SAN BRUNO MOUNTAIN AREA HABITAT CONSERVATION PLAN

— FINAL —

NOVEMBER 1982

SAN BRUNO MOUNTAIN
HABITAT CONSERVATION PLAN STEERING COMMITTEE
CHAIRED BY THE COUNTY OF SAN MATEO

VOLUME ONE

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PREFACE

San Bruno Mountain Area Conservation Plan (HCP or Plan) is a way to preserve and enhance habitat for an endangered species, the Mission Blue butterfly, in conjunction with limited development on San Bruno Mountain. Volume I includes a historical review of the area, the biological principles, and the institutional arrangement for the Plan operations. Volume II details a specific plan for each of the parcels of land on the Mountain. The biological research done by Thomas Reid Associates on San Bruno Mountain is described in a separate document.

The Habitat Conservation Plan and the Biological Study are supporting documents for a permit under Section 10(a) of the Endangered Species Act (1973). The permit would allow limited taking of endangered species in accordance with the Plan. The Plan was developed under the guidance of the San Bruno Mountain Steering Committee, representing San Mateo County, Daly City, South San Francisco, and Brisbane planners and policy makers; landowners and developers; biologists; United States Fish and Wildlife Service; California Department of Fish and Game and the Save San Bruno Mountain Committee.

The Section 10(a) permit and the Habitat Conservation Plan will be the subject of State and Federal environmental documents. If you wish to comment on the scope of the environmental documents, your comments should be sent to the following address by June 12, 1982:

Mr. William Rozar
San Mateo County Planning Division
590 Hamilton Avenue
Redwood City, CA 94063

You will have a separate opportunity to comment on this document. Please bring this document to the attention of all persons who would be interested in this matter.

Steering Committee

Thomas R. Adams, Adams, Broadwell and Russell, San Mateo -- Attorney representing Save San Bruno Mountain Committee, City of Brisbane

Edward J. Bacciocco, Jr., Supervisor 3rd Dist. San Mateo County Board of Supervisors, Redwood City

William Bottoms, President, Quarry Products, Inc., Richmond

Ann Broadwell, Adams, Broadwell and Russell, San Mateo -- Attorney representing Save San Bruno Mountain Committee, City of Brisbane

Malcolm C. Carpenter, Oakland -- Planner for Quarry Products, Inc., Richmond

B. Sherman Coffman, Executive Officer, LAFCO San Mateo County, Redwood City

William Dean, W.W. Dean and Associates, San Mateo

Louis dell Angela, Director, Department of Community Development, City of South San Francisco

David Dolter, Cadillac-Fairview Homes West, San Francisco

Larry L. Eng, Staff Biologist, California Department of Fish and Game, Sacramento

M. Sherman Eubanks, President, Visitacion Associates, San Francisco

Donald Fleming, Director of Community Development, City of Daly City

Roman Gankin, Senior Environmental Planner, Environmental Management Department, Planning Division, San Mateo County, Redwood City

Richard Garlinghouse, Cadillac-Fairview Homes West, San Francisco

David C. Hale, Planning Director, San Mateo County, Redwood City

Richard Brad Kerwin, City Manager, City of Brisbane

Gail Kobetich/Ralph Swanson, U.S. Fish and Wildlife Service, Office of Endangered Species, Sacramento

Paul M. Koenig, Director of Environmental Management, San Mateo County, Redwood City

Steve Kroeger, State Forest Ranger 1, California Department of Forestry

David Kuhn, Vice President for Community Development, Cadillac-Fairview Homes West, Newport Beach

Robert J. Lloyd, District Superintendent, Brisbane School District

Lindell L. Marsh, Nossaman, Krueger & Knox, Los Angeles -- Attorney for Visitacion Associates

George Menzoian, Bay Area Realty, Colma

Mike McKissick, President, Presley Homes of Northern California, Concord

Steve Nicola, Coordinator for Endangered Species, California Department of Fish and Game, Sacramento

Frank Pacelli, Local Representative, Bay Relations, Daly City

David Smith, David Smith Associates, -- Environmental Consultant for Visitacion Associates, La Jolla

Fred Smith, Mayor, City of Brisbane

Jay Watson, Telecommunications Properties, Concord

The Habitat Conservation Plan was prepared under the direction of the Drafting Committee. Drafting Committee members and their supporting staff, who contributed to the document are:

Thomas R. Adams, Adams, Broadwell and Russell

Ann Broadwell, Adams, Broadwell and Russell

David Byers, San Mateo County

Joan Donovan, San Mateo County

Victoria Harris, Thomas Reid Associates

Paul Koenig, San Mateo County

Priscilla Locke, Thomas Reid Associates

Lindell Marsh, Nossaman, Krueger and Knox

Tay Peterson, Thomas Reid Associates

Thomas S. Reid, Thomas Reid Associates

Larry Seeman, Larry Seeman Associates for Cadillac-Fairview Homes West

Ralph Swanson, U.S. Fish and Wildlife Service

Rob Thornton, Nossaman, Krueger and Knox

Karen Weissman, PhD., Thomas Reid Associates

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GLOSSARY

Adjacent Open Space - natural areas adjoining development parcels.

Administrative Parcel - a portion of San Bruno Mountain within the Planning Areas which corresponds to present land ownership.

Barriers - objects acting as obstructions to butterfly movement, i.e. trees, dense brush, roads, etc.

Biological Refuge - a unique area harboring unusual populations of animals and endemic plants which are rare or absent in the rest of its surrounding region.

Biological Study - refers to **Endangered Species Survey for San Bruno Mountain: Biological Study — 1980-1981**, prepared by Thomas Reid Associates.

Brush Species - several types of woody vegetation found on San Bruno Mountain, including Artemesia, Baccharis, Eriophyllum and Ceanothus.

Buffer Area - a strip of land at least 30 feet wide surrounding a development intended to provide some isolation for the conserved habitat, in order to protect the development from range fires as well as to protect the Conserved Habitat from changes in stormwater runoff and irrigation withinthe development areas.

CC&Rs - Conditions, Covenants and Restrictions imposed on the use of property in a recorded document by the landowner.

Cities - the cities of Brisbane, Daly City and South San Francisco.

Colony - a major concentration of butterflies within a larger population, which are partially isolated from the remainder of the population by intervening barriers or lack of habitat.

Compliance - conformance by the private sector landowner/developers and public agency participants with the terms and obligations of this plan.

Conservation - "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition, protection and maintenance, propagation, live trapping and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking." (The Endangered Species Act, 1973)

Conserved Habitat - those portions of the San Bruno Mountain Area that are presently or hereafter are to be held in fee ownership by the County and/or the State pursuant to the Agreement With Respect to the San Bruno Mountain Area Habitat Conservation Plan.

Corridors - Areas through which the butterflies can travel unimpeded. Differs from open space in that there can be no natural barriers, i.e. dense brush or trees, within a corridor.

County - San Mateo County, California.

Critical Habitat - "(i) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of ... this Act, on which are found those physical or biological features

(I) essential to the conservation of the species and

(II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with ... this Act, upon a determination by the Secretary that such areas are necessary for the conservation of the species." (The Endangered Species Act, 1973).

Dedication - transfer of title to San Mateo County those areas of land now in private ownership which will become conserved habitat at the time a grading permit is issued.

Design Guides - directions for conserving habitat in open space and for minimizing impact on species of concern, formulated to guide developers in preliminary site planning.

Developer - person or organization in charge of designing a development plan.

Development Agreement - an agreement provided for by California law (Govt. Code Section 65864, et seq.), which permits a local agency and private landowner to fix their mutual obligations at a point in time.

Development Areas - those portions of the San Bruno Mountain Area that are excluded from Conserved Habitat and are anticipated to be subject to urban uses.

Development Plan - layout of approximate building envelopes, access roads, utilities and associated grading for each parcel which follows necessary design guides and which includes schemes for dedication and phasing, reclamation and open space protection.

Diversity of Habitat - naturally occuring combination of different environmental features in an area, such as annual and perennial grassland, brushland and grassland, north and south-facing slopes, exposed and protected areas, moist and dry areas, high and low density areas of butterfly host plants.

Ecosystem - the complex of an ecological community and environment forming a functioning whole in nature.

Ecosystem stability - the integrity of species relationships in an ecological community maintained against succession, urbanization and other impacts.

Endangered - "any species which is in danger of extinction throughout all or

a significant portion of its range, other than a species of the class Insecta determined by the Secretary to constitute a pest whose protection under the provision of this Act would prevent an overwhelming and overriding risk to man", (Endangered Species Act, 1973).

Endangered Species Act - means the Endangered Species Act of 1973, as amended, 16 U.S.C. Sections 1531-1543.

Endemic - a plant or animal species which inhabits only one limited geographic locality, usually due to dependence on certain climatic, physical or biological conditions existing only in that locality. Compare: cosmopolitan.

Enhancement - the restoration of former habitat or improvement of existing habitat through the use of habitat enhancement techniques (e.g. revegetating with host plant species).

Exotics - species which have been introduced into local habitat from outside the United States and which often become pests, outcompeting native species.

Extinct - having disappeared as a species due to failure to reproduce in sufficient numbers to maintain succeeding generations.

Extirpated - extinct in one area although not as a species (not extinct throughout the species' range).

Feature - a topographic feature within an Administrative Parcel or Management Unit which warrants particular attention with regard to uses of that Parcel or Unit.

Fire Resistant Vegetation - species of plants known to be relatively inflammable and therefore valuable buffer material for protection of development areas from fires occurring in open space.

Flight Season - the portion of the year during which the adult, winged, reproductive form of a butterfly is found, and during which reproduction occurs.

Funding Program - a specific program for providing necessary funds for conservation activity on San Bruno Mountain. The Funding Program is described in Chapter V.

Gorse - Ulex europaeus. A thorny, leguminous shrub with oily wood; "Native of Europe; escaped from cultivation and often well established on the Pacific Coast from Vancouver Island to central California" (Abrams). Extensive on San Bruno Mountain, especially in the Saddle Area.

Grading Plan - layout of areas within a parcel to be temporarily or permanently disturbed in the process of development, indicating the phasing of each disturbed area -- the time at which it will be graded.

Grassland Species - comprising one of the two dominant vegetation communities on San Bruno Mountain, and including localized bunch grasses and many broadleaf species of wildflowers. Compare: brush.

Habitat Conservation Plan - the San Bruno Mountain Area Habitat Conservation Plan as adopted by the County Board of Supervisors on September 14, 1982 (Resolution No. 43770). Synonyms: HCP, Plan.

Habitat Contiguity - unobstructed connection of large open space areas to facilitate the butterflies' need to move through and to specific areas during their flight season.

Habitat Easement - a recorded restriction on the use of property to prevent uses which are inconsistent with use of the land as habitat by the Mission Blue, Callippe Silverspot and other species of concern.

Habitat Enhancement Techniques - manipulation of habitat in conserved areas to reverse the effects of previous disturbance, control exotic species, retain natural diversity, and maximize the value to endangered species. Examples: seeding/propagation, soil modification, chaining brush. Synonym: habitat manipulation.

Habitat Manager - the employee or contractor engaged by the Plan Operator to supervise the administration of the Conserved Habitat and the Habitat Conservation Plan.

Habitat Maintenance - care and preservation of the biological resources of conserved habitat which occurs naturally, or is subsequently created through habitat enhancement techniques.

Habitat Manipulation - deliberate alteration of habitat for enhancement. Synonym: habitat enhancement.

Habitat Utilization - in butterflies, use of various larval food or nectar plant species, perching substrates, protective terrain or other natural features present in certain areas on San Bruno Mountain.

Hilltopping - mating behavior peculiar to several types of butterflies in which males and females find each other near knolls and ridgetops to mate.

Human Encroachment - any disturbance of habitat by man, including off road vehicle activity, dumping, domestic animal activity, illegal burning and other forms of vandalism, and on a broader scale, urban development and quarrying.

Indefinite Perpetuation - the continued existence on San Bruno Mountain of a viable, reproducing population of a species of concern far into the future; the purpose of the HCP. Compare: extinction, extirpation.

Landowner(s) - Visitacion and developers or other persons and entities who own or have a right to acquire fee ownership of lands within the San Bruno Mountain Area.

Larval Food Plant - particular species of vegetation required by butterflies as an energy source for survival in the first stages of development, on which the adults will oviposit. For Mission Blue: the three Lupinus species; for Callippe: Viola pedunculata; for Elfin: Sedum spathulifolium.

Management - treatment afforded portions of SBM to enhance or protect existing habitat or to reclaim habitat lost to construction or other disturbance.

Management Unit - any management unit shown in Chapter VII of the HCP or any management unit subsequently established for unplanned parcels by the local agency having land use jurisdiction and in accordance with the Agreement With Respect to the San Bruno Mountain Area Habitiat Conservation Plan.

Marginal Habitat - an area which by the presence of certain species (e.g. host plants), is considered to be habitat but for some reason is poorly utilized at present.

May - Identifies a permissive element which is left fully to the discretion of the landowner/developer.

Minimize - refers to disturbance; to lessen the impact on an area of habitat through management techniques and mitigation measures.

Mitigation - The term "mitigation" shall have the same definition in this HCP that it has in the regulations promulgated pursuant to the California Environmental Quality Act (Title 14 California Administrative Code, Section 15032.5) or the National Environmental Policy Act (40 C.F.R., Section 1508.20) and includes the designation or reservation of land as open space or the provision of money to provide funding for wildlife conservation, protection or enhancement, and further includes the lessening of adverse development impacts through design modification, fencing at the grading perimeter, erosion control, reclamation, habitat enhancement or other protective activities.

Monitoring - the task, undertaken by the Plan Operator of regular observation of biological processes, development and conservation activities on San Bruno Mountain; the purpose is to assure compliance with the plan, and to measure the success of its implementation.

Natural Open Space - undeveloped land which has not been altered by man's activities (e.g. agriculture).

Nectaring - behavior of adult butterflies where an insect feeds on the nectar of flowers.

Nectar Plants - certain species of plants required by the adult butterflies as energy sources for survival during mating and egg-laying behavior. For Mission Blue: include Brodiaea pulchella, Eriogonum latifolium, Monardella villosa, and others; for Callippe: include various thistle species, Chrysopsis villosa, and others.

No Project Alternative - status quo; no habitat conservation or enhancement, and no additional urban development on San Bruno Mountain.

Open Space Buffer - see Buffer.

Oviposition - egg-laying by insects.

Permanent Disturbance - the portion of a development envelope designated for

buildings, paving or private landscaping; area permanently lost as habitat.

Pesticide - a chemical agent used to destroy insect pests.

Phasing - refers to the time schedule of development; the area which can be graded each year.

Pilot Study - small scale test of a habitat enhancement technique or mitigation method to provide statistical verification of success before expansion to a larger area.

Plan Operator - the County of San Mateo (or its successors as Plan Operator).

Planned Parcel - a parcel for which development plans have been set forth in Chapter VII of the HCP. See Table VI-2. These parcels have been reviewed and modified, as necessary to preserve natural habitat for Species of Concern and to contribute to and be consistent with the HCP and the Agreement With Respect to the San Bruno Mountain Area Habitat Conservation Plan.

Planning Areas - four areas of the Mountain defined by characteristic vegetation patterns and distribution of Species of Concern.

Planning Assistance - activities implemented prior to and in conjunction with development which will mitigate impacts on the species of concern.

Potential Habitat - areas currently containing marginal habitat which can be modified or enhanced to become usable habitat.

Preservation - maintenance of habitat in its present condition.

Preserved Habitat - those portions of the San Bruno Mountain Area that will be protected against grading and disturbance and which are now in public ownership or which are identified in the HCP for dedication to the State or County.

Range Limit Plants - a plant species for which the population found on San Bruno Mountain represents the southern geographic limit of the biological range of that species.

Rare - a legal term used by the state of California which is approximately equivalent to the federal term "threatened", see below.

Reclamation Plan - provides for fencing, revegetation, and possible subdivision of Management Units for ease of administration on all graded areas.

Reclaimed Habitat - the portions of a Developable Administrative Parcel which are to be disturbed by grading and thereafter reclaimed as viable habitat for the species of concern and dedicated to the County or State, as appropriate, as conserved habitat pursuant to the Agreement With Respect to the San Bruno Mountain Area Habitat Conservation Plan.

Recovery Benchmark - a measure of the status of a species of concern on San

Bruno Mountain after set intervals of time have elapsed from commencement of the Plan.

Research - an ongoing program carried out by the Plan Operator, designed specifically to aid the Plan activities, which includes pilot studies on succession, monitoring and enhancement strategies, executed through field work and preceded by literature investigation into methods and costs.

Resource Agencies - United States Fish and Wildlife Service (USF&WS) and the California Department of Fish and Game (CDF&G).

Restoration - recreation of ecological conditions after disturbance or in a new area (e.g. clearing brush to create grassland), through habitat enhancement. Compare: preservation.

San Bruno Mountain Area - the approximately three thousand acres in San Mateo County, California which is shown on Figure VI-1 of the HCP and which is the subject of the Agreement With Respect to the San Bruno Mountain Area Habitat Conservation Plan. Synonyms: SBM, the Mountain, San Bruno Mountain.

San Bruno Mountain Habitat Conservation Trust Fund - a trust fund established within the Plan area to provide income for habitat conservation activities as specified in this plan. Synonym: Trust Fund.

Section 7 - a section of the Endangered Species Act which requires federal agencies, in consultation with the Secretary of the Interior, to ensure that any action, authorized, funded or carried out by them is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. (16 USC §1536)

Section 9 - a section of the Endangered Species Act which prohibits the "taking of endangered species. (16 USC §1538)

Section 10a - a section of the Endangered Species Act which authorizes the Secretary of the Interior to permit, under such terms and conditions as he may prescribe, any act otherwise prohibited by Section 9 of the Act. The acts may be permitted for scientific purposes, or to enhance the propagation or survival of the affected species (16 U.S.C. Section 1539).

Shall - Identifies a mandatory element.

Should - Identifies guidance provided in this Plan which is based on policy considerations determined by the San Bruno Mountain Steering Committee.

Species - 1) "includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." (Endangered Species Act, 1973)
2) "A group of organisms judged by taxonomists (by diverse criteria) to be worthy of formal recognition as a distinct kind." (Ehrlich and Holm, The Process of Evolution, 1963). Synonym: species of concern.

Species of concern - these include the following:

Animals

1. The Mission Blue butterfly (Plebejus icarioides missionensis) - State and Federally listed endangered species
2. The San Bruno Elfin butterfly (Callophrys mossii bayensis) - State and Federally listed endangered species
3. The Bay Checkerspot butterfly (Euphydryas editha bayensis) - Candidate for the Federal endangered species list
4. The Callippe Silverspot butterfly (Speyeria callippe callippe) - formerly under Federal proposal for endangered status, proposal expired July 3, 1980
5. The San Francisco Tree Lupine Moth (Grapholitha edwardsiana) - formerly under Federal proposal for threatened status, proposal expired July 3, 1980
6. The San Francisco Garter Snake (Thamnophis sirtalis tetrataenia) - State and Federally listed endangered species
7. The Solitary Bee (Dufourea stagei) has never been proposed for listing

Plants - Larval Food

1. Plantago erecta - larvel food plant for the Bay Checkerspot
2. Sedum spathulifolium - larval food plant for San Bruno Elfin
3. Lupinus albifrons- larval food plant for the Mission Blue
4. Lupinus variicolor- larval food plant for the Mission Blue
5. Lupinus formosus- larval food plant for the Mission Blue
6. Viola pedunculata- larval food plant for the Callippe Silverspot
7. Lupinus arboreus - larval food plant for Tree Lupine Moth
8. Orthocarpus densiflorus - larval food plant for the Checkerspot

Other Plants - Host Plant, Rare, Endemic, and Range Limit

1. Lomatium utriculatum - host plant
2. Orthocarpus floribundus - San Francisco Owl's Clover; range limit; under federal review
3. Helianthella castanea - endemic; under federal review
4. Silene verecunda verecunda - The Dolores Campion; range limit; under federal review
5. Erysimum franciscanum var. franciscanum - The San Francisco Wallflower; range limit; under federal review
6. Arabis blepharophylla - Coast Rock Cress; range limit; under federal review
7. Arctostaphylos imbricata - Manzanita; endemic; under federal review
8. Arctostaphylos montaraensis - Montara Manzanita; endemic; under federal review
9. Arctostaphylos pacifica - endemic; under federal review
10. Arctostaphylos uva-ursi - Bear-berry; range limit
11. Vaccinium arbuscula - Huckleberry; range limit
12. Lathyrus vestitus - Pacific Pea; endemic
13. Clarkia rubicunda - Farewell to Spring; range limit
14. Chorizanthe pungens var. Hartwegii - Spine-flower; endemic
15. Grossularia leptosma - Bay/Canyon Gooseberry; range limit
16. Castilleja franciscana - Franciscan Paint Brush; range limit
17. Ligusticum apiifolum - Lovage; range limit

18. Maieanthemum dilatatum - False Lily of the Valley; range limit
19. Allocarya chorisiana - endemic
20. Sambucus callicarpa - Red Elderberry; range limit
21. Silene scouleri - range limit
22. Chrysopsis villosa - Golden Aster; range limit; host plant
23. Cirsium quercetorum - Brownie Thistle; range limit; host plant
24. Grindelia maritima - Steyermark; endemic; under federal review
25. Layia hieracioides - endemic
26. Pentachaeta bellidiflora - endemic; under federal review
27. Senecio aronicoides - Butterweed; range limit
28. Tanacetum camphoratum - Dune Tansy; endemic; under federal review
29. Eriogonum latifolium - Wild Buckwheat; host plant
30. Brodiaea pulchella - Blue Dicks; host plant
31. Carduus sp. - host plants
32. Silybum marianum - Milk Thistle; host plant
33. Pteridium aquilinum - Braken Fern; host plant
34. Monardella villosa - Coyote Mint, Pennyroyal; host plant
35. Horkelia californica - California Horkelia; host plant
36. Scabiosa atropurpurea - Pincushion Plant; host plant

State - the State of California, acting by and through its department of Parks and Recreation.

Sub-species - "a geographical subdivision of a species deemed worthy of formal recognition by a taxonomist." (Ehrlich and Holm)

Succession - undirectional change in the composition of a biological community as the available competing organisms, especially the plants, respond to and modify the environment.

Surveyed - to observe and census elements of the biological communities on San Bruno Mountain, such as butterflies and their host plants, using a transect or quadrat method at regular intervals over time and area.

Sweep Method - a method of generally surveying an area for host plant density and distribution where the terrain or size of an area prevents a detailed census. It involves direct mapping of plant locations and classification of density estimates as abundant or scarce. Compare: transect, quadrat.

Take - "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" with regard to endangered species. (Endangered Species Act, 1973 as amended 1978)

Technical Advisory Committee - a body established to evaluate the scientific and cost effectiveness of the Plan, as executed by the Plan Operator, and recommended revisions. The composition of the TAC is set forth in Chapter V of the HCP.

Temporary Disturbance - the portion of a development envelope designated for grading at the time of development, but which will become reclaimed habitat after a reclamation program is complete; area temporarily lost as habitat.

Threatened - "any species which is likely to become an endangered species

within the foreseeable future throughout all or a significant portion of its range", (Endangered Species Act, 1973).

Undisturbed - the portion of a development envelope designated to be excluded from any grading associated with development; a preserved area of habitat.

Unplanned Parcels - those parcels for which development plans have not been set forth in the HCP. The Unplanned Parcels are set forth in Table VI-2.

Untreated - to be left as currently exists, with no habitat enhancement required.

Visitacion Associates (VA) - also includes VA successors and assigns.

SUMMARY

SUMMARY

The HCP is divided into two volumes. The first volume describes the principles which guide the Plan, the general method of implementing the principles and the impact of the HCP on the butterflies. The second volume describes on a parcel-by-parcel basis the exact manner in which the Plan will be implemented on each parcel. This chapter is a summary of Volume One. Figure S-1 is an aerial photograph of San Bruno Mountain, while Figure S-2 shows the key planning areas and parcels on the Mountain.

Chapter II contains a historical review of the development proposals on San Bruno Mountain and of the events leading to the listing of the Mission Blue as an endangered species. Chapter III discusses the biological implementation of the HCP. In the spring of 1981, there were about 18,000 adult Mission Blue and 8,000 adult Callippe Silverspot butterflies on the Mountain. Sixty percent of the Mission Blue and 75% of the Callippe Silverspot butterflies were found on the Southeast Ridge. Both butterflies need a variety of habitat. The Mission Blue is dependent on three species of lupine plants. The Callippe's resource plants, violets, are scattered over large areas. Additionally, the Callippe is a hilltopping species, mating on hilltops, but laying eggs in lower areas. Figures S-3 and S-4 show the general population and habitat distribution of the Mission Blue and Callippe Silverspot, respectively.

Natural processes are promoting the spread of brush and exotic species (such as gorse and eucalyptus), which is reducing the density of the butterflies' host plants. Figure S-5 shows the extent of brush and gorse on San Bruno Mountain in 1932. Figure S-6, in striking contrast, shows great expansion of the brush area by 1981. As demonstrated in the Biological Study, this expansion of the brushland is slowly destroying the habitat of the endangered butterflies. Trespassing off-road vehicles are also damaging the host plants. Implementation of the HCP will result in control of the natural spread of brush and exotic species, as well as protection against vandalism.

Preservation of the existing diverse ecological values is one of the foremost objectives of the Plan. Diversity is related to the stability of ecological systems. Habitat manipulation should only be used when it clearly improves on the existing biological condition, and should always be tried on an experimental basis first.

Phasing of development is one feature of the overall implementation of the Plan. Phased development lessens the biological impacts in any given season and provides needed time for enhancement measures to take effect. Potential manipulation or enhancement techniques include: chaining, scraping, and burning, control of brush with herbicides, runoff and irrigation control, and seeding and propagation of host plants. The early years of the HCP will be characterized by pilot studies of monitoring techniques and habitat enhancement strategies, along with mitigation of impacts surrounding the development areas. During later years, habitat enhancement programs will be used on a larger scale. After the main field effort is completed each year, the Plan Operator will prepare a report on the three major biological activities of the HCP (research, monitoring and habitat enhancement).

