ring, six feet in diameter, is located immediately in front of the amphitheatre. This area is currently underused for its intended youth group purposes and has become a nuisance due to abuse (drinking and vandalism) by people who illegally enter Edgewood after hours of operation, i.e., after-hours crowd.

A ranger office and storage area is also connected to the restroom facilities. This area is somewhat limited for its working and storage uses. Oftentimes, some of the maintenance equipment is borrowed from other County park locations. However, needed equipment may not always be available at the time, especially when it is needed simultaneously at other parks, for example, during seasonal trail maintenance.

4. *Ranger Residences*

There are two houses which have been converted to ranger residences. They are located on the northeast corner of Edgewood in the Old Stage Day Camp. The residences are rented to San Mateo County park rangers, subject to outlined conditions.

5. *Benches*

There are two benches at Edgewood which were donated and installed in 1993

and 1995. The benches are located along the Sylvan Loop Trail and Ridgeview Loop, in the north-central area of Edgewood (see Figure A-8), and have been subjected to vandalism.

6. *Signs*

Signs are valuable to users for indicating where activities are located, distance, names of trails, restrictions, etc. Within the site, the following three types of signs are found:

1. Interpretive Signs. Wooden and metal entrance signs are located at the Edgewood Road, Cañada Road, Sunset, and Old Stage Day Camp entrances. These signs are large enough to be clearly visible, and most contain the following characteristics: the Edgewood Park and Natural Preserve name; hours of operation; pockets for Edgewood maps and brochures; and symbols and language about basic site prohibitions including dogs and bicycles.
2. Directional Signs. Directional signs clearly label or point the way to a trail, area, or other park facility.
3. Regulatory Signs. Regulatory signs inform visitors of the pertinent rules and restrictions at particular locations. Included are the posting of boundaries, no parking and restricted access signs.

Many of the signs at Edgewood have been, and continue to be vandalized.

C. Operating and Maintenance Practices at Edgewood

1. *Resource Management*

The natural resources at Edgewood are constantly threatened, and therefore require management techniques or practices that protect, maintain and restore the resources and related natural processes. Techniques may be either active or passive. Active management techniques involve the physical manipulation of a particular area. Passive techniques, on the other hand, do not alter an area, but protect it from further detrimental impacts so that normal restoration processes may occur.

The techniques currently employed at Edgewood are predominantly passive and include: (1) regulating land use for habitat protection, (2) classifying sensitive habitats, (3) fencing to create buffers adjacent to sensitive habitats, (4) educating

visitors to some extent, and (5) enforcement. Fencing has resulted in the revegetation of some areas at the southern end of the site.

Current active management methods performed at Edgewood are: hand weeding, some mowing and cutting, removal of large specimens by hand, and restoration through the planting of native grasses. Hand weeding has resulted in the successful removal of exotic and invasive plant species in some areas of Edgewood.

In order to control the number of undesirable species that threaten the native plant communities and butterfly habitats at Edgewood, volunteers have spent countless numbers of hours removing invasive or exotic species by hand weeding. To date, efforts have concentrated on the eradication of the following invasives: Yellow star thistle, Italian thistle, Bull thistle, Milk thistle, Bristly oxtongue, French broom, fennel, teasel, and bellardia. As shown on Figure A-11, hand weeding efforts are undertaken throughout Edgewood, in both serpentine and non-serpentine areas. The volunteers have been issued the required permit from the County for hand weeding and are either specifically trained, or led by qualified biologists. County rangers transport the bagged weeds out of Edgewood for disposal. On a weekly or bi-weekly basis, the volunteers work in groups of no more than 5, and have been successful in eradicating teasel and fennel from entire areas of Edgewood. In another instance, weeding and planting efforts have resulted in the restoration of purple needlegrass colonies.

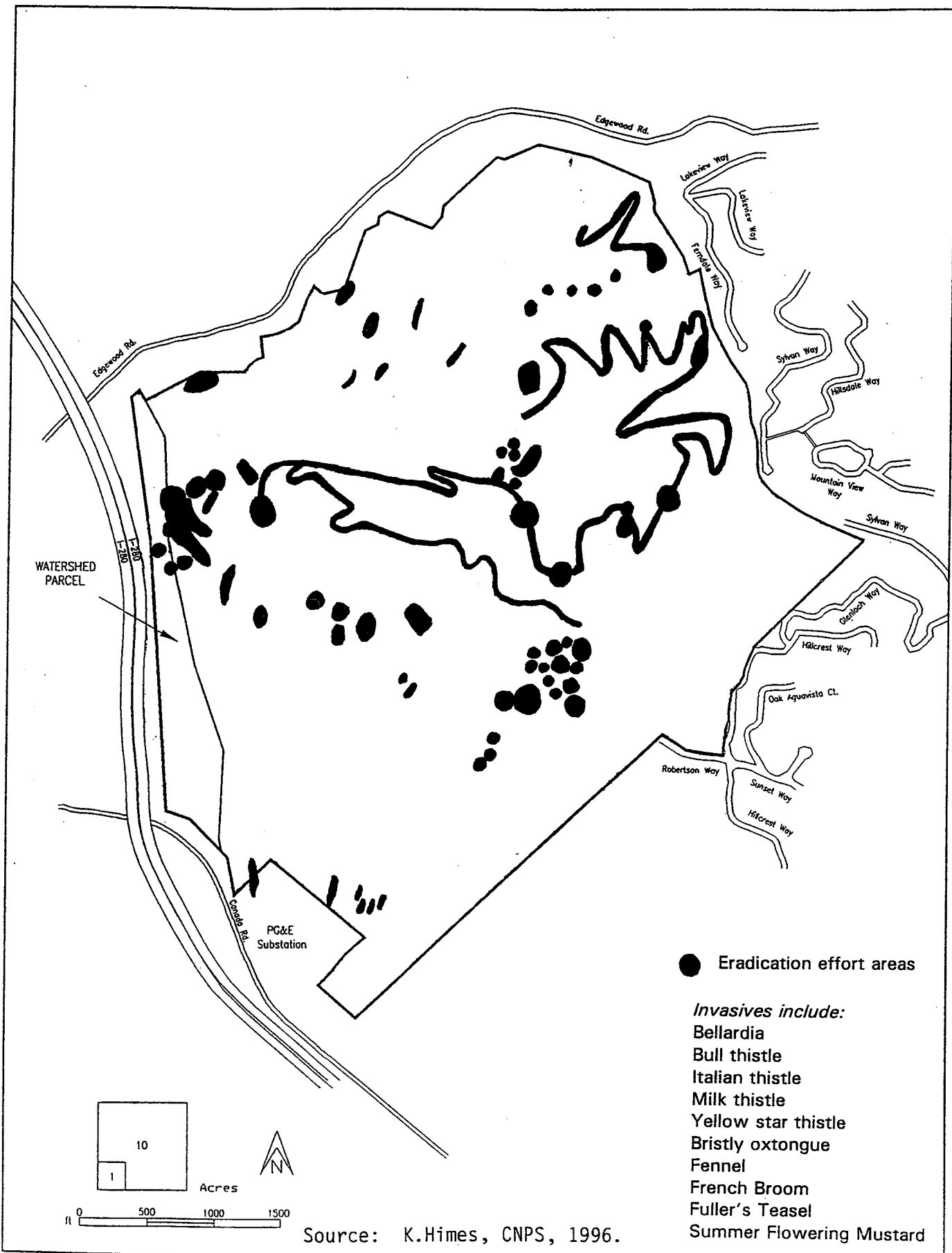
2. *Facilities Maintenance*

In addition to assisting and educating visitors, two County Park Rangers and two seasonal Park Aides perform routine maintenance activities at Edgewood. Their duties include: landscape maintenance, facility repair and cleaning in the Old Stage area; trail repair and maintenance; fence, gate and sign installation and repair; facility painting; general area cleanup throughout the site; and administrative oversight of maintenance and operation activities.

3. *Trails and Service Road (or "Route") Maintenance*

Route maintenance requires the brushing (or cutting away) of about one foot of vegetation on either side of a trail to keep from protruding too far onto the trail. Maintenance also requires repairing trail treads. Surfacing trails with road rock, i.e., "rocking", is also a common trail maintenance practice at Edgewood. Rocking seasonally wet areas provides a more stable surface and prevents the creation of muddy bogs and slippery areas, as well as maintain the integrity of the trail. Although it is County's policy to maintain County trails and service roads to higher

FIGURE A-11 -- INVASIVE PLANT SPECIES ERADICATION EFFORTS



than the nationally-acceptable standards, trails and service road (also referred to as "routes") surface repairs at Edgewood, including rocking, have not been carried out for several years. The proposed 1996 rocking of wet areas was postponed pending further study regarding the use of imported or non-native soil, rocks and other materials to repair trail surfaces in sensitive areas. There is a perception that these materials might have a detrimental effect on sensitive areas and species since they could carry ingrained exotic seeds, or contain compounds which may change the composition of the existing soil, making it more habitable for invasive weeds.

As a result of a lack of repairs, bogs or muddy areas have developed on several areas of the routes. These wet soils are slippery and unsafe. Moreover, some trail treads have not been maintained at the original four-foot wide standard that could accommodate two users simultaneously. The result of the foregoing is narrowed, boggy and/or slippery areas along routes. Hikers, in particular, thus tend to walk off-trail, around the outer edge of trails. Consequently, there is further soil erosion, ad hoc and inappropriate trail widening, and imminent damaged habitats.

4. *Fire Management*

Fires are the result of both natural causes and human activities. Natural causes such as lightning, while not frequent, are a threat on the site due to the limited annual rainfall and the biotic community (such as the scrub, chaparral and grasslands) that builds up dry fuel. Human-related causes include: (1) accidental fires from illegal campfires and cigarettes, and (2) intentional fires from arson and vandalism.

In the late-1980's to early-1990's, fires were reported in the grassland areas, on the northeastern side of Edgewood. Another recently occurred in the northwest area of chaparral from Edgewood Road. Although controlled, it was suspected to be caused by an arsonist. Illegal campfire activity is also occasionally reported. With respect to PG&E facilities, their operational requirements have ensured that areas of about 20 feet around each electric tower structure remain clear of vegetation.

Responsibility for firefighting in Edgewood rests with the California Department of Forestry (under contract with San Mateo County and Redwood City). These agencies have a mutual response agreement, and usually, the closest fire fighting units are dispatched. Firefighting units are self contained with fire suppression equipment and supplies. Historically, CDF has been the main service provider.

Within the Old Stage area, fire extinguishers are located near the restroom unit and

in County Park vehicles, and are readily available for staff use. During fire season, County Park vehicles are also equipped with 5-gallon water pumps.

The current road system within Edgewood provides limited or minimal access for fire fighters and emergency vehicles.

5. *Security*

The County Parks and Recreation Division assumed security and patrol responsibility during negotiations for the final purchase of Edgewood in 1981. Trained volunteers often assist in patrol duties. The on-site County staff observe park visitor activities while on foot or in a vehicle, and usually in conjunction with performing other duties. Volunteers also assist County staff with foot and horse patrols. The volunteers observe and report trail use, problems and violations; they educate and assist trail users; and some enforce park regulations such as the prohibition of dogs, bikes, and off-trail use. The volunteers also assist staff in dealing with unauthorized after-hour use at Edgewood. Staff and volunteer efforts have been effective in reducing site abuse, vandalism, and adverse environmental impacts.

RELEVANT LEGAL AND INSTITUTIONAL DOCUMENTATION

1. Resolution 56062, dated May 5, 1992 -- Resolution Designating Edgewood County Park as a Natural Preserve Under Terms of the County General Plan.
2. Resolution 57385, dated July 27, 1993 -- Resolution Authorizing and Directing the Execution of an Amendment to the Joint Powers Agreement with the Midpeninsula Regional Open Space District Entered into on September 16, 1980.
3. Resolution 57386, dated July 27, 1993 -- Resolution Authorizing and Directing the Execution of a Modification to a Park, Recreation, Scenic, and Open Space Easement Granted to the Midpeninsula Regional Open Space District on September 16, 1980.
4. Correspondence from United States Department of the Interior, Fish and Wildlife Service dated October 17, 1996.
5. United States Department of Fish and Wildlife Service. Correspondence re Edgewood dated May 23, 1997 from White, W.S., Field Supervisor.
6. Correspondence from United States Department of the Interior, Fish and Wildlife Service dated November 3, 1992.
7. Correspondence from California Department of Fish and Game dated November 3, 1992.
8. San Mateo County General Plan's Park and Recreation Facility Classification Definition, Development Standards and Planning and Management Guidelines for "Park".
9. San Mateo County General Plan's Park and Recreation Facility Classification Definition, Development Standards and Planning and Management Guidelines for "Natural Preserve".

RESOLUTION NO. 56062

BOARD OF SUPERVISORS, COUNTY OF SAN MATEO, STATE OF CALIFORNIA

RESOLUTION DESIGNATING EDGEWOOD COUNTY PARK AS A NATURAL PRESERVE
UNDER THE TERMS OF THE COUNTY GENERAL PLAN

RESOLVED, by the Board of Supervisors of the County of San Mateo, State of California, that

WHEREAS, Edgewood County Park is recognized statewide for its biological diversity and tremendous beauty; and

WHEREAS, Edgewood County Park contains serpentine soil which supports many native plants and wildflowers such as Lupine, Owl's Clover, Cream Cups, Gold Fields and Tidy Tips including several rare and endangered species some found only at Edgewood County Park; and

WHEREAS, Edgewood County Park is highly valued for its research and educational uses as well as for its accessibility to our community; and

WHEREAS, the Board of Supervisors unanimously agreed earlier this year to suspend plans for a golf course at Edgewood County Park and appoint a committee of golfers, environmentalists and county officials to search for alternative sites; and

WHEREAS, the San Mateo County Board of Supervisors' Task Force Chaired by Supervisors Huening and Schumacher consisting of citizen golfers and environmentalists from our community have worked diligently to locate a site better suited to a county golf course and are recommending six alternative sites; and

WHEREAS, a Natural Preserve is defined by the County General Plan as, "a scenic and natural area where outstanding features as well as significant wildlife habitants are preserved in their present state for the enjoyment, education and well-being for the public," and as such adheres to the following standards: A County Natural Preserve should be of outstanding scenic and natural character; Primary resources typically should consist of woodlands, meadows, hillsides, canyons, creeks, lakes, ridgelines, shorelines, visually sensitive or prominent landscape features and rare, endangered or unusual natural resources; Public facilities should be limited to those necessary for public health, safety and education; and

WHEREAS, a Natural Preserve defined by the County General Plan holds to the following planning and management guidelines: The prime resource of the area should be determined. Preservation and enhancement of the prime resource should be the most important objective. Interpretation and enjoyment should be secondary management objectives; Development should be limited to foot trails, protective barriers, regeneration of indigenous vegetation, overlooks, signs, sanitary facilities, parking areas, interpretive centers and other minimal service facilities as may be required; Emphasis should be placed on locating natural preserves within 15 minutes of urban areas; Emphasis should be placed on the protection of rare, endangered, unusual or educationally important natural resources; Access should be controlled to provide adequate resource protection and sufficient buffers from adjacent environment should be provided within its boundaries; A natural preserve may be a separate unit of the county park system or be contained within a county park; and

NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors of San Mateo County respectfully recommends to the San Mateo County Parks and Recreation Commission the designation pursuant to the County General Plan to include all 467 acres of Edgewood County Park as a Natural Preserve and thereby exclude all uses not consistent with the above definition of a natural preserve; and be it

FURTHER RESOLVED, that the Board of Supervisors respectfully requests the San Mateo County Parks and Recreation Commission to consider reviewing other County maintained parks currently not designated for inclusion as natural preserves.

DATED: MAY 5, 1992

Regularly passed and adopted this 5th day of May, 1992.

AYES and in favor of said resolution:

Supervisors:

MARY GRIFFIN

TOM HUENING

ANNA G. ESHOO

TOM NOLAN

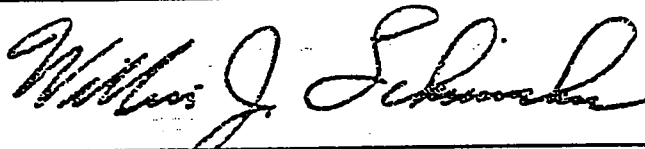
NOES and against said resolution:

Supervisors:

WILLIAM J. SCHUMACHER

Absent Supervisors:

NONE



President, Board of Supervisors
County of San Mateo
State of California

Certificate of Delivery
(Government Code section 25103)

I certify that a copy of the original resolution filed in the Office of the Clerk of the Board of Supervisors of San Mateo County has been delivered to the President of the Board of Supervisors.