FIGURE S-1
AERIAL PHOTOGRAPH

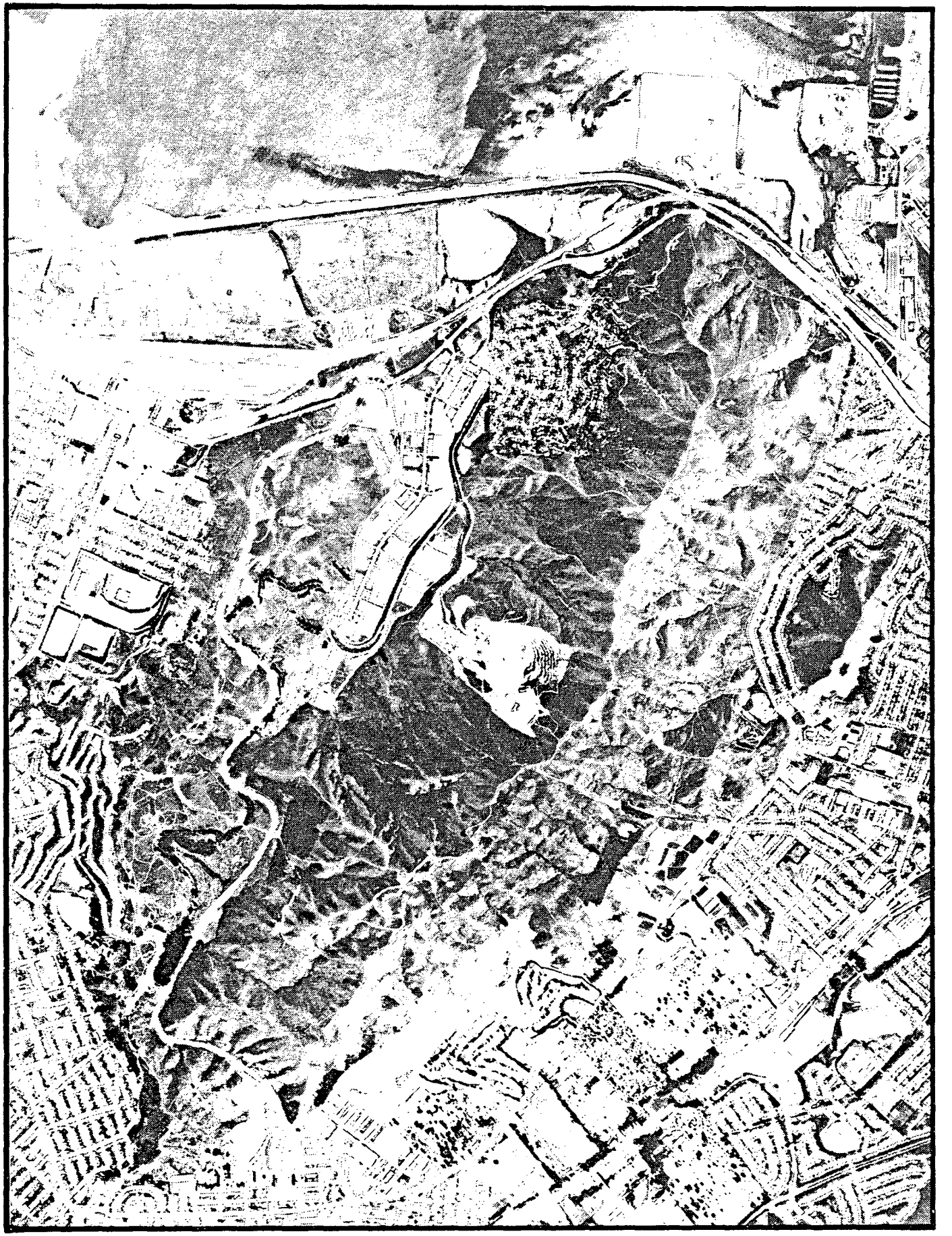

FIGURE S-2
LAND OWNERSHIP

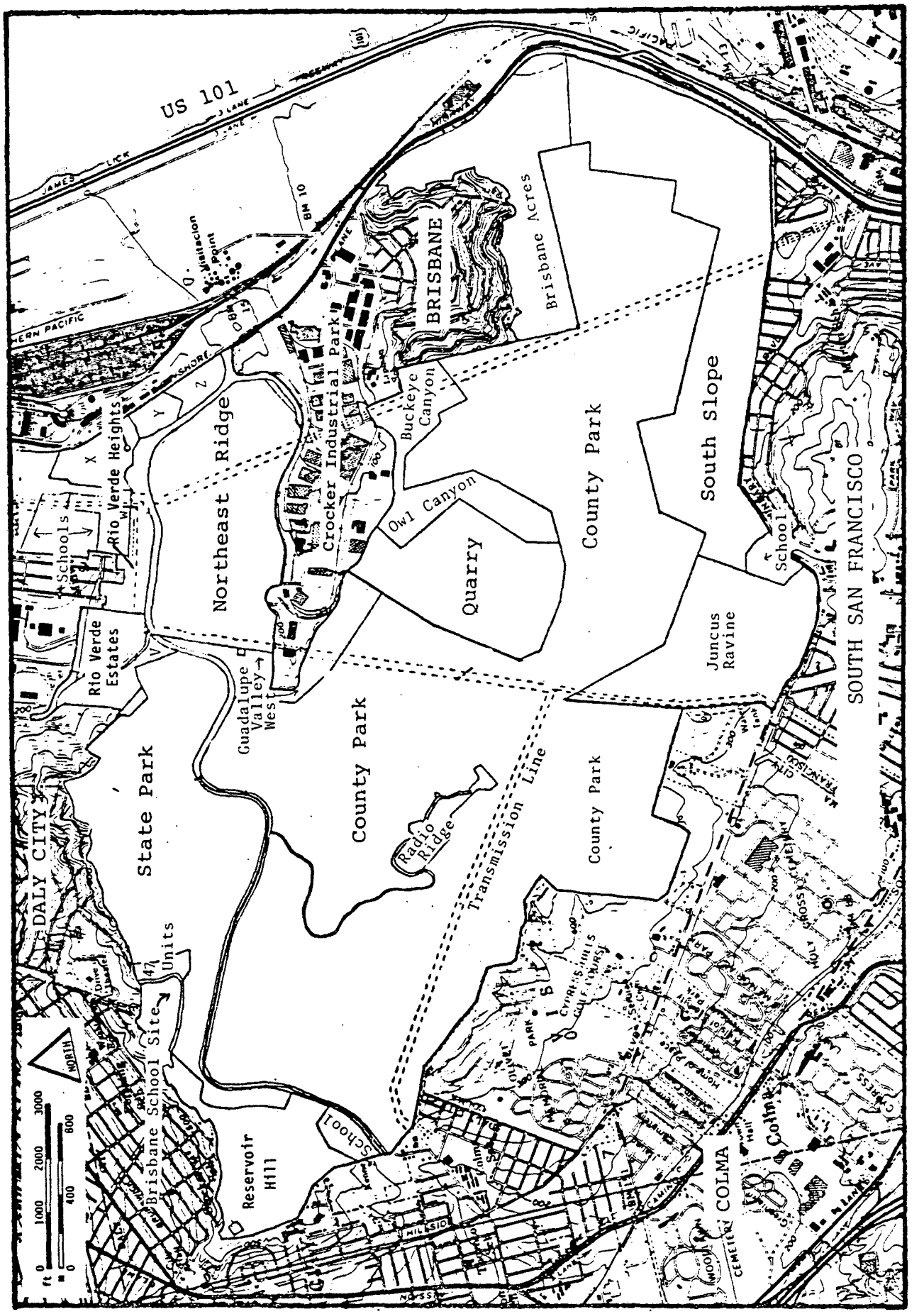

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FIGURE S-3

GENERAL POPULATION AND HABITAT DISTRIBUTION -- MISSION BLUE -- 1981

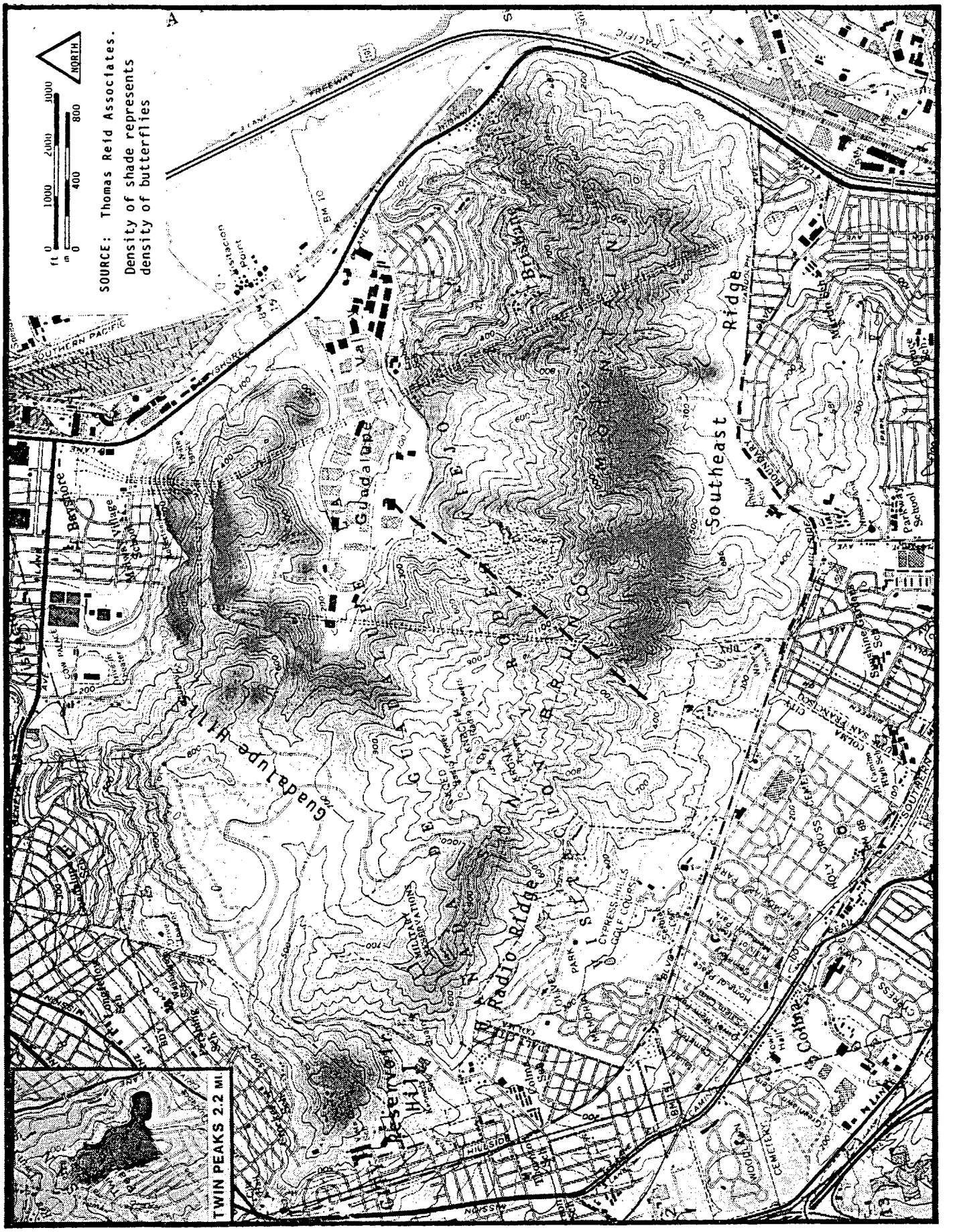


FIGURE S-4
GENERAL POPULATION AND HABITAT DISTRIBUTION -- CALLIPPE -- 1981

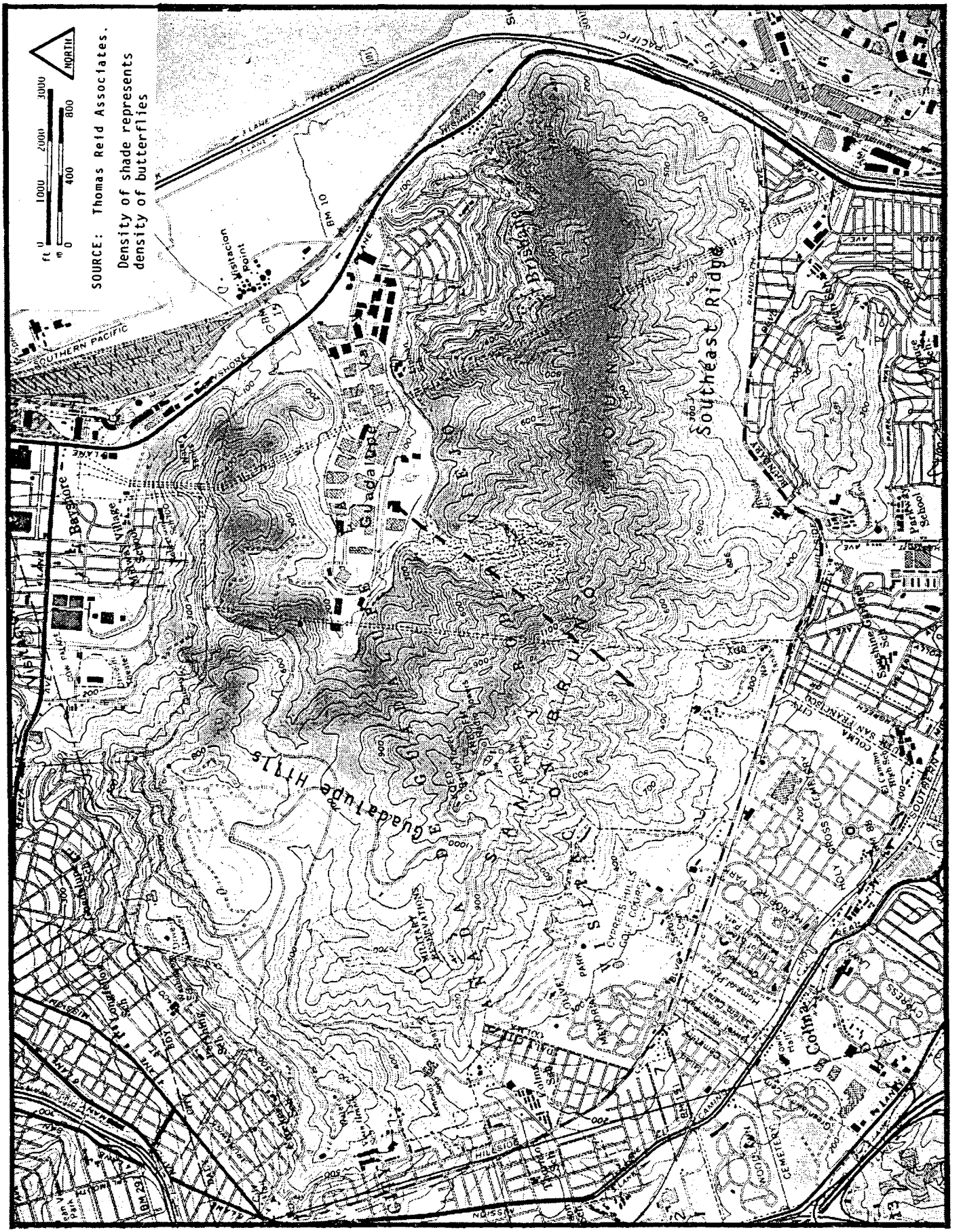


FIGURE S-5
MAJOR VEGETATION COMPONENTS --SAN BRUNO MOUNTAIN -- 1932

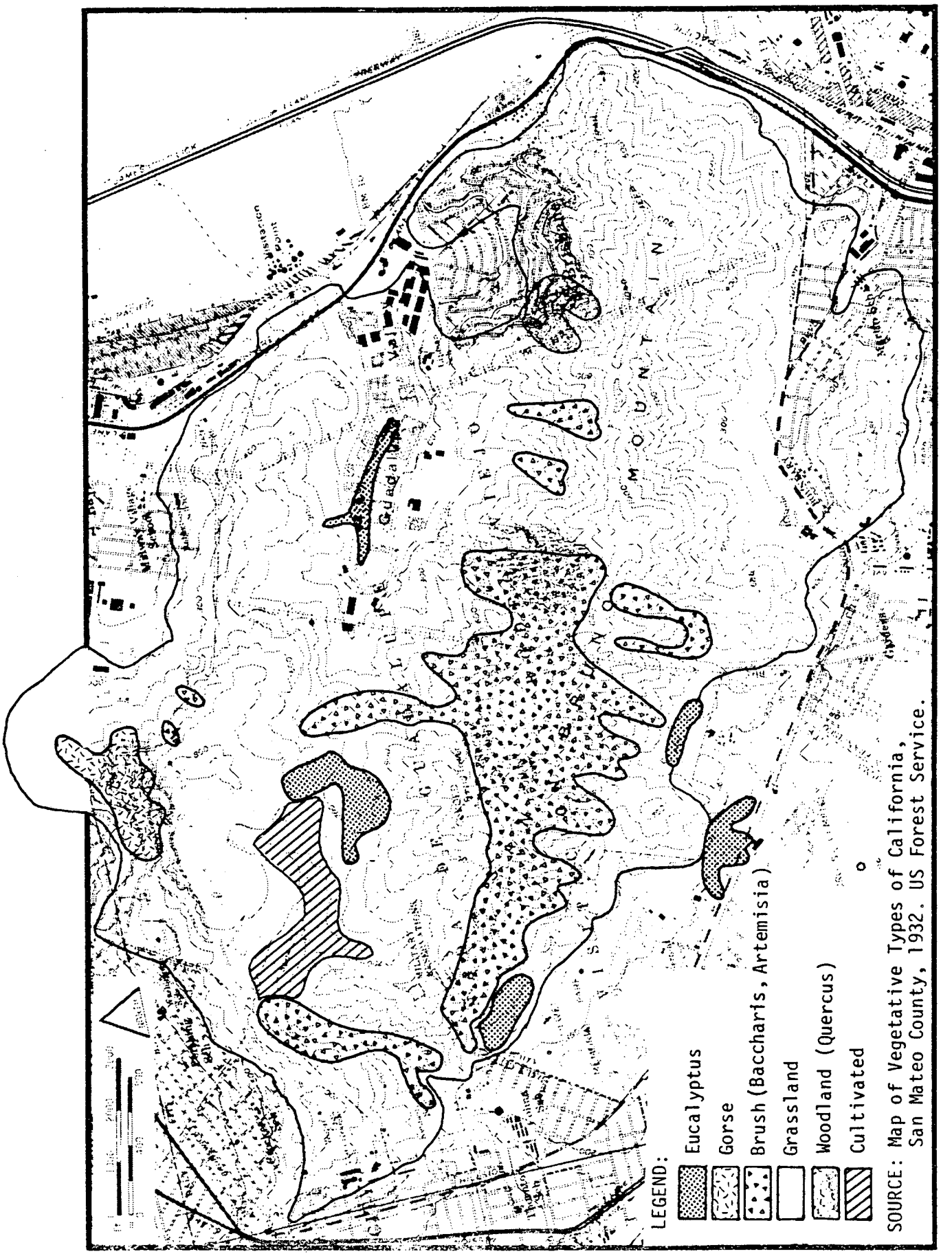
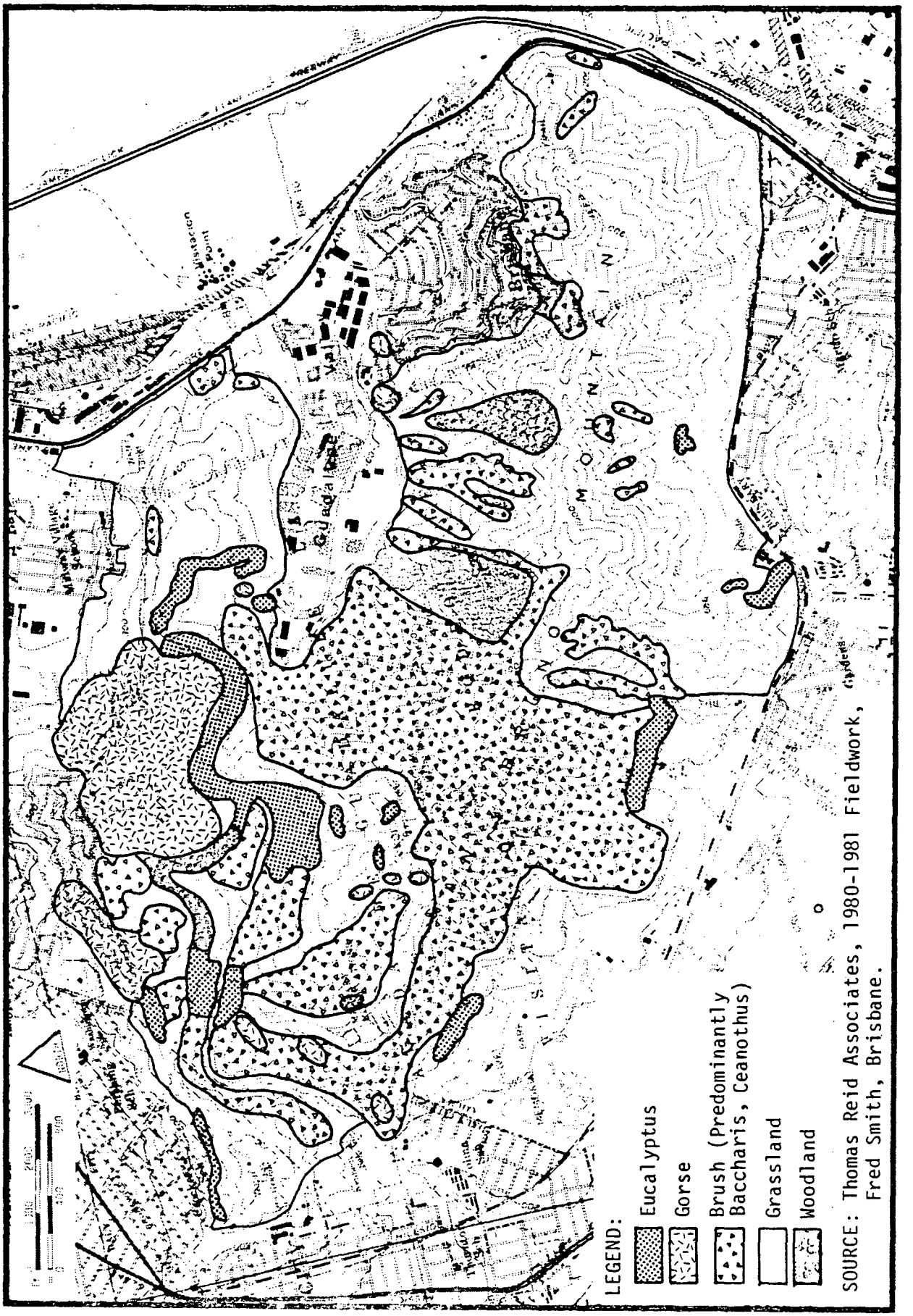


FIGURE S-6
MAJOR VEGETATION COMPONENTS --SAN BRUNO MOUNTAIN -- 1981



One of the important functions of the HCP is to allow both public and private projects on San Bruno Mountain to be planned so as to minimize the effect on endangered species and the other biological resources of the Mountain. As part of the preparation of the HCP, the private developers have redesigned their projects to reflect habitat consideration. The HCP provides for ongoing planning assistance, including: design review, phasing, reclamation of land disturbed during development, and the creation of buffer zones.

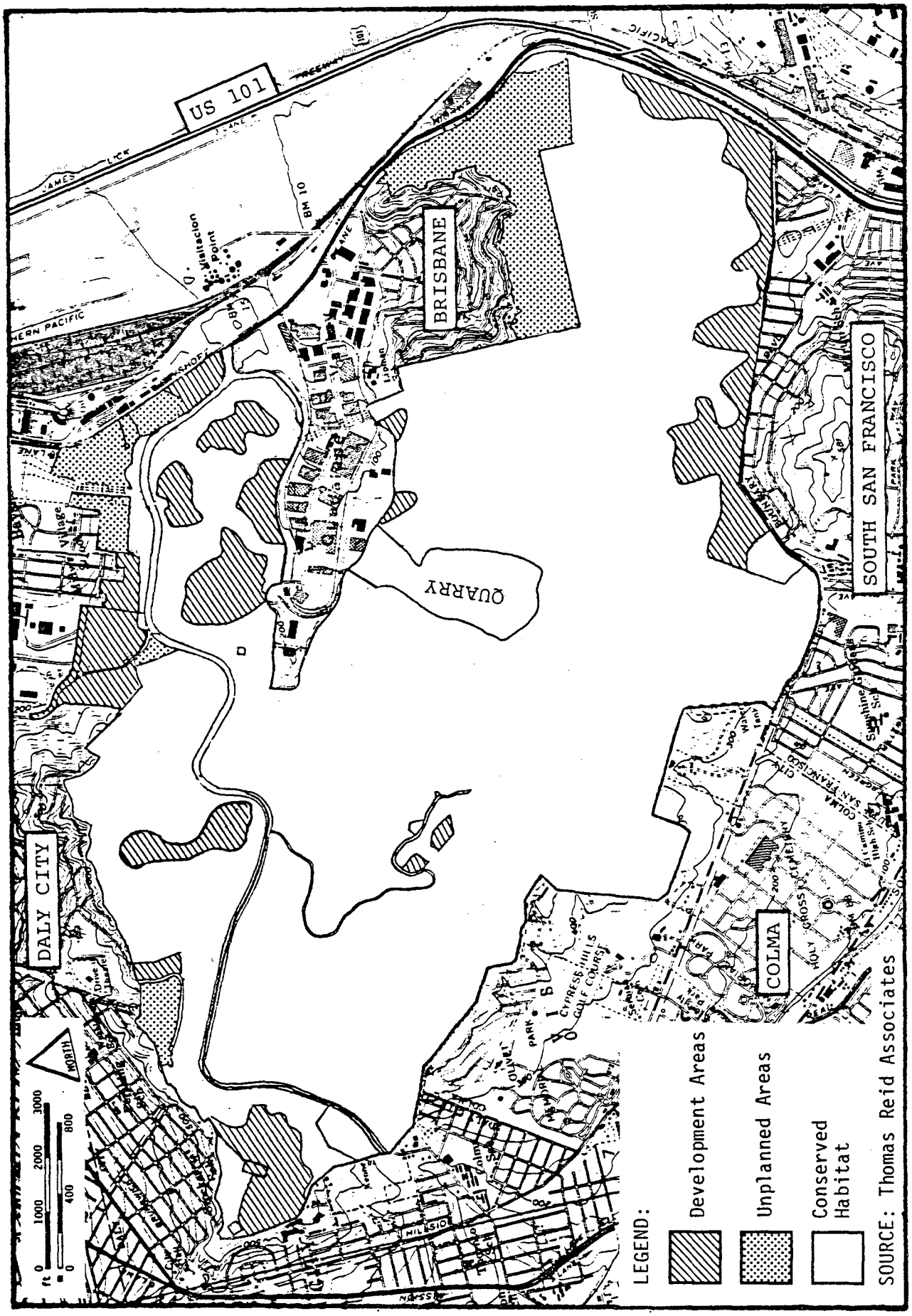
Chapter IV discusses the impact of the HCP on species survival. Although the long-term result of the HCP will be the conservation and enhancement of the Mission Blue, the Callippe Silverspot and other species on the Mountain, development will destroy the habitat of 14% of the Mission Blue population, and the habitat of 8% of the Callippe Silverspot population. At least one quarter of that habitat is to be reclaimed after construction. While there is no precise way to predict the future of the insects, loss of this magnitude is not likely to cause abrupt decline in their populations. Study of other reserve areas gives a rough measure of the short term impact of the HCP on SBM populations. Anticipated habitat disturbance would cause an 2 - 5% increase in the likelihood that the Mission Blue will become extinct and a 1 - 3% increase in the Callippe's chances of extinction. The areas permanently lost to development are shown in Figure S-7.

Offsetting this increased risk of extinction are the mitigation measures adopted in the HCP. The HCP requires the conveyance of substantial additional habitat now in private ownership to the County of San Mateo. The selection of this land has been based on the habitat considerations such as preservation of a diversity of ecological values as well as upon development needs. Development will provide the funding to protect the existing grassland areas both from invasion of brush and exotic species and from destruction by off-road vehicles and vandalism. Development will also provide the funding for conservation activities which includes restoration of low grade habitat areas such as the Saddle area of the State Park.

Without development or a Habitat Conservation Plan, there is a significant risk that both species would become extinct on San Bruno Mountain within 5 to 20 decades. Habitat improvement is necessary both to counter balance the effect of development and to try to reverse the existing trend toward extinction. This HCP is a long-term program for conserving the ecology of the mountain. It will proceed in three general phases: start up, development mitigation and habitat enhancement.

Chapter V sets forth the legal and institutional mechanisms for implementing and enforcing this HCP. It proposes that the U.S. Fish and Wildlife Service will grant San Mateo County and the cities of Brisbane, Daly City and South San Francisco a permit to take butterflies under §10a of the Endangered Species Act. This will entitle the local public entities to allow butterflies to be killed in their jurisdictions only under very narrowly defined and limited circumstances. Developers will be allowed to grade and to build only in the areas shown in Volume Two of this HCP. They will be required to participate in the funding program to pay for preservation of the land set aside for habitat. They will dedicate the land shown in Volume Two to the public for butterfly conservation. The permit conditions will be

FIGURE S-7
AREAS TO BE DEVELOPED



enforced both by the local governments and by the U.S. Fish and Wildlife Service.

In Chapter VI, the Mountain has been divided into four planning areas (Guadalupe Hills, Southeast Ridge, Radio Ridge, Saddle) for management purposes. Those areas are divided into smaller administrative parcels, which correspond to ownership.

The Guadalupe Hills planning area contains the second largest butterfly colony on the Mountain. It has already been disturbed by Guadalupe Canyon Parkway, by off-road vehicles and by the uncontrolled spread of non-native plants. In the Guadalupe Hills, as much habitat as possible will be conserved, corridors connecting this area and the southeast and northeast ridges will be maintained and the quality of the conserved habitat will be improved.

The Southeast Ridge planning area is characterized by steep slopes and contains the majority of the Mission Blue and Callippe Silverspot populations. Grading and the maintenance of corridor connections with the rest of the Mountain are major concerns in this planning area. Grading would occur on the lower parts of the slopes in order not to destroy essential habitat area. The initial approach to the upper slopes of the Southeast Ridge is to leave them untreated, possibly using brush management at a later stage. In development areas, grading will be minimized, erosion prevention implemented, fire and vandalism control increased and constructive landscaping encouraged (i.e. landscaping with host plants or fire retardant vegetation). Long-term enhancement may be necessary to control expansion of brush, exotics, poison oak and the further spread of annual grasses.

Radio Ridge is composed almost entirely of County park lands and includes the peak of the Mountain, the radio towers and assorted transmission line corridors. Initially the area will be left untreated. Management of brush and non-native plants may be appropriate at later stages.

The Saddle planning area is made up of rolling hills which are marked by off-road vehicle damage and illegal dumping. The Mission Blue colony on Reservoir Hill is the only colony of endangered butterfly in the Saddle, and it is severely threatened by development. Since the Saddle is presently low-grade butterfly habitat and is mostly disturbed, there is an opportunity to try enhancement techniques and to attempt to reclaim the unique ecology of the Mountain. Therefore, the approach to the Saddle planning area is to proceed with proposed techniques of habitat enhancement in appropriate areas and accomplish some of the experimentation that is required. Successful enhancement of the Saddle area hinges on the eradication of the exotics which have invaded the area, and habitat manipulation will focus on that problem.

I. INTRODUCTION

I. INTRODUCTION

This Habitat Conservation Plan (HCP or Plan) has been created to address problems caused by the presence of endangered butterflies on San Bruno Mountain in San Mateo County. Figure I-1 shows the general location of San Bruno Mountain on the San Francisco peninsula. The Mountain encompasses approximately 3,600 acres of land. The butterflies are in danger of extinction and in order to increase their chances of survival, their habitat must be preserved and improved. Necessary improvements include increasing the number of butterfly food plants on the Mountain and preventing destruction of the habitat by off-road vehicles.

Large portions of the habitat on San Bruno Mountain are presently held by private landowners, one of largest being Visitacion Associates (VA). Prior to the discovery of the butterflies, VA had planned to develop much of its land. However, the Endangered Species Act prohibits killing or injuring any endangered butterfly. No development could occur on private or public land without killing or injuring some of the butterflies, and therefore, at present, no development is possible.