RICHARD L. SILVER,
Clerk of the Board of Supervisors

RESOLUTION NO. 57385

BOARD OF SUPERVISORS, COUNTY OF SAN MATEO, STATE OF CALIFORNIA

* * * * *

RESOLUTION AUTHORIZING AND DIRECTING THE
EXECUTION OF AN AMENDMENT TO
THE JOINT POWERS AGREEMENT WITH THE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
ENTERED INTO ON SEPTEMBER 16, 1980

RESOLVED, by the Board of Supervisors of the County of San Mateo, State of California, that

WHEREAS, on September 16, 1980, the County of San Mateo ("COUNTY") and the Midpeninsula Regional Open Space District ("DISTRICT") entered into a Joint Powers Agreement, pursuant to the provisions of California Government Code section 6500 et seq., to provide for funding to purchase certain real property formerly known as the Edgewood State College Site (hereinafter "Edgewood Site") for open space and recreation purposes by DISTRICT and COUNTY, to establish the final vesting of title to the Edgewood Site, and to designate the responsibility for the management and maintenance of the portion of said property devoted to park, recreation, and open space use; and

WHEREAS, pursuant to the Joint Powers Agreement, on September 16, 1980, COUNTY granted to DISTRICT a Park, Recreation, Scenic and Open Space Easement, which easement is recorded as Document No. 96615AP (beginning at Reel 7995, Image 1503) in the Official Records of the County Recorder of the County of San Mateo; and

WHEREAS, COUNTY and DISTRICT desire to amend the Joint Powers Agreement to (1) provide for a modification of the terms and conditions of the Park, Recreation, Scenic and Open Space

Easement to eliminate high intensity recreational uses as permissible uses on Edgewood Park, and (2) provide for a mechanism for future discussions with the Golden Gate National Recreation Area (hereinafter "GGNRA") concerning future management of Edgewood Park; and

WHEREAS, a form of such amendment to Joint Powers Agreement has been presented to this Board for its review and approval;

NOW, THEREFORE, IT IS HEREBY RESOLVED AND ORDERED that the President of the Board of Supervisors shall execute that certain Amendment to Joint Powers Agreement, amending certain terms of the Joint Powers Agreement previously entered into with the Midpeninsula Regional Open Space District on September 16, 1980, and the Clerk of the Board shall attest to her signature thereto.

* * * * *

Regularly passed and adopted this 27th day of July, 1993.

AYES and in favor of said resolution:

Supervisors: MARY GRIFFIN

TOM HUENING

TED LEMPERT

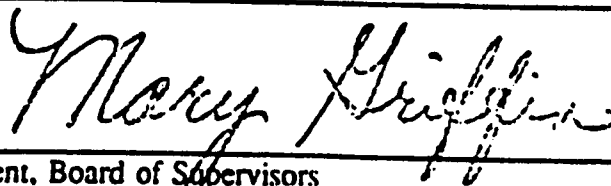
RUBEN BARRALES

MICHAEL D'NEVIN

NOES and against said resolution:

Supervisors: NONE

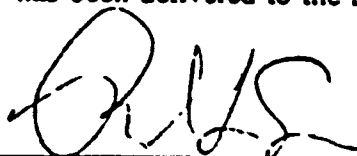
Absent Supervisors: NONE



President, Board of Supervisors
County of San Mateo
State of California

Certificate of Delivery
(Government Code section 25103)

I certify that a copy of the original resolution filed in the Office of the Clerk of the Board of Supervisors of San Mateo County has been delivered to the President of the Board of Supervisors.



RICHARD L. SILVER,
Clerk of the Board of Supervisors

RESOLUTION NO. 57386

BOARD OF SUPERVISORS, COUNTY OF SAN MATEO, STATE OF CALIFORNIA

* * * * *

RESOLUTION AUTHORIZING AND DIRECTING THE
EXECUTION OF A MODIFICATION TO A
PARK, RECREATION, SCENIC, AND OPEN SPACE
EASEMENT GRANTED TO THE MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT ON SEPTEMBER 16, 1980

RESOLVED, by the Board of Supervisors of the County of San Mateo, State of California, that

WHEREAS, on September 16, 1980, the County of San Mateo ("COUNTY") and the Midpeninsula Regional Open Space District ("DISTRICT") accepted, a Park, Recreation, Scenic and Open Space Easement over a portion of Edgewood Park (the "Subject Property") for the benefit of DISTRICT, its successors and assigns pursuant to a certain Joint Powers Agreement of the same date;

WHEREAS, DISTRICT and COUNTY have determined to amend the Joint Powers Agreement to allow for modification of the previously granted Park, Recreation, Scenic, and Open Space Easement to eliminate higher intensity recreational uses as allowed uses on the Subject Property; and

WHEREAS, DISTRICT and COUNTY now desire to modify the terms of the easement in accordance with the proposed amendment to the Joint Powers Agreement by conveying a modified Park, Recreation, Scenic and Open Space Easement which will supersede the Park, Recreation, Scenic and Open Space Easement granted on September 16, 1980; and

WHEREAS, a form of such modified easement has been presented to the Board for its review and approval;

NOW, THEREFORE, IT IS HEREBY RESOLVED AND ORDERED that the President of the Board of Supervisors shall execute that certain Modified Grant of Park, Recreation, Scenic and Open Space Easement modifying certain terms of the easement previously granted to the Midpeninsula Regional Open Space District on September 16, 1980, and the Clerk of the Board shall attest to her signature thereto.

Regularly passed and adopted this 27th day of July, 1993.

AYES and in favor of said resolution:

Supervisors:

MARY GRIFFIN

TOM HUENING

TED LEMPert

RUBEN BARRALES

MICHAEL D. NEVIN

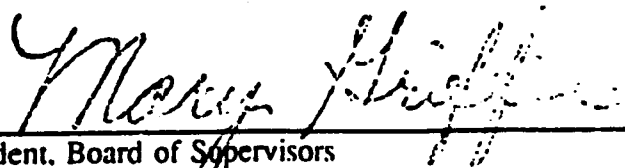
NOES and against said resolution:

Supervisors:

NONE

Absent Supervisors:

NONE



President, Board of Supervisors
County of San Mateo
State of California

Certificate of Delivery
(Government Code section 25103)

I certify that a copy of the original resolution filed in the Office of the Clerk of the Board of Supervisors of San Mateo County has been delivered to the President of the Board of Supervisors.



RICHARD L. SILVER,
Clerk of the Board of Supervisors



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Sacramento Field Office

3310 El Camino Ave., Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

In Reply Refer To:
1-1-97-TA-48

October 17, 1996

Bernadine Alling
San Mateo County
Parks and Recreation Division
590 Hamilton Street, 4th Floor
Redwood City, California 94063

Subject: Edgewood Park and Natural Preserve Draft Master Plan, San Mateo County, California

Dear Ms. Alling:

This letter responds to your request for comments on the August, 1996 draft Edgewood County Park and Natural Preserve Master Plan (Plan) which was received in our office on August 22, 1996. The Plan will guide the future use and management of Edgewood and is intended to provide a framework for management of natural resources while providing recreational opportunities for the public. The U.S. Fish and Wildlife Service (Service) appreciates the obvious effort the San Mateo County Parks and Recreation Division (Division) has made to accommodate disparate interests while maintaining a conservation ethic with respect to native plants, animals and natural features of the park. The County is to be commended for its efforts on behalf of endangered species and for its proposed efforts involving community outreach and education. Our comments address only endangered species issues.

The Service is concerned about the possible effects of the Plan on federally listed endangered and threatened plant and animals species and serpentine grasslands. As discussed further under "Incidental take" below, Section 9 and the implementing regulations of the Endangered Species Act (Act) prohibit even small amounts of "take" of listed animal species, regardless of the ultimate impact of the project without a permit or exemption. Therefore, the Service recommends that the Division obtain a permit for incidental take as provided for under Section 10 (a)(1)(B) of the Act. The Division would need to prepare a Habitat Conservation Plan (HCP) for the Park and apply for the incidental take permit, which has an application fee of \$25.00. The HCP would be similar to the Master Plan, but would focus on the selected alternative management plan and would provide a more detailed analysis of the Plan's likely impacts on special-status species. Forms and guidance for these procedures are available from this office; we will be happy to work with you in developing an appropriate application.

Our general and specific comments follow. Some of these issues could be addressed in detail in an HCP, should the Division decide to prepare one.

General comments:

1. Incidental take: A properly designed and maintained trail system should not threaten the federally endangered Bay checkerspot butterfly (*Euphydryas editha bayensis*) population at the site. To approach this ideal, unofficial trails would have to be closed and their formation discouraged, and some official trails might best be re-routed.

Although impacts from a well designed trail system would be expected to be small, the likelihood of small amounts of "take" of the threatened butterfly due to operation and maintenance of the trail system will be difficult to eliminate entirely; people and horses may stray from trails, trampling vegetation and possibly butterfly larvae, pupae or eggs. Unofficial trails or extreme conditions may create erosion hazards. Hikers may pick trailside vegetation or carelessly start fires, inexperienced trail workers may inadvertently damage sensitive plants, and so on.

It also appears that, despite the likely benefit to the butterfly of the habitat enhancement efforts contemplated in the Plan, these efforts would be likely to result in small amounts of take. Such take would be difficult if not impossible to avoid completely, and would result from trampling, inadvertent uprooting or disturbance of host plants, and inadvertent harassment of butterflies.

2. Discussion of impacts: The draft Plan contained no detailed discussion of the expected effects of each alternative on plant and animal species of concern and their occupied or potential habitat. Consideration of the specific effects of the preferred alternative in future drafts or an HCP would help the Service accurately evaluate potential impacts.

In addition, the draft Plan did not discuss expected impacts of specific proposed management strategies or how the Division would choose among various strategies in particular situations. In what situation would the preferred technique be mechanical mowing versus use of chemicals versus prescribed burning? How will these decisions be made?

3. Monitoring: The Service recommends that the Division consider a detailed monitoring program to track federally listed plant and animal species as well as other species of concern in Edgewood Park, including federally proposed and candidate species and federal species of concern. Monitoring should also address the quality and quantity of occupied and potential habitat for the species.

Along with this monitoring, the management plan should be adaptive and dynamic. It should require management strategies to be evaluated periodically. If populations of plant and animal species of concern are not responding as expected, the Plan ought to be flexible enough to allow changes in management to compensate for any unexpected population trends.

4. Wetlands: Based upon our review of the draft Plan, we note that the County may be required to obtain permits to fill or modify wetlands as required by the Clean Water Act, section 404. During the Army Corps of Engineers review of permit applications the Service is consulted concerning impacts to fish and wildlife resources including wetland habitats and species. In order to assist you with completing the Plan and any subsequent documents such as Environmental Impact Reports, we are providing Enclosure B. This document provides general guidelines which will assist you and the Service in conserving, protecting, and enhancing fish and wildlife and their habitats.

Specific comments:

1. The Plan should include comprehensive plant and animal species lists from recent surveys of the park as well as details of how surveys were conducted to substantiate the lists. The California Natural Diversity Data Base Rarefind records indicate that some plant species of concern occur in Edgewood Park which are not addressed in the Plan (e.g. *Lessingia arachnoidea*). A list of plant and animal species which should be considered for inclusion is enclosed.

The Service also recommends that the Division evaluate the presence and extent of potential, but currently unoccupied, habitat for federally listed species, federally proposed and candidate species, and federal species of concern. Avoidance of suitable occupied and unoccupied habitat should be specifically addressed. These sites may play an important role in recovery of listed species.

2. It should be noted that the Service has proposed to discontinue the designation of Category 2 species (Federal Register 61 (40): pp. 7549-7613). Former Category 2 species are currently being referred to as Species of Concern.
3. The Service recommends that publicly available Plan documents should discuss and map locations of listed and proposed species only in a general way. Including exact locations of populations may increase the species' vulnerability to collecting and other human-related impacts.
4. The Plan should have a specified term, such as 5 or 10 years, after which it is reevaluated and is renewed or revised.

Thank you for providing the Service the opportunity to comment on the draft Edgewood Park and Natural Preserve Master Plan. Please contact David Wright at 916/979-2725, Jan Knight or Diane Elam at 916/979-2120 of my staff if you have any questions about this letter, if you wish to consider developing a habitat conservation plan, or if you require other assistance in developing the final plan.

Sincerely,

Joel A. Medlin

Joel A. Medlin
Joel A. Medlin
Field Supervisor

Enclosure

cc: CDFG, Carl Wilcox
CNPS, David Tibor
CNPS, Carolyn Curtis
Friends of Edgewood, Bill Korbholz
San Mateo County Trail Users Group,
Adda Quinn



United States Department of the Interior

FISH AND WILDLIFE SERVICE Ecological Services

Sacramento Field Office

3310 El Camino Ave., Suite 130

Sacramento, California 95821-6340

IN REPLY REFER TO:

1-1-97-TA-1325

May 23, 1997

Bernadine Alling
San Mateo County
Parks and Recreation Division
590 Hamilton Street, 4th Floor
Redwood City, California 94063

Subject: Edgewood Natural Preserve Master Plan, San Mateo County,
California

Dear Ms. Alling:

This letter responds to your request for comments on the May, 1997 Edgewood Natural Preserve Master Plan (Plan). The U.S. Fish and Wildlife Service (Service) recognizes the efforts of San Mateo County Parks and Recreation Division (Division) to reconcile differences among various stakeholders in the process of developing the Plan. The County is to be commended for its commitment to maintenance of the area as a natural preserve and for its conservation ethic with respect to native plants, animals and natural features of the preserve.

General comments:

1. As mentioned in our letter of October 17, 1996, the Service recommends that, as the Plan is implemented, the Division prepare a Habitat Conservation Plan (HCP) and obtain a permit for incidental take as provided for under Section 10(a)(1)(B) of the Endangered Species Act (ESA). Preparation of an HCP is consistent with the goals of protection, preservation, restoration and responsible stewardship of Edgewood Natural Preserve; a 10(a)(1)(B) permit would be necessary should restoration and other activities result in take of federally listed species. An HCP would also be valuable for the Division and the Service as a guide to how restoration, maintenance, and management activities might be designed to minimize their impacts to sensitive species and habitats.
2. The Service recommends that the Division consult with the California Department of Fish and Game (CDFG) regarding California Endangered Species Act (CESA) and California Environmental Quality Act (CEQA) issues, including exemption from CEQA.

Specific comments:

1. Definitions. #8: The Service recognizes that in the Plan, sensitive habitats are defined based on the presence of legally protected species. We recommend that the definition be reworded to state specifically that the species considered (i.e., federally listed species and State-listed and candidate species) are those with legal protection.
2. Permitted Uses. #14: Restoration of damaged habitat may require permitting by several agencies. We recommend that the phrase "subject to permit issuance" be clarified so that it makes explicit which agencies may need to be contacted for permitting. When restoration

involves or impacts species with Federal status, permits from the Service may be required. Similarly, restoration involving or impacting species with State status would require permits from the CDFG. Permits from the Service and CDFG would be required in addition to any permits issued by the County.

3. Natural Resource Protection, #18: Before any resource management technique or strategy is to be undertaken at Edgewood Preserve, the Service recommends that the Service be consulted. Coordination on the planning and implementation of management techniques would best be conducted through preparation of an HCP which would address various management techniques and their impacts on sensitive plant and animal species and their habitats.
4. Natural Resource Protection, #20: We recommend the following wording be used to describe allowable native plant collection: "Prohibit the collection of California native plants and seeds at Edgewood Preserve for purposes other than restoration of damaged habitat or other recovery activities approved by the California Department of Fish and Game (CDFG) for species with State status, the U.S. Fish and Wildlife Service (USFWS) for species with Federal status, and the San Mateo County Parks and Recreation Division for other native plant species. Appropriate permit approval is required for plant or seed collection at Edgewood Preserve. Permits for work with State-listed species are issued by CDFG Plant Conservation Program, for federally-listed species, by USFWS, and for other native species at Edgewood Preserve by San Mateo County."
5. Natural Resource Protection, #23: The Service commends the Division for requiring periodic evaluation of management activities. We recommend that a specific time period for evaluations be specified, perhaps every five years. The evaluation should include an analysis of the status of sensitive plants, animals and habitats at Edgewood Preserve (see below). We suggest adding a sentence to specify that management activities will be modified if populations of plant and animal species of concern are not responding as expected.

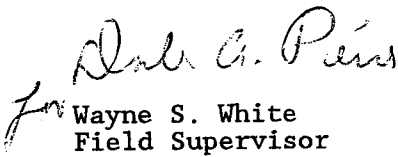
As mentioned in our previous correspondence, the Service recommends that the Division design and implement a detailed monitoring program to track federally listed plant and animal species, other species of concern in Edgewood Natural Preserve, and the quality and quantity of occupied and potential habitat for these species. The Service is aware of the work of the California Native Plant Society in this respect and suggests that a formal monitoring plan for plants could be developed and implemented with their help. In general, we suggest that populations of annual plant species be monitored at least every two years and populations of perennials at least every five years. We also recommend that surveys be conducted for federally-listed Bay checkerspot butterfly (*Euphydryas editha bayensis*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) and red-legged frog (*Rana aurora draytoni*). With respect to the San Francisco garter snake and the red-legged frog, we note that the last surveys for these species at Edgewood were conducted thirteen years ago.

6. Operations and Maintenance, #31: The Service recommends that the evaluation period be specified, perhaps every five years.
7. Access, Parking and Associated Amenities, #38: The Service is concerned that fire management and suppression activities have the potential to seriously damage sensitive species and their habitats (in particular, the *Acanthomintha duttonii* habitat). We recommend that the Division work with the Service and other appropriate agencies in developing a fire management strategy that would take these concerns into account. Coordination with the Service would best be conducted through preparation of an HCP.

8. Plan Monitoring and Amendment, #44: As mentioned in previous correspondence, the Service recommends that the Plan have a specified term, such as 5 or 10 years, after which it is reevaluated and renewed or revised.
9. Page A-19, third full paragraph under Vegetation: Diane Steeck has also conducted research on the San Mateo thornmint (*Acanthomintha duttonii*).
10. Page A-32, last line: The Plan should note that *Cirsium fontinale* var. *fontinale* is federally listed as endangered.
11. Page A-33, footnote 8: Check with Susan Sommers about whether there was more than one individual of *Cirsium fontinale* var. *fontinale* at the Edgewood location in the past. Also, it is difficult to predict a species' mating system; it is preferable to base conclusions on experimental analysis of the mating system.
12. Page A-36, last paragraph and page A-37: As noted above, the Service recommends that Edgewood Preserve be resurveyed for sensitive amphibian and reptile species.
13. Page A-37, first paragraph about Birds: Does the Plan mean to state that California horned lark (*Eremophila alpestris actia*) and loggerhead shrike (*Lanius ludovicianus*) are no longer considered candidates for Federal listing? No longer species of concern? The statement needs to be clarified.
14. Page A-59, Fire Management: As noted in 7 above, the Service is concerned that fire management activities may adversely impact sensitive plant and animal species and/or their habitats. This issue could be addressed in an HCP.
15. Page C-4, third full paragraph: Certain management activities may require permits from the CDFG as well as the Service. This should be stated in the Plan.

Thank you for providing the Service the opportunity to comment on the Edgewood Natural Preserve Master Plan. Please contact David Wright at 916/979-2725, Jan Knight or Diane Elam at 916/979-2120 of my staff if you have any questions about this letter, if you wish to consider developing a habitat conservation plan, or if you require other assistance.

Sincerely,


for Wayne S. White
Field Supervisor

cc: CDFG, Carl Wilcox
CDFG, Deborah Hillyard
CDFG, Sandra Morey
CNPS, David Tibor
CNPS, Carolyn Curtis
Friends of Edgewood, Bill Korbholz



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Sacramento Field Office
2800 Cottage Way, Room E-1823
Sacramento, California 95825-1846

In Reply Refer To:
1-1-93-TA-098

November 3, 1992

Mr. Paul Koenig
Environmental Services Agency
County of San Mateo
County Government Center
Redwood City, California 94063

Subject: Proposed Golf Course at Edgewood County Park, San Mateo County, California

Dear Mr. Koenig:

This responds to your October 8, 1992, request for information to prepare a scope of work for the proposed golf course at Edgewood County Park in San Mateo County, California. The U.S. Fish and Wildlife Service (Service) is concerned about the possible effects of the proposed project on federally listed, proposed and candidate species, and wetland resources. The comments and recommendations in this letter are based on the material supplied by your office that was received by the Service on October 22, 1992.

Regarding fish and wildlife resources, the environmental document should assess fully the impacts of the proposal and its alternatives on species populations and their habitats, with emphasis on wetlands and endangered, threatened, or candidate species. The document should state clearly the purposes of, and document the needs for the proposed project so that the capabilities of the various alternatives to meet those purposes and needs can be determined readily. The document should include a thorough description of all the facilities to be constructed as part of the proposal. Figures accurately depicting proposed project features in relation to natural features in the project areas also should be included.

The threatened bay checkerspot butterfly (*Euphydryas editha bayensis*) has been documented to inhabit serpentine grasslands at the project site. This animal is fully protected under the Endangered Species Act of 1973, as amended (Act). Activities that may adversely impact this animal could violate section 9 of the Act, which prohibits the "take" of any federally listed endangered or threatened species by any person subject to the jurisdiction of the United States. Take of the bay checkerspot butterfly could result from actions that destroy or damage its habitat.

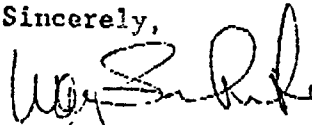
Take incidental to an otherwise lawful activity may be authorized by one of two procedures. If a Federal agency is involved with the permitting, funding, or carrying out of the project, then initiation of formal consultation between that agency and the Service pursuant to section 7 of the Act is required if it is determined that the proposed project may affect a federally listed species. Such consultation would result in a biological opinion that addresses the anticipated effects of the project to the listed species and may authorize a limited level of incidental take. If a Federal agency is not involved with the project, and federally listed species may be taken as part of the project, then an incidental take permit pursuant to section 10(a) of the Act would need to be obtained. The Service may issue such a permit upon completion of a satisfactory conservation plan for the listed species that would be affected by the project.

The environmental document should discuss take and potential adverse impacts to the bay checkerspot butterfly resulting from the proposed golf course. To address this issue, the Service recommends that any serpentine grassland habitat be mapped accurately, along with the locations and approximate numbers of the foodplants of the larvae and adult nectar sources. In addition, a qualified entomologist should conduct an adequate survey for the butterfly during its activity period. The Service recommends that destruction or damage to any areas containing serpentine habitat and potential movement corridors be avoided. If the project is not designed to avoid adverse impacts to the bay checkerspot butterfly and any other endangered or threatened species that may be present at the project site, authorization to take listed species must be obtained under section 7 or 10(a) of the Act.

The County of San Mateo should provide information on any listed, proposed, or candidate species that may be found at the project site. The following candidate species should be addressed (numbers in parentheses indicate candidate status): San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) (Endangered), loggerhead shrike (*Lanius ludovicianus*) (2), California horned lark (*Eremophila alpestris actia*) (2), western spadefoot toad (*Scaphiopus hammondi hammondi*) (2R), California tiger salamander (*Ambystoma californiense*) (2), California red-legged frog (*Rana aurora draytonii*) (1), Opler's longhorn moth (*Adela oplerella*) (2), Edgewood micro-blind harvestman (*Microcina edgewoodensis*) (2), Edgewood Park blind harvestman (*Calicina minor*) (2), *Acanthomintha duttoni* (San Mateo thornmint) (Endangered), *Hesperolinon congestum* (Marin dwarf flax) (1), *Pentachaeta bellidiflora* (2), *Silene verecunda* ssp. *verecunda* (Mission Delores campion) (2), *Fritillaria liliacea* (fragrant fritillary) (2), and *Cirsium fontinale* var. *fontinale* (fountain thistle) (2). Although candidate species are not protected under Federal law, the 1988 amendments to the Act require the Service to monitor their status. If any of these candidates decline precipitously, they could be listed under an emergency basis. The Service recommends that adequate surveys be conducted during the proper flowering or activity periods by qualified biologists. The findings of the surveys and measures that will be taken to avoid/mitigate any adverse impacts to these species should be included in the environmental document. In addition, as part of a settlement agreement for a lawsuit brought by an environmental group, the Service will be issuing proposed rules in the near future to list a number of category-1 candidate plant species in California, including some or all of those in the project area.

Please contact Chris Nagano of my staff at the letterhead address or at 916/978-4866 if you have any questions. Thank you for your interest in endangered species and California's remaining wildlife habitats.

Sincerely,



Wayne S. White
Field Supervisor

DEPARTMENT OF FISH AND GAME

POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500



November 3, 1992

Mr. Paul Koenig
County of San Mateo
County Government Center
Redwood City, California 94063

Dear Mr. Koenig:

Department of Fish and Game personnel have reviewed your notice of intent to prepare an environmental constraints analysis for construction of a golf course on a portion of Edgewood County Park. The area under consideration contains a number of State and Federally-listed plant and animal species, which are associated with serpentine grassland on the project site.

Edgewood Park is within the range of three rare insects, one of which, the Bay checkerspot butterfly, *Euphydryas editha* ssp. *bayensis*, is listed by the U. S. Fish and Wildlife Service (USFWS) as threatened. The other two species, the Edgewood blind harvestman, *Calicina minor*, and the Edgewood micro-blind harvestman, *Microcina edgewoodensis*, are both endemic to the serpentine in Edgewood Park and are candidates for Federal listing.

Information about the Bay checkerspot indicates that this butterfly was historically distributed across virtually all serpentine soil-based grasslands from San Mateo to Santa Clara counties. Bay checkerspot has a population structure that considers the entire range as a metapopulation, characterized by periodic increases and decreases in population numbers. The extinction of local populations and subsequent recolonizations are part of this regional population structure of the Bay checkerspot butterfly. This information indicates that virtually all of the serpentine grassland areas within Edgewood County Park could be considered suitable habitat for the Bay checkerspot. In view of the above, the county should request an opinion from USFWS regarding the potential effects of this project on the Bay

Mr. Paul Koenig
November 3, 1992
Page Two

checkerspot. Should the USFWS determine that "take" of a listed species would occur as a result of the proposed golf course, the county will be required to prepare a Habitat Conservation Plan in order to receive a permit for take under Section 10(a) of the Federal Endangered Species Act.

Edgewood County Park contains habitat for four listed plant species: San Mateo thornmint, *Acanthomintha obovata* ssp. *duttonii*, California and Federally endangered; fountain thistle, *Cirsium fontinale* var. *fontinale*, California endangered and Federal candidate; dwarf flax, *Hesperolinon congestum*, California threatened and Federal candidate; and white-rayed pentachaeta, *Pentachaeta bellidiflora*, California endangered and Federal candidate. A proposed rule on the three federal candidate species is expected early in 1993. In addition, there are several other rare plant species that occur in Edgewood County Park: San Francisco collinsia, *Collinsia franciscana*, western leatherwood, *Dirca occidentalis*, northern malacothamnus, *Malacothamnus arcuatus*, and valley oak, *Quercus lobata*. Fragrant fritillary, *Fritillaria liliacea*, is considered rare and endangered.

The Department's Natural Diversity Data Base considers two communities that occur on serpentine to be of significance: mixed serpentine chaparral, considered to be of limited distribution and very threatened; and serpentine bunchgrass, of limited distribution and threatened. Because these two plant communities are considered to be significant resources, the constraints analysis needs to identify the extent of their presence on site. This is particularly important, as the serpentine grassland community provides the matrix within which are found the four listed plant species as well as the three rare insect species.

Transplantation and propagation have not been shown to be effective measures to mitigate the loss of rare species; success rates are typically very low. While relocation of rare species has met with limited success in some species, it is generally successful only in those areas where suitable habitat exists that for whatever reason is not currently occupied by the species of concern. Rare plants and animals are generally rare not just because there is a lack of individuals, but because of the lack of suitable habitat and an increase in numbers of individuals is not usually effective in increasing or maintaining the overall population (or replacing lost individuals) unless there is a concomitant increase in the available habitat. In serpentine communities, this is further complicated by the fact that there can be great differences in soil chemistry within a local area.

Mr. Paul Koenig
November 3, 1992
Page Three

This will influence survival of individuals on a very site specific basis, and soil that has been disturbed can further complicate relocation efforts.

The Department views avoidance as the only appropriate mitigation for loss of species on serpentine habitat. After avoidance, the second preferred alternative is off-site habitat purchase and preservation combined with experimental translocation onto existing nonoccupied habitat or created habitat. Creation of habitat is the least preferred alternative, and no mitigation plan would be acceptable unless the county is able to demonstrate conclusively that the proposed mitigation measures would ensure a successful recreation of the populations and habitat area to be impacted prior to disturbance of existing habitat. Mitigation will be based on no net loss of acres of habitat and numbers of individuals. This may be particularly difficult at Edgewood County Park as there simply is no other place on earth that contains these unique characteristics and thus would provide a suitable site for off-site habitat purchase and/or creation of habitat. In addition, the county will be required to enter into a Mitigation Agreement with the Department regarding any activities that affect the State-listed species.

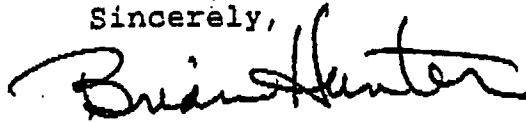
Fountain thistle, *Cirsium fontinale* var. *fontinale*, is typically found in seeps and springs of serpentine areas. Presence of this habitat type would indicate the need for consultation with the U. S. Army Corps of Engineers regarding a permit under section 404 of the Clean Water Act. Should a Federal permit be required, or Federal funds be used in the project, consultation with USFWS will be required regarding the Federally-listed species.

Evaluation of the environmental constraints on the site would include consideration of not only the status of the resources of the site, but law and Department policy in regard to appropriate mitigation of impacts to identified sensitive resources. Edgewood Park is considered by the Department as one of the most sensitive areas in the State, primarily due to the presence of the serpentine bunchgrass community and the unique suite of rare plants and animals that occur in conjunction with this community. In recognition of the unique qualities of the Edgewood Park area, the site is designated by the Department as a Significant Natural Area (SNA). Realistic constraints analysis will need to identify the total area within which both construction of the golf course and long-term protection of the sensitive resources on site can take place, since there is simply not another area with values equivalent to Edgewood Park that could serve as the site of any potential off-site mitigation.

Mr. Paul Koenig
November 3, 1992
Page Four

Thank you for the opportunity to provide information regarding the proposed constraints analysis for Edgewood County Park. Should you have questions regarding our comments, please contact Ms. Deborah Hillyard, Plant Ecologist, at (408) 726-3847 or at the letterhead address.

Sincerely,

A handwritten signature in dark ink, appearing to read "Brian Hunter". The signature is fluid and cursive, with the first name "Brian" and last name "Hunter" clearly distinguishable.

Brian Hunter
Regional Manager
Region 3

cc: Ms. Jan Knight,
U. S. Fish and Wildlife Service
Sacramento

Mr. Chris Nagano
U. S. Fish and Wildlife Service
Sacramento

PARK

DEFINITION

A spacious area of outstanding scenic and natural character where outdoor recreation opportunities and facilities may be provided for public convenience and enjoyment and within which special natural areas, geologic exhibits or historic places can be set aside.

STANDARDS

1. The major portion of a park should include (or potentially include) an area of outstanding scenic and natural character. This area should be designated as a Natural Area for planning and management purposes.
2. A smaller portion(s) of a park should be suitable for accommodating a variety of recreation activities. The area(s) should be designated as a Facilities Cluster(s) for planning and management purposes.

PLANNING AND MANAGEMENT GUIDELINES

1. Emphasis should be placed on locating County parks within 15 minutes of urban areas.

Natural Areas

2. The purpose of Natural Areas is to assure the protection of the natural environment within a significant portion of a County park.
3. The most important management objective is to determine the prime resource of the park and to protect and enhance it.
4. Only those recreation activities compatible with this primary management objective should be allowed.
5. Development of recreation facilities should be limited to those which make the unit available for public enjoyment and convenience in a manner which is consistent with the protection and enhancement of the prime resource. Development may include facilities for nature interpretation, hiking and horseback riding trails. Access should be controlled.
6. Resource management techniques such as tree cutting, controlled burning, reforestation and planting may be used to preserve, maintain or recreate the desired environmental setting. Preference should be given to planting native species.

Facilities Cluster

7. Facilities Clusters should contain substantially all of the recreation development that is provided within a County park.
8. Development in a facilities cluster should be limited to those facilities which are consistent with the protection and enhancement of the primary resource. Development may include campgrounds, youth group camps, picnic areas, commercial concessions, nature interpretive facilities, nature, hiking and horseback riding trails and equestrian facilities. Access should be controlled.
9. All developed facilities should be designed, landscaped and managed to harmonize visually with the surrounding natural environment.

PARK AND RECREATION RESOURCES

NATURAL PRESERVE

DEFINITION

A scenic and natural area where outstanding features as well as significant wildlife habitats are preserved in their present state for the enjoyment, education and well-being of the public.