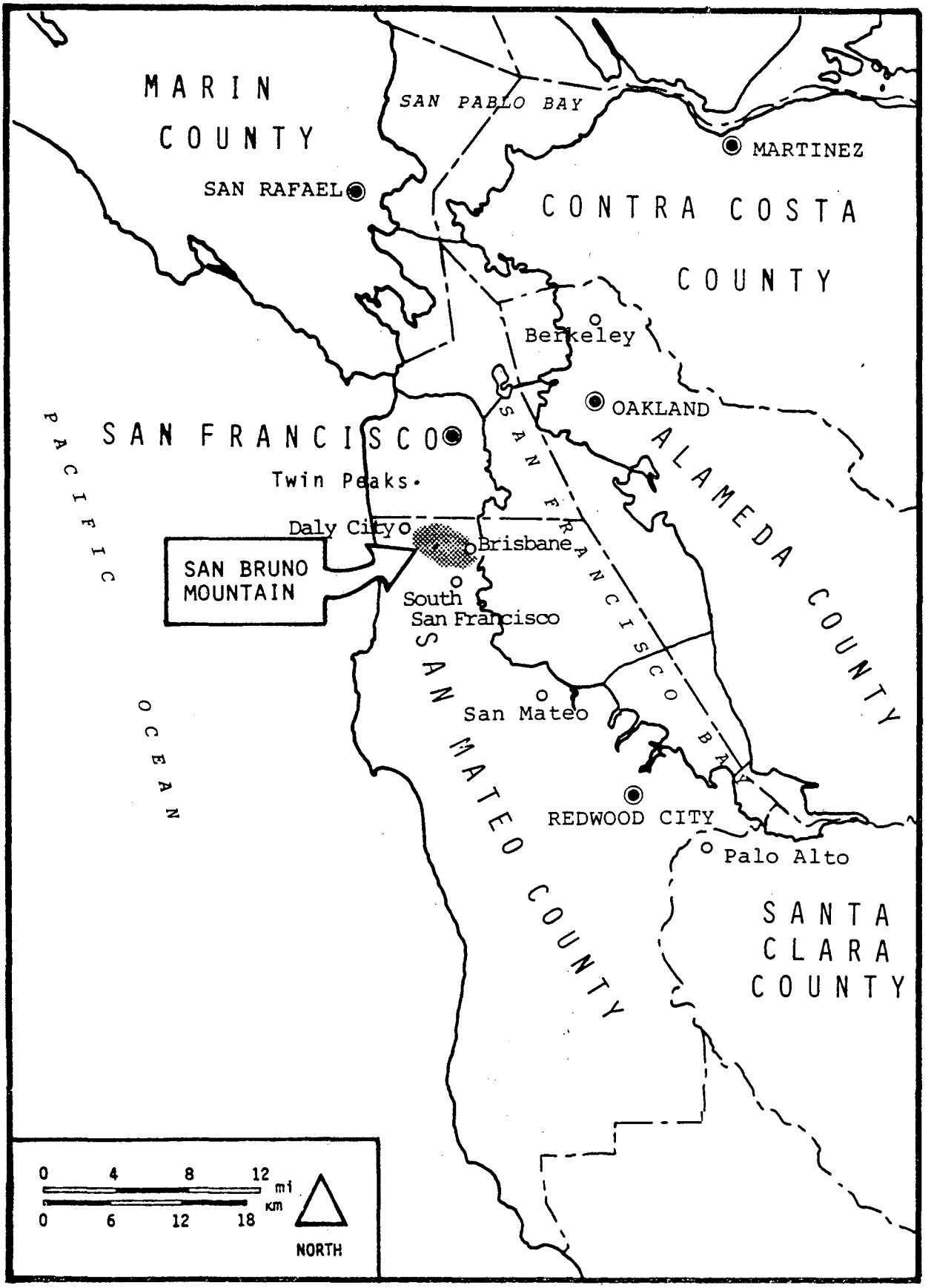
This HCP is an effort to address both the problem of the butterflies' potential extinction and private landowner's desire to develop their land. It is the result of several years of work by San Mateo County, the cities of Brisbane, Daly City and South San Francisco, Visitacion Associates, other private landowners, the Committee to Save San Bruno Mountain, the State of California and the U.S. Fish and Wildlife Service.

The butterflies which live on the grassland portion of San Bruno Mountain are the Mission Blue and the Callippe Silverspot. The existence of both butterflies is threatened by both natural and human forces. Most of their original grassland habitat has been destroyed over the years by urban development and encroachment of brush and exotic species. Their present habitat on San Bruno Mountain is being destroyed by dirt bikes and other off-road vehicles (ORV's). Their host plants are also being reduced by changes in the species composition of the grassland itself.

The impasse between private landowners and the butterflies has been detrimental to both sides. The butterflies are headed toward extinction and private landowner's are unable to develop their land. The goal of this HCP is to resolve the deadlock. The County of San Mateo contracted with Thomas Reid Associates, a Palo Alto environmental consulting firm, to perform a biological study of the Mission Blue and the Callippe Silverspot. The study was to determine the exact location of the butterflies on the Mountain, and the location of their food plants, along with other information about their habits and life cycles. The study was also to determine whether any development could occur without harming the butterflies chances of survival. The study was paid for by private landowners, but supervised and administered through a contract between the County and Thomas Reid Associates to ensure biological independence of the study. Private landowners and developers are willing to help establish a funding source to pay for maintaining and enhancing the remaining habitat in order to preserve the butterflies, in exchange for the opportunity to develop some of the land.

The first phase of the biological study was completed in December, 1980. The Phase I Report described the biological work in progress, directing the

FIGURE I-1
LOCATION



work on the second phase which would provide a much more comprehensive picture of the status of the Mission Blue and Callippe Silverspot butterflies and other species of concern on San Bruno Mountain. The Phase II Biological Study is now complete. The findings form the basis of this Habitat Conservation Plan.

Based on the biological analysis, San Mateo County believes that this HCP can allow a limited amount of land to be developed on the Mountain in order to raise the money necessary to preserve and improve the remaining habitat. Such development will provide a source of funding to conserve and maintain the habitat in an effort to prevent the extinction of the Mission Blue and to protect the viability of the Callippe Silverspot. Private landowners have agreed that in return for the opportunity to develop some of its land, they will donate the remaining land to the public to be preserved as butterfly habitat. Additionally, they will participate in a funding program to ensure the ongoing preservation and maintenance of the habitat. Funds will be raised through a combination of levies on the property after development and specified start-up contributions.

Today, roughly 95% of the SBM area (3380 acres) is undisturbed open space -- the remainder is roads and small developed areas. The open space comprises brush and grassland, which is the habitat for the Mission Blue. Some 1952 acres of the open space is already in public ownership; the HCP would add 800 acres of private land to the park which would mean that 81% of the present open space will be in public ownership. The development anticipated by the HCP would remove 368 acres (11%) of the open space, and 260 acres (8%) are yet unplanned.

In return for private donation of land and participation in the funding program, the local public entities have agreed to apply to the U.S. Fish and Wildlife Service for a permit to take butterflies. The Service is authorized to issue such a permit under §10a of the Endangered Species Act if taking the butterflies will enhance their survival. The U.S. Fish and Wildlife Service has participated in planning to conserve the butterflies' habitat. If the permit is issued, the local entities have agreed to allow limited development, which would result in the taking of butterflies according to the provisions in this HCP.

In working out the specific provisions of this HCP, the following points have been used as guidelines:

1. The Plan and studies should include the ecological whole of San Bruno Mountain. The Plan focused in this case on the mountain-wide impacts of the development proposals as allowed by the 1976 San Bruno Mountain General Plan Amendment, and other General Plans, because these proposals represented the greatest threat to the species of concern.

2. The Plan should set aside conserved habitat for the species through the transfer of ownership to the public. These ownership interests should be restricted so that the conserved habitat is protected permanently.

3. The Plan should provide a permanent funding source for conservation activity.

4. The Plan should be based upon an biological study performed by an independent expert under contract to a public entity.

5. The Plan should rely on preservation rather than manipulation, unless manipulation is of proven effectiveness.

6. The Plan should comprehensively address all threats to the endangered species, including biological threats as well as threats from human activity.

7. The Plan should designate those areas in which development may occur and in which endangered individuals may be taken and habitat destroyed.

8. The Plan should simultaneously provide private landowners with a permanent resolution of endangered species and habitat issues, and provide the conserved habitat with protection against additional development proposals encroaching upon it.

9. The overall effect of the Plan should be sufficient to provide for the long-term, indefinite perpetuation of the species.

II. HISTORICAL REVIEW

II. HISTORICAL REVIEW

The San Bruno Mountain area is the only remaining undeveloped property left from the original Spanish land grant of "Canada de Guadalupe Visitacion y Rodeo Viejo". This Spanish land grant was made in 1837 to Jacob P. Lessee, a naturalized Mexican citizen. By 1872, the largest holdings were owned by Visitacion Land Company and were acquired in 1884 by Charles Crocker. During the period following its acquisition by Crocker, the area was used primarily for cattle grazing.

Subsequently, the property passed to the Crocker Land Company. The Crocker Land Company was acquired by Foremost-McKesson Inc., in 1970, and its interest in San Bruno Mountain is now held by Visitacion Associates, a joint venture of Foremost-McKesson and Amfac, Incorporated.

Prior to 1965, few urban uses existed in the area, other than early subdivision of adjacent portions of Brisbane, establishment of radio and television transmission towers atop the highest peak, and construction of access roads and fire trails.

The area has more recently been the subject of a number of development proposals. In 1965, a proposal was made to excavate earth from the Mountain over a period of 20 years to provide fill for the San Francisco Airport and for a possible southern crossing of the San Francisco Bay. It would also have resulted in removing enormous quantities of earth (approximately 200 million cubic yards), from the Mountain. This proposal was extremely controversial when made and is thought by some to have caused the formation of the Save the Bay Committee and the ultimate adoption of the San Francisco Bay Conservation and Development Commission, which now regulates dredging and filling within San Francisco Bay. In addition, this proposal triggered the formation of a more local citizens group, the Committee to Save San Bruno Mountain, which has been intensively involved in the conservation of the Mountain since that time. Late in the 1960's, another proposal was made to develop portions of the area for residential uses. This proposal was not pursued.

The most serious recent development proposal for the Mountain was made in 1975. At that time, Visitacion proposed the construction of approximately 8,500 residential units and 2,000,000 square feet of office and commercial space on various portions of San Bruno Mountain. An intensive political battle ensued. Ultimately, the Board of Supervisors of San Mateo County approved a decision, keeping the Saddle Area of the Mountain in open space, but contemplating development of 1,250 residential units on the Northeast Ridge and 950 residential units on the South Slope sections of the area. The political controversy in 1975 and 1976 did not include development proposals for other sections of the area which lie within the planning jurisdiction of Daly City, such as the Administrative Parcels comprising Reservoir Hill, Rio Verde Estates and Rio Verde Heights.

In 1978, Crocker Land Company, a co-owner of Visitacion, settled litigation with San Mateo County by donation and sale of approximately 1,711 acres, consisting of almost the entire main ridgeline of San Bruno Mountain. Approximately 1,100 of these acres were sold to San Mateo County for $6.2 million and the remaining 546 acres were donated to the County.

In 1979, the State of California began negotiations with Visitacion for acquisition of the Saddle Area of the Mountain for a park. After extensive negotiations, a portion of the Saddle Area on which 47 dwelling units could be constructed was omitted from the Saddle Area acquisition and Visitacion completed donation and sale transfers of the Saddle to the State of California. Visitacion was paid $5.0 million for a 42 acre portion of the Saddle Area and donated the balance (256 acres), to the State so that a total of approximately 298 acres was acquired by the State of California.

Since 1979, proposals have been advanced for the construction of approximately 335 dwelling units on Reservoir Hill. Additionally, adjacent to the Saddle Area is a site owned by the Brisbane School District. Since the site is no longer necessary for school purposes, the Brisbane School District is attempting to obtain a planned development zone which would permit the construction of approximately 225 units on 17 acres. On the North Slope of the Saddle Area, facing toward San Francisco (Rio Verde Heights and Rio Verde Estates), there are proposals to construct approximately 750 units on 34 acres of land.

There is also an active quarrying operation within the area (Quarry). One of the major owners of the Quarry owns adjacent Owl and Buckeye Canyons. At present, only small portions of the floor of the canyons are designated for development by the County's 1976 General Plan with the remainder designated as open space.

In southern Brisbane on the higher slopes of San Bruno Mountain, there is a subdivision consisting of 90 parcels which are generally in multiple ownership. This subdivision, known as Brisbane Acres, has been in existence for 50 years. There are no current development proposals for most of these lots since there are no water, street or utility services to the parcels. Because they are in individual ownership, it is all the more difficult for a development plan to be put forward which could bear the expense of putting most of the necessary service infrastructure in place.

In summary, San Bruno Mountain has, over the course of the years, been the subject of a number of development proposals, several of which are currently pending. Although more than 1,952 acres of San Bruno Mountain are presently in public ownership and contain substantially important habitat, the remaining private lands also contain substantially important butterfly habitat. If the current development proposals, for one reason or another, are withdrawn or are unsuccessful, it can be expected in light of past history and the continuing market pressure for housing development, that future development of this land will be comtemplated. Thus, the habitat of the San Bruno Mountain area which remains within private ownership or is otherwise subject to development is under continuing pressure and threats of loss.

Subsequent to the adoption of the General Plan Amendment for the Mountain area and the resolution of the land use controversy, it was discovered that portions of the Mountain provided habitat for a federally listed endangered species, the Mission Blue butterfly. The Mission Blue was listed by the USF&WS on June 1, 1976, as "endangered" persuant to the provisions of the Endangered Species Act of 1973. In designating the Mission Blue as an endangered species, the Director of the USF&WS made the following statement:

"This butterfly is limited in distribution to two small isolated

populations which occur on the summits between Twin Peaks, San Francisco County and the San Bruno Mountains, San Mateo County, California. In San Francisco County, the Mission Blue was formerly more wide spread on the higher hills within the County, but due to expansion of the City and plantings of exotic plants, such as eucalyptus, it is now reduced to a tiny remnant on Twin Peaks and may soon become extirpated. In the San Bruno Mountains, the species is uncommon, and proposed developments there would probably eliminate the butterfly." 41 Fed. Reg. 22041 (June 1, 1976).

On July 3, 1978, the USF&WS proposed to list the Callippe Silverspot and to designate areas of San Bruno Mountain as its "critical habitat". Before final action could be taken on the listing and critical habitat proposal, Congress passed the Endangered Species Act Amendments of 1978 which changed the procedures for the designation of critical habitat. As a result, on March 6, 1979, the USF&WS withdrew the critical habitat portion of the July 3, 1978 listing and designation proposal. On March 28, 1980, the USF&WS re-proposed the designation of critical habitat for the Callippe Silverspot. The proposed "critical habitat" for the Callippe Silverspot includes all of the areas within the San Bruno Mountain area designated as available for development pursuant to the County General Plan. In June, 1980, the USF&WS allowed the listing proposal for the Callippe Silverspot to expire. In allowing the listing and critical habitat proposal to expire, the USF&WS indicated that habitat of the Callippe Silverspot included essentially the same areas as the Mission Blue and was therefore effectively protected by the listing of the Mission Blue and that the proposal could be reconsidered upon the development of further information.

III. BIOLOGICAL PROGRAM

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A. ISSUES

The purpose of the Habitat Conservation Plan is to provide for the indefinite perpetuation of the Mission Blue and Callippe Silverspot butterflies on San Bruno Mountain, as well as to conserve and enhance the value of the Mountain as a whole as a remnant ecosystem or biological refuge which contains other rare or unusual species in addition to the two butterflies. To achieve this purpose, the Plan must be founded on an adequate understanding of the ecology of the two butterflies, the other species of concern, and the biological processes which affect the Mountain as a whole. The biological study conducted in 1980 and 1981 has provided sufficient biological information to serve as the basis for this Plan.

In providing for conservation of the Mission Blue and Callippe Silverspot the more pervasive goal is to simultaneously provide for the perpetuation and enhancement of the grassland habitat which supports the butterflies, including its high proportion of native plants, local and regional endemics, and the animals which utilize the grassland. The focus of preservation is on the grassland because this is thought (Kuchler, 1977) to be the ancestral native habitat of the area, it supports the endangered butterflies and many other species, and it is threatened by the encroachment of the brush community and the spread of gorse and eucalyptus. While the brush community also contains rare and endemic species such as the San Bruno Elfin butterfly and the three unusual manzanitas, and the Plan also contains strenuous provisions to protect these resources, the brushland is thought to be favored biologically by the present conditions on SBM and not under the same threat of replacement as the grassland.

The HCP is not simply a Plan to preserve rare butterflies, but a Plan to preserve the grassland habitat of which they are a small, but important part. The principles which guide the Plan and many aspects of its operation would remain unchanged even if the Mission Blue and/or Callippe Silverspot were to go extinct on the Mountain (most likely due to forces -- such as droughts -- beyond the Plan's control). The principles of the Plan -- preserving existing habitat types, manipulation and enhancement only to restore to natural condition disturbed or degraded habitats are valid whether or not the butterflies are specially considered. These principles are intended to perpetuate the total set of ecological values on the Mountain which distinguish it from other open space within the SF Bay region, particularly as the habitat of nearly 400 native plants, many animals and most likely rare or unique species which we have not yet discovered.

The study concluded that the Mission Blue (and Callippe) is a single population inhabiting San Bruno Mountain. The population has been divided by man's prior disturbance (i.e. Industrial Park and Guadalupe Canyon Parkway) into two major population clusters or "colonies". These colonies are not independent of one another. There is movement between them which genetically links them (see Biological Study for complete discussion). The largest colony is found along the Southeast Ridge; 1981 estimates placed 60% of the Mission Blue and 75% of the Callippe Silverspot populations there. The other colony is two miles to the north on the Guadalupe Hills, where about 30% of the Mission Blue and 25% of the Callippe populations occurred in 1981 (see Figures

III-1 and 2). The Mission Blue is also found scattered at low density throughout the Mountain's grassland and in three other small, but distinct colonies on Radio Ridge, Reservoir Hill and Twin Peaks (2.2 miles north of SBM, in San Francisco). All of the San Bruno Mountain colonies have some genetic interchange. It is unlikely that there is interchange between the Twin Peaks colony and the San Bruno Mountain colonies.

The total number of flying adults of Mission Blue inhabiting San Bruno Mountain during the 1981 flight season was roughly 18,000; the Callippe population was estimated at 11,000 and 8,000 adults for the 1980 and 1981 flight seasons, respectively. Migration data gathered during the biological study indicate one population sharing genetic contiguity; there are no smaller, isolated sub-units. Both seasonal and daily estimates of population size show that the populations are well above the minimum reproductive size believed necessary for genetic stability; they are not likely to go extinct simply because they are already too small. A high proportion of long-distance movement is the basis for genetic interchange between colonies and for re-establishing colonies lost from small areas of habitat.

The SBM grassland has high relief -- steep hillsides, sharp ridges, deep swales, and exposed hilltops. The relief is important to both butterflies as it determines both the distribution of the larval food plants and the adult nectar plants. Lupine, the larval food plant of the Mission Blue, grows best on rocky outcrops, in poor soils where grass grows poorly, and in areas of recent disturbance such as roadcuts, landslides and rodent diggings. Violet, the Callippe larval food plant, grows best in openings in grassland where it is not overgrown by dense grass or brush.

Both species depend on a mixture of high and low density habitat within the SBM grassland, but for different reasons. Mission Blue can find basic requirements (mating, nectaring, egg-laying) within a very small area (less than one acre), but since the lupines shift location somewhat from year to year, succeeding generations of Mission Blue must shift also. The Callippe resource, on the other hand, is scattered over a larger area (usually more than five acres) so Callippe is forced to use more of the the habitat on a daily basis.

Callippe is a "hilltopping" species; males "patrol" hilltops and females instinctively fly uphill to mate and downhill to lay eggs. The importance of hilltops to Callippe dictates that hilltops or ridgelines must be maintained as habitat in a viable conservation plan. Mission Blue is commonly found in dense clusters on certain hilltops, but the orientation is an accidental result of the high density of lupine also found on these hilltops, not a behavioral response to hilltops.

Both species will cross small distances of unsuitable habitat, such as scattered brush or trees, small paved roads and dirt roads. However, dense brush or plantings of trees (such as the Eucalyptus groves on Northeast Ridge), major paved roads and residential lots act as severe barriers to Mission Blue, and significant barriers to Callippe as well. The butterfly response to barriers indicates that corridors (see Glossary) of suitable habitat must be preserved within developed areas, to preserve habitat contiguity with major expanses of open space, thereby avoiding fragmenting the existing continuous populations.

FIGURE III - 1
GENERAL POPULATION AND HABITAT DISTRIBUTION -- MISSION BLUE -- 1981

FIGURE III - 2

GENERAL POPULATION AND HABITAT DISTRIBUTION — CALLIPPE — 1981

The distribution of plants and animals we see today on SBM is the result of the replacement of the ancestral perennial bunch grassland with a European annual grassland, followed by many decades of grazing, and the removal of grazing in the mid-1960's. The larval food plants of Mission Blue (lupines) and some of their nectar plants (thistles) are favored by grazing since larger plants are not eaten by cattle and also thrive in disturbed areas and in poor soil which results from intensive grazing. The lower average vegetation height in grazed grassland may make the low-growing violets more accessible to Callippe as well. Grazing also controls the spread of brush as young seedlings invading grasslands are grazed.

Since grazing and its biological effects on the landscape have ended, natural processes are promoting the spread of brush and reducing the density of lupines, violets and butterfly nectar plants within the grassland. These processes, combined with vegetation damage by trespassing off-road vehicles, significantly threaten the long-term survival of these insects and their grassland habitat on San Bruno Mountain. Elements of the Plan aimed at modifying natural succession and protecting the area from vandalism are expected to enhance significantly the prospects for long-term survival of these species and the grassland habitat in general.

Ninety-seven percent (97%) of the Mission Blue's current habitat as reflected by population distribution is on San Bruno Mountain and 3% of the habitat is on Twin Peaks. Owners of 88% of the total habitat have entered into this HCP and have agreed to dedicate 75% of the Mission Blue's current habitat to permanent, undisturbed open space. The owners will destroy 14% of the present habitat in the process of developing their property; at least one quarter of this may be reclaimed after grading. Owners of the remaining 12% of the land (including Twin Peaks) have not entered into any agreements, and will be prohibited by the Endangered Species Act and local regulation from destroying any habitat they own. Thus, 87% of the Mission Blue's habitat is protected (75% by dedication and 12% by regulation).

The Callippe Silverspot is similarly protected. All of the Callippe's habitat is on San Bruno Mountain. Owners of 89% of the Callippe's habitat have entered into this HCP and will dedicate 82% of the habitat to permanent open space; 8% of it will be developed. Owners of the remaining 11% of the habitat are prohibited by local regulation from taking any of the butterflies. Thus, 93% of the Callippe's habitat is protected (82% by dedication and 11% by regulation).

Another endangered butterfly species, the San Bruno Elfin (Callophrys mossii bayensis) is found on San Bruno Mountain. This insect is dependent on a single host, and the adults seldom stray very far from this host; as such it occurs in rather distinct colonies. Little interchange takes place between colonies (Robert Langston, 1982). Figure III-3 shows the nine colonies known to Robert Langston in 1982. The shaded portion of the map indicates the extent of the Elfin's habitat as mapped by R. A. Arnold in the 1982 San Bruno Mountain Recovery Plan.

It is the intent of the HCP not to cause the taking of any San Bruno Elfin butterflies, therefore within the potential habitat areas shown in Figure III-3, no takings of the Elfin can occur. Anywhere development is contemplated in potential habitat areas further studies must be done to assess the separate impact on this species. In addition, the HCP requires that the

Habitat Manager be aware of these potential habitat areas. In addition, if the Habitat Manager is not already familiar with the Elfin, he will become so, in order that research and monitoring of this insect can take place annually. Should San Bruno Elfins be found outside the areas designated in Figure III-3, impacts should be avoided if possible, however, incidental takings outside of designated potential habitat areas will be covered by the 10(a) Permit.

Another rare butterfly found on San Bruno Mountain is the Bay Checkerspot (Euphydryas editha bayensis). This insect is currently proposed for listing on the Federal Endangered Species list; a decision on this listing is expected to take place in 1983. The Checkerspot has a limited distribution on the Mountain; its known range is entirely within the County Park portion of the Mountain, at the top of Southeast Ridge. As indicated in Chapter VII of this HCP, the Park has no plans to develop or build trails within the area containing Bay Checkerspot habitat. The Habitat Manager will be monitoring these insect on a annual basis to more fully identify their distribution and habits on the Mountain.

After publication of the Draft HCP, San Mateo County asked its biological consultant, Thomas Reid Associates, to research the presence and potential habitat of the Federally listed Endangered San Francisco Garter Snake on San Bruno Mountain.

The U.S. Fish and Wildlife Service in conjunction with the California Department of Fish and Game has been searching for the snake on the Mountain since early 1982. The main emphasis of their searches is in the State and County portions of the Park, near and within the bog area of the Saddle. They have also been consulting Ted Papenfuss, Ph.D. Up to now, no snakes have been found. The efforts of the Federal and State government have been coordinated with the HCP.

Thomas Reid Associates contacted Ted Papenfuss, Ph.D., Research Herpetologist from U.C. Berkeley and respected authority on the San Francisco Garter Snake, to prepare a map of the snake's potential habitat on the Mountain. After field work, he was able to prepare such a map (See Figure III-4). Although no official sitings of the the snake have been recorded in recent years, the areas indicated on the map are where further research should be done.

As with the San Bruno Elfin, within the snake's potential habitat areas shown in Figure III-4, if the snake is found, no takings can occur. Anywhere development is contemplated in potential habitat areas, further studies must be done to assess the separate impact on this species. In addition, the HCP will require that the Habitat Manager be aware of these potential habitat areas, and that he become familiar with its appearance and habits so that he can help assess the presence of the snake on the Mountain. Should a snake be found outside of these areas, impacts should be avoided if possible, however, incidental takings outside of designated potential habitat areas will be covered by the 10(a) Permit.

FIGURE III - 3
GENERAL POPULATION AND HABITAT DISTRIBUTION -- SAN BRUNO ELFIN

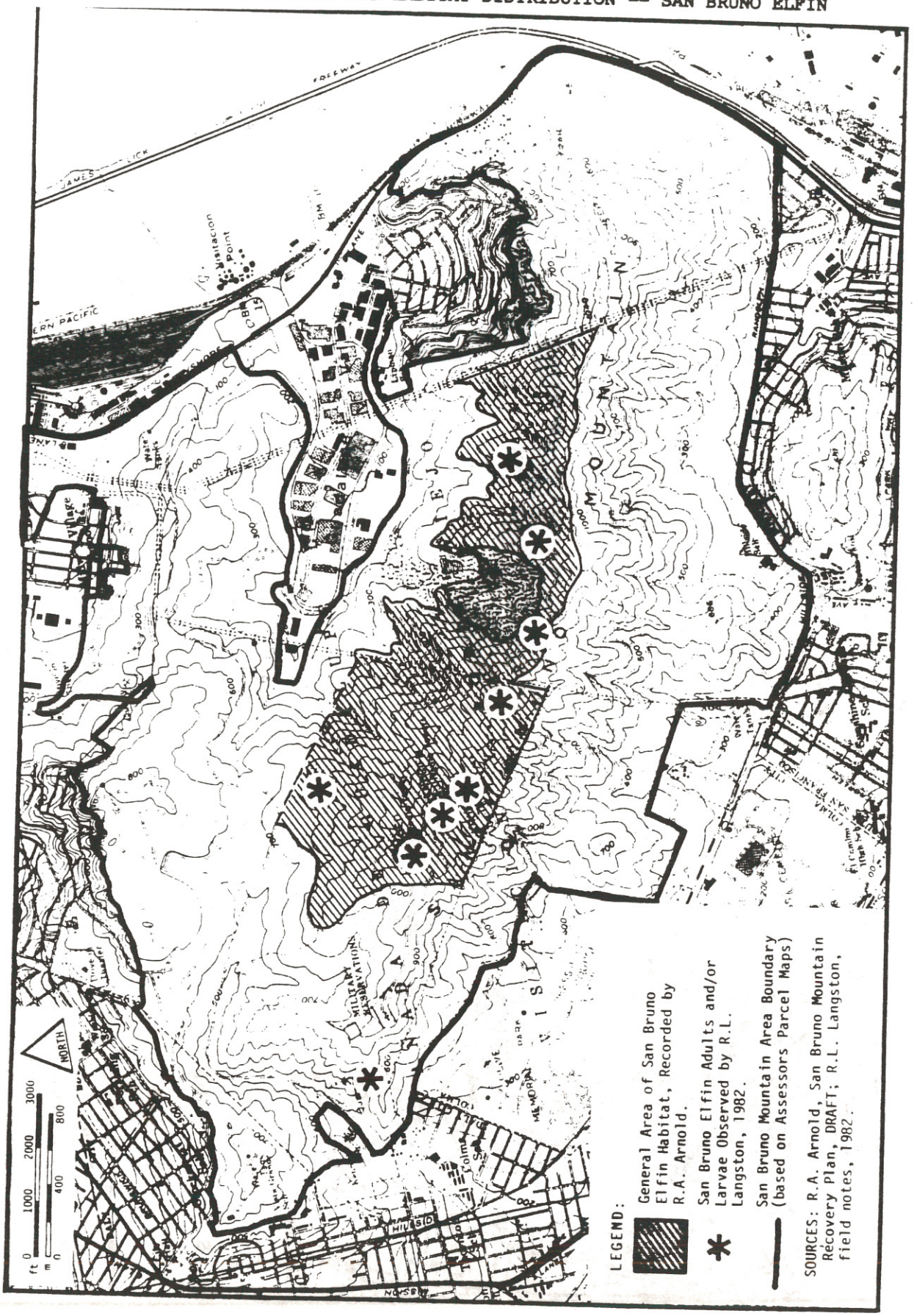
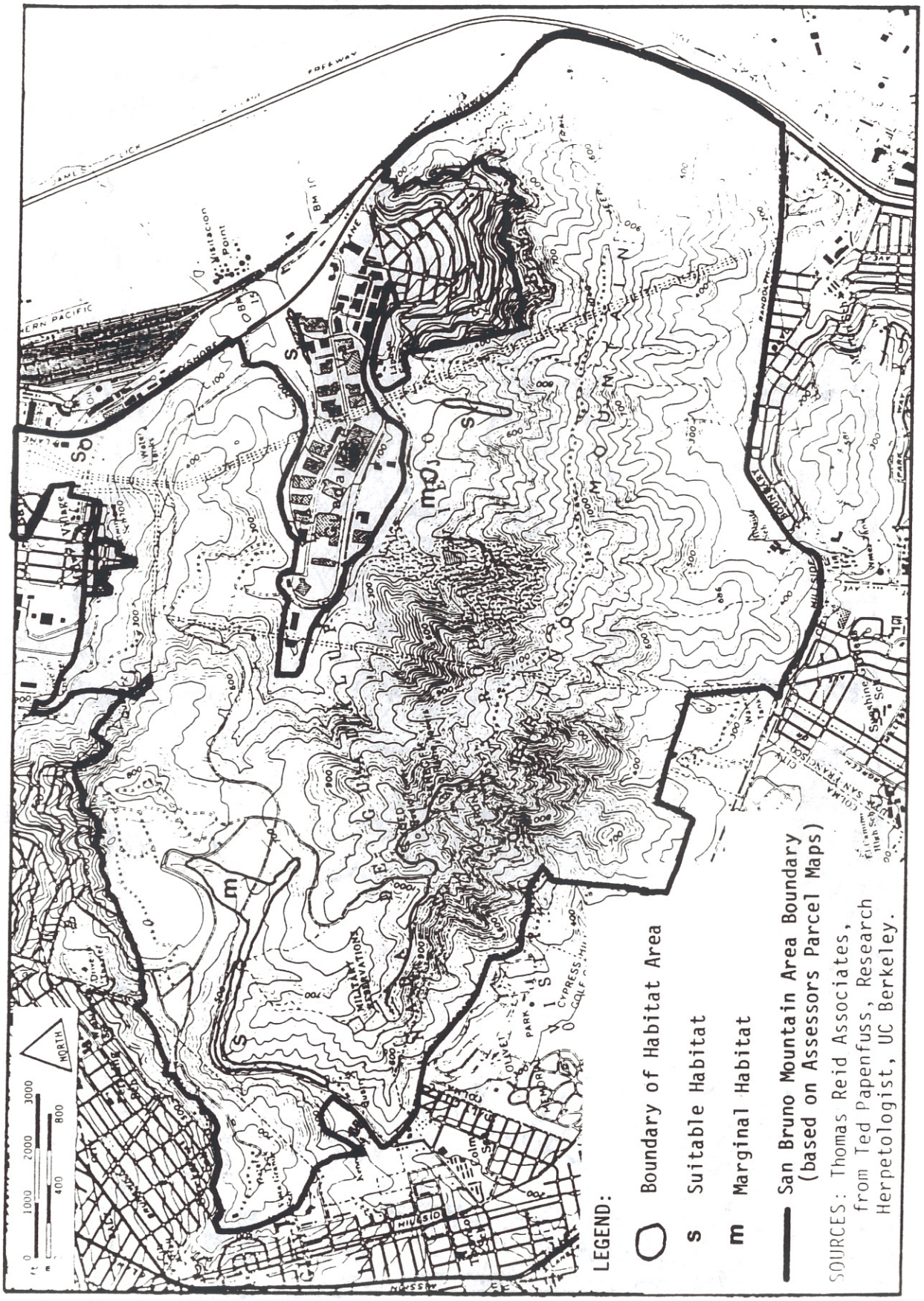


FIGURE III - 4
POTENTIAL HABITAT OF THE SAN FRANCISCO GARTER SNAKE



B. GUIDING PRINCIPLES

The application of habitat conservation strategies to the San Bruno Mountain area in concert with a certain amount of development will be guided by a broad set of conservation and planning principles. The principles are formulated to maximize the Plan's success in conserving both the endangered species of interest and the overall ecological fabric of the Mountain. Each specific conservation technique applied to the management units within each administrative parcel on the Mountain will be in accordance with these principles.