STANDARDS

1. A County Natural Preserve should be of outstanding scenic and natural character.
2. Primary resources typically should consist of woodlands, meadows, hill-sides, canyons, creeks, lakes, ridgelines, shorelines, visually sensitive or prominent landscape features and rare, endangered or unusual natural resources.
3. Public facilities should be limited to those necessary for public health, safety and education.

PLANNING AND MANAGEMENT GUIDELINES

1. The prime resource of the area should be determined. Preservation and enhancement of the prime resource should be the most important management objective. Interpretation and enjoyment should be secondary management objectives.
2. Development should be limited to foot trails, protective barriers, regeneration of indigenous vegetation, overlooks, signs, sanitary facilities, parking areas, interpretative center and other minimal service facilities as may be required.
3. Emphasis should be placed on the protection of rare, endangered, unusual or educationally important natural resources.
4. Emphasis should be placed on locating natural preserves within 15 minutes of urban areas.
5. Access should be controlled to provide adequate resource protection, and sufficient buffers from adjacent environment should be provided within its boundaries.
6. A natural preserve may be a separate unit of the County park system or be contained within a County park.

PLANT SPECIES AT EDGEWOOD

1. The Flora of Edgewood County Park, California Native Plant Society, 1996.
2. Checklist of Plants at Edgewood Alphabetically by Common Name, Toni Corelli.
3. Bryophytes at Edgewood, 1994-1995.

THE FLORA OF EDGEWOOD COUNTY PARK

compiled by

Toni Corelli, Botanist
for the Santa Clara Valley Chapter
of the California Native Plant Society

REVISED APRIL 1993, JUNE 1994, AUGUST 1996

Introduction

Edgewood County Park is comprised of 467 acres located at the intersection of Interstate 280 and Edgewood Road in Redwood City and Woodside. The Park is known for the biological diversity of plants and animals represented in a single area. Contained within this flora are 470 vascular plant species representing 76 plant families and 9 plant communities.

Edgewood Park is especially well known for its serpentine grasslands, which become spectacular carpets of wildflowers in spring. To date, the rare, threatened, and endangered species discovered in Edgewood Park include 11 plants, 2 plant communities, the bay checkerspot butterfly (*Euphydryas editha ssp. bayensis*), and two arachnids. There is much ongoing research conducted at the park because of the biological diversity.

Acknowledgments

This flora was partially compiled from the many years of work by Susan C. Sommers contained in her work, Partial Flora of Edgewood County Park, 1987. Many others contributed to this booklet as well including: John Allen, Brenda Butner, Sally Casey, Carolyn Curtis, Ken Himes, Midpeninsula Regional Open Space District, Bart O'Brien, Mary Simpson and Jean Sorensen.

This publication was made possible by the Santa Clara Valley Chapter of the California Native Plant Society.

Illustrations by John Allen and
Jean Sorensen.

Asteraceae Maple Family
Acer macrophyllum

232 FW,MEF

Alzooaceae Carpet Weed Family
Dorotheanthus bellidifloris

Anacardiaceae Sumac Family
Toxicodendron (Rhus) diversilobum

230 C,FW,MEF

Apiaceae Carrot Family

Angelica tomentosa
Anthriscus caucalis (scandicinia)

262 FW,R

Bowlesia incana
Conium maculatum

257 FW

Daucus pusillus
Eryngium aristulatum

260 D,G

Foeniculum vulgare
Lomatium californicum

257 GSG

Lomatium caruifolium
Lomatium dasycarpum

255 SG

Lomatium macrocarpum
Lomatium utriculatum

258 D,G

Osmorhiza chilensis
Perideridia kelloggii

261 FW

Sanicula bipinnata
Sanicula bipinnatifida

261 SC,SG

Sanicula crassicaulis
Sanicula lachniata

261 SC,SG

Scandix pecten-veneris
Tauschia kelloggii

255 D

Torilis arvensis
Torilis nodosa

259 C,FW,G

Yabea (Caucalis) microcarpa

255 D

Apocynaceae Dogbane Family
Vinca major

257 C,FW

Araceae Calla or Arum Family
Zantedeschia aethiopica

273 D

Aracaceae (Palmae) Palm Family
Erythea edulis

111 D

Asclepiadaceae Milkweed Family
Asclepias fascicularis

111 D

Asteraceae Sunflower Family
Achillea millefolium

274 CG

Achyrochaena mollis
Adenocaulon bicolor

370 SG

Agoseris heterophylla
Artemisia californica

359 GSG

Artemisia douglasiana
Aster chilensis

354 RF

Aster radulinus

342 G,FW,SG

372 C

372 C,FW

351 FW

351 FW

Asteraceae cont.

Baccharis douglasii

Baccharis pilularis

Baeria chrysostoma (see Lasthenia californica)

Carduus pycnocephalus

Centaurea calcitrapa

Centaurea mellitensis

Centaurea solstitialis

Chamomilla suaveolens

Cichorium intybus

*Cirsium fontinale fontinale

Cirsium vulgare

Conyza sp.

Crepis vesicaria taraxacifolia

Eriophyllum confertiflorum

Eriophyllum staechadifolium

Filago gallica

Gazania linearis

Gnaphalium canescens beneolens

Gnaphalium purpureum

Gnaphalium ramosissimum

Gnaphalium stramineum (chilense)

Grindelia camporum

Grindelia hirsutula

Heterotheca sessiliflora

Lactuca serriola

Lactuca saligna

Helenium puberulum

Helianthus californicus

Hemizonia congesta luzulifolia

Hesperis (Evax) sparsiflora

Hypochaeris glabra

Hypochaeris radicata

Lactuca saligna

Lagophylla ramosissima

Lasthenia californica (chrysostoma)

Layia platyglossa

Lessingia hololeuca

Madia elegans densifolia

Madia exigua

Madia gracilis

Madia sativa

Matricaria matricarioides (see Chamomilla suaveolens)

Micropus californicus

Microseris douglasii

Monolopia gracilis

Monolopia major

Pentachaeta (Chaetopappa) bellidiflora

Pteris echioides

Psilocarphus brevissimus

Rigipappus leptocladus

Senecio aronicoides

Senecio breweri

Senecio mikanoides

Senecio vulgaris

Silphium marianum

Solidago californica

marsh baccharis

coyote brush

rosin weed

Italian thistle

purple star-thistle

totalote

yellow star-thistle

pineapple weed

chicory

fountain thistle

bull thistle

horseweed

hawk's beard

golden yarrow

lizard tail

narrow-leaved filago

gazania

fragrant everlasting

purple cudweed

pink everlasting

cotton-batting plant

gumplant

hirsute grindelia

goldenaster

prickly lettuce

willow lettuce

sneezeweed

California sunflower

hayfield tarweed

erect evax

smooth cat's ear

rough cat's ear

willow lettuce

common hareleaf

goldfields

tidy-tips

woolly-headed lessingia

common madia

threadstream madia

slender tarweed

coast tarweed

Chamomilla suaveolens

slender cottonweed

Douglas' microseris

woodland monolopia

cupped monolopia

white-rayed pentachaeta

bristly ox-tongue

dwarf woolly-heads

rigiopappus

groundsel

Brewer's butterweed

german-ivy

common groundsel

milk thistle

California goldenrod

346 M

346 C

364 GSG

380 D,G

377 D,G

377 G,SG

377 D,G

371 D,G

339 D,G

378 SG

378 D,G

351 C,FW

344 G,SG

366 C,SG,SC

366 C

356 G,SG

355 D

355 C

355 FW

355 C,G

355 FW,G

346 G

346 G

343 D,G

343 D,G

367 M

359 M

364 GSG

356 SG

341 D,G,SG

341 D,G,SG

343 D,G

359 GSG

368 GSG

360 GSG

353 GSG

362 GSG

362 GSG

362 GSG

362 GSG

356 GSG

341 GSG

367 SC

367 FW

349 SG

341 D,G

356 SC,SG

367 SG

375 C,FW,MEF

375 MEF

374 M,R

374 D

377 D,G

349 C

Hydrophyllaceae Waterleaf Family

Species	FW	MEF
<i>Eriodictyon californicum</i>	287	CSC
<i>Nemophila heterophylla</i>	284	FW, MEF
<i>Nemophila menziesii</i>	284	G
<i>Nemophila pedunculata</i>	284	G
<i>Phacelia californica</i>	285	GSG
<i>Phacelia distans</i>	286	SG
<i>Phacelia divaricata</i>	286	SG
<i>Phacelia imbricata</i>	286	CG
<i>Pholisma auritum</i>	283	FW, MEF

Iridaceae Iris Family

<u>iris douglasiana</u>	Douglas' iris	128	G
<u>iris germanica</u>	bearded iris		D
<u>Sisyrinchium bellum</u>	blue eyed grass	126	GSG
<u>Juglandaceae Walnut Family</u>			
<u>Juglans sp.</u>	walnut		D

Juncaceae Rush Family

<i>Juncus</i> butonilus	toad rush	115	G.M
<i>Juncus effusus</i> pacificus	rush	114	G.M
<i>Juncus patens</i>	common rush	114	G.M
<i>Juncus xiphioides</i>	iris-leaved rush	115	G.M
<i>Luzula comosa</i> (multiflora)	common wood rush	115	G.M

Lamiaceae Mint Family

	San Mateo thornmint	SG
<i>Acanthomintha (obovata) duttonii</i>	pitcher sage	296
<i>Lepechinia calycina</i>	pennyroyal	300
<i>Mentha pulegium</i>	coyote-mint	C,FW
<i>Monardella villosa</i>	pogogyne	D
<i>Pogogyne serpylloides</i>	yerba buena	C,SG
<i>Satureja douglasii</i>	Dannie's skull cap	C,SG,FW
<i>Scutellaria tuberosa</i>	rigid hedge nettle	FW,MEF
<i>Stachys albuginea rigida</i> (quercetorum)	short-spiked hedge nettle	C,FW
<i>Stachys pycnantha</i>		SC

Garryaceae Silk Tassel Family

<u>Garrya elliptica</u>	coast silk tassel	263 C
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Gentianaceae Gentian Family

<i>Centaureum davyi</i>	Davy's centaury	272	GS3
<i>Centaureum muhlenbergii</i> (<i>floribundum</i>)	June centaury	272	GS3
<i>Cicendia (Microcala) quadrangularis</i>	tlmwort	272	GS3

Geraniaceae Geranium Family

<i>Erodium botrys</i>	long-beaked filaree	223	G,SG
<i>Erodium cicutarium</i>	red-stemmed filaree	223	G,SG
<i>Erodium moschatum</i>	white-stemmed filaree	223	G,SG
<i>Geranium dissectum</i>	cut-leaved geranium	222	G,SG
<i>Geranium molle</i>	cranesbill	222	G,SG

Grossulariaceae Gooseberry Family

Plant species	Number of individuals	Number of flowers	Number of fruits	Number of seeds
<i>Ribes (Grossularia) californicum</i>	193	193	193	193
<i>Ribes malvaceum</i>	192	192	192	192
<i>Ribes menziesii</i> (<i>Grossularia leptosma</i>)	193	193	193	193
<i>Ribes sanguineum glutinosum</i>	192	192	192	192

Hippocastanaceae Buckeye Family

Aesculus californica	California buckeye	232	FW.MEF
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Hydrophyllaceae Waterleaf Family

Species	FW	MEF
<i>Eriodictyon californicum</i>	287	CSC
<i>Nemophila heterophylla</i>	284	FW, MEF
<i>Nemophila menziesii</i>	284	G
<i>Nemophila pedunculata</i>	284	G
<i>Phacelia californica</i>	285	GSG
<i>Phacelia distans</i>	286	SG
<i>Phacelia divaricata</i>	286	SG
<i>Phacelia imbricata</i>	286	CG
<i>Pholisma auritum</i>	283	FW, MEF

Iridaceae Iris Family

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<u>iris germanica</u>	bearded iris		D
<u>Sisyrinchium bellum</u>	blue eyed grass	126	GSG
<u>Juglandaceae Walnut Family</u>			
<u>Juglans sp.</u>	walnut		D

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<i>Juncus patens</i>	common rush	114	G.M
<i>Juncus xiphioides</i>	iris-leaved rush	115	G.M
<i>Luzula comosa</i> (multiflora)	common wood rush	115	G.M

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	San Mateo thornmint	SG
<i>Acanthomintha (obovata) duttonii</i>	pitcher sage	296
<i>Lepechinia calycina</i>	pennyroyal	300
<i>Mentha pulegium</i>	coyote-mint	C,FW
<i>Monardella villosa</i>	pogogyne	D
<i>Pogogyne serpylloides</i>	yerba buena	C,SG
<i>Satureja douglasii</i>	Dannie's skull cap	C,SG,FW
<i>Scutellaria tuberosa</i>	rigid hedge nettle	FW,MEF
<i>Stachys albuginea rigida</i> (quercetorum)	short-spiked hedge nettle	C,FW
<i>Stachys pycnantha</i>		SC

Lauraceae Laurel Family

Umbellularia californica	California bay	FW.MEF
173		

Liliaceae Lily Family (including Amarillidaceae, Convallariaceae, Melanthaceae)

	Number	Percentage	Mean	Standard deviation	Significance
Allium falcifolium (breweri)	124	SG	sickle leaved onion		
Allium dichlamydeum	124	SG	coastal onion		
Allium lacunosum	124	SC	pitted onion		
Allium triquetrum	123		wild onion		
Brodiaea coronaria	126	SG	coronary brodiaea		
Brodiaea elegans elegans	126	SG	harvest brodiaea		
Brodiaea terrestris	126	SG	dwarf brodiaea		
Calochortus albus	118	SC,FW,MH	white globe lily/fairy lantern		
Calochortus luteus	120	GSG	yellow mariposa lily		
Calochortus venustus	120	GSG	white mariposa lily		
Chlorogalum pomeridianum	117	ALL	amole/soap plant		
Dichelostemma capitatum (puchella)	125	SG	blue dicks		
Dichelostemma congestum (congesta)	125	C,SC,SG	oakow		
Disporum hookeri	122	HF	Hooker's fairy bells		
Eritrillaria affinis (lanceolata)	118	FW,MF	mission bells/checker lily		
Fritillaria lilacea	119	SG	fragrant fritillary		
Xiphophya uvularia	118	D	red hot poker		

<u>Poaceae cont.</u>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Saxifragaceae Saxifrage family

woodland star 191 FW,MEF
 hill star 191 FW,MEF
 California saxifrage 191 FW

Scrophulariaceae Figwort Family

Antirrhinum vexillo-cauliculatum 309 C,SC
 Bellardia trixago 316 D,G
 Indian paint brush 320 C,FW
 Castilleja affinis 318 G,SG
 Castilleja (Orthocarpus) densiflora 318 G,SG
 Castilleja exserta (Orthocarpus purpurascens) 319 C,SG
 Castilleja foliolosa 318 G,SG
 Castilleja rubicundula lithospermoides (Orthocarpus lithospermoides) 309 FW,MEF
 Collinsia heterophylla 310 FW
 Collinsia multicolor (franciscana) 310 G
 Collinsia sparsifolia collina 316 C,SC
 Cordylanthus pilosus 316 SC
 Cordylanthus rigidus 308 G
 Linaria sp. 311 C
 Mimulus (Diplacus) aurantiacus 313 SC,SG
 Mimulus douglasii 312 M
 Mimulus guttatus 315 FW,MEF
 Pedicularis densiflora 310 C,SC
 Scrophularia californica 318 G,SG
 Triphysaria (Orthocarpus) eriantha 318 G
 Triphysaria (Orthocarpus) pusilla 307 D
 Verbascum blattaria 314 M
 Veronica americana 314 D,G
 Veronica persica

* no longer at Edgewood (1996)

Nomenclature based on The Jepson Manual, Higher Plants of California, James C. Hickman, Editor. Scientific names in parenthesis are from the Flora of the Santa Cruz Mountains of California, A Manual of the Vascular Plants by John Hunter Thomas.

Updated 8/96

Simaroubaceae Simarouba Family

Allanthus altissima 226 D

Solanaceae Nightshade Family

Solanum umbelliferum 303 FW,MEF,SC

Taxodiaceae Bald Cypress Family

Sequoia sempervirens 64 RF

Thymelaeaceae Mezereum Family

Dirca occidentalis 243 FW,MEF

Typhaceae Cattail Family

Typha sp. 64 M

Urticaceae Nettle Family

Urtica dioica 138 M
 Parietaria judaica 138 M

Valerianaceae Valerian Family

Centranthus ruber 328 D
 Plectritis ciliosa 329 G,SG
 Plectritis macrosera 329 FW

Verbenaceae Vervain Family

Verbena lasiostachys 294 C

Species in *italics* are Rare and/or Endangered Plants.
 Species in **Bold** type are non-native plants.
 Page # indicates the page number in Thomas' Flora.

Plant Communities:

ALL = All plant communities at Edgewood
 C = Chaparral
 D = Disturbed areas
 G = Grassland
 FW = Foothill Woodland
 M = Moist areas not including riparian

MEF = Mixed Evergreen Forest
 R = Riparian
 RF = Redwood Forest
 SC = Serpentine Chaparral
 SG = Serpentine Grassland

Bibliography

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CHECKLIST OF PLANTS AT EDGEWOOD ALPHABETICALLY BY COMMON
NAME BY TONI CORELLI

Abrams' eriastrium
 acacia, Bailey
 acacia, black
 acacia, star
 alfalfa
 amole/soap plant
 angelica, wood
 aster, common California
 aster, rough-leaved
 baby blue-eyes
 baccharis, marsh
 barley, meadow
 barley, Mediterranean
 bedstraw
 bedstraw, climbing
 bee plant
 bellardia
 Bermuda buttercup
 bigleaf maple
 bird's-beak, hairy
 bird's-beak, stiffly-branched
 bitter-cress
 bitterroot
 black locust
 black medick
 blackberry, pacific
 blow wives
 blue elderberry
 blue eyed grass
 blue gum
 blue witch
 bluegrass, annual
 bolisduvalia, dense-flowered
 bowlesia
 Brewer's butterweed
 bristly ox-tongue
 brodiaea, coronary
 brodiaea, dwarf
 brodiaea, golden
 brodiaea, harvest
 brome, barren
 brome, California

Eriastrium abramsii
 Acacia baileyana
 Acacia melanoxylon
 Acacia verticillata
 Medicago sativa
 Chlorogalum pomeridianum
 Angelica tomentosa
 Aster chilensis
 Aster radulinus
 Nemophila menziesii atomaria
 Baccharis douglasii
 Hordeum brachyantherum
 Hordeum marinum gusoneanum
 Galium aparine
 Galium porrigens
 Scrophularia californica
 Bellardia trixago
 Oxalis pes-caprae
 Acer macrophyllum
 Cordylanthus pilosus
 Cordylanthus rigidus
 Cardamine oligosperma
 Lewisia rediviva
 Robinia pseudoacacia
 Medicago lupulina
 Rubus ursinus
 Achyrachaena mollis
 Sambucus mexicana
 Sisyrinchium bellum
 Eucalyptus globulus
 Solanum umbelliferum
 Poa annua
 Epilobium densiflorum
 Bowlesia incana
 Senecio breweri
 Picris echioides
 Brodiaea coronaria
 Brodiaea terrestris
 Triteleia ixioides (lutea)
 Brodiaea elegans elegans
 Bromus sterilis
 Bromus carinatus carinatus

brome, purple false
 brome, red
 brome, woodland
 broom, California/deerweed
 broom, French
 broom, Scotch
 broom-rape, clustered
 broom-rape, naked
 buckbrush
 buckeye, California
 buckwheat, California
 buckwheat, coast
 buckwheat, naked-stemmed
 buckwheat, wicker
 bur-chervil
 (scandicina)
 butter-and-eggs
 buttercup, California
 buttercup, prickly-fruited
 buttercup, pubescent-fruited
 California bay
 California tea
 calla lily
 canary grass
 cat's ear, rough
 cat's ear, smooth
 cattail
 centaury, Davy's
 centaury, June
 chamise/greeseewood
 checker lily/mission bells
 checker mallow
 chickweed
 chickweed, field
 chickweed, shining
 chicory
 chinese houses
 chinese houses, sparse flowered
 Christmas berry/toyon
 cinquefoil, sticky
 clarkia, four-spotted
 clover, bearded
 clover, bur
 Douglas fir
 dove weed/turkey mullein

Brachypodium distachyon
 Bromus madritensis rubens
 Bromus laevipes
 Lotus scoparius
 Genista (Cytisus) monspessulana
 Cytisus scoparius
 Orobanche fasciculata
 Orobanche uniflora
 Ceanothus cuneatus (dubius)
 Aesculus californica
 Eriogonum fasciculatum
 Eriogonum latifolium
 Eriogonum nudum
 Eriogonum vimineum
 Anthriscus caucalis

Triphysaria (Orthocarpus) eriantha
 Ranunculus californicus
 Ranunculus muricatus
 Ranunculus hebecarpus
 Umbellularia californica
 Rupertia (Psoralea) physodes
 Zantedeschia aethiopica
 Phalaris canariensis
 Hypochaeris radicata
 Hypochaeris glabra
 Typha sp.
 Centaurium davyi
 Centaurium muehlenbergii
 Adenostoma fasciculatum
 Fritillaria affinis (lanceolata)
 Sidalcea malvaeflora
 Stellaria media
 Cerastium arvense
 Stellaria nitens
 Cichorium Intybus
 Collinsia heterophylla
 Collinsia sparsifolia collina
 Heteromeles (Photinia) arbutifolia
 Potentilla glandulosa
 Clarkia purpurea quadrivulnera
 Trifolium barbigerrum
 Medicago polymorpha
 Pseudotsuga menziesii
 Eremocarpus setigerus

evax, erect
 everlasting, fragrant
 everlasting, pink
 fairy bells, Hooker's
 fairy lantern/white globe lily
 farewell-to-spring
 fennel
 fern, bird's-foot
 fern, California maiden-hair
 fern, California polypody
 fern, coastal wood
 fern, coffee
 fern, goldback
 fern, western sword
 fescue, California
 fescue, Elmer's
 fescue, few-flowered
 fescue, rattail
 fescue, western six-weeks
 fiddleneck
 fiesta flower
 filaree, long-beaked
 filaree, red-stemmed
 filaree, white-stemmed
 flax, dwarf
 flax, narrow-leaved
 flax, small-flowered
 toxtall, farmer's
 Fremont's star lily
 fringed sidalcea
 fritillary, fragrant
 fuchsia, California
 garden burnet
 gazania
 geranium, cut-leaved
 german-ivy
 gilia
 gilia, bird's eye
 godetia, large
 goldenaster
 goldenrod, California
 goldfields
 gooseberry, bay
 gooseberry, hillside
 goosefoot

Hesperavex (Evax) sparsiflora
 Gnaphalium canescens beneolens
 Gnaphalium ramosissimum
 Disporum hookeri
 Calochortus albus
 Clarkia rubicunda
 Foeniculum vulgare
 Pellaea mucronata
 Adiantum jordanii
 Polypodium californicum
 Dryopteris arguta
 Pellaea andromedifolia
 Pentagramma triangularis
 Polystichum munitum
 Festuca californica
 Festuca elmeri
 Vulpia microstachys pauciflora
 Vulpia myuros myuros
 Vulpia myuros hirsuta
 Amsinckia menziesii intermedia
 Pholistoma auritum
 Erodium botrys
 Erodium cicutarium
 Erodium moschatum
 Hesperolinon congestum
 Linum bienne
 Hesperolinon micranthum
 Hordeum murinum leporinum
 Zigadenus fremontii
 Sidalcea diploscypha
 Fritillaria liliacea
 Epilobium canum
 Sanguisorba minor muricata
 Gazania linearis
 Geranium dissectum
 Senecio milkanioides
 Gilia clivorum
 Gilia tricolor
 Clarkia purpurea vinea
 Heterotheca sessiliflora
 Solidago californica
 Lasthenia californica
 Ribes menziesii
 Ribes (Grossularia) californicum
 Chenopodium californicum

grass, annual beard
 grass, annual hair
 grass, California canary
 grass, California oat
 grass, cultivated oat
 grass, European silver hair
 grass, Hall's bent
 grass, harding
 grass, hedgehog dogtail
 grass, Italian rye
 grass, June
 grass, little quaking
 grass, Mediter. canary
 grass, medusa head
 grass, nit
 grass, pine blue
 grass, perennial rye
 grass, rattlesnake
 grass, ripgut
 grass, Scribner's
 grass, slender hair
 grass, slender wild oat
 grass, spanish brome
 grass, squiretail
 grass, velvet
 grass, wild oat
 greesewood/hamise
 grindelia, hirsute
 groundsel
 groundsel, common
 Guadalupe Island palm
 gumplant
 hareleaf, common
 hawk's beard
 hedge nettle, rigid
 hedge nettle, short-spiked
 hedge parsley
 hedge parsley, California
 knotted hedge parsley
 hill star
 Himalya berry
 holly-leaved cherry
 honeysuckle, hairy
 horkelia, wedge-leaved
 horsetail, giant

Polypogon monspeliensis
 Deschampsia danthonioides
 Phalaris californica
 Danthonia californica
 Avena sativa
 Aira caryophyllea
 Agrostis halii
 Phalaris aquatica (tuberosa)
 Cynosurus echinatus
 Lolium multiflorum
 Koeleria macrantha
 Briza minor
 Phalaris minor
 Taeniatherum caput-medusae
 Gastridium ventricosum
 Poa secunda (scabrella)
 Lolium perenne
 Briza maxima
 Bromus diandrus (rigidus)
 Scribneria bolanderi
 Deschampsia elongata
 Avena barbata
 Bromus madritensis
 Elymus glaucus X E. multisetus
 Holcus lanatus
 Avena fatua
 Adenostoma fasciculatum
 Grindelia hirsutula
 Senecio aronicoides
 Senecio vulgaris
 Erythea edulis
 Grindelia camporum
 Lagophylla ramosissima
 Crepis vesicaria taraxacifolia
 Stachys ajugoides rigida
 Stachys pycnantha
 Torilis arvensis
 Yabea (Caucalis) microcarpa
 Torilis nodosa
 Lithophragma heterophyllum
 Rubus discolor (procerus)
 Prunus ilicifolia
 Lonicera hispidula vacillans
 Horkelia cuneata
 Equisetum telmateia braunii

lovegrass
 hound's tongue
 hyacinth, long-rayed
 hyacinth, wild
 Indian pink, California
 Indian warrior
 iris, bearded
 iris, Douglas'
 jivriel's spear
 lady's mantle
 larkspur, California
 larkspur, royal
 larkspur, spreading
 larkspur, western
leatherwood
lessingia, woolly-headed
 lettuce, prickly
 lettuce, willow
 lily, leopard
 linanthus, bicolored
 linanthus, common
 linanthus, flax-flowered
 linanthus, pigmy
linanthus, serpentine
 linanthus, small-flowered
 lizard tail
 locoweed, Gambell's drawl
 lomatium, bladder parsnip
 lomatium, California
 lomatium, caraway-leaved
 lomatium, large-fruited
 lomatium, woolly-fruited
 loosestrife
 lovegrass
 lupine, arroyo
 lupine, bicolor
 lupine, bush
 lupine, chick
 lupine, summer
 madder, field
 madia, common
 madia, threadstream
 madrone
 mallow, chaparral

Conyza sp.
 Cynoglossum grande
 Triteleia peduncularis
 Triteleia hyacinthina
 Silene californica
 Pedicularis densiflora
 Iris germanica
 Iris douglasiana
 Triteleia laxa
 Aphanes (Alchemilla) occidentalis
 Delphinium californicum
 Delphinium variegatum variegatum
 Delphinium patens
 Delphinium hesperium hesperium
Dirca occidentalis
Lessingia hololeuca
 Lactuca serriola
 Lactuca saligna
 Lilium pardalinum
 Linanthus bicolor
 Linanthus androsaceus
 Linanthus liniflorus
 Linanthus pygmaeus
Linanthus ambiguus
 Linanthus parviflorus
 Eriophyllum staechadifolium
 Astragalus gambellianus
 Lomatium utriculatum
 Lomatium californicum
 Lomatium caruifolium
 Lomatium macrocarpum
 Lomatium dasycarpum
 Lythrum sp.
 Eragrostis sp.
 Lupinus succulentus
 Lupinus bicolor
 Lupinus albitrons
 Lupinus microcarpus densiflorus
 Lupinus formosus
Shardaria arvensis
 Madia elegans densifolia
 Madia exigua
 Arbutus menziesii
Malacothamnus fasciculatus

man-root, California
 man-root, coast
 manzanilla
manzanilla, Kings Mountain
 mariposa, lily white
 mariposa, lily yellow
 meadow rue
 melica, California
 melica, small-flowered
 melica, Torrey's
 microseris, Douglas'
 milk maids
 milkweed, narrow-leaved
 miner's lettuce
 mission bells/checker lily
 monkey flower, large
 monkey flower, sticky
 monolopia, cupped
 monolopia, woodland
 (P) Monterey cypress
 montia, common
 morning glory, chapparal
 morning glory, hill
 mountain dandelion
 mugwort
 muilla
 mule ears
 mule ears, narrow-leaved
 mullein, moth
 mustard, California
 mustard, field
 mustard, tumble
 narrow-leaved filago
 navarrelia, Callistoga
 needlegrass, foothill
 needlegrass, purple
 nemophila, meadow
 nemophila, variable-leaved
 niveitas
 ninebark, pacific
 nodding trisetum
 oak, blue
 oak, coast live
 oak, leather

Marah fabaceus
 Marah oreganus
 Arclostaphylos tomentosa crinita
Arclostaphylos regismontana
 Calochortus venustus
 Calochortus luteus
 Thalictrum fendleri polycarpum
 Melica californica
 Melica imperfecta
 Melica torreyana
 Microseris douglasii
 Cardamine (Dentaria) californica
 Asclepias fascicularis
 Claytonia (Monilia) perfoliata
 Fritillaria affinis (lanceolata)
 Mimulus guttatus
 Mimulus (Diplacus) aurantiacus
 Monolopia major
 Monolopia gracilens
 Monterey cypress
 Claytonia exigua glauca
 Calystegia occidentalis
 Calystegia subacaulis
 Agoseris heterophylla
 Artemisia douglasiana
 Muilla maritima
 Wyethia glabra
 Wyethia angustifolia
 Verbascum blattaria
 Guilenia (Thelypodium) lasiophylla
 Brassica rapa (campestris)
 Sisymbrium altissimum
 Filago gallica
 Navarrelia heterodoxa
 Nassella (Stipa) lepida
 Nassella (Stipa) pulchra
 Nemophila pedunculata
 Nemophila heterophylla
 Cryptantha flaccida
 Physocarpus capitatus
 Trisetum cernuum
 Quercus douglasii
 Quercus agrifolia
 Quercus durata durata

oak, scrub	Quercus berberidifolia	poppy, California	Eschscholzia californica
oak, valley	Quercus lobata	primrose, slender flowered	Camissonia graciliflora
oceanspray/cream bush	Holodiscus discolor	pterostegia	Pterostegia drymarioides
olive	Olea europaea	purple mouse ears	Mimulus douglasii
onion, coastal	Allium dichlamydeum	pygmy-weed	Crassula connata
onion, pitted	Allium lacunosum	pyracantha	Pyracantha coccinea
onion, sickle leaved	Allium falcifolium (breweri)	radish	Raphanus sativus
onion, wild	Allium triquetrum	rattlesnake weed	Daucus pusillus
orchid	Epipactis helleborine	red hot poker	Kniphofia uvaria
orthocarpus, dwarf	Triphysaria (Orthocarpus) pusilla	red maids	Calandrinia ciliata (menziesii)
oso berry	Oemleria (Osmaronia) cerasiformis	red valerian	Centranthus ruber
owl's clover	Castilleja (Orthocarpus) densiflora	redberry, spiney	Rhamnus crocea
owl's clover, common	Castilleja exserta	redwood, coast	Sequoia sempervirens
oyster plant/salsify	Tragopogon porrifolius	rigiopappus	Riglopappus leptocladus
paint brush, Indian	Castilleja affinis	rose, ground	Rosa spithamea (sonomensis)
paint brush, woolly	Castilleja foliolosa	rose, wild California	Rosa californica
pampas grass	Cortaderia sp.	rose, wood	Rosa gymnocarpa
pea, chaparral	Pickeringia montana	rosin weed	Calycadenia multiglandulosa
pea, hillside	Lathyrus vestitus	rush, common	Juncus patens
pea, wild	Lathyrus vestitus ochropetalus	rush, common wood	Luzula comosa (multiflora)
peak rush-rose	Helianthemum scoparium	rush, iris-leaved	Juncus xiphioides
pearwort, dwarf	Sagina apetala (barbata)	rush, needle spike	Eleocharis acicularis
pearwort, western	Sagina decumbens occidentalis	rush, pacific	Juncus effusus pacificus
pellitory	Parietaria judaica	rush, spike	Eleocharis montevidensis
pennyroyal	Mentha pulegium	rush, toad	Juncus bufonius
pentachaeta, white-rayed	Pentachaeta bellidiflora	ryegrass, alkali	Leymus (Elymus) triticoides
peppergrass, shining	Lepidium nitidum nitidum	sagebrush, California	Artemisia californica
periwinkle	Vinca major	salsify/oyster plant	Tragopogon porrifolius
phacelia California	Phacelia californica	San Mateo thornmint	Acanthomintha duttonii (obovata)
phacelia, common	Phacelia distans	sand-spurrey, purple	Spergularia rubra
phacelia, divaricate	Phacelia divaricata	sandwort, Douglas'	Minuartia (Arenaria) douglasii
phacelia, imbricate	Phacelia imbricata	sandwort, dwarf	Minuartia (Arenaria) californica
phlox, slender	Phlox gracilis	sanicle, coast	Sanicula laciniata
pineapple weed	Chamomilla suaveolens	sanicle, pacific	Sanicula crassicaulis
piperia, elegant	Piperia elegans	sanicle, poison	Sanicula bipinnata
pitcher sage	Lepechinia calycina	sanicle, purple	Sanicula bipinnatifida
plantain, California	Plantago erecta	sanicle/turkey pea	Sanicula tuberosa
plantain, English	Plantago lanceolata	saxifrage, California	Saxifraga californica
plecritis, long-spurred	Plectritis ciliosa	scarlet pimpernel	Anagallis arvensis
plecritis, white	Plectritis macrosera	sedge	Carex sp.
pogogyne	Pogogyne serpylloides	sheep sorrel	Rumex acetosella
poison hemlock	Conium maculatum	shepard's purse	Capsella bursa-pastoris
poison oak	Toxicodendron diversilobum	shooting star	Dodecatheon hendersonii
popcornflower	Plagiobothrys nothofolius	shooting star, lowland	Dodecatheon clevelandii patulum