The following is a list of the more important guiding principles for the implementation of the habitat conservation program; they are not listed by priority. Each is described in more detail below:

1. Preservation of ecological values
2. Preservation of existing diversity
3. Reliance on preservation rather than restoration
4. Habitat manipulation for enhancement
5. Phasing
6. Resolution of Uncertainties
7. Ongoing review

Preservation of existing ecological values is one of the foremost objectives of the Plan. The ecological values to be preserved comprise all of the features of San Bruno Mountain which result from its unusual climate, steep topography, and past relative freedom from urban development. These values include the endangered species of concern, the unusually large number of other rare or endemic plants and animals, the complexity and diversity of ecological communities including the high proportion of native plants and high degree of utilization by wildlife. Since the Mountain has experienced the effects of man's activities increasingly in recent times, including livestock grazing, arson, the quarry, the telecommunications facilities, and roads (most significantly Guadalupe Canyon Parkway), the ecological value of the Mountain has been reduced from its ancestral, or "pristine" condition. Nonetheless, since it is extremely difficult to theoretically reconstruct what this ancestral condition would have been, and virtually impossible to recreate it, a realistic and much more workable goal is to attempt to preserve the known values of the present-day "biological refuge".

As mentioned, part of the ecological value of San Bruno Mountain is its diversity of species, community types, and topographic features. This diversity is reflected in the very occurrence of the endangered species and local endemic plants of special concern. To preserve its ecological values, a second guiding principle is **to preserve in open space existing diversity** in terms of annual and perennial grassland, brushland and grassland (particularly brushland harboring species of concern such as the San Bruno Elfin), north and south-facing slopes, exposed and protected areas, moist and dry areas, high and low density areas of butterfly larval food plants and nectar plants.

Diversity is also related to stability in ecological systems. Although the precise nature of the relationship is still under study by ecologists, it is generally thought that part of the stability of ecological systems stems from the complexity and overlap in their food webs (the food and feeding relationships among animals and plants). (Odum, 1971, Ehrlich et al. 1977).

Removal of species from the food web simplifies the system and may make it more prone to collapse*. For example, the loss of a large predator leads first to an outbreak of its herbivorous prey, which then may defoliate and kill its food plants and subsequently starves. From the point of view of both the ecological value of the diversity on San Bruno Mountain and its long-term maintenance, preservation of the diversity makes sense as a conservation plan principle.

The principle of **reliance on preservation** (as opposed to manipulation or restoration) is an extremely important one. Preservation of existing ecological conditions is preferable to attempting to recreate these conditions after disturbance or elsewhere (e.g. clearing brush to create grassland) for several reasons. Preservation is less expensive than restoration. Even more importantly, there is always uncertainty as to whether a restoration or habitat enhancement effort will produce the desired result or whether it will adversely affect another species. Although the habitat enhancement techniques recommended in this plan have been tested in range management or other enhancement programs reported in the literature, their application to San Bruno Mountain is still, in many ways, an experiment with unknown results. (This is why, as discussed below, we also recommend a conservative, or step-wise approach to habitat manipulation). The underlying problem is that biological systems and their interaction with the physical environment are so complex that one cannot know or control all of the variables which could affect the success of the enhancement strategy.

Even in the absence of development, strict conservation of all of San Bruno Mountain would not guarantee that the species of concern or the existing ecological communities would survive in perpetuity. As described in Chapter VI of the Biological Study Report the natural process of succession (see Glossary), which has been taking place since the removal of grazing, is causing the gradual spread of the brush community at the expense of grassland, and is also changing the proportion of broadleaf to grass species within the grassland. Both of these trends can, in themselves, jeopardize the long-term persistence of the endangered species on San Bruno Mountain. Therefore, to maximize the probability that these species will persist, habitat manipulation is a viable alternative to strict conservation in those localities where it can be demonstrated by monitoring that succession is having a detrimental effect on particular species.

Within the framework of a plan founded on conservation principles, one can adopt a case by case program of habitat manipulation. Within habitat areas that are simply preserved it is always possible to apply future manipulation for enhancement, but once habitat is altered, it is not possible to guarantee restoration of its former condition. Specifically, we have strong evidence that graded areas can be restored to Mission Blue and Callippe habitat, but the HCP should not rely on such action to maintain the species.

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* The role of diversity in ecosystem stability is one of the basic scientific principles reflected in the Endangered Species Act itself. In a broad sense, part of the purpose of the SBM HCP is to preserve the stability of biological systems by offsetting a tendency toward loss of diversity exemplified by the extinction of a butterfly subspecies. Man is a part of the biological system and derives some of his quality of life from it.

Therefore, to minimize foreclosure of future options, the initial approach is to assume that all graded areas within development parcels will be lost as habitat; hence the plan stresses the need to conserve as much area as possible in open space. The open space should further conform to the following conservation principles: (1) it should preserve large habitat areas (2) it should preserve the existing diversity of habitat types, including high and low density resource areas for the butterflies of concern, and of physical conditions (slope, exposure) (3) it should preserve contiguity between open space areas on all major portions of the mountain (Planning Areas) and (4) it should preserve connections between open space within conserved habitat. To maintain the level of genetic interchange between colonies and small sub-units of the Mountain's population necessary to maximize the chances for species survival, it is critical to prevent true fragmentation of the current population and isolation of any open space areas which are expected to harbor endangered species in the long term. Therefore, in the review of current development proposals, the final layout of development and the implementation measures for management units described in Chapter VII of this Plan all incorporate these specific conservation principles. Likewise, they should be used in evaluating and modifying all future development proposals.

As an adjunct to preservation habitat manipulation for enhancement is justifiable in instances where the manipulation fulfills one or more of the following explicit criteria:

1. When the manipulation helps to compensate for the nearby loss of habitat to development, such as the re-establishment of lupine outside the development area on Reservoir Hill where lupine now supports Mission Blue.

2. When the manipulation reverses past disturbance or accelerates the rate of natural recovery from past disturbance, as areas invaded by gorse, areas planted in eucalyptus, roadcuts or other slopes prone to erosion, dirt bike trails etc.

3. When the manipulation reverses a natural process, such as succession of grass to brush, or loss of broadleaf species from grassland which further threatens the existence of endangered species on San Bruno Mountain;

The approach to manipulation is to prioritize areas for enhancement in the order of the criteria given: that is, the first sites targeted for enhancement are those where habitat destruction due to advanced development plans is imminent, such as on Reservoir Hill (RH). Also since the present day Mission Blue colony on RH would be destroyed, it makes sense to spread out the colony and establishing its food plants in an adjacent area to be retained as open space. Similarly, carefully controlled experimental measures to eradicate gorse or revegetate erosion or off-road vehicle scars can both improve overall habitat quality on SBM and provide needed information about the effectiveness of revegetation and invasive species control methods.

Since habitat enhancement through manipulation is still experimental, and secondary to conservation, the approach to manipulation is to use it only when it clearly improves on the existing biological condition of an area according to the criteria listed above, and to proceed in an incremental, or step-wise fashion. Habitat enhancement techniques should generally be tried first on a small, "pilot" or experimental scale to (1) determine if they are biologically effective, (2) refine them so that they are both most effective and cost-

effective and (3) determine whether they have any undesired effects not anticipated. Once techniques can be demonstrated to work on a pilot scale, they can be employed on a larger scale such as entire management units. In applying habitat manipulation for enhancement only to clearly disturbed or degraded areas, one can be reasonably sure that "healthy" habitat will not be damaged or natural processes within the grassland-brush ecosystem disrupted.

In any application of enhancement strategies there should be an order of preference among the strategies chosen. Strategies should be utilized which are less expensive, have been proven to work in range management, for erosion control, or in other situations with some resemblance to San Bruno Mountain before those which are more expensive and/or highly experimental. A rough grouping of the enhancement techniques discussed in the following section (VI B) from more accepted to more experimental would be as follows:

Generally accepted or widely used in range management or highway construction	Chaining and Scraping (of brush or areas succeeding to brush) Herbicides application (for Exotic species and Brush Management) Landscaping Runoff and Irrigation Control Seeding/Propagation (with native or host plants)
Widely used but more experimental in this application	Grazing Burning Vandalism/Fire control
Not widely used. Experimental in this and all other applications	Soil Modification (Rock Spreading) Relocation of Host Plants Off-site introduction of species of concern Lab Rearing/Cultivation of species of concern (for re-introduction into the wild)

Phasing is a key feature of both the overall implementation of the Plan and the application of habitat enhancement techniques in Conserved Habitat areas.

1. Conserved Habitat. As described later in this Chapter, the initial years of Plan implementation within Conserved Habitat areas will be characterized by pilot studies of monitoring techniques and habitat enhancement strategies. Later years (5 or more years after start-up) should see the larger scale application of habitat enhancement programs within Conserved Habitat.

Within the Conserved Habitat, uncertainties regarding optimum methods for monitoring populations of species of concern and others, and for implementing and monitoring habitat enhancement will be resolved through the research/pilot program effort carried out during the first few years and critically evaluated by the Technical Advisors to the County. For example, a research program for the Mission Blue and its lupine host plants is already underway on Reservoir Hill and preliminary results should be available by late Spring, 1982.

2. Development Areas. In Development Areas, development mitigation such as dedication of graded areas and erosion control measures will be phased

concurrently with adjacent development activities. The phasing is determined primarily by the financial and engineering needs of development. While longer intervals between development phases would be beneficial to the conservation program, long delay would jeopardize the feasibility of the various projects. Nonetheless, the planned phasing is a commitment on the part of the developers and allows the HCP to anticipate the impact and program mitigation accordingly.

C. ACTIVITIES

1. Research

At the close of the Phase Two Biological Study adequate information had been collected to address the basic scientific questions of the study and to serve as the basis of a planning program to preserve endangered species on San Bruno Mountain. Notwithstanding the considerable knowledge gained through the Biological study, the Habitat Conservation Plan, in concept and in implementation, is novel and in many ways, experimental. There are many biological uncertainties which inescapably remain at the outset of such an ambitious undertaking which can only be resolved through an ongoing program of applied research designed specifically to direct Plan implementation.

As described in III C 2. and III C. 3 some of the activities which fit the general description of research are pilot studies into the most cost effective monitoring and habitat enhancement techniques. The scope and general mechanics of these research topics are described under each activity. The text addresses the need for further study, the anticipated background research, field techniques and analysis that would be employed, and the direct way in which the results would serve the conservation program.

While the Biological Study was not an exhaustive study of the entire ecology of San Bruno Mountain -- as an intensive study of the two butterflies of concern and their habitat requirements it concurrently revealed much about the present day ecological relationships within the grassland and between the grassland and the brush to allow the participants to formulate a Habitat Conservation Plan with a degree of confidence seldom afforded to conservation efforts. While longer term basic research on the Mountain, on any species or ecological question, at the scale and intensity of the 1980-81 effort is prohibited due to a clear lack of funding sources, basic research even at a more modest scale is desirable to improve and update our total understanding of the ecology of the Mountain. Such research within dedicated lands is to be encouraged through the traditional channels of academic research at local colleges and universities. Due to the absolute limits on funding between the private and public sector participants in the Plan, research within the Plan itself must be much more highly focused on furthering the successful operation of the plan. It will therefore necessarily center on such topics as the best methods of monitoring butterfly populations, host plants, endemic plants, spread of brush, effective methods of gorse eradication, cost-effective plant propagation techniques and so forth.

One important aspect of the academic research potential of an ecological reserve on SBM is the potentially valuable contribution from continuing research programs begun on SBM before the HCP. Several scientists in the Bay Area have been observing the plants and animals of SBM for several decades. The data from past research represents an invaluable historical perspective on the enhancement activities of the HCP. While much of the data has been

analyzed and published (and used in the HCP), more knowledge will be drawn from an organized, synthetic research program conducted over many years. Special consideration should be given to attracting researchers who have historical data on SBM.

One area of basic research which is integral to the long-term implementation of the plan is research into the process of natural succession on the Mountain -- in particular the rate at which brushland is replacing grassland and the rate at which butterfly host plants, such as lupines or violets are being outcompeted by other grassland species. There is much evidence, as described in Chapter VI of the Biological Study Report and elsewhere in this Plan, that these successional trends are occurring and affecting the overall distribution and character of the habitats on the Mountain. Comparison of the vegetation map prepared by the US Geological Survey and US Forest Service in 1932 (Figure III-5) and the map prepared by TRA in 1981 (Figure III-6) document the advance of brush and spread of gorse over a 50-year period. The numerical change (acreage and percent) in this 49-year interval, calculated by planimetry, is given in Table III - 1.

TABLE III - 1
CHANGE IN EXTENT OF VEGETATION TYPES, 1932-1981

	1932 (acres)	Urbanized Since 1932 (acres)	1981 (acres)	Change (acres)	Change (Percent)
Gorse	52	52	334	+282	+545
Brush	600	50	1141	+541	+90
Eucalyptus	124	46	206	+82	+65
Woodland	32	--	72	+40	+125
Cultivated	95[a]		0	-95	
Total, non-grassland	808	148	1753	+945	+117
Total, grassland	4047[b]	1238	1811	-2331	-55
Total SBM area	4950	1386	3564.5	-1386	

[a] Left out of the non-grassland sum since it was not natural land in 1932.
[b] The area of contiguous grassland in 1932 which is larger than the present study area of 3564.5 acres.
Source: Thomas Reid Associates Figures III - 5; III - 6

FIGURE III - 5
MAJOR VEGETATION COMPONENTS -- SAN BRUNO MOUNTAIN -- 1932

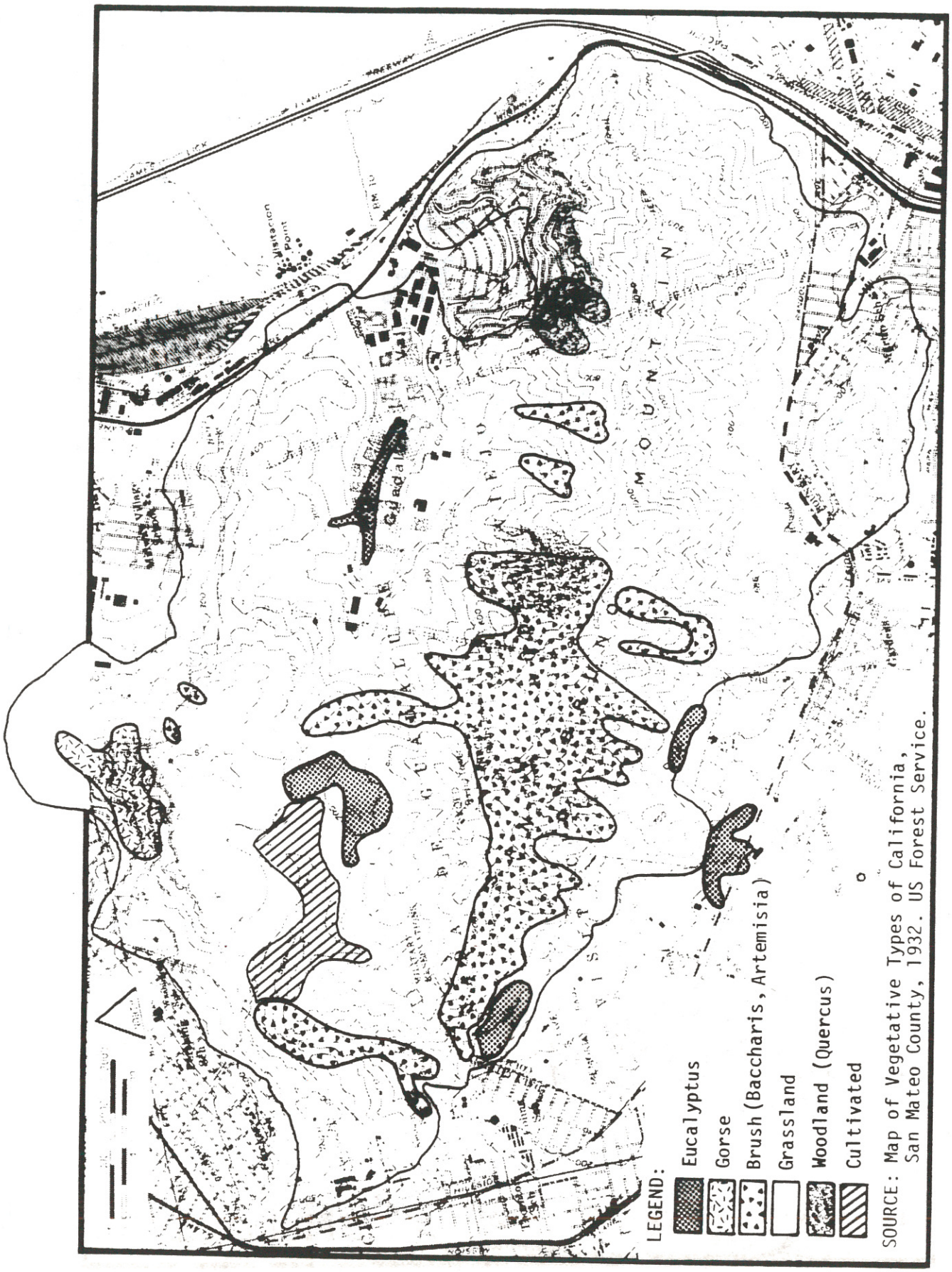
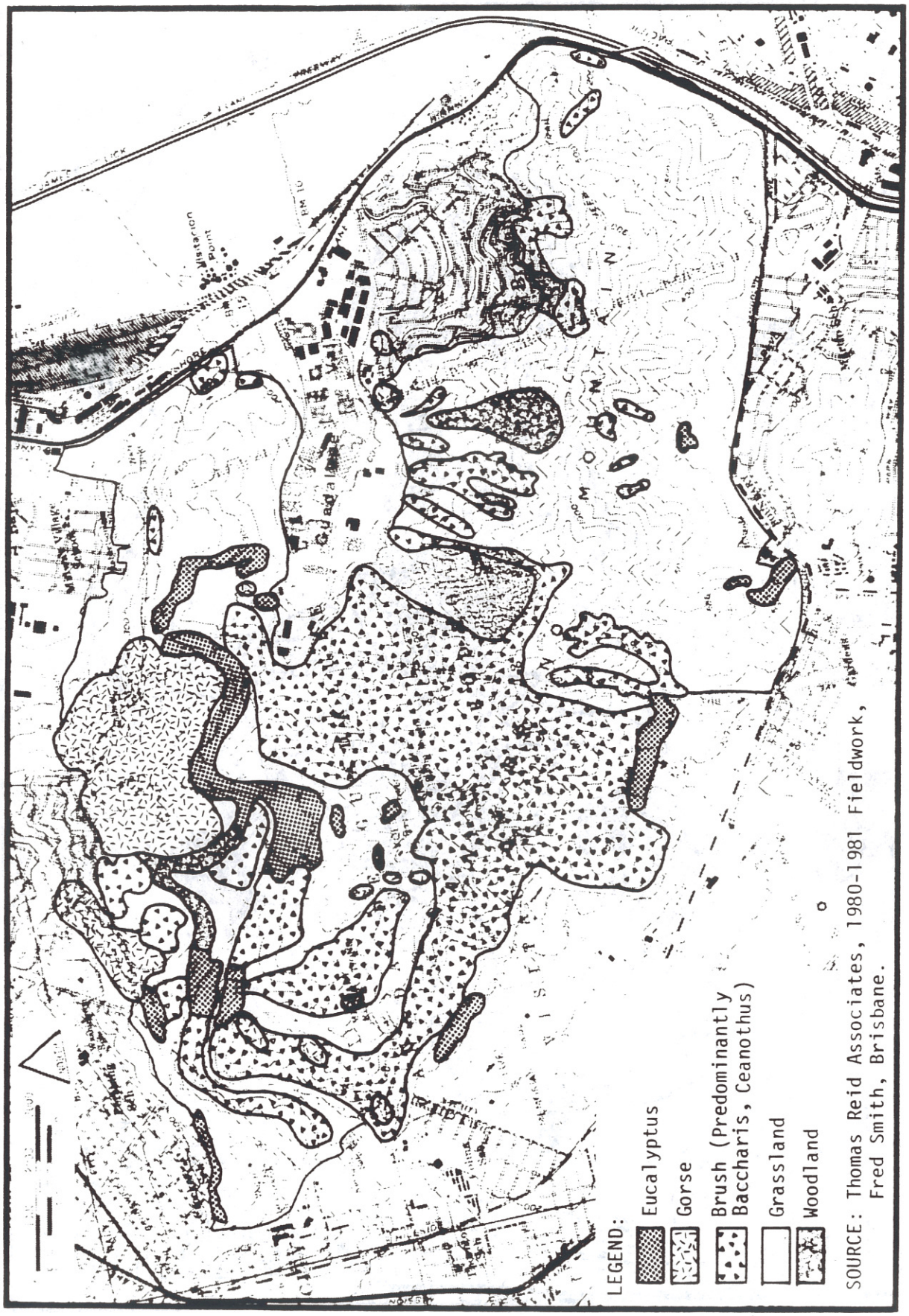


FIGURE III - 6
MAJOR VEGETATION COMPONENTS -- SAN BRUNO MOUNTAIN -- 1981



As Table III - 1 shows, in 1932 in the San Bruno Mountain area there was more than four times as much grassland as non-grassland; in 1981 the proportions are nearly equal. Almost 950 acres have been taken over by invasive species and native brush; another 1386 have been lost to urbanization. Gorse is by far the most active invader, judging by its proportional increase compared to the other vegetative types. In 1932 the area of contiguous grassland on San Bruno Mountain was substantially larger than the entire present day study area of 3564 acres because of the far smaller extent of urbanization on the periphery at that time.

Since we have no intervening data yet analyzed, we do not know how the process of grassland invasion by other plant types accelerated after grazing ended. We hypothesize that the rate was slower prior to 1965. If the rate of loss was linear over the 49-year interval, then grassland would be disappearing at the rate of 19 acres per year. At this rate, one could expect the remaining grassland to be completely replaced in about 90 years. In reality, ecological processes such as invasion of one plant community by another are not linear, but more likely to be exponential because as the brush expands it presents an ever larger reservoir of seeds and front for expansion.

An exponential model would predict that in the absence of brush or exotics control by deliberate management or incidental annual burning, all of the remaining grassland would be replaced in about 44 years (1.6% per year). In reality, it is doubtful that all of the grassland would be replaced, since there may be localized areas where grassland is ecologically favored. However, it is clear that existing biological processes, unchecked will dramatically reduce the area of grassland habitat in the near future so that the dominant aspect of the Mountain will be brush and exotics.

There is also strong evidence from other biological study sites within the SF Bay region that such processes are occurring (McBride and Heady, 1968; McBride 1974). However, although we have evidence for the overall magnitude of change in vegetation communities over a 50-year period, we do not know the kinetics of the process, particularly the likely acceleration in the rate of brush encroachment since the cessation of grazing, nor the true severity of the impact of this succession on the endangered species of concern.

The degree of habitat manipulation which will be necessary in the long term and the timing of its application depends very strongly on the rate or intensity of this biological process. If the rate is currently relatively slow, so that the species composition of the grassland changes very little in a decade or very few acres are converted to brush, then the need for some types of manipulation to enhance grassland is reduced. In particular areas, activities such as chaining or herbicide control of brush, burning or reintroduction of grazing may be eliminated or deferred into the future. Since conservation is less expensive than manipulation, information gained through a modest research program on succession may save many times the cost of the research on reduced manipulation.

The thrust of the research program would be to more thoroughly document the historical (pre- versus post-grazing) and present rates of brush advance on San Bruno Mountain. Documentation would be achieved through study of all available aerial photographs taken during and after the grazing years. Photos obtained to date are black and white and at small scale, but do show the boundary between grass and brush and allow us to measure its rate of advance

over a period of a decade or less. According to Joe McBride, professor in the School of Forestry and Conservation at UC Berkeley, images that may be superimposed with a stereoscope greatly improve the visual resolution of brushland and grassland from photographs. (McBride published some striking photographs of the advance of Baccharis shrubland into grassland over a 30 year period in Tilden Park in the Berkeley Hills.) Perhaps stereo photographs or large scale (1:24,000 or less) photographs may yet be found which can provide the historical documentation sought.

As part of the Plan it could be required that false color infrared aerial photographs of SBM be taken periodically at the appropriate scale to provide future photo documentation of brush advance. The procedure which was used as part of the 1981 Biological Study involved charter of a commercial high-wing single engine aircraft for 3 or 4 hours, the use of a trained observer with an ordinary 35 mm camera and infrared film. The cost for a day's photo run was thus only about $500 including the scientist's labor, and a single run covering the mountain at the same time each spring would probably be sufficient.

Field experimentation could involve comparing the age of individual plants of Baccharis or other woody brush species in the center of a large stand compared to the edge, and compared to "pioneer" individuals found in the midst of large expanses of grassland. If individuals at the edge of the stand or out in the grassland are younger, this is direct evidence that the stand is actively moving outward. By appropriate sampling, one can draw an "age contour" map of a stand of brush which shows the rate of outward expansion. The age of woody plants may be determined by counting growth rings of the main stem. Other means to detect brush advance in the field include the use of markers at the edge of stands to measure the movement of the stand past the markers.

Changes in the species composition of the grassland of interest include increased density of native perennial grasses, increased height and density of annual grasses and decreased density or loss of broadleaf species including lupines, violet, grassland endemics, and all butterfly nectar plants. To measure these successional trends on a mountain-wide scale, sampling techniques measuring percent cover would have to be used systematically throughout the grasslands. The techniques could be similar to the transect method described in detail in the Biological Study Report. Experience of the 1980-81 field crew and captains, and of the California Native Plant Society, has shown that once one becomes familiar with plant patterns on the mountain through a period of intensive sampling (e.g. 5% coverage of the grassland during one week out of each of three months in the spring) he would be able to detect a significant change in the vegetation by visual estimation or with a much less intensive sample (less than 1% coverage of the grassland area).