shooting star, Padres'	Dodecatheon clevelandii sanctarum	trail plant	Adenocaulon bicolor
sierra plum	Prunus subcordata	tree of heaven	Ailanthus altissima
silk tassel, coast	Garrya elliptica	trefoil, birdfoot	Lotus corniculatus
silver wattle	Acacia dealbata	trefoil, Chile	Lotus wrangelianus (subpinnatus)
skunkweed	Navaretia squarrosa	trefoil, short-podded	Lotus humistratus
slender cottonweed	Micropus californicus	trefoil, small flowered	Lotus micranthus
snapdragon, wiry	Antirrhinum vexillo-calyculatum	trillium, giant	Trillium chloropetalum
sneezeweed	Helenium puberulum	turkey mullein/dove weed	Eremocarpus setigerus
snowberry	Symphoricarpos albus laevigatus	venus' needle	Scandix pecten-veneris
snowberry, creeping	Symphoricarpos mollis	vervain, western	Verbena lasiostachys
soap plant/arnole	Chlorogalum pomeridianum	vetch, American	Vicia americana americana
soft chess	Bromus hordeaceus (mollis)	vetch, purple	Vicia benghalensis
solomon seal, fat	Smilacina racemosa (amplexicaulis)	vetch, spring	Vicia sativa
solomon seal, slim	Smilacina stellata (sessifolia)	virgin's bower	Clematis lasiantha
speedwell, American	Veronica americana	walnut	Juglans sp.
speedwell, Persian	Veronica persica	water cress	Rorippa nasturtium-aquaticum
spurge, petty	Euphorbia peplus	wax myrtle, California	Myrica californica
spurrey	Spergula arvensis (arvense)	white globe lily/fairy lantern	Calochortus albus
squirreltail, big	Elymus multisetus (Sitanion jubatum)	wildrye, blue	Elymus glaucus
star-thistle, purple	Centaurea calcitrapa	willow, arroyo	Salix lasiolepis
star-thistle, yellow	Centaurea solstitialis	willow herb	Epilobium brachycarpum
starflower, pacific	Trientalis latifolia	willow herb, minute	Epilobium minutum
stephanomeria, tall	Stephanomeria virgata	willow herb, northern	Epilobium ciliatum (adenocaulon)
stinging nettle	Urtica dioica	windmill pink	Silene gallica
sun cups	Camissonia (Oenothera) ovata	winter cress	Barbarea orthoceras
sunflower, California	Helianthus californicus	woodland star	Lithophragma affine
sweet alyssum	Lobularia maritima	woolly-heads, dwarf	Psilocarphus brevissimus
sweet cicely	Osmorhiza chilensis	yampah	Perideridia kelloggii
tarweed, coast	Madia sativa	yarrow	Achillea millefolium
tarweed, hayfield	Hemizonia congesta luzulifolia	yarrow, golden	Eriophyllum confertiflorum
tarweed, slender	Madia gracilis	yerba buena	Satureja douglasii
tauschia, Kellogg's	Tauschia kelloggii	yerba santa	Eriodictyon californicum
teasel, fullers	Dipsacus sativus		
thistle, bull	Cirsium vulgare		
thistle, common sow	Sonchus oleraceus		
thistle, fountain	*Cirsium fontinale fontinale		
thistle, Italian	Carduus pycnocephalus		
thistle, milk	Silybum marianum		
thistle, prickly sow	Sonchus asper		
tidy-tips	Layia platyglossa		
timothy, cultivated	Phleum pratense		
timwort	Cicendia quadrangularis		
toadflax	Linaria sp.		
toadote	Centaurea mollensis		
toyon/Christmas berry	Heteromeles (Photinia) arbutifolia		

Bryophytes

Alan Whittemore of the Missouri Botanical Gardens, who is cataloging bryophytes in the conterminous United States, found the bryophytes listed in this section in Edgewood Natural Preserve in May 1994 and 1995. The bryophytes are listed in three tables: liverworts, hornworts, and mosses.

In these tables, habitat notes refer to the general habitat in San Mateo County, not to the specific site in the park that each record came from. Here, "dry" refers to sites that are damp only during rainy periods (thus drying out early in the spring and perhaps at times during the rainy season); "wet" sites dry out only after the rains have been over for some time, and may retain somewhat humid even into the summer.

Several interesting records were found in the park. *Cephaloziella stelluifera*, *Phaeoceros bulbiculosus*, and *Bestia longipes* are not very common locally; all three are plants of mesic sheltered sites, found on the slopes above Sylvan Way and the vicinity of the spring. On the other hand, several species, notably *Pseudobraunia californica* and *Grimmia laevigata* (found on the large outcrop in the northern part of the park) and *Pottia starkeana* are common in the interior foothills of California but much less common in the outer coast ranges. One other species of *Pottiaceae* was collected near where the *Pottia* grew; Susan Sommers has not been able to identify this yet, but believes it is surely something unusual.

In sum, Dr. Whittemore found 57 bryophyte species: 13 liverworts, 3 hornworts, and 41 mosses.

Table A-3 Liverworts

Family	Species	Source	Habitat
<i>Aytoniaceae</i>	<i>Asterella bolanderi</i>	(Aust.) Underw. (5277)	Dry soil.
	<i>Asterella californica</i>	(Hampe) Underw. (5252)	Dry soil, on banks and around rocks
<i>Targioniaceae</i>	<i>Targionia mexicana</i>	Lehm. & Lindenb. (5251)	Dry soil on banks. Formerly identified as <i>Targionia hypophylla</i> L., an Old World species that doesn't occur in North America.
<i>Ricciaceae</i>	<i>Riccia californica</i>	Aust. (5265)	Bare soil in rather dry places.
	<i>Riccia nigrella</i>	DC. (5227B)	Dry soil.
	<i>Riccia sorocarpa</i>	Bisch. (5220)	Dry soil.
<i>Fossombroniaceae</i>	<i>Fossombronia longiseta</i>	Aust. (5232, 5255)	Dry soil.
<i>Gymnomitriaceae</i>	<i>Marsupella bolanderi</i>	(Aust.) Underw. (5269A)	Dry soil on banks.
<i>Cephaloziellaceae</i>	<i>Cephaloziella divaricata</i>	(Smith) Schiffn. (5227A, 5275)	Dry soil.
	<i>Cephaloziella stellulifera</i>	(Tayl.) Schiffn. (5256)	Soil in sheltered places.
	<i>Cephaloziella turneri</i>	(Hook.) K. Müll. (5269B, 5350)	Soil, usually on banks, in damp to rather dry sites.

Table A-3 (Continued) Liverworts

Family	Species	Source	Habitat
<i>Porellaceae</i>	<i>Porella bolanderi</i>	(Aust.) Pears. (5239, 5241, 5242)	Bark and rocks, varying from wet shaded sites to dry exposed sites.
<i>Jubulaceae</i>	<i>Frullania bolanderi</i>	Aust (5222)	On dry bark.

Table A-4 Hornworts: Family Anthocerotaceae

Species	Source	Habitat
<i>Anthoceros fusiformis</i>	Aust. (5266)	Dry or more or less humid soil.
<i>Phaeoceros bulbiculosus</i>	(Brotero) Prosk. (5245)	Dry soil.
<i>Phaeoceros pearsonii</i>	(M.A. Howe) Prosk. (5254, 5342)	Dry soil.

Table A-5 Mosses

Family	Species	Source	Habitat
<i>Ditrichaceae</i>	<i>Anisothecium varium</i>	(Hews.) Schimp. (5267)	Dry soil.
	<i>Ceratodon purpureus</i>	(Hedw.) Brid. (5349)	Dry, sandy soil.
<i>Fissidentaceae</i>	<i>Fissidens curvatus</i> Hornsch.	(5248)	On dry soil; probably introduced from the tropics. Formerly known as <i>Fissidens milobakeri</i> F.W. Koch.
	<i>Fissidens limbatus</i>	Sull. (5244)	Usually on soil, many habitats.
<i>Pottiaceae</i>	<i>Didymodon occidentalis</i>	Zander (5231)	Dry soil or rock.
	<i>Didymodon vinealis</i>	(Brid.) Zander var. <i>flaccidus</i> (Br. & Sch.) Zander (5259)	Soil or rock in more or less humid places.
		(Brid.) Zand. var. <i>vinealis</i> (5336)	Dry soil or rock.
	<i>Pottia starkeana</i>	(Hedw.) C. Müll. var. <i>starkeana</i> (5345)	Dry sunny soil.
	<i>Timmiella crassinervis</i>	(Hampe) L.F. Koch (5230, 5263)	Dry soil.
	<i>Tortula bolanderi</i>	(Lesq) M.A. Howe (5262)	Dry soil of banks.
	<i>Tortula laevipila</i>	(Brid.) Schwaegr. (5226, 5229, 5338)	Dry bark and sometimes rock.

Table A-5 (Continued) Mosses

Family	Species	Source	Habitat
<i>Grimmiaceae</i>	<i>Tortula princeps</i>	De Not. (5236)	Dry rock and base of trees.
	<i>Weissia controversa</i>	Hedw. (5253)	Dry soil, usually on banks.
	<i>Grimmia laevigata</i>	(Brid.) Brid. (5276)	Dry rock, in exposed places, commoner inland.
	<i>Grimmia cf rivulare</i>	Brid. (5224))	Dry rock.
	<i>Grimmia trichophylla</i>	Grev. (5223, 5271, 5272)	Exposed surfaces of large boulders and rock outcrops.
<i>Funariaceae</i>	<i>Funaria hygrometrica</i>	Hedw. (5335)	Trampled soil in disturbed areas.
	<i>Funaria mjhlenbergii</i>	Turn. (5261)	Dry soil of banks.
<i>Bryaceae</i>	<i>Bryum argenteum</i>	Hedw. (5344)	Dry sunny soil.
	<i>Bryum canariense</i>	Brid. (5257)	Dry soil.
	<i>Bryum capillare</i>	Hedw. (5273)	Dry soil, rock or sometimes bark.
	<i>Bryum flaccidum</i>	Brid. (5340)	Bark or rock, usually in dry shaded places. Doubtfully distinct.
<i>Bartramiaceae</i>	<i>Epipterygium tozeri</i>	(Grev.) Lindb. (5337)	Shaded soil beneath rocks.
	<i>Anacolia menziesii</i>	(Turn.) Paris (5274)	Dry rock; commoner inland.
	<i>Bartramia stricta</i>	Brid. (5246, 5347)	Dry soil.
<i>Orthotrichaceae</i>	<i>Orthotrichum lyellii</i>	Hook. & Tayl. (5343)	On bark, dry or humid places.
	<i>Othotrichum rupestre</i>	Schleich. ex Schwaegr. (5225)	Dry rock.
	<i>Orthotrichum tenellum</i>	Bruch ex Brid. (5221)	Dry bark of tree trunks (usually oaks).
<i>Hedwigiaceae</i>	<i>Pseudobraunia californica</i>	(Lesq.) Broth. (5270)	Dry rock, in exposed places, commoner inland.
<i>Leucodontaceae</i>	<i>Alsia californica</i>	(Hook. & Arn.) Sull. (5243)	Bark of trees, more or less humid places.
	<i>Antitrichia californica</i>	Sull. in Lesq. (5228)	Bark of trees, dry or rather humid places.
	<i>Dendroalsia abietina</i>	(Hook.) E.G. Bridd. (5264)	Bark of trees, more or less humid places.
	<i>Pterogonium gracile</i>	(Hedw.) Smith (5233, 5234)	Bark or rock, dry or rather humid places.
<i>Thuidiaceae</i>	<i>Claopodium whippleanum</i>	(Sull. in Whipple & Ives) Ren. & Card. (5260)	Dry or wet soil.

Table A-5 (Continued) Mosses

Family	Species	Source	Habitat
<i>Brachytheciaceae</i>	<i>Bestia longipes</i>	(Sull. & Lesq.) Broth (5238, 5240)	Rock or bark in sheltered places.
	<i>Eurhynchium praelongum</i>	(Hedw.) Schimp. in B.S.G. (5238)	Soil and decaying plant material.
	<i>Homalothecium arenarium</i>	(Lesq.) Lawt. (5348)	Dry soil, often in chaparral.
	<i>Homalothecium nutallii</i>	(Wils.) Jaeg. (5249)	Bark of trees, dry or rather humid places.
	<i>Homalothecium pinnatifidum</i>	(Sull. & Lesq.) Lawt. (5237, 5247, 5268)	Dry soil.
	<i>Isothecium myosuroides</i>	Brid. (5235)	Soil, rock, or wood, many habitats.
	<i>Scleropodium californicum</i>	(Lesq.) Kindb. (5219, 5250)	Dry or wet soil.
	<i>Scleropodium touretti</i>	(Brid.) L.F. Koch (5339, 5341)	Dry shaded soil, rock, or sometimes wood.

WILDLIFE AT EDGEWOOD

Class	Order	Species
		centipedes, millipedes
	<i>Hymenoptera</i>	wasps, including yellowjackets and tarantula wasps bees, including honeybees and native solitary bees ants, including native black ants
	<i>Lepidoptera</i>	butterflies, including the Bay checkerspot (<i>Euphydryas editha bayensis</i>), monarch, tiger swallowtail, zebra swallowtail, blues, dusky wing, buckeye, western painted lady, mourning cloak, California sister moths
	<i>Coleoptera</i>	beetles
	<i>Arachnidae</i>	spiders and arachnids: argopiope, tarantula, blind harvestman (<i>Calicina minor</i>), Edgewood micro-blind harvestman (<i>Microcina edgewoodensis</i>)
<i>Amphibia</i>	<i>Caudata</i>	California slender salamander (<i>Batrachoseps attenuatus</i>) California newt (<i>Taricha torosa</i>)
	<i>Salientia</i>	Pacific tree frog (<i>Hyla regilla</i>) Western toad (<i>Bufo boreas</i>)
<i>Reptilia</i>	<i>Squamata</i>	Northern alligator lizard (<i>Gerrhonotus coeruleus</i>) Western fence lizard (<i>Sceloporus occidentalis</i>)
	<i>Herpes</i>	California common kingsnake (<i>Lampropeltis getulus californiae</i>), Pacific gopher snake (<i>Pituophis melanoleucus</i>), Western ringneck (<i>Diadophis punctatus</i>), Western rattlesnake (<i>Crotalus atrox</i>), garter, California boa, green water
<i>Chordata</i>	<i>Marsupialia</i>	opossum (<i>Didelphis marsupialis</i>)
<i>Mammalia</i>	<i>Insectivora</i>	mole: presence observed but no species identified shrew: presence observed but no species identified
	<i>Aves</i>	(See Appendix D, 'Bird Species at Edgewood')
	<i>Chiroptera</i>	Seen but non-specific identified: bats
	<i>Rodentia</i>	Western gray squirrel (<i>Sciurus griseus</i>) pocket gopher (<i>Thomomys bottae</i>) California Meadow vole (<i>Microtus californicus</i>) Western harvest mouse (<i>Reithrodontomys megalotis</i>) dusky-foot woodrat (<i>Neotoma fuscipes</i>)

Wildlife at Edgewood (continued)

Class	Order	Species
	<i>Carnivora</i>	racoon (<i>Procyon lotor</i>) fox, gray (<i>Urocyon cinereoargenteus</i>) fox, red (<i>Vulpes fulva</i>) coyote (<i>Canis latrans</i>) bobcat (<i>Lynx rufus</i>)
	<i>Lagomorpha</i>	desert cottontail (<i>Sylvilagus auduboni</i>) black-tailed jackrabbit (<i>Lepus californicus</i>)
	<i>Artiodactyla</i>	California mule deer (<i>Odocoileus hemionus columbianus</i>)

BIRD SPECIES SIGHTED AT EDGEWOOD

1. Bird Species at Edgewood
3. Edgewood County Park - Birds to Look For,
San Francisco Peninsula Birdwatching, 1996

BIRD SPECIES AT EDGEWOOD

The following birds are believed to be resident, or that local Audobon Society members have sighted at Edgewood.

Bird	Aerial	Grassland	Riparian	Oak Woodland	Chaparral
Vultures, hawks, falcons					
turkey vulture	x				
black-shouldered kite	x	x	x		
sharp-shinned hawk	x			x	
Cooper's hawk	x			x	
red-tailed hawk	x	x		x	
red-shouldered hawk	x			x	
northern harrier	x	x			
kestrel	x	x			
Gallinaceous birds					
California quail		x	x	x	x
Pigeons and doves					
band-tailed pigeon	x			x	
mourning dove		x		x	
rock dove	x			x	
Owls					
great horned owl				x	
Hummingbirds					
Anna's hummingbird			x	x	x
Allen's hummingbird			x	x	x
Woodpeckers					
common flicker			x	x	
hairy woodpecker				x	
downy woodpecker				x	
Nuttall's woodpecker				x	
Flycatchers					
ash-throated flycatcher				x	
black phoebe			x		x
western wood pewee				x	

Table C-1 (Continued) Birds at Edgewood

Bird	Aerial	Grassland	Riparian	Oak Woodland	Chaparral
Swallows					
violet-green swallow	x			x	
rough-winged swallow	x				
barn swallow	x				
Jays and crows					
scrub jay				x	x
Stellar's jay				x	
common raven	x				
common crow	x				
Chickadees					
chestnut-backed chickadee			x	x	
plain titmouse			x	x	
bush tit			x	x	
Nuthatches and creepers					
brown creeper				x	
Wrenitis and wrens					
wrenit			x	x	x
Bewick's wren				x	x
Mockingbirds and thrashers					
mockingbird		x		x	x
California thrasher				x	
Thrushes					
American robin				x	
varied thrush				x	
hermit thrush				x	
Swansen's thrush			x	x	
western bluebird		x		x	
Gnatcatchers and kinglets					
blue-gray gnatcatcher				x	x
ruby-crowned kinglet				x	
gold-crowned kinglet				x	
Waxwings, starlings, vireos					
starling				x	
Hutton's vireo				x	
Wood warblers					
orange-crowned warbler			x	x	x
yellow-rumped warbler			x	x	
Townsend's warbler				x	x
Wilson's warbler					x

Table C-1 (Continued) Birds at Edgewood

Bird	Aerial	Grassland	Riparian	Oak Woodland	Chaparral
Meadowlarks, blackbirds, orioles		x			
western meadowlark		x		x	
Brewer's blackbird			x		
northern oriole					
Grosbeaks, finches, sparrows					
black-headed grosbeak			x		
purple finch				x	
house sparrow		x		x	x
pine siskin	x	x		x	
American goldfinch			x		x
lesser goldfinch				x	x
rufous-sided towhee			x	x	x
brown towhee			x		x
dark-eyed junco				x	x
white-crowned sparrow				x	x
golden-crowned sparrow		x		x	x
fox sparrow			x		x
lark sparrow		x			
song sparrow			x		
chipping sparrow					
savannah sparrow		x		x	
Gulls					
western	x				
herring	x				
Shore birds					
killdeer		x			

Birds to look for

Year-round species

Turkey Vulture, Cooper's, Red-tailed and Red-shouldered Hawks, American Kestrel, Golden Eagle (rare), California Quail, Band-tailed Pigeon, Mourning Dove, Rock Dove, Anna's Hummingbird, Northern Flicker, Downy, Hairy and Nuttall's Woodpeckers, Black Phoebe, Scrub and Steller's Jays, Common Raven, American Crow, Chestnut-backed Chickadee, Plain Titmouse, White-breasted Nuthatch, Bushtit, Brown Creeper, Wrentit, Bewick's Wren, Northern Mockingbird, California Thrasher, American Robin, Western Bluebird, European Starling, Hutton's Vireo, Western Meadowlark, Brewer's Blackbird, California and Rufous-sided Towhees, Dark-eyed Junco, Song and Savannah Sparrows, Purple and House Finches, Pine Siskin, Lesser and American Goldfinches and House Sparrow.

Spring and summer species

Allen's Hummingbird, Olive-sided, Pacific-slope and Ash-throated Flycatchers, Western Wood-Pewee, Violet-green, Tree, Barn, Cliff and Northern Rough-winged Swallows, Swainson's Thrush, Blue-gray Gnatcatcher, Orange-crowned and Wilson's Warblers, Brown-headed Cowbird, Northern Oriole, Black-headed Grosbeak, Chipping and Grasshopper Sparrows.

Winter species

White-tailed Kite, Sharp-shinned Hawk, Northern Harrier, Say's Phoebe, Hermit and Varied Thrushes, Ruby-crowned and Golden-crowned Kinglets, Yellow-rumped and Townsend's Warblers, Golden-crowned, White-crowned and Fox Sparrows.

Directions

There are three entrances to the park: Sunset Way; Edgewood Road west of Interstate 280; and the Old Stage Day Camp entrance on the south side of Edgewood Road adjacent to Crestview Drive. The best entrance to the ridge trail is at the junction of Sunset Way and Hillcrest Way. Take Jefferson Avenue west from El Camino Real in Redwood City. Watch for Jefferson to turn right sharply at Farm Hill Boulevard. After making the turn, proceed about 1.8 miles and turn right on California Way. (Look for the firehouse on the corner). Park at the junction of Sunset Way and Hillcrest Way. Walk past the PG&E substation to the

Toni Corelli, Botanist
Rare & Endangered Plant Chairperson
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California Native Plant Society
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March 10, 1997

Patrick Sanchez and Bernadine Alling
 San Mateo County Parks and Recreation Division
 590 Hamilton Street, Fourth Floor
 Redwood City, CA 94063

Dear Director Sanchez and Ms. Alling:

This letter concerns the Edgewood Natural Preserve Master Plan draft of February 1997, pages 26, 38 and 39. I submit the following suggested changes:

Table 2

Species of Concern at Edgewood Natural Preserve. I think this table should be as shown below so as to include all of the plants that occur in the "Inventory of Rare and Endangered Vascular Plants of California", fifth edition. All of these plants have been documented with the Department of Fish and Game using Field Survey Forms.

<u>SCIENTIFIC NAME</u> <u>COMMON NAME</u>	<u>LEGAL STATUS</u>		<u>CNPS</u>	<u>HABITAT AT EDGEWOOD</u>
	<u>STATE</u>	<u>FEDERAL</u>		
Acanthomintha duttonii San Mateo thorn-mint	Endangered	Endangered	1B	Serpentine grassland.
Arctostaphylos regismontana Kings Mtn. manzanita	CEQA?	none	4	Franciscan sandstone in evergreen forests.
Collinsia multicolor San Francisco collinsia	CEQA?	none	4	Moist, shady evergreen woodland.
Dirca occidentalis western leatherwood	CEQA	none	1B	Moist, shady evergreen woodland.
Fritillaria liliacea fragrant fritillary	CEQA	Species of Concern	1B	Moist areas in serpentine grasslands.

Hesperolinon congestum Marin western flax	Threatened Threatened	1B	Serpentine grasslands.
Lessingia hololeuca woolly-headed lessingia	CEQA? none	3	Serpentine grasslands.
Linanthus ambiguus serpentine linanthus	CEQA? none	4	Serpentine grasslands.
Malacothamnus arcuatus arcuate bush mallow	CEQA? none	4	Chaparral.
Pentachaeta bellidiflora white-rayed pentachaeta	Endangered Endangered	1B	Serpentine grasslands.

SENSITIVE PLANTS THAT MAY OCCUR AT EDGEWOOD OR HISTORICAL RECORDS OF SENSITIVE PLANTS

Cirsium fontinale fontinale fountain thistle	Endangered Endangered	1B	Serpentine grasslands in seeps and ravines.
Eriogonum luteolum caninum Tiburon buckwheat	CEQA? none	3	Serpentine in chaparral and grassland.
Pedicularis dudleyi Dudley's lousewort	Rare Species of Concern	1B	Coniferous forest
Silene verecunda verecunda San Francisco campion	CEQA Species of Concern	1B	Sand hills and rocky soils in open areas.

Abbreviations and Comments:

The California Native Plant Society (CNPS) Lists

1B	=	Plants Rare, Threatened, or Endangered in California and Elsewhere
3	=	Plants About Which We Need More Information - A Review List
4	=	Plants of Limited Distribution - A Watch List
CEQA	=	CEQA (California Environmental Quality Act) consideration is mandatory for CNPS List 1&2 plants.
CEQA?	=	It is recommended that evaluation for CEQA consideration for CNPS List 3&4 plants.

Federally-listed Plants - Former C1 and C2 taxa are now referred to as "Species of Concern" by the US Fish and Wildlife Service.

Nomenclature used is from "CNPS Inventory of Rare and Endangered Vascular Plants of California", fifth edition.

References:

Corelli, T., Chandik, Z. 1995. The Rare and Endangered Plants of San Mateo and Santa Clara County with Photographs and Illustrations. Monocot Press.
 Skinner, M.W., Pavlik, B.M., eds. 1994. Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society Special Publication No. 1 (Fifth Edition).

Plant Species of Concern (these are my comments for pages 38 and 39 in the draft)

There are 10 rare and endangered plant species documented with the Department of Fish and Game that have extant populations at Edgewood County Park. Three of them are listed by the State and Federal Government as Threatened or Endangered and one is listed as a Species of Concern. These are:

Acanthomintha duttonii, San Mateo thorn-mint is an annual plant endemic to serpentine grassland with one population found at Edgewood. Historically this species occurred in a number of populations in San Mateo County from the Emerald Hills in Redwood City to Crystal Springs Reservoir. The San Mateo thorn-mint is now known from only two natural occurrences, both in San Mateo County. This plant is listed by the State and Federal Government as Endangered.

Fritillaria liliacea, fragrant fritillary is a herbaceous perennial plant which grows from a bulb. There are three populations found at Edgewood. There are many extant populations found from Sonoma County to Monterey County. In San Mateo County there are seven extant populations. This is listed by the Federal Government as a Species of Concern.

Hesperolinon congestum, Marin western flax is an annual plant endemic to serpentine soils with three populations found at Edgewood. Historically this species occurred quite extensively from Marin to San Mateo County there are now fourteen extant populations within Marin, San Francisco and San Mateo County. This plant is listed by the State and Federal Government as Threatened.

Pentachaeta bellidiflora, white-rayed pentachaeta is a small annual plant with one population found on serpentine grassland at Edgewood. Historically this species occurred in Marin, San Mateo and Santa Cruz counties. The white-rayed pentachaeta is now known from only two natural occurrences, both in San Mateo County. This plant is listed by the State and Federal Government as Endangered.

Other Plant Species of Potential Concern:

Cirsium fontinale fontinale, fountain thistle is a perennial herbaceous plant endemic to serpentine seeps and ravines in San Mateo County. There is one documented population at Edgewood but no plants have been found at this location since 1996. Recent surveys in July and August 1996 (by T. Peterson, Thomas Reid & Associates, and Dr. W. Savage, San Jose State University) failed to show any evidence of the plant, or seedling material. Dr. Savage noted, however, that in the long term (greater than 5 years), the area presents a favorable habitat for the return of the fountain thistle.

There are four extant populations found only in San Mateo County. This plant is listed by the State and Federal Government as Endangered.

The status of several other plant species known to occur at Edgewood is under investigation. These plants are not listed as endangered or threatened, or as species of concern by the State or Federal Government, but it is recommended by CNPS and the Department of Fish and Game that they be given CEQA consideration. They are: (1) Arctostaphylos regismontana, Kings Mountain manzanita, (CNPS List 4) that occurs as one plant at the edge of the evergreen woodlands; (2) Lessingia hololeuca, woolly-headed lessingia, (CNPS List 3) that occurs in one population on serpentine grassland; (3) Linanthus ambiguus, serpentine linanthus, (CNPS List 4) that has three populations in the serpentine grasslands; (4) Malacothamnus arcuatus, arcuate bush mallow, (CNPS List 4) occurs in one population in the chaparral; (5) Collinsia multicolor, San Francisco collinsia, (CNPS List 4) that occurs in the evergreen woodlands; (6) Dirca occidentalis, western leatherwood, (CNPS List 1B) that occurs in four populations in the evergreen woodlands.

Other sensitive plants reported by CNPS and other private individuals to possibly occur at Edgewood are Eriogonum luteolum caninum, Tiburon buckwheat, Silene verecunda verecunda, San Francisco campion, and Pedicularis dudleyi, Dudley's lousewort. The Tiburon buckwheat's presence at Edgewood has not been confirmed, and currently it is thought that the species may not extend south of Marin County. A specimen is at the UC Herbarium at Berkeley (with Barbara Etter, Curator) undergoing taxonomic investigation to determine if Edgewood has a population of this plant. The San Francisco campion and Dudley's lousewort were at one time on the Edgewood Park plant list but never vouchered at a herbarium as having occurred there, so their existence at the park is doubtful. These plants have been looked for but not found and the habitat for these two plants does not appear to occur within the park. Therefore, they have been removed from the list of species occurring at Edgewood.

Three plants occurring at Edgewood have been dropped from consideration due to either a change in rare status or taxonomic clarification. These are: Quercus lobata, valley oak, Clarkia rubicunda rubicunda, farewell-to-spring and Quercus dumosa, scrub oak. The valley oak and farewell-to-spring are no longer in the "CNPS Inventory of Rare and Endangered Plants", fifth edition. The Quercus dumosa has undergone a taxonomic reclassification and according to the Jepson Manual the scrub oak that occurs in our area is Quercus berberidifolia, scrub oak which has never had any protection.

These are my suggested changes, I would be glad to discuss any of these suggested ideas with you or your staff. Thank you for your efforts in moving this master plan process forward.

Sincerely,



Toni Corelli, Botanist
(415) 726-0689

cc: Carolyn Curtis
David Tibor, CNPS Botanist
Diane Elam, U.S. Fish and Wildlife Service

21 JUNE 1993

**The Status of the Bay Checkerspot Butterfly
at Edgewood County Park: 1979-1993**

Alan E. Launer

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Introduction

This report contains information gathered by researchers at Stanford University on the Bay checkerspot butterfly (*Euphydryas editha bayensis*) population residing in the serpentine soil-based grasslands of Edgewood County Park (San Mateo County, CA). This report includes both summary information from the period 1979 to 1992, and results of 1993 field work.

Basic biology and habitat requirements of the Bay checkerspot butterfly

The Bay checkerspot butterfly is univoltine (one generation per year), with adult butterflies typically present at a given location for an approximately three week period during late winter or early spring. Egg masses of 50 to 250 eggs are laid on *Plantago erecta*, *Orthocarpus densiflorus*, or *Orthocarpus purpurascens* (note that recent taxonomic revisions have placed the two *Orthocarpus* species in the genus *Castilleja*). Eggs hatch after ten days to two weeks, and the larvae initially feed on the plant on which they were laid. The larvae feed for several weeks, occasionally moving to nearby plants, and then go into a dormancy period (diapause). This dormancy lasts until late November or early December, after autumn rains have allowed the larval food plants to germinate and begun to grow. Postdiapause larvae are comparatively mobile, and generally feed until early February. At that time the larvae pupate. Bay checkerspot butterflies exist as pupae for one to two weeks. Most mortality occurs when the larval hostplants senesce before the larvae have reached size large enough to survive the dormancy period. Additionally, both prediapause and postdiapause larvae are susceptible to parasitoids, and approximately 50% of the individuals that pupate do not survive to become adult butterflies. Individual butterflies generally live a week to ten days as adults.

The Bay checkerspot butterfly is restricted to patches of native California

grassland containing a mixture of its larval hostplants (*Plantago erecta*, *Orthocarpus densiflorus*, or *O. purpurascens*), and adult nectar sources (including *Lasthenia chrysostoma*, *Layia platyglossa*, *Allium* species, *Muilla maritima*, *Amsinkia intermedia*, *Linanthus* species, and *Lomatium* species).