Because of problems of relying on long standing experienced field crew persons, this technique should be done in conjunction with a quantitative approach. The data gathered during the Biological Study would be the basis from which future surveys would be compared and analyzed. If such a sampling program reveals that species such as lupine, violet, grassland endemics or butterfly nectar species are rapidly and broadly diminishing, this would be a signal to implement habitat enhancement on a feasible and appropriate scale.

For research into monitoring and habitat enhancement techniques further literature research can be used to develop the methodologies of the field

research. Literature work will comprise review of studies done by others which pertain to the work to be done here or which assist in the development of specific techniques (e.g. how large of a tractor is needed, what tools should be used). Small scale experimentation on the Mountain will allow the chance for gauging how successful these experiments will be, and give the opportunity to modify the techniques before the work is done at a larger scale. It will be important that both the effectiveness in enhancing butterfly habitat and the cost-effectiveness of the practices be measured.

Research into both succession and into monitoring and enhancement strategies can be done by the Plan Operator exclusively, or overseen by the Operator with technical advice and assistance from graduate students and undergraduates at local colleges and universities. In each case field work should be preceded by literature research of related experiments, methods of application and cost of experimental techniques to be used in pilot studies.

2. Monitoring

Monitoring is the task, undertaken by the Plan Operator of regular observation of biological processes, development and conservation activities on San Bruno Mountain. The categories of processes and activities that will require monitoring include the following:

a. Mitigation -- compliance with Plan conditions with respect to development areas.
b. Population status of endangered species (and other species) including status of habitat resources and components vital to endangered species, i.e., host plants, exotic species encroachment
c. Research and pilot study progress
d. Conserved Habitat enhancement programs

The purpose of monitoring is to assure the Plan conditions are being met in practice (as opposed to on paper), and to keep an ongoing record of the progress of implementation which will be the basis for periodic re-evaluation of the Plan and modification of its major activities, as needed. The degree of monitoring will correspond to the intensity of construction work underway and should be structured to provide sufficient information for the ongoing review. Monitoring of initial experimentation will be more intensive than monitoring done after techniques are established.

Initially, the optimum cost effective techniques for monitoring are uncertain. Therefore early monitoring will involve trial methods which are subject to refinement as the Plan Operator and the Technical Advisors determine that they are providing the proper level of information at an appropriate level of effort.

a. Mitigation — Compliance with Plan Conditions in Development Areas

The major activities associated with the construction phase of development which will require monitoring include grading, erosion and drainage control, and restoration and revegetation of remnant open space temporarily disturbed by grading. Monitoring of grading practices will assure that the grading takes place within prescribed boundaries, that the proper slopes are maintained, and that conserved habitat is protected by fencing, if necessary. Site preparation monitoring will also cover the construction and use of haul

roads, lay-down areas for materials and equipment, temporary stockpile areas, and spoils disposal (fill or removal). Erosion control monitoring will record whether temporary slope stabilization measures such as hydro-mulching are being employed and whether there appears to be excessive runoff or land slippage. Restoration/revegetation monitoring is to insure that such procedures as topsoil cover, mulching, seeding, seed predation control and watering are properly performed at the appropriate time of year. The specific requirements with respect to Administrative Parcels in development area are set forth in Chapter VII.

As each development project reaches the construction stage, it will require monitoring of the activities described. Thus, the level of effort of construction monitoring will be high during the peak construction years but will taper off once the major projects are completed.

b. **Population Status of Endangered Species**

Monitoring the status of endangered species is central to the main purpose of the Habitat Conservation Plan -- to preserve endangered species. The population status information will be a key indicator of the success or failure of the Plan and its component parts. The most cost-effective method to monitor butterfly and host plant populations on a long-term basis is to be found through experimentation guided by the experience of the 1980-81 biological study. The major colonies of the Phase Two Biological Study within conserved habitat as well as private lands to be dedicated to the public as conserved habitat should all be monitored. A special subset of the butterfly monitoring program is the assessment of butterfly utilization of areas where habitat manipulation for enhancement has occurred.

The monitoring should allow the Plan Operator to determine whether the populations are essentially stable in numbers, decreasing, increasing or fluctuating and whether the distribution of animals is shifting with only a small proportion of the effort spent in the mark-release-recapture program in the Biological Study. Trial methods include observation and counting along predetermined transects, possibly with simplified marking to avoid duplicate counting. If an observer walks a straight path, duplicate observations should be minimal; sometimes during close observation one can get an impression of whether the animals are being counted more than once. During the flight season each area should be surveyed once a week.

Butterfly host plant populations should probably also be monitored since the butterfly populations are very likely to respond to changes in the abundance or quality of their food resources. It is probably sufficient to monitor only the larval food plants because these insects utilize such a wide variety of nectar plants that it is unlikely that nectar plants alone would become limiting.

The host plants may be monitored generally using the sweep method explained in the biological study (see Glossary). Each area should be swept during the blooming seasons and general distribution maps drawn up. It may be feasible to census host plant populations during the course of butterfly censusing. The observer could then also note insect utilization of host plant in different areas. Where more detailed information is required, the traditional methods of censusing by transect or quadrant may be employed.

Other species of concern should also be monitored - both for effects caused by HCP activities, and to find out more about their population and distribution on San Bruno Mountain. Emphasis should be on monitoring the San Bruno Elfin and Bay Checkerspot butterflies, and the Tree Lupine moth. Also further searches for the San Francisco Garter Snake should take place. Finally, the Habitat Manager should be knowlegable as to the the description and habits of the rare plants found on the Mountain, so that detailed mapping of these plants can be made.

c. Research and Pilot Study Progress

Monitoring of research and pilot studies on habitat enhancement techniques is an aspect of the research itself. It is the means by which follow-up data are obtained for pilot programs of host plant propagation, grassland seeding, prescribed burning, brush control and so forth.

After the main field effort is completed each year, probably in late summer, the Plan Operator should prepare a report on the three major biological activities of the Plan (research, monitoring, and habitat enhancement). The report will be prepared with the assistance of the Technical Advisory Committee who will present the results of the Plan's scientific effectiveness and cost to the Plan Operator. The TAC can make recommendations to the Board of Supervisors regarding changes in particular activities for different administrative parcels or management units within retained habitat. The Board will then evaluate both the scientific and cost effectiveness of the Plan activities, and adopt changes in Plan implementation accordingly. The changes may involve a shifting allocation of funds among the various activities, or modification or where or how the activities are carried out.

d. Habitat Enhancement Programs

Monitoring of habitat enhancement programs is the basis on which their initial success and continued effectiveness and cost effectiveness will be evaluated. Effectiveness will have two measures: (1) the degree to which the technique produced the intended effect (e.g. the germination success of lupines or violets, or native grasses in a seeded area; the relative abundance of lupines in an area of artificial rocky outcrop produced by rock spreading; the number of brush plants re-sprouting in the first two years after an area is burned or treated with herbicide) and (2) the degree to which endangered species utilize the newly enhanced habitat. The observed population densities from the 1980-81 study can provide a baseline from which to compare insect utilization of enhanced areas as long as the monitoring techniques employed have been carefully worked out to yield data comparable to 1980-81.

Cost effectiveness is measured as the degree of enhancement and utilization achieved for a given level of effort and dollar cost. Standards of cost-effectiveness have yet to be developed; rough standards should be available based on the small-scale pilot phase of the enhancement programs. If certain enhancement programs prove not to be cost effective on large-scale application, new alternatives may have to be sought.

In October 1982, the County Department of Environmental Health (DEH) submitted a memo to the County Planning Department regarding the presence of plague bearing rodents on the Mountain. Their concern was that HCP related enhancement activities (such as brush or exotic species removal) may lead to

an increased carrying capacity of the plague carrying rodents. The HCP will take these concerns into account when developing and carrying out the specifics of the enhancement activities, and the Habitat Manager will cooperate with the Department of Environmental Health in every way possible with regard to this problem. With regard to individual development projects, each city and/or the County having jurisdiction over the project should assure that the developer meet with the requirements of the DEH during the development process.

3. Habitat Enhancement Techniques

The following techniques are those currently identified as having the greatest potential worth for San Bruno Mountain in maximizing the value of the conserved habitat for the species of concern, and in retaining and in some cases, restoring the natural diversity of conserved habitats on the mountain. They are not necessarily an exhaustive list of habitat enhancement methods; others may be identified and utilized in the course of Plan evolution. Below is a short description of the techniques and their effects.

a. Seeding/Propagation

Description

Seeding is the broadcasting of seed directly onto the soil of the Mountain, before or after pre-treatment to enhance germination success. Propagation is hand planting on the Mountain young plants which have been raised from either seeds or cuttings in a nursery or elsewhere on the Mountain than their intended enhancement location. Seeding and propagation are both methods of enhancing habitat by introducing host plants to areas where they do not occur, or by increasing their abundance in the areas where they already exist. The process of seeding or propagating involves several steps. These are: a) determining areas where seeding/propagation should take place, b) collecting host plant seeds, either from the Mountain or from a local seed distributor, c) growing seedlings either on the Mountain or in a nursery, d) sowing the seeds or planting the seedlings, and e) monitoring the growth and development of the plants.

The types of plants to be considered for seeding/propagation include the larval food plants of endangered butterflies, perennial grasses, native broadleaf species including local endemics, and butterfly nectar plants.

Effects

Enhancement of the species of interest may be paralleled by a corresponding loss of annual grasses in the affected areas, depending on soil modification (see below) and the scale of the experiment. The population of host plants will increase, thereby enhancing the existing habitat for the butterflies. The competitive displacement of other grassland species in these particular areas will slightly change the character of the present grassland but is not viewed as detrimental to the goals of this Plan.

b. Chaining and Scraping/Raking

Description

Both chaining and scraping/raking are methods of successional management which are used to rid areas of dense grass or brush. Chaining is primarily a method of brush control, and involves the use of a tractor which drags heavy chains across the vegetation being removed. The piles of brush which remain after chaining are usually burned. Scraping or raking is another way to remove brush but is also used to eradicate dense grass. This method involves the use of a tractor with a blade or rake which clears the dense grass and brush. Dense grass may also be brought under control by a tractor equipped with a brushland disk which turns the soil in preparation for cultivation (UC Division of Agricultural Sciences, Leaflets 2402, 2922, 2920, 2923, 2921).

Effects

Scraping or chaining brush areas should check the process of grass succession to brush, thereby increasing butterfly habitat. If areas of dense, tall grass are also chained or scraped, some loss of the species of concern will occur due to the crushing effect of the heavy equipment. However, if this proves to be a successful technique, these impacts would be offset since it will allow host plants to re-invade, provided that the activity was done in conjunction with a seeding and weed control program. For example, Viola pedunculata re-invading a scraped plot would be accessible to Callippe, whereas the violet underneath tall grass on an unscraped plot probably would not. This technique of grassland successional management would not take place where high quality habitat exists (i.e., reasonable distribution of native species, perennial grasses, and butterfly host plants), but only in areas where there is clear evidence of disturbance or succession.

c. Burning

Description

Controlled or prescribed burning is another management technique used for eliminating dense grass or brush. It is an effective way of reducing fuel loads in areas where otherwise uncontrollable wildfires would cause heavy damage, and in grassland successional management can be used to control the overgrowth of non-native grasses and brush which outcompete the native species. Where brush is a problem it is usually bulldozed into piles and burned; re-sprouting can be controlled by herbicides or grazing animals. Prescribed burning takes place in specific locations which are surrounded by fire breaks and are done only when weather conditions are right. For brush control, chaining or scraping of the brush should take place sometime before the prescribed burn (UC Division of Agricultural Sciences, Oct. 1973 and Leaflet 2402).

Effects

Incidental fires are part of a natural process which takes place in and around grasslands and act to maintain that habitat type. The occurrence of natural fires on SBM is probably rare because of the climatic conditions; most fires there are initiated by humans. Controlled burning will serve to destroy the existing grassland and some of the brush so that the perennial

grassland can be re-established and rocky outcrops can be re-opened for invasion (or introduction), of earlier successional plants (i.e., lupine). While some annual grassland and brush habitat will be lost, the net effect should be an increase in host plant populations.

Particular impacts which would be of interest are how fire affects the pH of the soil, what plants will return in the burn, and how fire affects the natural predation processes in the area (e.g. do seed predators avoid the area after the burn, thereby allowing for a greater number of viable seeds).

d. Soil Modification (Rock Spreading)

Description

In this application, soil modification means spreading native aggregate onto slopes within the grassland habitat before and after pre-treatment to create rocky outcrops. The Quarry and/or grading material could be a source for the aggregate. These outcrops would reduce vegetative competition and possibly alter the make-up of the soil, making the area more receptive to the growth of some host plant species. Historically, some of the butterfly host plants (e.g. lupines) have maintained stable populations on rocky outcrops. It should be noted that this technique is strictly experimental in nature and would be initially implemented on a small scale.

Effects

This enhancement technique could be an effective way to create additional stable populations of lupine which in turn would help to support the Mission Blue. In addition, it would extend the effect of seeding since the rock spreading impacts could last anywhere from 20 to 100 years or more before the rock was eventually weathered to finer particles or covered by plant material. There would be some grassland structure loss as well as physical damage to species inhabiting the target sites prior to treatment. This technique may be especially appropriate in the design of roads through conserved habitat areas.

e. Exotic Species and Brush Management

Description

There are various exotic pest species which have invaded several areas of the Mountain. These species are a threat to the existing grassland habitat and must be either eliminated or managed. There are also large areas where brush encroachment is threatening the existing grassland. These areas must be managed by checking advancement and eliminating new seedlings. Techniques such as scraping, chaining, and burning, which are mentioned above, as well as herbicides can be used as management tools.

Effects

There will be some impacts on the plants and animals which depend on the exotic species and brush habitat, therefore careful consideration will take place to determine target areas. Elimination and control of exotics and brush can open up additional areas for native grassland expansion. Brush will not be locally retarded in areas where other species of concern are known to exist. If herbicides are used there may be loss of vegetation other than

exotics and brush; again careful consideration should take place before this measure is approved.

f. Re-introduction of Grazing

Description

Grazing is the utilization of grassland (forage) by domestic livestock such as cattle, sheep, goats or horses. Where appropriate, re-introduction of grazing can be an effective means of maintaining the grassland habitat by eliminating brush and tall grass which would outcompete the butterfly host plants. Because some of the host plants (e.g. lupine) are not palatable to grazing animals, they tend to increase in grazed areas. A grazing regime also crops and limits the seed production of the annual grasses, thereby improving the competitive position of broadleaf species (wildflowers) so that they maintain a higher overall density within the grassland.

Effects

Grazing may retard the re-establishment of bunch grass in some areas, depending on the animals employed. It may also increase human activity on the Mountain. Fences may have to be built and could become obstructive to the wildlife there. Grazing could cause compaction, erosion and some loss of the nutritive value of the soil. Some plants will be favored by grazing, such as the lupines and thistles which are not grazed, but grazing may destroy habitat for others. The specific effects will depend on the type of livestock used; for instance, sheep are considered to be more compatible with native grasses because they do not tend to forage on the bunch grasses as cattle and horses do (Van Kekerix et al., 1978).

g. Vandalism/Fire Control

Description

Development will increase human activity on the Mountain which will in turn likely increase such things as off road vehicle activity (i.e., dirt motorcycles and jeeps), dumping, domestic animal activity, and illegal burning. In the past these activities have been damaging to the grassland, and their control should be part of the habitat enhancement program. Ways to control these activities include policing and patrolling the grassland habitat by helicopter or automobile for possible violations, especially in areas near housing developments, and the use of fencing or other barriers. The intensity of the patrolling should increase during periods when each type of activity is popular. For instance, illegal burning usually takes place after school lets out for the summer, and off-road activity often takes place after the rains in the spring.

Effects

Policing the Mountain will seemingly increase human activity there, but its overall effect will probably be to decrease the human activity, particularly of an illegal sort. If implemented with the correct level of effort, it will expedite the habitat enhancement program; if insufficient it will indeed only add to the disturbance and not sufficiently control detrimental activities. It must, furthermore, be implemented cost-effectively.

h. Off-Site Introduction of the Species of Concern

Description

Off-site introduction of the species of concern means establishing new butterfly colonies in areas away from San Bruno Mountain. This would be appropriate where the butterfly was once found, but where habitat destruction eliminated a colony. In order to do this suitable habitat would have to be found or created and the butterflies, either collected or lab reared, would have to be transplanted there. Follow-up work would include monitoring the progress of the populations. This measure is recommended only as a last alternative available to preserving the species.

Effects

If successful, this technique could extend the present range of the species of concern; however, over time the populations could become distinct subspecies because of genetic separation. Immediate impacts may include the alteration of habitat that is already supporting other species, although the alterations would not necessarily be unfavorable.

i. Lab Rearing/Cultivation of the Species of Concern

Description

Lab rearing is the cultivation of continuous generations (i.e., adult, egg, larva, adult etc.) of the insects of concern in a laboratory or greenhouse. It could be used in conjunction with the previously discussed technique of off-site introduction and could be useful in supplementing populations on the Mountain. As a last resort it represents a means of preserving the species in its own right (similar to the preservation of large mammals in zoos which may be extinct in the wild).

Lab rearing of butterflies is often done for purposes of studying their biology or as part of a biological control program (e.g. sterile male releases); it is not usually done in order to preserve an endangered species, and is not likely to be a viable method for such a purpose. The biggest problem appears to be maintenance of natural genetic diversity in the lab strain. Through imposition of severe, unnatural conditions, the insects are rapidly "domesticated" -- those which can survive under lab conditions are able to reproduce and dominate the genetic stock of the insects produced. When the animals are released into the wild, they may lack proper behavior, enzymes for detoxifying plant poisons, and physical hardiness.

Lab rearing the butterflies of concern involves collecting gravid female butterflies or unmated pairs and having them produce eggs which when hatched into larvae are raised in the laboratory. It is assumed at this point that the lab reared butterflies could be transplanted back into the field, however research would be required before this was certain. Cultivation of the host plants includes collecting seed or plant cuttings, starting seedlings in peat pots and transplanting them into the field. To support a lab colony of insects, corresponding lab populations of their host plants would also have to be successfully established and maintained. Artificial diets are commonly used in large scale rearings and are available for the Mission Blue (R.A.

Arnold, pers. comm.), but the difficulty of exactly reproducing the chemical and physical (e.g. hairiness) character of the natural food plant exacerbates the problem of maintaining natural genetic viability in the lab (C. Boggs, pers. comm.).

Effects

If successful this technique could increase the populations of the species of concern to some degree. There may be other effects which are unforeseeable at this time. For instance, there is the danger that disease would be introduced by artificially reared insects or plants which could seriously affect the natural populations. A laboratory colony is always a risky substitute for a natural population because it is subject to a far higher danger that a single epidemic of disease or parasitism, or even a mechanical failure in a heating/cooling system could destroy the entire colony. Therefore, it appears that under present circumstances this approach does not warrant further considerations.

j. Landscape Modification

Description

Landscape modification entails changing the terrain of chosen areas to form more hilltops and rocky outcrops. Hilltops are heavily utilized by the Callippe for finding mates, and rocky outcrops provide preferred lupine habitats which in turn support the Mission Blue population. After developing the design for these areas, modification activities would include tractor/bulldozer and seeding work.

Effects

Landscape modification would cause destruction of some grassland structure and may alter the microclimate of the site. If successful it would open more area for propagation of host plants and native grasses, which would then be available to the butterflies. New hilltopping sites may also be created, mitigating to a certain extent any loss of old sites or increasing the number of acceptable mating sites for the Callippe.

4. Planning Assistance and Plan Revision

Introduction

One of the important functions of the Habitat Conservation Plan is to plan both private and public projects on San Bruno Mountain prior to their local agency approvals so as to minimize impact on the species of concern. A primary underlying purpose of Habitat Conservation Plan is the establishment of private sector funding sources to allow appropriate maintenance and enhancement of conserved habitat areas. Accordingly the Plan identifies areas which may be excluded from habitat and devoted to urban uses. The uses occurring in these areas will be a source of funding for maintenance and enhancement in conserved habitat areas. The HCP has evaluated the impacts of such exclusions on the species of concern and specified appropriate mitigation. In addition, the Plan provides for planning assistance to develop further mitigation which will be incorporated into the plans for the development areas:

- o Design Review
- o Dedication of Conserved Habitat areas
- o Phasing
- o Reclamation (covering Conserved Habitat disturbed during development)
- o Buffers
- o Ongoing restrictions within developed areas (with respect to the use of pesticides and buffer areas)

The parcels subject to development are at various stages of planning and therefore the HCP provides different levels of planning assistance. For this purpose, we identify four stages of planning and development:

o **Stage One.** At this stage, the land owner/developer takes the general plan land use designation (e.g. 500 units of multi-family housing) and works up a preliminary concept plan for the parcel that shows approximate building envelopes, access roads, utilities, and associated grading. Here the HCP provides **Design Guides** for conserving habitat and for minimizing impact on species of concern. The plan must show which undeveloped lands will be dedicated as Conserved Habitat. The plan should also indicate approximate **Phasing** for grading and the probable sequence of grading for identified portions of the site.

o **Stage Two.** Nearly all development will require grading to alter landforms and prepare ground for construction. Depending on the project, all site preparation, including grading, may be left to the builder and will occur after the final design stage. Grading causes the direct biological impact of development and is regulated by the HCP. At this stage, the HCP requires a detailed **Reclamation Plan** for graded areas which provides for fencing (e.g.two strand wire, snow fencing), revegetation, and possible subdivision of Management Units for ease of administration.

o **Stage Three.** This stage involves detailed architectural and engineering plans suitable for actual construction. The HCP requires that the plans incorporate a **Buffer Area** to protect the developed area from grassland fires and to minimize impacts on the grassland of runoff and irrigation from the developed area. The developer must identify the fire protection and runoff control provisions to be used.

o **Stage Four.** As structures are built and occupied, the HCP provides for some landscaping and maintenance restrictions within the buffer areas to protect adjoining areas of habitat.

a. Design Guides

In the course of the biological study a series of design criteria were formulated to guide developers in preliminary site planning. The rational behind the guides is discussed in III.B Guiding Principles. The primary requirement for planning development on SBM is that the maximum extent and utility of habitat be retained as Conserved Habitat. The type of land use in adjoining areas to be excluded from habitat is unimportant as long as there is an adequate buffer. The guides for habitat are:

- o Maintain Large Conserved Habitat Areas

- o Maintain Habitat Diversity
- o Maintain Contiguity
- o Corridors Should Connect Large Conserved Habitat Areas

Large Conserved Habitat Areas: **Because** of the butterflies requirements for both low and high density host plant concentrations, suitable mating and egg laying locations, and extensive flight areas, preservation of large habitat areas is important. This is especially true for the Callippe which has the ability to travel much greater distances than the Mission Blue.

Habitat Diversity: Because some aspects of the insects habitat needs are yet unclear, (i.e., microclimate needs), Conserved Habitat areas should contain a diversity of habitat types. This would include various slope aspects, elevations, hilltops, vegetation types, rocky outcrops, etc. The goal should be to retain the same portions of habitat types existing on the site before the development. This will not only benefit the butterflies of concern but also the entire mountain's unique ecosystem.

Contiguity: Because of the butterflies need to travel to specific areas during their adult flight season (i.e., Callippe requirement for hilltop mating locations), large Conserved Habitat areas should be contiguous and unobstructed.

Corridors: In order to facilitate movement between large contiguous Conserved Habitat areas, suitable corridors should be maintained. These corridors could range from 50 feet to 500 feet wide depending on the length. Based on considerations of statistical distribution of insect movements, the optimum corridor should have a width-to-length aspect ratio of at least 1:2. Depending on the degree of use and existing quality of habitat found in the corridors, they may or may not require some host plant enhancement or other modifications.

Where appropriate, changes can be made during the preliminary plan stage to ensure avoidance of particularly rich habitat and high concentrations of the species of concern. These changes include re-alignment of streets or fences, relocation of structures, and density transfers. Plan modification would serve to prevent major disruption of areas of rich habitat and dense butterfly population. There may be some financial loss incurred by the developer in having to alter development plans. After changes are made in the preliminary plan stage, further modifications in development plans will not be made.

b. Dedication

As part of Stage One, the development plan shall specify the portions of the site to be dedication to the public as Conserved Habitat.

Because of topography and planning requirements, nearly all projects on SBM will have some portion left in natural open space. It is important that this open space be maintained as Conserved Habitat and be protected from further development or other disturbance. For this reason, there must be public control of the habitat. The legal aspects of this donation of land as Conserved Habitat are discussed in Chapter V., Legal Implementation. For convenience, the transfer of control to the public is referred to in this section as "dedication".

The timing of dedication is important to all parties. Since the HCP allows grading in Conserved Habitat within specified limits, the developer will have a responsibility to carry out the Reclamation Plan. At the same time, or earlier, the HCP Operator will be working in ungraded areas of the Conserved Habitat to expand or improve habitat. Whether dedication occurs before or after grading is complete, both parties will need access to the parcel for specific purposes.

From the private landowner the timing of the conveyance of habitat to the public has implications relating to liability, taxes, and subsequent permit approvals. Development will often be phased, and it is appropriate to tie dedication of a conserved habitat parcel to parallel final construction approval for some portion of the project. Thus, the Stage One plan which shows the project phasing should also designate phasing of the conveyance of associated Conserved Habitat. It is anticipated that this phasing will also be the subject of an agreement between the County and the landowner (See Section V). This requirement is necessary for the Plan Operator to plan a program that can respond to the rate of development reflected by the developer's preliminary phasing.

c. Phasing

As part of Stage One, the development plan shall specify the Phases of development.

Phasing refers to the time schedule of development -- the area that can be graded each year. Ideally a large project would be phased to reduce impact on the species of concern. Phasing offers time to:

- o Spread the impact of habitat loss over more than one generation/flight season;
- o Allow for reclamation of previously disturbed areas before new areas are disturbed;
- o Defer destruction of more important habitat areas until enhancement programs are in effect;

If habitat enhancement techniques are successful, species losses from development will be offset by resource replacement. Thus, phasing can be an effective measure if it allows time for enhancement methodologies to be tested before large scale implementation, and if it allows adequate time for enhancement to mitigate the worst impacts on the species of concern.

Decisions regarding phasing require comparison between the development plans and population distribution and an assessment of economic feasibility. Unfortunately, engineering constraints limit the flexibility of phasing for most projects. The high densities proposed for the building sites require substantial grading in this terrain. Grading is planned to allow the volume of earth cut and earth filled to balance on-site to avoid importing fill or exporting excess earth; each phase of grading is usually chosen to balance as well. A project will need road access, utilities, and sometimes community facilities to serve even the first few units; grading for such infrastructure must accompany the first grading phase. Apart from these considerations, the phasing also reflects the developer's anticipation of the rate at which the structures can be built and sold.

The phases described in the HCP are jointly determined by the developer and Plan Operator and represent the maximum construction rate permitted for the project. The developer is requested to slow construction as much as possible; the specified phasing represents the minimum rate that the developer is willing to accept as a condition of approval. In most cases, the specified annual progression is too rapid to allow complete reclamation of previously disturbed areas.

In addition, the actual construction rate could be slowed by market conditions, and there would then be more time between each phase or less than a complete phase would be built each year. It is anticipated that only in the event of slow construction would the full mitigation benefit of delay be attained.

Plan design changes contingent upon reclamation or enhancement success is impractical because of construction and sales requirements. Contingent design changes should only be required where the Preliminary Design has not had the opportunity to reflect the principles of conservation set forth in the Design Guides. In such cases, the the number of units originally permitted will remain the same but will relocated to areas of lower habitat value.

d. Reclamation Plan

Prior to grading, the landowner shall prepare a Reclamation Plan for all areas in or to be donated as Conserved Habitat which will be graded. The reclamation of the graded areas is the responsibility of the landowner and will comprise provisions for:

- o precise delineation of all disturbance,
- o continuous fencing at the graded perimeter,
- o erosion controls,
- o revegetation with appropriate species, and
- o detailed schedule.

The Stage One Plan must show the areas to be donated as Conserved habitat and the limit of grading that will take place within it. The Reclamation Plan must show the required grading in sufficient detail to permit staking in the field. In addition to the primary graded areas, the Reclamation Plan must show trenches required for utilities, haul or other temporary roads, and earth stockpiles -- all places where construction will disturb natural vegetation.

The areas to be graded must be temporarily fenced during construction so that there is a continuous, unambiguous boundary between the graded area and habitat that is to remain undisturbed. The purpose is to ensure that protected habitat is not accidentally destroyed and to make it easier for the HCP Operator to enforce the Reclamation Plan. The fencing must provide a clear, durable boundary (e.g. snow fencing, two strand wire, etc.). Utilities trenches and haul roads need not be fenced as long as disturbance does not exceed 30 feet.

Both revegetation and mechanical methods are used to prevent erosion in graded areas. The measures will be required during construction and after the project is completed. Most of the methods are normally part of a grading ordinance. Methods of erosion control include the following:

- o developmental design which is compatible with the existing topography, soils and vegetation
- o minimizing soil exposure during the rainy season with the timing of grading and construction and by revegetating or mulching unprotected slopes before they are exposed to possible runoff
- o when grading, retain topsoil and respread on finished slopes
- o retaining natural vegetation whenever feasible
- o diverting runoff away from areas susceptible to erosion, such as steep graded slopes, by using barriers or drainageways
- o minimizing the length and steepness of graded slopes by benching or terracing
- o monitoring of sites to ensure that control methods are effective and to correct problems as needed

Effective control of water runoff will serve to prevent damage to the Mountain caused by erosion. By revegetating denuded areas water will also be trapped by the plants and able to permeate the soil, minimizing the loss of moisture. The use of native species for revegetation would contribute to the conservation of the Mountain's unique ecology, and, depending on the location, may enhance the habitat available for use by the butterflies. Correct implementation of erosion controls will also reduce sediment in drainageways and so reduce the need for maintenance.

Revegetation is the critical step in the restoration of habitat. The methods of plant propagation and revegetation are discussed under IV.B.3 Enhancement Techniques. The revegetation portion of the Reclamation Plan should be formulated with the assistance of the HCP Operator and can be quite detailed.

Generally, revegetation will have different treatments for cut slopes and for fill slopes and different levels of habitat restoration. The difference between cut and fill is simply a matter of soil type and plant material suitability. Enhancement research mountain-wide will guide the basis revegetation strategy. Restoration levels will range from:

- o "moderate", meaning broad scale reseeding with a native grass mixture, through;
- o "high", which would add a broad group of the insects' host plants, to;
- o "intensive", which is thorough planting of host plants in small areas using seedlings and accompanied by soil and microhabitat modification.

The Reclamation Plan will also contain a time schedule for grading which will permit the HCP Operator to take plant materials from areas to be graded for use in habitat enhancement programs.

The Reclamation Plan shall be prepared by the developer. The HCP Operator will provide technical assistance, approve the type of revegetation, and monitor compliance.

e. Buffer (Fire Break)

At the time of the preparation of the Stage Three plan for the development area, the landowner will incorporate the design for a buffer between Conserved Habitat and structures within the development area, and shall provide for the establishment of such a buffer in connection with Stage Four. These shall be approved by the Plan Operator.

The primary buffer purpose is to protect the development from fires occurring in the Conserved Habitat. Any adequate fire protection plan will fulfill this requirement. Although the exact character depends on slope and fuel type, a general buffer for habitat conservation purposes would provide up to 30 feet of firebreak at the edge of the building lot. This can be accomplished in a number of ways, including, but not limited to, a road, parking area, patio, gazebo, shed, vegetable garden, orchard, lawn, embankment, rocky cut slope, or fire resistant vegetation. While many of the insects' host plants could occupy a low fuel buffer, no habitat value is required. There will be some areas in a development which may not be easily protected by a firebreak; in these cases, a hydrant and access for fire trucks may be approved as the fire protection plan. In no case shall buffer required to meet habitat conservation purposes be additive to other requirements of local fire protection authorities, where their combination would exceed 30 feet.

The HCP recognizes the importance of fire in grassland ecology on SBM. While the present Plan does not call for prescribed burning, it may be needed in the future. The Plan does specify a "let burn" policy during the proper time of year for most areas. It is critical that the proximity of structures to Conserved Habitat resulting from development not significantly interfere with the Plan Operator's use of fire as a successional management tool. If the development is not well protected from fire, then there will be greater liability, greater costs of stand-by fire protection, and anxiety on the part of the homeowners that could lead to political opposition to the Plan.

The secondary purpose of the fire buffer is to protect the Conserved Habitat from changes in storm water runoff and from irrigation. The reason is to avoid loss of habitat to vegetation changes associated with greater or non-seasonal water availability. For this reason, an irrigated turf area (fire resistant vegetation) would not be a suitable buffer on a slope above Conserved Habitat, but would be acceptable below Conserved Habitat where ground water would drain away.

Optional buffer planting can provide habitat as well as protection. There is a broad range of landscaping materials which are compatible with the Conserved Habitat remaining around the developed areas; introducing exotics can cause problems later on if they escape into the grassland. Adjacent plantings may prove to be an effective management technique. By using host plants along with vegetation, landscaping can attract butterflies so they travel through corridors adjacent to development and into other areas of Conserved Habitat. Generally, there is no need to physically bar the butterflies from the development areas, but some vegetation barrier may be indicated in some areas.

The use of landscaping materials to reduce fire hazard is a well known technique (UC Division of Agricultural Sciences, leaflet 2401, 1976); however, the use of barriers (e.g. hedges, stone walls) to restrict the penetration of

the insects of concern and the use of host plants to attract them still need some research. In addition, although not absolutely necessary, the areas may be monitored for butterfly use. It is not certain how much the optional measures will benefit the species of concern, but it is assumed that it will not be detrimental.

The land for the buffer should be provided within the development areas, and not be included in the land donated as Conserved Habitat. The cost of establishing and maintaining the buffer shall be borne by the landowner and its successorl in interest. As long as the landscaping scheme was determined within the time frame of the development activities, the costs of landscaping itself should not greatly exceed those that would normally be incurred. Some additional expense may have to be made for research in fire resistant habitat materials; this would be a normal part of the HCP program.

f. Ongoing Restrictions in Development Areas

The development areas shall continue to be encumbered by the recordation of covenants, conditions, and restrictions in favor of the Plan with respect to:

(1) the ongoing maintenance and provision of buffer areas for fire protection purposes, as discussed in sub-paragraph e above; and

(2) the use of pesticides.

With respect to the use of pesticides within development areas to protect landscaping, pesticides requiring a special governmental agency permit, or which are applied by aircraft or helicopter, or which are applied on a large scale basis (in excess of 0.5 acres upon a single application), must be approved, in writing, by the HCP Operator.

The exact degree of restriction needed for pesticides, however, is not known. Not only the butterflies, but other invertebrates (e.g. ants for Mission Blue) may be destroyed by inappropriate pesticide use. Certainly no pesticides should be used in the Conserved Habitat areas. Within the development areas, care should be directed primarily at the means of application. A tentative requirement would be approval for any use of registered pesticides. This would tend to cover large scale use, as by a professional pest operator, and exempt small scale use as by the individual homeowner.

IV. IMPACT ON SPECIES SURVIVAL

IV. IMPACT ON SPECIES SURVIVAL

The long term result of the HCP will be the conservation and enhancement of the species of concern. The HCP provides for some development of private lands with consequent loss of habitat. The plan also provides for a planning process to minimize the effects of such development and use on the species and for a program of habitat enhancement on 2800 acres of land which will be retained in open space. The finding of no significant impact is based on a three level assessment of the HCP.

The success of the Plan rests on three key questions (shown in **boldface** below):

If essentially all of the habitat within the development parcels is lost, what is the incremental impact on the probability of species extinction?

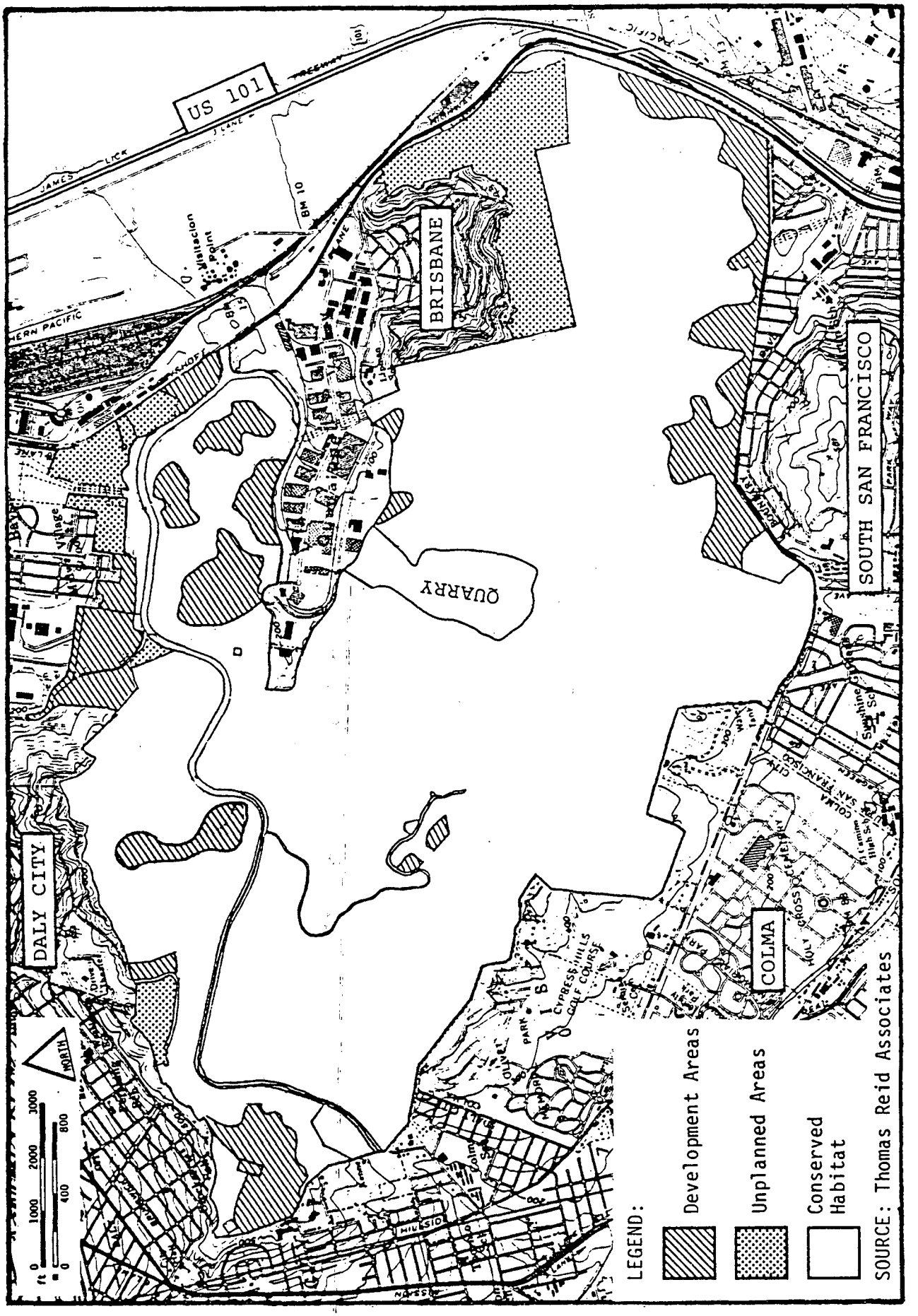
Private lands subject to possible development comprise approximately one third of Mission Blue and one quarter of Callippe habitat on SBM (See Figures III - 1, III -2, and IV - 1). If development were to destroy the habitat in these private holdings, the entire colony of Mission Blue on Reservoir Hill would be destroyed and there would be a serious loss to the Guadalupe Hills colony of both Mission Blue and Callippe. Nonetheless, the major colony of Mission Blue and Callippe is on the southeast ridge which is in public ownership and would be protected. Such a major loss would increase the likelihood that one or both of the rare species would go extinct more rapidly than without such development. However, according to the apparent size and robustness of the southeast ridge colony, it is unlikely that the loss would precipitate a significant acceleration in their extinction -- the impact is an incremental risk rather than an abrupt loss.

This conclusion bears on the HCP in two important regards. First, the increased risk is nevertheless sufficiently large that a strenuous program of mitigation and enhancement in the HCP is warranted. Second, the probable ability of the species to survive for an indeterminate length of time means that the impact of the development will not be disastrous even if the enhancement provisions of the HCP fail or do not succeed for many years.

What opportunities for habitat conservation exist within the privately held parcels?

Because of engineering (topographic) constraints and design criteria, the larger parcels to be devoted to urban uses can include large areas of open space which can be preserved with little disturbance from roads or grading. Much of the grassland community ecology can also be conserved within small areas providing that the areas represent a cross section of the community constituents and that the areas are contiguous with the larger areas of open space on the Mountain. The specific ecological and behavioral requirements of the species of concern are used to formulate design guides for internal open space areas. The scope of the areas and their preservation undisturbed throughout construction provide habitat within these parcels that substantially reduces the probable impact on the SBM populations as a whole.

FIGURE IV - 1
AREAS TO BE REMOVED FROM HABITAT



Can the open space remaining after development be used to expand the habitat of the species by reclamation and enhancement?

In many regards we are fortunate to be dealing with a community (grassland) and with species which tolerate disturbance or even require some disturbance in the long term to sustain the habitat. While direct loss of grassland to development is irreversible destruction of habitat, there is good reason to believe that areas graded during construction but not used for buildings or landscaping can be returned to habitat. Similarly, areas which are not now good habitat due to prior disturbance such as grading or exotic species invasion can be converted to good habitat.

A. PLAN IMPACT

The assessment of plan impact on the species is based first on the gross amount of habitat protected from disturbance. Then we consider the possibility of augmenting habitat through enhancement. The first assessment is based on the expected increase in extinction probability (for detailed treatment, see Biological Study).

San Bruno Mountain may be considered an "island" surrounded by urbanization, or alternatively a biological "refuge". The theory of island biogeography is a useful tool for understanding the ecological role of San Bruno Mountain, its importance to endangered species, and for estimating the likelihood of future extinction, with and without development and/or habitat management.

The number of species found on islands is proportional to their size and distance from the mainlands. Large islands support more species than small islands and extinction is slower. By extension, large refuges support more species than small refuges. The species/area relationship for islands gives us a formula to test for loss of species (probability of extinction) with degrees of habitat loss. Islands (or refuges) are colonized or recolonized from outside (e.g. mainland) source areas -- the smaller and more distant the island the slower its colonization rate. Even with a constant number of species present, the actual species present changes with time on islands and in refuges.

As a refuge, San Bruno Mountain has high species diversity and supports a relatively large number of endemic species or subspecies of plants and animals. Its refuge qualities are probably related to a combination of climate, topography, and past history including lack of urban development.

Table IV-1 shows the proportion of each major colony of Mission Blue and Callippe within proposed development areas and the proportion of the entire San Bruno Mountain populations of each species in each such area. A conservative, pessimistic impact measure assumes that all the the population within each parcel in private ownership could be lost due to development, with no habitat value attributed to project open space. A more optimistic measure counts only the areas of structure, road and landscaping (permanent) and grading (temporary) disturbance. Applying the Species/Area formula to the conservative measure predicts that in the areas of densest population concentration -- the Northeast Ridge development in the Guadalupe Hills colony -- the development reductions in habitat area (without the mitigation measures specified in the Plan) will result in a 3 to 6% increase in the present-day

TABLE IV - 1
DEVELOPMENT IMPACT ON POPULATION - MISSION BLUE AND CALLIPPE

AREA / PARCEL	MISSION BLUE % OF POPULATION entire parcel	MISSION BLUE % OF POPULATION disturbed area	CALLIPPE % OF POPULATION entire parcel	CALLIPPE % OF POPULATION disturbed area
GUADALUPE HILLS				
RIO VERDE ESTATES	.42	.24	0.1	0.1
CARTER-MARTIN ROAD EXT.	.27	.27	0.2	0.2
RIO VERDE HEIGHTS	3.93	1.86	0.25	0.05
PARCEL X			0.15	0.15
PARCEL Y			0.33	0.33
PARCEL Z	.03			
NORTHEAST RIDGE PROJECT	16.05	5.55	11.85	4.58
GUADALUPE VALLEY WEST	3.48		1.25	
STATE PARK	4.17		10.35	
GUADALUPE CANYON PARKWAY	.12		.38	
GAS & TRANSMISSION LINES				
P G & E FEE	.12		.05	
S.F. WATER PIPELINES			.06*	
PARCEL W	1.8		.1	
G. V. W. WATER TANK	.09			
PARCEL V	.24			
TOTAL	30.0	7.92	25.00	5.41
SOUTHEAST RIDGE				
QUARRY	.9		.38	
OWL & BUCKEYE CANYON	3.78	1.14	6.53	.9
BRISBANE ACRES	1.80		10.2	
SOUTH SLOPE PROJECT	9.0	2.22	2.1	.45
COUNTY PARK	43.8		55.65	
HILLSIDE SCHOOL				
GAS & TRANSMISSION LINES		.37**		1.30**
JUNCUS RAVINE	1.44		.15	
S.F. WATER PIPELINES	.04*		.15*	
FIRE BREAKS	.4*		.03*	
TOTAL	60.00	3.73	75.0	2.65
RADIO RIDGE				
ANTENNA SITES	.12			
COUNTY PARK	4.88			
GUADALUPE CANYON PARKWAY				
GAS & TRANSMISSION LINES				
TOTAL	5.0			
SADDLE				
RESERVOIR HILL PROJECT	1.94	1.94		
BRISBANE SCHOOL SITE				
"47 UNITS"				
STATE PARK	.06			
GUADALUPE CANYON PARKWAY				
WATER TANK, RESERVOIR HILL				
TOTAL	2.00	1.94		
TWIN PEAKS	3.00			
GRAND TOTAL	100.00	13.59	100.00	8.06

--- No Specific Development Plans Pending * Easement not added into totals
** Virtually all of this impact would not take place before 1988.

extinction probability of the entire SBM Mission Blue population and a 2.5 to 5% increase in the likelihood of Callippe extinction. All anticipated development on the Mountain, without the conservation provisions of the HCP, would probably result in a 8 to 14% increase in the chance that the Mission Blue will go extinct on San Bruno Mountain, and a 4 to 8% increase that Callippe will become extinct. A cautious approach to endangered species dictates that any increase in extinction probability requires mitigative action, such as those provided in this Habitat Conservation Plan.

If either species were to go extinct on the Mountain, the probability of recolonization from outside is small. The nearest potential source area for Callippe, in the Oakland Hills, is considered a different subspecies; for Mission Blue, the Twin Peaks colony is itself more extinction prone than are the large colonies on the Mountain. If the butterflies continue to exist on SBM, one or both subspecies may evolve into true species, genetically distinct from their neighboring S. callippe and P. icarioides populations.

Accordingly, the objective of the Plan is to conserve the species of concern with or without urban development on SBM. This plan is necessary for that purpose because of the other pressures on the habitat (e.g. vegetative succession). The provisions of the Plan relating to development areas are intended to provide mitigation for the loss of habitat for the species of concern and to counteract the impact of development.

When dealing with biological systems, particularly in the natural (as opposed to the laboratory) environment, it is virtually impossible to **guarantee** that the actions one proposes will have their intended effect, and only that effect. The plan can provide, however, explicit means to measure its own ongoing success or failure; these measures may in turn suggest modifications of the plan which will boost its success.

The term "recovery benchmarks", in accordance with the Recovery Plans for endangered species under Section 4 (g) of the Endangered Species Act, has been suggested as the measure of the success of the HCP in promoting the conservation of endangered species. "Recovery benchmark" is not a meaningful term if it is meant to imply that once the population of Mission Blue, for example, on SBM, reaches 20,000 adult animals (or any other figure), it is no longer endangered. Recovery of biological species is not a static phenomenon, but an ongoing process. Meaningful measures of plan success, or species recovery which can be achieved through the monitoring procedures proposed in this Plan include:

o Evidence that the populations of species of concern are stable in size on the Mountain as a whole, and not fluctuating wildly in number from year to year. In measuring stability, the population levels measured in the 1980 though 1981 years of the Biological Study can be used as a baseline. Even though these may not by any means represent the maximum levels that Mission Blue and Callippe have achieved on SBM, and as discussed in the Biological Report, have probably been adversely affected by past disturbance and fragmentation of habitat on the Mountain, the 1980-81 levels (9000 to 17000 adult animals) are robust enough to serve as a good baseline for a survival level against which to measure future changes. If the populations, under the HCP are stable from year to year, or slowly increasing, this is a good measure that the plan is working. If, on the other hand, they are steadily declining, or characterized by outbreaks followed by crashes, this

indicates that near-term extinction is likely.

o The total area of habitat utilized by species of concern on the Mountain;

o Evidence that species of concern are utilizing new habitat areas, or newly created subdivisions of former habitat areas, including areas revegetated after development, open space areas of development parcels and areas treated to enhance habitat. An appropriate measure of utilization would be that the density of animals (and host plants) in these areas were comparable to the densities observed in the colonies as they existed in 1980-81.

In evaluating the impact of the Habitat Conservation Plan it is important to recognize that species of concern could suffer major declines, due to natural processes, in spite of protection efforts, and that such declines would have occurred even in the total absence of new development. A severe drought, for example, lasting three years or more, could severely impact host plant germination, or growth, or force early senescence which would make it impossible for the majority of the butterflies to complete their life cycle. This effect would be felt in the richest butterfly colonies (Southeast Ridge) and if the species were extirpated on SBM as a result, it would be extremely unlikely that the absence of development alone would have preserved them.

Since SBM, although large in itself, is now virtually the last refuge of the particular subspecies of Mission Blue and Callippe, local extirpation would destroy that subspecies since there are no longer any "pockets" of these animals up and down the Peninsula to serve as source areas to colonize the Mountain. Nonetheless, P. icarioides missionensis and S. callippe callippe are taxonomic subspecies, members of a larger, but closely related species which appear physically distinctive because the microclimatic regime of SBM gives rise to characteristic expression of their genes for small size and dark wing coloration. It is likely, at this time, that the same genes now expressed by the SBM population still exist in the populations of related subspecies elsewhere (such as the East Bay, Sierra Nevada etc), and if transplanted to San Bruno Mountain, these forms would soon express these genes and closely resemble the subspecies now found there. Transplantation is, as described in 3 C. of this plan, both expensive and extremely risky, it is only mentioned as an alternative in the circumstance where these animals were actually extirpated on the Mountain.

Comparison with No-Project Alternative

The No Project/No Action Alternative is taken to mean status quo -- no habitat conservation or enhancement, and no additional urban development. Under these conditions, the species of concern on San Bruno Mountain would continue to suffer the effects of the existing threats to their survival: habitat loss due to off-road vehicles, soil erosion, spread of exotic species, wildfire, and natural succession within the grassland and from grassland to brush. Based on the Biological Study, we believe that the continued operation of these threats results in a significant risk that the species would go extinct on SBM within 5 to 20 decades from now.

2. ENHANCEMENT

At this point in plan formulation, the full scope of enhancement programs has not been determined. Much of the range of enhancement undertaken through the HCP depends on appraisals of biological effectiveness, likelihood of damage to other species, and cost effectiveness which will be revised during the early phases of plan implementation.

Reclamation of graded areas cannot be considered true enhancement since it mitigates a habitat loss to development provided by the plan itself. Nonetheless, successful reclamation would offset some of the impact described above. Overall, nearly 100 acres of graded land is available to be returned to habitat.

True enhancement, restoration of former habitat areas and improvement of present habitat, would be centered on the higher, western portion of the Guadalupe Hills (County Park 1-09-01) and on the broad, brushy zone of the Guadalupe Hills at the upper end of the Guadalupe Valley Industrial Park (County Park 1-09-02 and Guadalupe Valley West 1-08-01, 1-08-02). The objective in the former is primarily expansion of existing habitat for Mission Blue and Callippe by grassland successional management and control of off road vehicles. In the latter, the objective is partially improvement of existing habitat, but primarily for the purpose of improving inter-colony movement of the insects to offset the impact of the industrial park and the quarry on the integrity of the SBM population of these animals. In the major enhancement units, it may be possible to provide some 200 acres of habitat with long term value to these insects.

V. INSTITUTIONAL PROGRAM

V. INSTITUTIONAL PROGRAM

This chapter discusses the procedure by which the conserved habitat will be created and maintained and by which the HCP will be implemented. The primary purpose of the HCP is to provide habitat on San Bruno Mountain for the indefinite perpetuation of the Mission Blue, Callippe Silverspot and other species of concern. In order to accomplish that, it is necessary to arrange for an institutional structure of sufficient durability to be able to fulfill its primary mission. There must be created as part of the institutional structure a funding mechanism which is adequate to provide for indefinite, long-term habitat maintenance. In addition, to the extent possible, the institutional structure should be able to address the entire habitat on San Bruno Mountain despite the division of the habitat by the overlapping jurisdiction of various governmental agencies and the complex pattern of private and public ownership of the habitat. Finally, the institutional structure must have adequate management flexibility to respond to the unanticipated needs of the future.

Concurrent with the issuance of the Section 10(a) Permit, an agreement will be signed by the federal, state and local agencies involved and the participating landowners and developers. The Agreement sets forth the understandings of the parties and their agreement to their obligations as set forth in the HCP. The Agreement also contains provisions coordinating the various activities of state, local and federal agencies with respect to habitat conservation on San Bruno Mountain. The Agreement also provides that compliance with the Agreement and the Permit will be sufficient for Visitacion Associates and their successors to meet the requirements of the Endangered Species Act and no further requirements will be imposed upon them. The Agreement contains more specific provisions for implementing this HCP. The Agreement is entitled "Agreement With Respect to San Bruno Mountain Area Habitat Conservation Plan", hereinafter "Agreement".

A. LAND USE REGULATION

San Bruno Mountain presently is under the jurisdiction of four public entities. The County of San Mateo has jurisdiction over all of the unincorporated land on the mountain (approximately 3,200 acres). The cities have jurisdiction over land in the following approximate amounts: Brisbane, 200 acres; Daly City, 90 acres, South San Francisco, 10 acres. The cities have been assigned potential jurisdiction over the following approximate amounts of land currently under San Mateo County jurisdiction: Brisbane, 500 acres; Daly City, 100 acres, South San Francisco, 300 acres.

Within the various jurisdictions are lands owned by one large private owner, Visitacion Associates (VA), and by several smaller private owners. Public land owners include the State of California (which owns the state park), the County of San Mateo (which owns the county park), and two school districts, which own school sites. Publicly owned lands cover approximately 2,000 acres on the mountain; privately owned lands cover 1,500 acres.

Land use on the unincorporated areas of the mountain is presently regulated by the County, which has adopted a General Plan which includes the

mountain. As sections of the mountain are prepared for development, they will be annexed to the surrounding cities (Brisbane, South San Francisco, Daly City). Those cities will also regulate land use by means of a General Plan, adopted pursuant to state law, along with other statutory land use regulations. Land annexed to the surrounding cities will still be subject to the HCP and the Agreement.

The County and the three cities will be co-applicants for the Section 10(a) Permit and shall exercise their land use authority, as set forth in the California Government Code and in the California Constitution, to enforce the conditions of the Permit and the terms of the Agreement. As permittees, the Cities of Brisbane, Daly City and South San Francisco and the County of San Mateo have a duty to comply with the Section 10(a) Permit and also to enforce the Permit and the Agreement. The terms of the Permit are subject to the final enforcement authority of the U.S. Fish and Wildlife Service.

The owners of 93% of the private land area on San Bruno Mountain have submitted plans which are included in this HCP. The remaining 7% of the land (the Unplanned Parcels) will be subject to local land use authority and no takings on the Unplanned Parcels will be authorized by the Section 10(a) Permit unless (1) the landowner agrees to comply with the Section 10(a) Permit and the Agreement, and (2) the local government having land use regulatory authority exercises its authority to require compliance with the Section 10(a) Permit and the Agreement.

Developers who plan construction in the San Bruno Mountain area will submit their plans to the appropriate local agency and follow the normal approval procedures. In addition, the developers shall consult with the Plan Operator and shall demonstrate to the local agency as provided below that they are complying with the Section 10(a) Permit and the Agreement. Land use proposals for unplanned parcels may be subject to modification in conformance with the HCP and the Agreement.

At or prior to the time of the initial discretionary project approval (including applications in connection with zoning, specific plans, subdivision tract maps, use permits, planned developments, building and grading permits) with respect to projects which have not yet received such approvals (e.g., Reservoir Hill has received such approval), copies of all application materials dealing with HCP compliance will be sent by the local agency to the U.S. Fish and Wildlife Service, the California State Department of Fish and Game and the Plan Operator. These agencies shall have 30 days to comment upon the application before a local agency public hearing is held to consider compliance of the proposed action with the Agreement and the Section 10(a) Permit conditions. The local agency shall hold a noticed public hearing of the proposed action on compliance with the Agreement. Notice shall be given as provided in Government Code §65854 and §65854.5, or any successor statutes. This hearing will be held in conjunction with any other local public hearing scheduled to consider the development proposal.

After the noticed public hearing, the local agency shall impose on the applicant the conditions required by the Agreement and by the Section 10(a) Permit (in addition to other conditions permitted by law). In no case shall an agency approve an application without first making written findings that the application complies with the Section 10(a) Permit and the Agreement. Such a finding of compliance with the Section 10(a) Permit and the Agreement

fulfills the agency's obligation under CEQA to assess the impact, including the cumulative impact, of the project on the species of concern. The local agency shall apply the provisions of the HCP, Chapter III, pages 22-28, to the unplanned parcels.

Developers who plan construction in the San Bruno Mountain Area will submit their plans to the appropriate local agency and follow the development procedures. However, prior to the first discretionary approval (and, where no discretionary approval is required prior to any grading or any major construction or any change in land use on any parcel, whichever comes first), at least one public hearing must be held to determine whether the proposed action on the parcel complies with the Section 10(a) Permit and with this Agreement. Whenever a subsequent public hearing is required by the normal planning or approval procedures, the local agency shall take no action at that hearing without first making written findings that the proposed action complies with the Section 10(a) Permit and this Agreement. The local agency shall take no subsequent discretionary action without first finding that the action complies with this Agreement, but if a public hearing is not otherwise required by this Agreement or by applicable law, such discretionary action may be taken and such findings may be made without a public hearing being held. The following examples are given as an aid in interpreting this section:

1. If a project receives an initial discretionary approval from a city at a public hearing at which the required findings are made, then this Agreement requires no further public hearings. However, if the city's usual planning process requires additional public hearings, then at each such hearing prior to taking action, the city must find that the proposed action complies with the Section 10(a) Permit and with this Agreement. If the city's usual planning process allows discretionary action, subsequent to the first public hearing, to be taken without additional public hearings, then the city must find that the subsequent actions comply with the Section 10(a) Permit and this Agreement prior to taking action, but need not make the findings at a public hearing.