The only areas that presently support this mixture of grassland forbs are found on the patchily distributed serpentine-derived soils. Serpentinic rock weathers to form shallow, nutrient poor soils, low in nitrogen and calcium, and high in magnesium, nickel, and chromium. Serpentine soils are easily saturated by rains, but dry rapidly, and are comparatively harsh substrates for most plant species. For these reasons, grasses and forbs from Eurasia, which now dominate many California grasslands, have been unable to dominate many areas of serpentine soils. As a result, the Bay checkerspot butterfly is currently restricted to remnant patches of native grasslands that are limited in area and isolated from one another.

Variations in the timing of the adult flight period and hostplant senescence makes the Bay checkerspot butterfly highly prone to weather-induced population fluctuations. Following years favorable to the Bay checkerspot butterfly, that is years that favor postdiapause larval growth and prediapause larval survival, the number of butterflies may dramatically increase; some populations have been observed to exhibit a five hundred percent increase in population size from one year to the next. Conversely, following years with comparatively little spring rain, which results in the early senescence of larval hostplants, the number of butterflies may decrease by an order of magnitude. Not surprisingly, Bay checkerspot butterfly populations crashed in numbers during the severe droughts of 1975-1977 and the late 1980's, and a number of populations are thought to have gone extinct during these periods.

The topographic configuration of specific patches of serpentine soil-based grasslands plays a critical role in determining the ability of an individual habitat patch to support Bay checkerspot butterfly populations through extreme weather years. Variations in aspect, slope and elevation across hillslopes create distinct solar exposure regimes, which result in distinct microclimates (for example, south-facing slopes are warmer and drier than north-facing slopes, because south-facing slopes receive much more solar radiation on clear days than do north-facing slopes). This microclimatic variation affects the timing of both butterfly and hostplant development. Bay checkerspot butterfly larvae on warm south-facing slopes may develop faster and emerge as adults a month (or more) earlier than larvae on cool north-facing slopes. Hostplant senescence is also dependent upon solar exposure; hostplants on south-facing slopes may flower and senesce three or four weeks before those on cooler slopes.

The spatial pattern of prediapause survival, and, hence, distribution of postdiapause larvae, across the microclimatic gradient changes from year to year. If the timing between an adult butterfly flight period and hostplant senescence is such that prediapause larvae can survive on warm slopes, the population may be able to sustain a "thermal advance." Population increases are often associated with thermal advances. Conversely, if the timing between adult butterfly flight period and larval hostplant senescence is such that prediapause larvae can only survive on cool slopes, then the population may experience a "thermal retreat." Population declines are often associated with thermal retreats.

These ever-shifting patterns of larval survival emphasize the importance of topographic diversity in maintaining populations of the Bay checkerspot butterfly. A variety of microclimates across a habitat patch apparently acts to buffer the population from weather fluctuations, and greatly increases the

chance of long-term persistence. The range of slope exposures determines the overall range of microclimates available.

Additionally, specific microclimates are apparently very important to the long-term persistence of the Bay checkerspot butterfly. In particular, microclimatically cool exposures, typically north-facing slopes, appear to form "core" habitat in which at least some individuals will survive during most drought conditions. Even small areas of cool microclimate (north-facing slopes) will confer to a population resistance to extinctions during short or mild periods of drought.

Warmer slope exposures are also important. Postdiapause larvae have been found to disperse to warmer slopes on which they grow more rapidly. Hence, the lack of adjacent warm slopes may act to inhibit postdiapause larval development. Reduced developmental rates may result in later flight periods, and may lead to timing problems between adult flight period and hostplant senescence. Additionally, even warm slope exposures far beyond the dispersal ability of postdiapause larvae, can contribute to the persistence of the population by providing early season nectar, which can serve to increase female fecundity.

Metapopulation dynamics of the Bay checkerspot butterfly

On the San Francisco Peninsula, the Bay checkerspot butterfly survives as a single metapopulation. The extinction of local demographic units within this metapopulation and the subsequent recolonization of temporarily unoccupied habitat patches seems to be a common occurrence. Historical records, as well as recent observations, indicate that during periods with average or slightly greater than average seasonal rainfall, the size of individual populations and the total number of populations tend to increase and the geographic range of the butterfly tends to

expand. Conversely, during periods of drought or much higher than average precipitation, the number and sizes of populations tend to decrease and the geographic range tends to contract.

At the present time, only two populations of the butterfly are known to exist on the San Francisco Peninsula (Jasper Ridge Area H and Edgewood County Park). While direct evidence of dispersal between these two locations is scant, genetic studies indicate a linkage such that the populations should most likely be considered to be components of a single metapopulation. Until the late 1980's the butterfly was found on at least four other Peninsula serpentine soil-based grasslands, including those located at San Bruno Mountain, northeast of the Highway 280 and 92 interchange, south and west of Farm Hill Boulevard, and Jasper Ridge Area C. While poorly documented, it is generally assumed that several other populations of the Bay checkerspot butterfly existed on the Peninsula until the 1960's.

Bay checkerspot butterfly habitat in Edgewood County Park

The serpentine grassland habitat located in the park and on adjacent San Francisco Water Department lands can be divided into seven distinct subareas (identified by letters A through G on the attached map). Subarea A is in the "triangle" on the west side of highway 280, on San Francisco Water Department land. Subarea B is the "main" block of habitat east of highway 280, and is the largest subarea. Subarea C is near the Hillcrest gate. Subarea D is just off Hillcrest Way, next to the *Acanthomintha* population. Subarea E is to the north of the main hill of the park. Subarea F is just to the north of the the freeway overpass. Subarea G is the small semi-isolated patch of serpentine grassland to the south of subarea B.

Historical records

While the serpentine grasslands of the San Francisco Peninsula have long

been known to support populations of the Bay checkerspot butterfly, the Edgewood population of this species was only first studied in any detail during the late 1960's by Stanford University graduate student Michael Singer (see Singer 1971). Since Singer's work, researchers from the Stanford group have continued to study the Edgewood population.

Table 1 provides a summary of our presence-absence data for Bay checkerspot butterflies during the period from 1979 to 1993. Effort was not consistent during each of these years, but most of the subareas were visited on several occasions in each year.

Larval distribution

Larvae have been found in every subarea in the Park, except for subarea F (see Table 1). Subareas B, C, and D have probably supported Bay checkerspot larvae every year since 1979. Subareas A, E, and G have supported larvae only during years of high population levels.

During the study period, subarea B consistently supported the largest number of butterfly larvae. However, the observed densities of larvae in subareas C and D were often as high as those recorded in subarea B, but given the much more limited extent of these two subareas, the total number of larvae in these subareas was much lower than the total in subarea B.

Distribution of adult butterflies

Adult butterflies have been found on every subarea in the Park at least once since 1979. Subarea B invariably supports the most adult butterflies -- 100,000 butterflies were estimated to be present in that subarea in 1981. The number of butterflies has declined dramatically in recent years, and there have been no more than 3,000 to 10,000 adult butterflies present during each of the last five years. Adult

butterflies have also been consistently observed in subareas C and D. Lower densities of butterflies have been sporadically observed in each of the other subareas.

Dispersal of Bay checkerspot butterflies between subareas

Our observations indicate that all serpentine grasslands in the Park have been utilized at one time or another by Bay checkerspot butterflies. Mark-recapture studies conducted at the Park have shown that adult butterflies are generally quite sedentary, but that approximately 2.5% of butterflies will transfer between adjacent subareas (i.e. between subarea B and subarea C). This low rate is sufficient to tie the subpopulations together genetically, but are low enough that the subpopulations probably act as independent demographic units in all but very high population level years. For example, at the 2.5% transfer rate, with the subarea B subpopulation size of 100,000 in 1981, an estimated 2500 individuals originating in subarea B would be expected to disperse to each of the adjacent subareas. While the mechanics of dispersal are poorly understood, it is generally thought that certain physical features may act to facilitate dispersal (based on our work at Edgewood, Jasper Ridge, and Kirby Canyon). Of primary importance is habitat type -- Bay checkerspot butterflies appear to preferentially fly over grasslands. Serpentine soil-based grasslands, typically supporting relatively abundant adult nectar resources, are probably preferred by the butterflies over grasslands composed primarily of non-native grasses, but dispersal through patches of non-serpentine grasslands is common. Dispersal through non-grassland habitat, such as chaparral or oak woodlands is probably less frequent. Topography is also a factor in dispersal.

Additionally, adult Bay checkerspot butterflies often congregate at hill tops or along ridgelines ("hill topping" is a common behavior in male butterflies). As a result, movements to and from hill tops and along ridgelines have been frequently noted in the Bay checkerspot butterflies, and may contribute to dispersal between patches of

habitat supporting larval host plants.

1993 Surveys

Surveys for Bay checkerspot butterfly larvae were conducted in late February 1993, a time when postdiapause larvae were large enough to be readily found, but when the larvae had not yet begun to pupate. Time-constrained searches were conducted (covering an area of approximately 2,000 square meters) by two experienced field workers (AEL and SBW). The position of each larva was marked with a flag, and the total number of larvae observed in each ten minute time period was noted (five minutes for each of two observers). This method allows for a rapid estimation of relative densities of larvae over large areas of habitat, and has been calibrated and used extensively at sites in Santa Clara County.

Larvae were found in subareas B, C, and D. Larvae were well distributed across subarea B. No larvae were found in subareas A, E, and F (see map for location of search areas and number of larvae found during ten minute searches). Densities of larvae ranged from 0 to 9 larvae per 10 minute search period. Larvae were most dense on the north-facing slope in subarea C, and in the central portions of subarea B.

1993 Adult Survey

Bay checkerspot butterflies were observed flying on numerous occasions in subareas B, C, and D. No butterflies were observed by Stanford University personnel in any of the other subareas in 1993.

CONCLUSIONS

Historic records and recent surveys show the following:

- 1) Bay checkerspot butterflies have been observed in all serpentine grassland

Summary of Bay checkerspot butterfly observations at Edgewood County Park
 + = Bay checkerspot butterflies present; 0 = Bay checkerspot butterflies not observed
 during several site visits; - insufficient number of site visits during appropriate weather
 or season

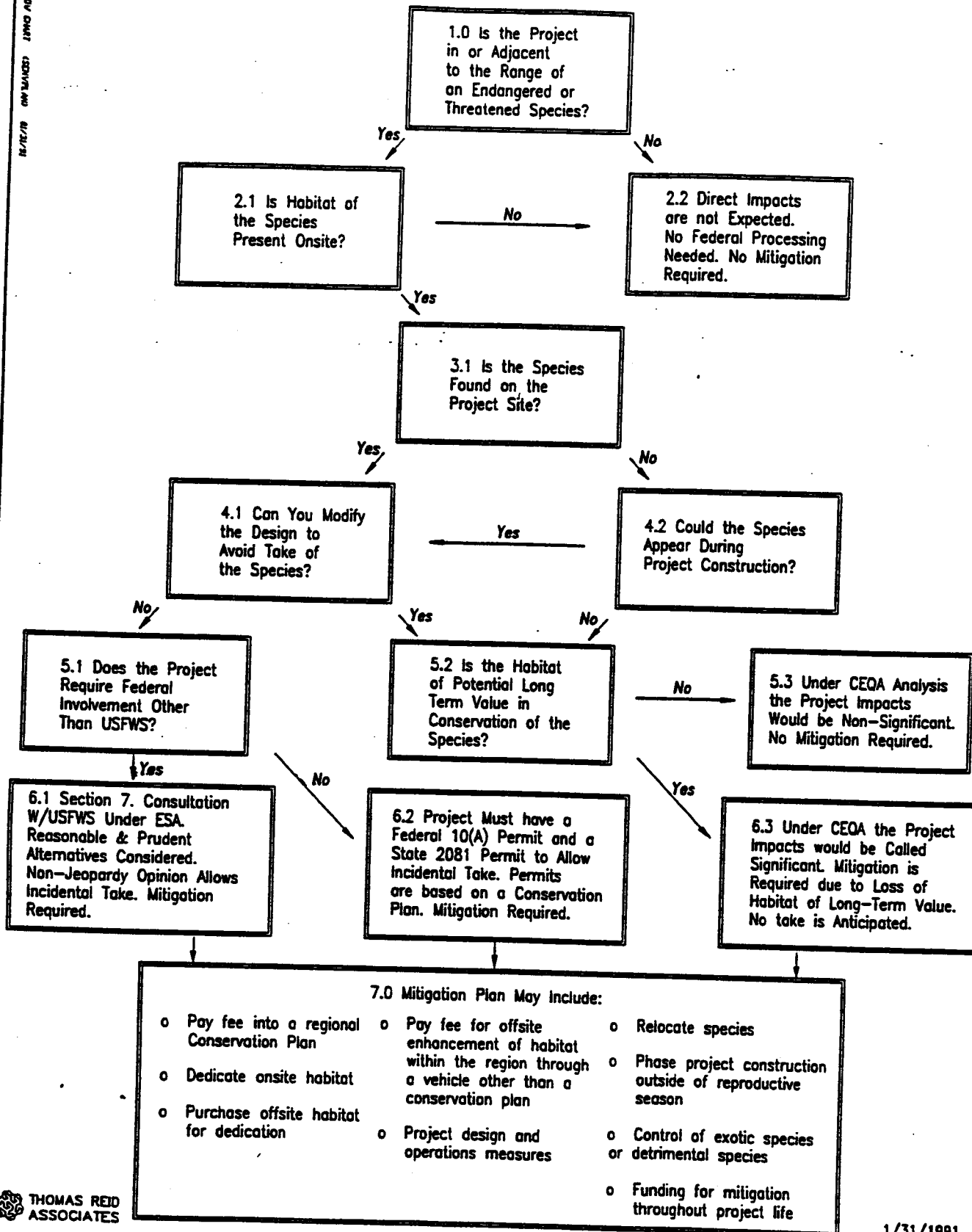
BUTTERFLY ADULTS

	A	B	C	D	E	F	G
1979	+	+	-	-	-	-	-
1980	+	+	-	-	-	-	-
1981	+	+	-	-	+	+	-
1982	+	+	-	-	-	-	-
1983	+	+	+	+	+	+	+
1984	+	+	+	+	+	+	-
1985	+	+	+	+	-	+	-
1986	+	+	+	+	-	+	-
1987	-	+	+	+	-	+	-
1988	-	+	+	+	-	+	-
1989	-	+	+	+	-	+	-
1990	0	+	+	+	-	+	-
1991	0	+	+	+	-	+	-
1992	0	+	+	+	-	+	-
1993	0	+	+	+	0	0	0

BUTTERFLY LARVAE

	A	B	C	D	E	F	G
1979	-	+	-	-	-	-	-
1980	-	+	-	-	-	-	-
1981	-	+	-	-	-	-	+
1982	-	+	-	-	-	-	-
1983	+	+	+	+	+	-	-
1984	-	+	-	+	-	-	-
1985	-	+	-	+	-	-	-
1986	-	+	+	+	-	-	-
1987	-	+	+	+	-	-	-
1988	-	+	-	+	-	-	-
1989	-	+	-	+	-	-	-
1990	0	+	-	+	-	-	-
1991	0	+	-	+	-	-	-
1992	0	+	-	+	-	-	-
1993	0	+	+	+	0	0	-

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areas at Edgewood Park at some time since 1979.

2) While subareas B, C, and D have apparently supported butterfly larvae continuously during this time period, subareas A, E, and G each supported larvae at least once.

3) The number and distribution of Bay checkerspot butterflies at Edgewood Park fluctuate greatly from year to year. Two of the smaller subpopulations (E and A) have apparently gone extinct.

4) Despite their small extent, subareas D and C have supported high densities of Bay checkerspot butterflies during each year since 1979.

5) The 1993 number of larvae in Edgewood Park is on the order of several thousand individuals, with the majority found in subarea B.

6) Individually, each of the subareas at Edgewood County Park is of limited topographic diversity, and, hence, each subarea by itself probably does not provide enough "environmental buffering" necessary for the the long-term persistence of a butterfly population. However, when all the subareas are viewed as supporting components of a single, albeit somewhat diffuse, population, then there is considerable topographic diversity present and a large buffering capacity.

7) Non-native grasslands located between the serpentine soil-based grasslands probably act to facilitate Bay checkerspot butterfly dispersal between subareas

These results indicate that the subpopulations at Edgewood are tightly linked one another and should be considered components of a single population. Each of these components and dispersal routes between the subareas are probably necessary for the long-term persistence of the butterfly at Edgewood County Park. In addition, the Bay checkerspot butterfly population at Edgewood County Park is undoubtedly key to the long-term persistence of the San Francisco Peninsula metapopulation as the only other known Peninsula population, at Jasper Ridge Area H, declined to approximately 30 individuals in 1993. Populations reaching this low level are highly susceptible to extinction.