2. Some projects would normally proceed without any public hearings. Projects which require only a city building permit are one example. In those cases, this Agreement requires that at least one public hearing be held prior to any grading, major construction or change in land use. At that public hearing, the city must find that the proposed grading, major construction or change in land use complies with the Section 10(a) Permit and with this Agreement. Until the city makes such findings, the grading, major construction or change in land use shall not take place.

When a local government issues a building permit or a grading permit in compliance with the applicable conditions of the Agreement, such issuance automatically authorizes takings under the Section 10(a) Permit. The incidental takings under the Section 10(a) Permit must be performed by an employee or agent of the local government or by a private entity under the direct control of the local government through its land use authority, general police power, or any contractual rights. Each local government may issue grading permits and building permits upon satisfaction of the applicable conditions of the Agreement and of the Section 10(a) Permit, and other local requirements unrelated to wildlife conservation. For purposes of the Section 10(a) Permit, any Landowner (together with its agents, employees and contractors) who has agreed in writing to be bound by the terms of the

Agreement and by the conditions of the Section 10(a) Permit by signing a copy of this Agreement and when acting (together with its agents, employees and contractors) under a permit issued in accordance with this Agreement, shall be deemed to be acting under the direct supervision and control of a permittee under the Section 10(a) Permit.

Each developer shall offer for dedication to the County of San Mateo those parcels which are designated as conserved habitat in Chapter VII. The offer of dedication of Conserved Habitat may be phased at the option of the Landowner but shall occur prior to or concurrently with the recordation of the final subdivision tract map for the area to be dedicated. Title shall be dedicated in fee to the County or the State, as appropriate. San Mateo County shall accept these dedications. Temporary access to portions of any Developable Administrative Parcel which are to become Conserved Hab ctat shall be provided by the respective Landowner to the Plan Operator in order to permit the Plan Operator to monitor plan compliance and to develop plans for the protection, operation and enhancement of the Conserved Habitat upon reasonable terms and conditions (including waivers of liability, insurance, etc.) and to conduct any activity consistent with the Agreement. Owners of unplanned parcels may be required, during the planning process, to dedicate land as conserved habitat as a condition of authorization to take Mission Blue under the Section 10(a) Permit.

Some developments may utilize Development Agreements as authorized by California Government Code §65864, et seq. Any such Development Agreement shall provide that the development is subject to and will comply with the terms of the Agreement and the conditions of the Section 10(a) Permit.

To change an unplanned parcel into a planned parcel or to obtain approval of a reclamation plan, the parcel owner shall submit the proposed plans to the Plan Operator. The Plan Operator shall review the proposed plans and recommend to the local agency with local use jurisdiction that the plans be approved or disapproved. The Plan Operator shall give the USF&WS and CDF&G notice and copies of the proposed plans. The USF&WS and CDF&G shall have 30 days to review and comment upon the proposed plans. At the end of that time, the local agency with land use jurisdiction shall either approve or disapprove the plans. Upon approval of plans to change an unplanned parcel into a planned parcel, the parcel becomes a planned parcel.

Field maps (used to show grading boundaries, location of fencing, etc.) shall be reviewed by the Plan Operator for compliance with the HCP prior to their use. If the Plan Operator disapproves a field map, that decision may be appealed to, and reviewed by, the local agency with land use planning jurisdiction.

B. FUNDING PROGRAM

A basic element of the HCP is creation of a funding mechanism which is able to support the monitoring, research, enhancement and other conservation techniques provided for in this HCP for permanent habitat conservation. The amount of funding must be adequate and protected against inflation. It does not seem possible to provide permanent, inflation-free funding solely by reliance on discretionary appropriations from public entities. As a result, the HCP proposes to rely on private funding for habitat maintenance. Funds

for habitat maintenance would be deposited in three distinct but overlapping phases: initial funding, service contract funding, and permanent funding.

- Interim funding will begin upon the execution of this Agreement, and will be paid by the Landowners. Upon full implementation of the program, it is anticipated that the total amount of interim funding paid by the Landowners will be approximately $50,000.00 per year.

- Funds will also be raised through fees charged to the developers for monitoring of development, and for consultation provided to the developers, by the Plan Operator. The fees charged will cover the Plan Operator's costs and expenses and will also provide some extra money for operation and enhancement of the Conserved Habitat.

- Permanent and ongoing funding for habitat operation, maintenance and enhancement will be provided by a $20.00 annual charge per dwelling unit within the Development Areas and a $10.00 annual charge per 1,000 square feet of floor area of private non-residential development on the mountain. As the construction is completed and permanent funding is imposed, interim funding will be phased out.

Concurrently with the execution of this Agreement, the County and the Cities shall either enter into a trust agreement and thereby and thereupon establish the "San Bruno Mountain Area Habitat Conservation Trust Fund" (hereinafter "Trust Fund") or form an Assessment District or provide for other appropriate funding sources as provided below. The funding source shall have the duty to use the funds for habitat conservation on San Bruno Mountain so as to provide for the conservation of the Mission Blue, Callippe Silverspot and other Species of Concern and the San Bruno Mountain Area Ecological Community.

The trustees of the Trust Fund shall be the Managers for the County and the Cities who shall act and administer the Trust Fund solely for the purpose of providing the County with funds for the protection and enhancement of the Species of Concern by the operation, maintenance and enhancement of the Conserved Habitat for such purposes, all as set forth in greater detail in said Trust Agreement.

The funds will be paid annually to the funding source, as appropriate, and dedicated solely to habitat conservation activity. Upon full implementation of the program, it is anticipated that the amount of annual funding will be in excess of $60,000.00, which has been determined to be sufficient for habitat conservation. The exact amount of annual funding cannot be calculated because Landowners will begin participation in the funding program at different times. The Trust will consist of one representative each from San Mateo County, Brisbane, Daly City and South San Francisco. The Trustees of the Trust shall have the duty to use the funds for habitat conservation on San Bruno Mountain so as to provide for the conservation of the Mission Blue, Callippe Silverspot and other Species of Concern and the San Bruno Mountain Area Ecological Community.

In connection with the subdivision, development and use of the Developable Administrative Parcels, the respective local agency having jurisdiction shall require, and in any event (except as provided in the Agreement) each Landowner with respect to each Development Area, or portion thereof, shall record, a covenant with respect to such Developable

Administrative Parcels, or portion thereof.

Prior to the time when the funding from covenants and restrictions assessments provided for above becomes available, the parties shall establish an Interim Funding (Interim Fund) in the amount of at least $50,000.00 per year for preliminary habitat restoration activities, native plant seeding and species population monitoring, and other habitat enhancing and monitoring activities. It is anticipated that additional interim funding will come from new projects, contributions from public agencies and from fees for monitoring and consultation, so that the interim funding will probably be in excess of $50,000.00 per year.

As a contribution to the Interim Fund, each of the following Landowners shall pay to the Plan Operator the amount of money set forth below opposite its name monthly in advance, commencing with the later of (i) the approval of a specific plan, rezoning for residential or commercial purposes, PUD, or tentative subdivision map for any portion of the Developable Administrative Parcel set forth opposite the respective Landowner's name below; or (ii) the execution of this Agreement by each Landowner.

Landowner/Developable Administrative Parcel	Monthly Payment	Pro Rata Limit
Cadillac-Fairview Homes West: Northeast Ridge Project	$ 1,956.67	$ 23,480.00
W.W. Dean & Associates: South Slope Project	781.67	9,380.00
Presley: Reservoir Hill	681.67	8,180.00
Foxhall Investment, Ltd: Rio Verde Estates and Rio Verde Heights	746.67	8,960.00

With respect to all other Developable Administrative Parcels, the Landowner with respect thereto, upon the approval of any PUD, tentative subdivision tract map, building permit, grading permit, conditional use permit or special use permit shall be required to commence and continue paying to the Plan Operator for the Interim Fund, in the same manner and to the same extent provided above with respect to the Landowners specified in this subsection, a charge in the amount of $20.00 per year for every residential unit and $10.00 per year per 1,000 square feet of non-residential floor area proposed to be developed under the approval sought.

In the event that any of the Landowners above fails to meet its interim habitat funding obligation, the obligation to make payments shall terminate and the respective Landowner shall thereafter have no obligation to make further payments and the Landowner shall lose its rights and benefits under the Section 10(a) Permit.

As the permanent funding provided becomes available, the Interim Funding shall be phased out.

The parties to this Agreement recognize and agree that the permanent charge/assessment may be satisfied through collection on the annual County property tax bill of an equivalent amount. Such collection may be through an assessment levied by a public entity or district such as a landscape and lighting district pursuant to Streets and Highways Code §§22500-22679, an open space maintenance district pursuant to Government Code §§50575-50628, or some other mutually agreed upon funding source. All parties agree to cooperate in good faith in the formation of such a funding source as is selected by the Cities and the County and the Landowners shall consent to the formation of any such funding source so selected.

C. ENFORCEMENT

As set forth above, the local agencies, as permittees, have the duty to enforce the conditions of the Section 10(a) Permit and the terms of the Agreement. Their enforcement authority includes the issuance of stop work orders.

The Section 10(a) Permit provides that no grading shall occur within the Conserved Habitat other than in specifically designated Reclaimed Habitat areas. The applicant for a grading permit shall sign a statement acknowledging that grading in the Preserved Habitat may be a crime. The statement shall be in substantially the following form:

> "I understand that grading is being permitted by federal authority in certain areas which may contain an endangered species -- the Mission Blue butterfly, the San Bruno Elfin butterfly or the San Francisco Garter Snake. I also understand that grading is permitted only inside areas which have been fenced. I understand that grading beyond the fenced area is not permitted and that it may be punishable as a federal crime to grade beyond the fenced area if such grading kills or injures butterfly eggs, larvae or adult butterflies, or kills or injures San Francisco Garter Snakes."

There shall be no grading within 300 feet of any point on a boundary of the Conserved Habitat which is required by Chapter VII of this HCP to be fenced until a fence is erected on the boundary of the Conserved Habitat for a reasonable distance and a pre-grading conference is held. Signs shall be posted on the fence every 100 feet which shall state, in the following language, that grading beyond the fence is not permitted and may result in the imposition of criminal penalties:

"NOTICE: Grading beyond this fence could result in a violation of federal law (16 U.S.C. §§1531-1543) and could result in a fine of $20,000.00 and imprisonment for one year (16 United States Code §1540(b))."

At the pre-grading conference, the prohibition against grading beyond fenced areas shall be explained. The parties to the pre-grading conference shall include, in addition to the local agency, at a minimum, the contractors, developers, foremen, heavy equipment operators and the Habitat Manager.

The appropriate local agency shall issue and enforce a stop work order immediately upon its determination that there has been grading outside the grading boundaries as shown on the approved grading plan. Local agencies may

exercise this authority based upon the Agreement, the police power, the Section 10(a) Permit, the grading permit itself and any contractual agreements with developers to enforce the Agreement, the Section 10(a) Permit and/or the grading permit.

Local agencies shall have available the full extent of legal and equitable remedies available to them in the event of violations of the Agreement or the Section 10(a) Permit. Violations may result in requiring reclamation of any improperly graded area, donation to the County of undisturbed habitat within the permit area equivalent to the habitat improperly graded, forfeiture of bonds, revocation of the grading permit (and concomitantly the authorization for taking under that grading permit) and/or any other appropriate and available remedies in the discretion of the local public entity.

The USF&WS and the local agencies agree that the Section 10(a) Permit is severable for enforcement purposes by management unit or portions thereof. Violations that occur in one management unit are not grounds for revocation of the permit or other remedies against a separate management unit. Revocation of the permit will not be considered until other remedies and sanctions have been tried and found by the USF&WS to be inadequate. USF&WS may suspend or revoke the permit pursuant to the provisions of 50 CFR §13.51. The violation of the Section 10(a) Permit with respect to any management unit, or portion thereof, shall not adversely affect any Landowner or local agency with respect to any other management unit, or portion thereof. The past conduct of a violator with respect to one management unit may be considered in determining the appropriate remedies with respect to such violator's activities with respect to another Management Unit.

In the event that the development of any Development Area entails grading within 200 feet of any Conserved Habitat, the Landowner shall post a bond in favor of the Cities, the Plan Operator and the San Bruno Mountain Area Habitat Conservation Trust Fund or Assessment District securing performance of the following obligations:

1. The Landowner shall not grade any Conserved Habitat except as provided in this Agreement;

2. In the event that any Landowner does grade any Conserved Habitat (including, but not limited to Preserved Habitat) in violation of this Agreement, such Landowner shall expeditiously comply with the reasonable directives of the Plan Operator to restore the improperly graded area; and

3. In the event of a breach of the obligations described in subsections (i) and (ii) above, it would be impracticable or extremely difficult to fix the actual damages resulting from the breach and therefore the Landowner shall pay to the Trust Fund or to the Assessment District or alternate funding source liquidated damages, and not as a penalty, the sum of $20,000.00 per acre of Conserved Habitat that is improperly graded. The liquidated damages per acre shall be prorated according to the amount of Conserved Habitat that is improperly graded, but in no event shall be less than $2,000.00. These sums represent a reasonable endeavor by the parties hereto to estimate a fair compensation for the foreseeable losses that might result from a breach of such obligations.

The amount of any bond obtained pursuant to this provision shall be no less than $25,000.00 per acre of Conserved Habitat, other than areas constituting Reclaimed Habitat, that occurs within 200 feet of any area that is to be graded. Such bond shall be posted by the Landowner and required by the local agency having planning jurisdiction prior to the initiation of such grading.

Suspension

1. The USF&WS may suspend the Section 10(a) Permit for any violation of the Permit or this Agreement.

2. Except where the USF&WS determines that emergency action is necessary to protect any endangered or threatened species, the USF&WS shall not suspend the Section 10(a) Permit without first: (a) requesting the appropriate City or the County to take appropriate remedial or enforcement action; and (b) providing to the affected City or County permittee and to each affected Landowner under the direct control of the affected permittee, notice in writing of the facts or conduct which may warrant the suspension and an opportunity to demonstrate or achieve compliance with the Permit and this Agreement.

3. Any suspension under this subsection shall be lifted immediately upon the reasonable determination by the USF&WS that the violation(s) has been effectively redressed.

4. It is the intent of the parties hereto that in the event of any suspension of the Section 10(a) Permit, all parties shall act expeditiously to cooperate to lift any suspension of the Section 10(a) Permit to carry out the objectives of this Agreement. Notwithstanding any provision of this subsection, no suspension of the Section 10(a) Permit, or the rights, benefits or privileges of the Section 10(a) Permit shall extend beyond a period of 180 days, unless the USF&WS makes the determinations required below.

Revocation or Termination

1. The USF&WS shall not revoke or terminate the Section 10(a) Permit for a violation of the Permit or this Agreement unless the USF&WS determines that such violation: (a) involves a taking of an endangered or threatened species; (b) has significantly and adversely affected such species throughout its range; (c) cannot be effectively redressed by other remedial or enforcement action, and (d) destroys more than 5% of the total Conserved Habitat in that Administrative Parcel.

2. The USF&WS shall not revoke or terminate the Section 10(a) Permit without first: (a) requesting the appropriate City or the County to take appropriate remedial or enforcement action; and (b) providing to the affected City or County permittee and to each affected Landowner under the direct control of the affected permittee, notice in writing of the facts or conduct which may warrant the revocation or termination and a reasonable opportunity (but not less than 60 days) to demonstrate or achieve compliance with the Permit and this Agreement.

D. HABITAT MAINTENANCE

The County shall grant to the California Department of Fish and Game, the California Department of Parks and Recreation and to the U.S. Department of the Interior an easement to enter the conserved habitat owned by the County to enforce the terms of the Agreement and to enforce the conditions of the Section 10(a) Permit. The County shall also restrict the conserved habitat by deed or other recorded document so that the land will be used only for habitat purposes and for other uses consistent with use as a habitat. The document shall provide that the restrictions on use can only be relaxed or modified with the consent of the USF&WS, the California State Department of Parks and Recreation and Fish and Game, the County of San Mateo and the cities of Brisbane, Daly City and South San Francisco.

The California Department of Parks and Recreation shall grant to the County, the California Department of Fish and Game and to the U.S. Department of Interior an easement to enter the conserved habitat owned by the State to enforce the terms of the Agreement and to enforce the conditions of the Section 10(a) Permit. The State shall also restrict the conserved habitat by deed or other recorded document so that the land will be used only for habitat purposes and for other uses consistent with use as a habitat. The document shall provide that the restrictions on use can only be relaxed or modified with the consent of the USF&WS, the California State Department of Parks and Recreation and Fish and Game, the County of San Mateo and the cities of Brisbane, Daly City and South San Francisco.

In order to effect the maximum economy, it is anticipated that the conservation activities will be closely integrated with the activities of San Mateo County as manager of a park on San Bruno Mountain.

The day-to-day management of the HCP will be handled by the Plan Operator. The Plan Operator will provide personnel and equipment to perform the physical job of conservation and maintenance of the conserved habitat. That work will be done under the supervision of a scientist or other appropriate personnel who will either be hired by the Plan Operator or under contract with the Plan Operator. The scientific consultant will perform whatever periodic review and planning is required by the HCP.

For the initial five years of the Plan, the Plan Operator will consult with the Technical Advisory Committee (TAC), composed of representatives of USF&WS, CDF&G, the County of San Mateo, the cities of Brisbane, Daly City and South San Francisco, Visitacion Associates, the Committee to Save San Bruno Mountain and a biologist. The duties of the TAC are to review the operation, implementation and success of the HCP as follows:

- Review the work of the Plan Operator, including the results of research, monitoring and habitat enhancement activities and including the planning and design assistance to the landowners.

- Recommend revisions to plan activities, research, monitoring or enhancement, as necessary.

The TAC shall meet formally at least once a year to review the ongoing implementation of the Plan, and more often as appropriate. After the initial five years, the TAC may be continued if major uncertainties regarding

biological activities for habitat maintenance and enhancement remain to be resolved. The TAC may, with the unanimous consent of the County and Cities, establish a subcommittee of scientific and technical personnel, including representatives of the resource agencies to provide it with needed biological advice.

E. LANDOWNER COMMITMENTS

Landowners shall be required to:

1. Demonstrate compliance with the Agreement and the Section 10(a) Permit as described in paragraph A above.

2. Participate in the Funding Program as set forth in the Agreement.

3. Satisfy the conditions of Chapter VII as to each parcel for which the landowner proposes development.

4. Dedicate conserved habitat as set forth in Chapter VII of the HCP.

5. Prepare and comply with reclamation plans as described in Chapter VII for areas designated to be reclaimed.

6. Comply with applicable provisions of the Agreement and the conditions of the Section 10(a) Permit.

7. Comply with the requirements for grading permits set forth in the Agreement.

8. Stop grading work immediately upon the issuance of a stop work order duly and properly issued by the local government having land use jurisdiction.

F. AMENDMENT PROCEDURE

It is necessary to establish a procedure whereby the Agreement and the Section 10(a) Permit can be amended. However, it is extremely important that the cumulative effect of amendments will not jeopardize any endangered species or other species of concern. The fundamental purpose of the Agreement is to provide permanent protection for those species and for their conserved habitat. No amendments which conflict with that purpose will be approved. Amendments must be evaluated based on their effect on the habitat as a whole. The Plan Operator must be consulted on all proposed amendments.

In order to ensure that changes in development plans are consistent with this HCP, the amendment procedures vary depending on the type of amendments proposed. For purposes of this Chapter, "amendment" means any change in the boundary, as set forth in Chapter VII, of the conserved habitat, or development area, or any change in any of the conditions set forth for any parcel in Chapter VII or any change in any of the funding provisions of the HCP or any obligations of any public entity under the HCP. Amendments types 1, 2 and 3 as set forth below shall not be regarded as having a substantial effect upon any endangered species or the habitat of any endangered species. The types of proposed amendments and the applicable amendment procedures are

as follows:

1. Amendments In The Development Areas

Upon the written request of the respective landowner, the local public entity having land use jurisdiction is authorized in accordance with applicable law to approve amendments to the development plans for Development Areas which do not occur in the conserved or reclaimed habitat other than the conditions set forth in Chapter VII.

2. Amendments For Minor Boundary Adjustments

Upon the written request of the respective landowner, after consultation with the Habitat Manager, the local jurisdiction is authorized to approve minor boundary adjustments in the reclaimed or preserved habitat upon information notice, sent to the cities of Daly City, Brisbane and South San Francisco, the County of San Mateo, the California State Department of Fish and Game, the California State Parks Department and the U.S. Fish and Wildlife Service set forth in the preceding section, if the amendment will result in:

a. Reestablishing a boundary not more than 30 nominal feet measured on the ground surface, except as provided in Chapter VII, on either side of that boundary as delineated on a tentative subdivision map approved by a local public entity in accordance with Chapter VII (or on either side of that boundary, as determined by the local agency, if no subdivision map has yet been approved), and

b. The cumulative loss per administrative parcel from all minor boundary adjustments is not greater than 5% of the total conserved habitat in that administrative parcel as shown in Chapter VII.

3. Amendments For Exchange Of Equivalent Conserved Habitat Prior To Grading

Amendments to Chapter VII may be prepared for the exchange of land designated as conserved habitat with land designated as a development area within the same administrative parcel, only if no grading has yet occurred after issuance of the Section 10(a) Permit in the proposed new conserved habitat and upon a written finding that the amendment will provide new conserved habitat which is essentially equivalent in biological value and acreage to the habitat which will be lost as a result of the amendment. Any decisions approving such proposed amendments must be in writing and must be made by both the local jurisdiction and the USF&WS.

4. Unforeseen Circumstances

a. In reconciling their interests, and in identifying the measures in the Habitat Conservation Plan, the parties have used their best efforts to anticipate and take into consideration future changes in circumstances affecting the San Bruno Mountain Ecological Community and Species of Concern. The following procedures shall be followed, however, with respect to unforeseen circumstances which either (i) appreciably reduce the likelihood of survival of the Mission Blue butterfly, San Bruno Elfin butterfly or San Francisco Garter Snake, or (ii) result in new species being listed under the Endangered Species Act whose conservation necessitates additional emphasis in

the HCP or the Plan Operator's operating program for Conserved Habitat areas.

b. In response to any unforeseen circumstances as set forth in subsection (a) above, any party to this Agreement may request the other parties to this Agreement to meet to discuss appropriate modifications or amendments to: the HCP as applied to Conserved Habitat areas, the Plan Operator's operating program, the Trust Fund Agreement or any provision of this Agreement. Any party to this Agreement who fails to vote upon any such proposed changes shall be bound by the terms and conditions of any modification or amendment adopted pursuant to the provisions of this Section.

c. The parties to this Agreement shall, to the maximum extent possible, attempt to reach a consensus in response to the unforeseen circumstances described in subsection (a) of this section. No modification or amendment proposed under subsection (b) of this section shall be adopted and become effective without the unanimous consent of all parties to this Agreement who voted upon such modifications or amendment.

d. Notwithstanding the provisions of subsection (c) of this section, upon a written finding by the USF&WS that an emergency exists wherein either the continued implementation of the HCP, as applied to the Conserved Habitat areas, or the Plan Operator's operating program, appreciably reduces the likelihood of survival of a species listed under the Endangered Species Act, such plan or program shall be immediately modified in accordance with the recommendations of the USF&WS. Within 30 days after the modification of such plan or program, the USF&WS shall hold an informal noticed public hearing in San Mateo County for the purpose of setting forth its justification for requesting a modification of the HCP or the Plan Operator's operating program and taking public comment thereon. Such requested modifications shall be withdrawn within 30 days after the hearing unless the USF&WS presents, in writing, substantial evidence which demonstrates that the modifications were (i) necessary for the conservation of a species listed under the Endangered Species Act, (ii) could not be accomplished through the continued implementation of the existing HCP or Plan Operator's operating program, and (iii) represented the minimal modifications available which would not appreciably reduce the likelihood of survival of the affected listed species. Upon the issuance of such findings, the requested modifications shall remain in force and effect until such time as the USF&WS determines that the emergency threat to the existence of the affected listed species has been avoided.

5. All Other Amendments

All other amendments are subject to approval as follows: (a) upon the prior written agreement of the fee title owners of the lands directly affected; and (b) after a noticed public hearing, and (c) upon written approval of the local jurisdiction, the County of San Mateo (only with respect to impacts on conserved habitat) and the U.S. Fish and Wildlife Service, and (d) supported by a biological study demonstrating that the amendment does not conflict with the primary purpose of the HCP to provide for indefinite, long-term perpetuation of the Mission Blue, Callippe Silverspot and other species of concern, and (e) will be considered an amendment to the Section 10(a) Permit, subject to any other procedural requirements of federal law or regulation which may be applicable to amendment of such a permit. Amendments in planned administrative parcels may be approved only at three calendar year

intervals. Amendments in unplanned administrative parcels are not subject to the three year limit, until after they become planned parcels.

Amendments in planned administrative parcels may be proposed and approved according to the following schedule:

Proposed Amendment Must Be Submitted By	Decision On Proposed Amendment Must Be Made By
1. June 30, 1985	December 31, 1985
2. June 30, 1988	December 31, 1988
3. June 30, 1991	December 31, 1991
4. June 30, 1994	December 31, 1994
5. Etc.	

Amendments shall be proposed by June 30 and decisions shall be made by December 31 at three year intervals as set forth herein and continuing on like dates forever.

Notwithstanding the foregoing, proposed amendments in the provisions of Volume II with respect to: (i) the boundary of the conserved habitat or development area; or (ii) any conditions set forth in Chapter VII regarding any administrative parcel may be considered at any time until such administrative parcel has been planned and is the subject of a specific plan or tentative subdivision tract map approval, after which time the time limits set forth above for consideration of amendments shall apply.

G. PROPOSED PERMIT

The County of San Mateo and the cities of Brisbane, Daly City and South San Francisco will be joint applicants for a permit for taking of the Mission Blue under Section 10(a) of the Endangered Species Act. Each of the four local governments will be named as a permittee.

The permit application will set forth proposed conditions under which the local governments will operate. The conditions will include the following items:

1. No taking of the Mission Blue on San Bruno Mountain shall occur except in compliance with procedural and substantive requirements of the Agreement.

2. The conserved habitat shall be held, used and administered in accordance with the HCP and Agreement.

3. The development areas shall be used and administered in accordance with the conditions in Chapter VII of the HCP.

4. A permanent institutional structure and funding mechanism shall be established in accordance with Chapter V of the HCP and compliance with the applicable funding requirements shall be demonstrated by each developer prior to the issuance of any grading permit or building permit.

5. The permit shall be valid for an initial thirty year term.

6. The Agreement, as required by Chapter V of the HCP, shall be executed concurrently with the issuance of the Section 10(a) Permit.

H. APPLICATION OF THE ENDANGERED SPECIES ACT

The primary question underlying the issuance of the Section 10(a) Permit under the Endangered Species Act is whether the endangered species of concern will be better conserved by this HCP than by no action at all. The HCP contemplates the exclusion and loss of some existing habitat and the incremental taking of the endangered species of concern. This plan is based on the finding that the existing habitat for the endangered species is threatened because of the succession of brush replacing existing grasslands, increasing recreational use and the threat of conversion to urban uses. It is believed that this trend can be stabilized by the regulation and enhancement of conserved habitat generally and by requiring mitigation for the comtemplated exclusion and conversion of areas for urban uses. The mitigation required will provide funding and title to privately held lands, stabilizing and promoting conservation of these species of concern.

The focus of this plan is on the conservation of habitat for these species of concern. This emphasis on habitat is particularly helpful here because the endangered species are invertebrates. As long as a certain population size is retained, the taking of a few individual insects has far less significance to population survival than does the taking of an equivalent number of a species of large vertebrates (e.g., grizzly bear, California condor). Insects are short-lived and have high individual reproductive output -- the entire population replaces itself each year. Large vertebrates, on the other hand, are long-lived, take years to reach maturity and have low individual reproductive output. In this sense, the protection of habitat for invertebrates may have greater long run significance for the endurance of the species than the protection of some individual members of the species.

1. Permitted Taking Under Section 10(a)

Section 10(a) of the Act authorizes the Secretary to permit, under such terms and conditions as he may prescribe, any act otherwise prohibited by Section 9 of the Act. The acts may be permitted for scientific purposes, or to enhace the propagation or survival of the affected species (16 U.S.C. §1539). Section 9 of the Act, in turn, prohibits the "taking" of any endangered species.

If the Secretary is to grant a permit under Section 10(a) of the Act, he is required to find that (1) the exception was applied for in good faith; (2) the exercise of the exception will not operate to the disadvantage of the endangered species; (3) the exception is consistent with the purposes and policies set forth in Section 1531 of this title (16 U.S.C. §1539(d)). The Secretary may impose on such a permit terms and conditions to further the purposes of the Act.

The legislative history of Section 10(a) indicates that it was intended to provide the Fish and Wildlife Service with the flexibility to permit the

taking of individual members of an endangered species where the taking would occur as part of activities to encourage the propagation or survival of the affected species. The House committee report on the 1973 legislation made the following comment with regard to this section:

> Any such activities to encourage propagation or survival may take place in captivity, in a controlled habitat or even in uncontrolled habitat so long as this is found to provide the most practicable and realistic opportunity to encourage the development of the species concerned. They might even in extraordinary circumstances include the power to cull excess members of a species where the carrying capacity of its environment is in danger of being overwhelmed. H.R. Rep. No. 412, 93d Cong. 1st Sess. 17 (1973). (Emphasis added.)

Similarly, the Senate report states:

> The Secretary may make certain exemptions from the prohibitions for scientific purposes or for the propagation of the species in controlled habitats, if he finds that such excepted conduct furthers the intent of the Act. Sen. Report No. 307, 93d Cong., 1st Sess. 4 (1973).

This is not an instance where the habitat is overpopulated with the species and certain individuals must be taken for the protection of the species itself. However, it now appears that this is an instance where the proposed habitat conservation plan is "...the most practicable and realistic opportunity to encourage the development of the species..."

In Section 2 of the Act (15 U.S.C. §1531), Congress found and declared that:

> (a)(1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation;...
>
> (5) encouraging the States and other interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs which meet national and international standards is a key to meeting the Nation's international commitments and to better safeguarding, for the benefit of all citizens, the Nation's heritage in fish, wildlife, and plants.
>
> (b) The purposes of this chapter are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.

As mentioned above, a critical feature of this permit is that a significant portion of the habitat is on private land. It is unlikely that adequate public funds can be located to acquire the entire habitat area. Under this approach, over half of the private land would be permanently preserved in its natural condition as habitat. The conserved habitat would be carefully selected both to protect the richest habitat areas and to provide an adequate diversity of habitat. In addition, the contemplated urban uses will

be a source of permanent, ongoing funding for continued habitat conservation.

In its general expressions of intent in Section 2, Congress stated its concern about the impact on species of "economic growth and development untempered by adequate concern and conservation." However, Congress sought to encourage "interested parties" "...to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide a program for the conservation of such endangered and threatened species."

Application of the Act to the private land on San Bruno Mountain as suggested would mean that the Secretary was exercising his permit authority to provide a program for the conservation of the species and its ecosystem by requiring the adoption and funding of this Habitat Conservation Plan. Under these circumstances, especially where the Act is being applied to an invertebrate species on private land, this is the most practicable and realistic means for providing the conservation of the species. In addition, the Secretary may impose on a permit for the taking of individuals, terms and conditions necessary to further the intent of Congress. In this case, the permit would generally authorize the taking of individuals of the endangered species subject to specific terms and conditions which would assure that the conservation purposes of the permit are achieved. Generally, these conditions could include implementation of specific elements of this Plan, including the regulation of conserved habitat, biological evidence developed by a qualified independent biologist that the HCP will be sufficient to provide for the indefinite perpetuation of the species, permanent funding to provide for habitat maintenance and protection, and an institution responsible for implementation of the habitat management plan which has the legal independence and authority to fulfill its responsibilities.

Because a permit for takings incidental to development activity would be issued under Section 10(a), there would be no conflict with the recent decision of the Ninth Circuit Court of Appeals in Palila v. Hawaii Department of Land and Natural Resources, 639 F.2d 495 (Cir. 9, 1981).

2. Consultation Under Section 7

The approach to resolving any potential endangered species conflict on San Bruno Mountain should involve both the application for a permit, pursuant to Section 10(a), to carry out the plan and the issuance of a favorable biological opinion pursuant to Section 7b of the Act. Section 7 of the Endangered Species Act requires federal agencies, in consultation with the Secretary of the Interior, to ensure that any action, authorized, funded or carried out by them is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species (16 U.S.C. §1536(b)).

Section 7 should be utilized in this instance by consultation of the Fish and Wildlife Service Permit Office with the Endangered Species Office on the application for an endangered species permit under Section 10(a) of the Act to carry out the plan and the associated development activities.

VI. PLAN OVERVIEW

VI. PLAN OVERVIEW

A. SUMMARY OF PLAN

The Plan provides four broad categories of actions leading to conservation of the species of concern. Legal and Planning actions incorporate conservation and impact minimization at the design and approval stages of development. Enhancement Activities and Monitoring will be carried on over the long term to accomplish the goals of the HCP. The general details of these primary techniques are given in Chapter III.

B. PHASES OF THE CONSERVATION PLAN

The HCP for SBM is a long term program for conserving the ecology of SBM and preserving the principal populations of several endangered species. While the philosophical foundation of the plan is maximum feasible conservation, there is an opportunity on SBM to gradually enhance the habitat for the species of concern through grassland successional management and other tools. The immediate threats to the species are disturbance from the development of privately held lands and surrounding urban uses. These require mitigation and conservation actions apart from a large scale, long term habitat enhancement program.

The two basic activities -- development mitigation and habitat enhancement -- define two principal phases of the HCP. In addition, the HCP will undergo a start-up period which should be considered an initial phase for the purpose of budgeting and research planning. The phases are not distinct, rather the HCP program activities will shift emphasis in response to the development schedule and according to the plan's own research program. The approximate timing of the phases is listed below.

Phase	Period (years from start)
Start-up	0 - 3
Development Mitigation	0 - 8
Habitat Enhancement	5 - ?

HCP phases are important considerations in program planning and will be referenced in the detailed plans described in Volume Two. Briefly, the HCP phases help solve the budget problem of allocating largely fixed resources among the many areas and types of possible activities. Phasing also reflects the philosophical evolution of the plan to include direct habitat manipulation as more is known about the ecology of the species of concern and the overall ecology of SBM.

C. PLANNING AREA OVERVIEWS

The following are brief overviews of each Planning Area with regard to description and location, vegetation, proposed development projects, biological issues, and Habitat Conservation Plan objectives. Following each general overview is an enhancement overview for each planning area which discusses timing, coordination with proposed projects, and specific enhancement measures. Detailed information for each Planning Area is incorporated in Volume Two of this Plan. The four Planning Areas are divided into Adminis-

trative Parcels which correspond to ownership, and the Administrative Parcels are further divided into Management Units which correspond to areas containing common conservation problems. The Table of Contents of Volume Two is included here for reference.

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VOLUME TWO

1. Guadalupe Hills

The Guadalupe Hills planning area includes that section of the Mountain north of Guadalupe Valley with its eastern border on Bayshore Boulevard, its western border in park lands and edged on the north by residential areas of San Francisco (see Figure VI-1). This area constitutes the lowest ridge of the Mountain, with moderately steep hills containing both grassland and brushland habitat. Exotics such as gorse and eucalyptus have also become well established (see Figure VI-2).

Development is now proposed for the Northeast Ridge, Rio Verde Estates, and Rio Verde Heights parcels, which includes the Carter-Martin Road Extension. Future land use for parcels V, W, X, Y, and Z is currently unknown. A list of the number of acres found in each of these parcels is presented in Table VI-2.

The Guadalupe Hills planning area contains the second largest butterfly colony on the Mountain (about 25% of the entire Mission Blue and 30% of the entire Callippe populations) and is subject to the greatest impact from development. The area has previously been disturbed by Guadalupe Canyon Parkway which now divides the colony, by extensive damage from off-road vehicle use, and by the uncontrolled spread of exotic plant species. Therefore the impact of development would be severe not only because of the number and placement of housing units and the increase in human activity, but also because it further decreases the natural value of this already disturbed habitat. In addition to the butterfly populations several grassland animals have been sighted in the Guadalupe Hills, and rare and endemic plant habitat is known to exist on County Park lands near the quarry (Biological Study). The corridor between the Southeast Ridge and the Northeast Ridge, which is now limited to the brushy area at the west end of the valley, must be preserved for utilization by the species so as to maintain continuity between the colonies. Likewise, contiguity within the colony must be maintained.

In order to maintain colony continuity, the approach toward the Guadalupe Hills planning area with regard to habitat protection is to conserve habitat, maintain large amounts of contiguous habitat, and improve the quality of the Conserved Habitat. Habitat conservation techniques will include control of exotics (eucalyptus and gorse), revegetation of off-road vehicle cuts and graded areas, planning assistance, and protection against human encroachment.

Enhancement Overview for the Guadalupe Hills Planning Area: Because of the extensive development proposed for this planning area, coordination of enhancement activities in the Conserved Habitat within various administrative parcels is important in order to offset the impact of major losses of habitat. Because these losses correspond to development phases, the overall enhancement activities for the planning area initially will be coordinated with these phases. There are two major development phases (I and II) proposed with the Northeast Ridge project. Because this parcel involves the largest area of habitat loss the short term enhancement phases will be within the same time frame as the major development phases. It appears that both the Rio Verde Estates Development and the Carter-Martin Road Extension will also fit into this scheme as development will likely begin in all areas at approximately the same time. Post development enhancement involves long term enhancement goals and will be considered as Phase III.

FIGURE VI - 1
PLANNING AREAS AND ADMINISTRATIVE PARCELS

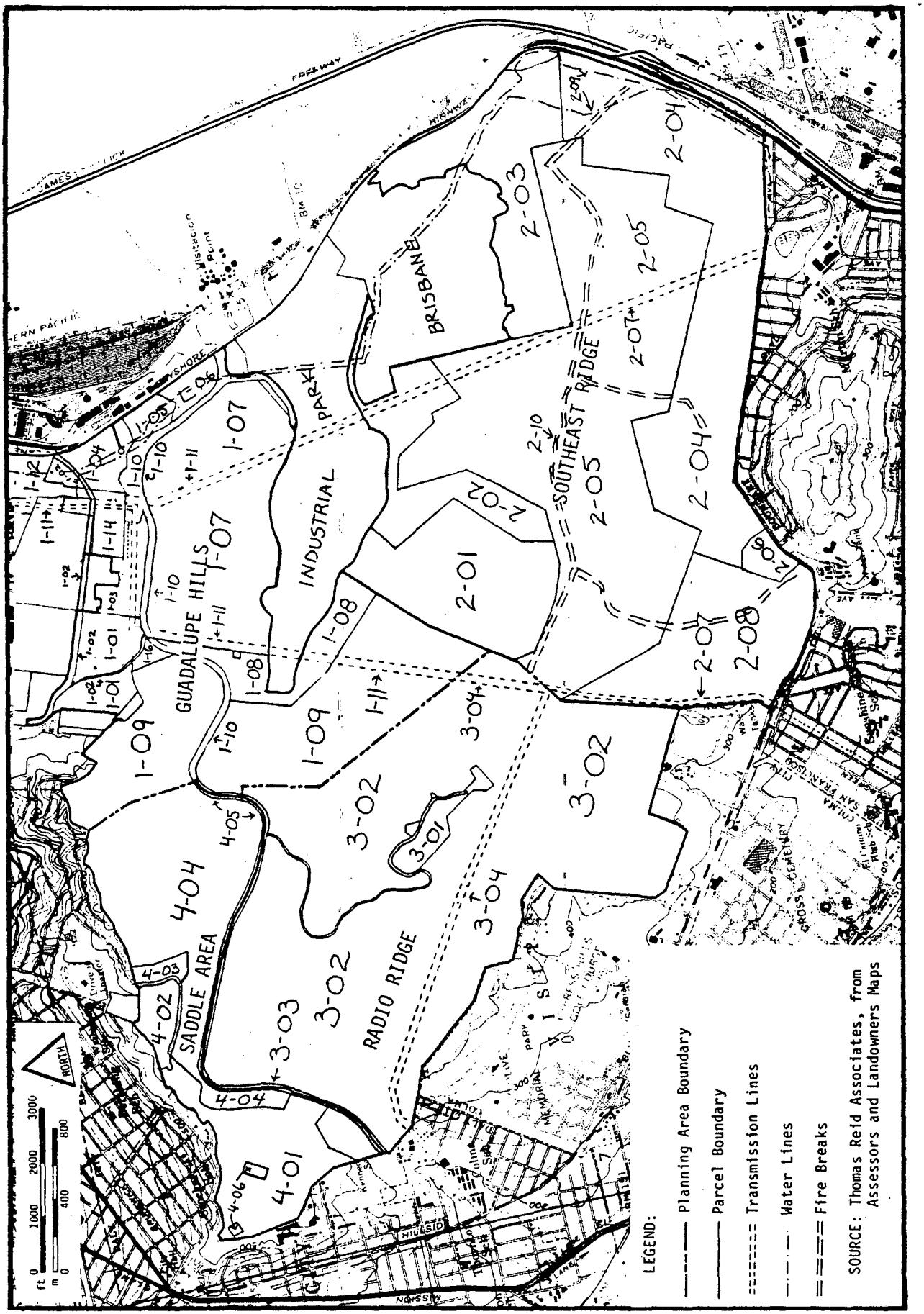

FIGURE VI - 2
PRIORITY AREAS FOR HABITAT ENHANCEMENT

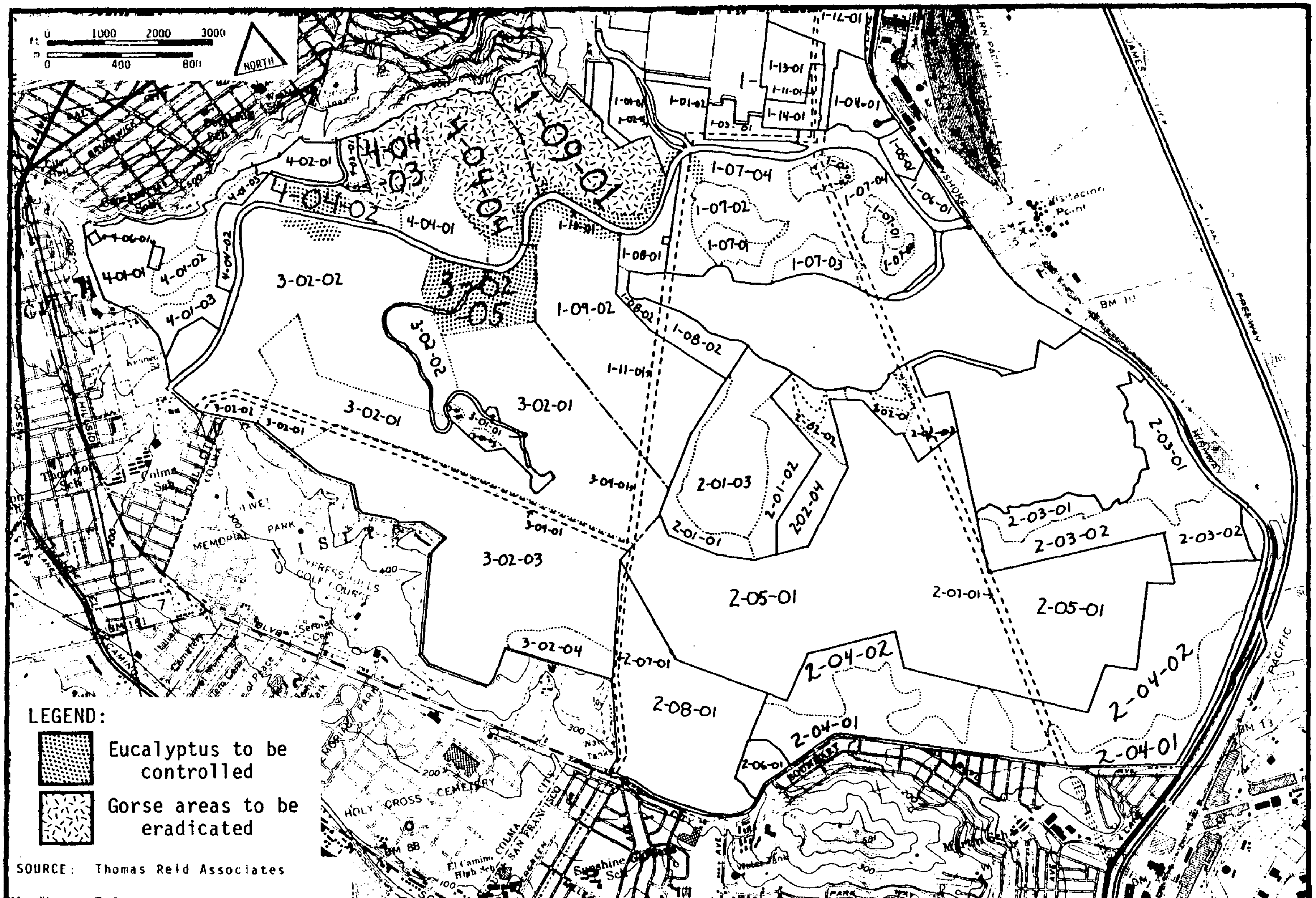

TABLE VI-1
LAND OWNERSHIP AND PLANNING RESPONSIBILITY

AREA/ PARCEL	CURRENT OWNERSHIP	PLANNING RESPONSIBILITY	POLITICAL JURISDICTION
1. GUADALUPE HILLS			
01. RIO VERDE ESTATES	VA	MENZOIAN	DC
02. CARTER-MARTIN ROAD EXTENSION	VA	DC	DC
03. RIO VERDE HEIGHTS	MENZOIAN	MENZOIAN	DC
04. PARCEL X	LEVINSON	LEVINSON	B
05. PARCEL Y	ALISAL LAND CO.	ALISAL LAND CO.	B
06. PARCEL Z	VA	CFHW	B
07. NORTHEAST RIDGE PROJECT	VA	CFHW	SM/B
08. GUADALUPE VALLEY WEST	VA	VA	SM/B
09. STATE PARK	STATE	STATE/SM	SM
10. GUADALUPE CANYON PARKWAY	SM	SM	SM/B
11. TRANSMISSION & GAS LINE EASEMENTS		PG&E	CPUC
12. PG&E FEE	PG&E	PG&E	CPUC/DC
13. WATER PIPELINES	S.F. WATER DEPT.	SF	SM
14. PARCEL W	BANK OF AMERICA	DC	DC
15. WATER TANK	G.V. MUNICIPAL IMP. DIST.	SM	SM/B
16. PARCEL V	VA	VA	DC
1. SOUTHEAST RIDGE			
01. QUARRY	QUARRY PRODUCTS	QUARRY PRODUCTS	SM/B
02. OWL & BUCKEYE CANYON	BOTTOMS	BOTTOMS	SM/B
03. BRISBANE ACRES	MULTIPLE OWNERS	MULTIPLE OWNERS	B
04. SOUTH SLOPE PROJECT	VA	W.W. DEAN	SM/SSF
05. COUNTY PARK	SM	SM	SM
06. HILLSIDE SCHOOL	SSF USD	SSF USD	SSF
07. TRANSMISSION & GAS LINE EASEMENTS	PG&E	PG&E	CPUC
08. JUNCUS RAVINE	VA	VA	SM
09. WATER PIPELINES	S.F. WATER DEPT.	SF	SM
10. FIRE BREAKS	CALIF. DEPT. OF FORESTRY	STATE	SM
3. RADIO RIDGE			
01. ANTENNA SITES	WATSON	WATSON	SM
02. COUNTY PARK	SM	SM	SM
03. GUADALUPE CANYON PARKWAY	SM	SM	SM
04. TRANSMISSION & GAS LINE EASEMENTS	PG&E	PG&E	CPUC
4. SADDLE			
01. RESERVOIR HILL PROJECT	VA	PRESELEY, CA	DC/SM
02. BRISBANE SCHOOL SITE	B SCH DIST	DC	SM/DC
03. "47 UNITS"	VA	VA	SM/DC
04. STATE PARK	STATE	STATE/SM	SM
05. GUADALUPE CANYON PARKWAY	SM	SM	SM
06. RESERVOIR HILL WATER TANKS	DC	DC	DC

B	CITY OF BRISBANE	SSF	CITY OF SOUTH SAN FRANCISCO
CFHW	CADILLAC-FAIRVIEW HOMES WEST	SSF USD	S.S.F. UNIFIED SCHOOL DISTRICT
DC	CITY OF DALY CITY	VA	VISITACION ASSOCIATES
SM	COUNTY OF SAN MATEO		

TABLE VI - 2
ADMINISTRATIVE PARCEL - ACREAGE

	PRESENT	HCP			
	DIST	OS	CH	PERM	UNPLA	TOTAL
1. GUADALUPE HILLS						
01. RIO VERDE ESTATES		53	18	35		53
02. CARTER-MARTIN ROAD EXT.		8	4	4		8
03. RIO VERDE HEIGHTS		19	11	8		19
04. PARCEL X		28			28	28
05. PARCEL Y		11	4	7		11
06. PARCEL Z				11		11
07. NORTHEAST RIDGE PROJECT		230	138	92		230
08. GUADALUPE VALLEY WEST		49	49			49
09. STATE & COUNTY PARK		288	288			288
10. GUADALUPE CANYON PARKWAY	28	6	6			34
11. TRANSMISSION AND GAS LINES						40*
12. P G & E		34			34	34
13. WATER PIPELINES						9*
14. PARCEL W		14			14	14
15. WATER TANK, GVH	1					1
16. PARCEL V		3			3	3
TOTAL	29	743	521	146		783
2. SOUTHEAST RIDGE						
01. QUARRY	78	70	70			148
02. OWL & BUCKEYE CANYON		91	76	15		91
03. BRISBANE ACRES		154			154	154
04. SOUTH SLOPE PROJECT		337	211	126		337
05. COUNTY PARK		575	575			575
06. HILLSIDE SCHOOL	13					13
07. TRANSMISSION LINE						35*
08. JUNCUS RAVINE		162	162			162
09. WATER PIPELINES						12*
10. FIRE BREAKS						
TOTAL	91	1389	1094	141	154	1480
3. RADIO RIDGE						
01. ANTENNA SITES	6	16	15	1		22
02. COUNTY PARK		885	885			885
03. GUADALUPE CANYON PARKWAY	14					14
04. TRANSMISSION LINE						28*
TOTAL	20	901	900	1	0	921
4. SADDLE						
01. RESERVOIR HILL PROJECT		104	31	73		104
02. BRISBANE SCHOOL SITE		19			19	19
03. "47 UNITS"		9	2	7		9
04. STATE PARK		204	204			204
05. GUADALUPE CANYON PARKWAY	14					14
06. WATER TANKS, RESERVOIR HILL	3					3
TOTAL	17	336	237	80	19	353
GRAND TOTAL	185	3380	2752	368	260	3537

LEGEND
DIST: presently disturbed area
OS: existing open space area
CH: conserved habitat under HCP
PERM: permanently disturbed area under HCP
UNPLA: unplanned as of May 1982
* easement not added into totals

Enhancement during the first phase will be limited to the creation or extension of corridor areas by thinning existing patches of exotics, and stopping the spread of both brush and exotics by eliminating seedlings which are invading open areas. The second phase will concern the control of extensive colonies of exotics in other areas with lesser corridor value, and revegetation of areas where the exotics were eliminated. Long term enhancement goals include continued brush and exotic species management and introduction of host plants into new areas. All enhancement activities mentioned below will be done by the Plan Operator. Certain activities should take place as soon as possible in order to be effective in offsetting habitat loss due to development, therefore land owners should give the Plan Operator permission to perform the activities prior to formal granting of easement or dedication of their land: The phases are as follows:

Phase I -- 1983-1984
Phase II -- 1985-1986
Phase III -- 1987 on

Specific Enhancement Measures for Phase I:

a. Thin eucalyptus along Eucalyptus Road as indicated in Figure VI-2 in Management Unit 1-07-04 to open up a corridor into the Saddle Area and Guadalupe Valley West Administrative Parcel.
b. Thin eucalyptus along Guadalupe Canyon Parkway as indicated in Figure VI-2 within Management Units 1-09-01, 1-09-02, and 1-01-02 in order to facilitate movement between the Saddle, Guadalupe Hills and the Southeast Ridge Planning Areas.
c. Begin gorse eradication experiments as indicated in Figure VI-2 in Management Unit 1-09-01 to determine most effective method of elimination.
d. Check the growth of brush and exotics by eliminating seedlings in Management Units 1-07-04, 1-09-01, and 1-09-02.
e. Monitor these areas during the flight season of both butterflies to assess the success of the enhancement activities.

Specific Enhancement Measures for Phase II:

a. Continue thinning of eucalyptus as necessary to open up additional corridors in units 1-09-01 and 1-09-02.
b. Continue gorse eradication in unit 1-09-01.
c. Enhance suitable areas on which gorse had previously existed with host plant or other native species.
d. Begin brush thinning in units 1-09-02, 1-08-01, and 1-08-02.
e. Monitor these areas to determine success and future needs.

Specific Enhancement Measures for Phase III:

a. Allow eucalyptus not previously thinned to naturally senesce and die out where not desired; control seedling growth so the stands do not spread.
b. Where eucalyptus are desired (i.e., for park uses) and do not inhibit butterfly movement insure that they are being properly managed.
c. Continue brush control when and where necessary to facilitate butterfly movement.

d. Continue gorse eradication until it is totally eliminated from the planning area.
e. Continue enhancing areas previously containing gorse with host plant or other native species.
f. Continue to monitor all enhancement areas to determine future needs.

2. Southeast Ridge

The Southeast Ridge planning area extends from Bayshore Boulevard on the east to the transmission line west of the Quarry and from Hillside Boulevard on the south to the quarry road in Guadalupe Valley on the north. It constitutes the eastern half of the main ridge of the Mountain and includes such features as the Quarry, transmission lines, an antenna site and Hillside School (Figure VI-1). The area is characterized by steep slopes; the north-facing side is primarily brushland with patches of grassland and some woodland habitat, while the south-facing side is predominantly grassland.

The parcels which are currently proposed for development include the South Slope, County Park, and Quarry. Future development may be proposed for Owl and Buckeye Canyons and Brisbane Acres. The transmission line stands as a separate parcel and no changes are proposed within it at this point. The acreage of these parcels is listed in Table VI-5.

The majority of the San Bruno Mountain populations of the Mission Blue and Callippe Silverspot are found on the upper slopes of the Southeast Ridge. For this reason grading is an important concern; it should be minimized and be well monitored in order not to destroy habitat essential to the insects. Another important concern is the contiguity between this colony and the rest of the Mountain, including areas around the quarry and at the western end of Guadalupe Valley. A third concern is whether increased human activity in the area will increase the potential for accidental fires and vandalism and threaten the habitats of the butterflies and other species found there, including endemic plants.

The initial approach to the upper slopes of the Southeast Ridge Planning Area is to leave them untreated (see Glossary), with perhaps introduction of brush management at a later stage. The conservation of maximum open space within and between colonies will be one point of concern in the design of the habitat conservation approach. In development areas grading will be minimized, erosion prevention implemented, fire and vandalism control increased, and constructive landscaping encouraged (i.e. landscaping with host plants or fire retardant vegetation). These techniques are explained in the section of this plan entitled "Habitat Enhancement Techniques" (in Chapter III) and their applications for each management unit are described below.

Enhancement Overview for the Southeast Ridge Planning Area: The Southeast Ridge currently provides extensive areas of prime habitat for the butterflies of concern which will remain as open space within the County Park. Because development is proposed in low grade habitat areas only, no short term enhancement is necessary to improve the quality or extend areas of habitat.

Long term enhancement, however, may be necessary to control expansion of brush, exotics, and poison oak, especially on the north-facing slopes of the main ridge. The poison oak is particularly a problem in this planning area as it is difficult to eradicate except by fire, and in this area fire control

could be a problem because of the steep slopes and high fuel load. Long term goals of dealing with this problem should include research and experimentation into the most effective brush and poison oak control methods, and restoration of these areas afterwards. Rock spreading and seeding of host plants may provide long term habitat for the Mission Blue and for this reason may be a very effective restoration tool in this planning area.

Another long term problem within the Southeast Ridge Planning Area is invasion of annual grasses in areas where lupine and violet exists. These grasses eventually outcompete the lupine and overgrow the violet making them inaccessible to gravid females. Re-introduction of grazing in these areas could eliminate the problem as the grass would be closely cropped by the grazing animals. Most grazing animals do not eat larger lupines as they contain certain chemicals which make them unpalatable.

Specific Long Term Enhancement Measures:

a. Experiment with the most effective means to eradicate poison oak and brush in Management Units 2-05-01 and 2-03-02, then eliminate it in areas where it appears to be taking over valuable habitat.
b. Experiment with rock spreading and seeding of host plants in the areas in (a) above; if successful do it on a larger scale.
c. Experiment with the re-introduction of grazing in Management Units 2-05-01 and 2-04-02; if successful continue indefinitely.
d. Monitor all experimentation areas for success in expanding or maintaining butterfly habitat.

3. Radio Ridge

The western half of the main ridge of San Bruno Mountain constitutes the Radio Ridge Planning Area. Its boundaries are Hillside Boulevard on the south and west, Guadalupe Canyon Parkway on the north and west and both the Guadalupe Hills and Southeast Ridge planning areas on the east (Figure VI-1).

This planning area is almost entirely composed of County parklands and includes the peak of the Mountain, the radio towers, the nike base, and assorted transmission line corridors. The terrain is characterized by steep, brush covered slopes with large expanses of exotic species in some parts (e.g. the eucalyptus grove along Guadalupe Canyon Parkway). Patches of grassland are located throughout the planning area, but they are largely being outcompeted by encroaching brush and exotics.

Existing developments in the Radio Ridge planning area include the radio towers, the nike base (which is now used by the San Mateo Parks and Recreation Department), and new park trails. Recently a plan to construct receiver and transmitter/receiver sites has been proposed in the vicinity of the radio towers.

The Radio Ridge planning area contains habitat suitable to the Mission Blue, Callippe and San Bruno Elfin butterflies. Rare and endemic plants are also located in this brushland/grassland area. Therefore, the biological concerns with regard to Radio Ridge consist primarily of protecting this habitat from the encroachment of exotic plant species and damage resulting from human activity (i.e. vandalism, accidental fires, miscellaneous construction).

The habitat conservation approach to Radio Ridge is initially to leave the area untreated, and to monitor the expansion of exotics and human encroachment. After obtaining results in other areas on the Mountain, implementation of brush and exotic management may be appropriate, otherwise as little manipulation as possible is recommended.

Enhancement Overview for the Radio Ridge Planning Area: Enhancement of the Radio Ridge Planning Area will be attained primarily through the eradication or thinning of present exotics and the continued control of exotic invasion. Two major concerns at this time are the gorse which is starting to invade the roadcuts and the ridgetop, and the immense grove of eucalyptus at the entrance to the park (Management Unit 3-02-05).

As in the other Planning Areas, the enhancement process should occur in phases. The first phase (short term) will involve the initial eradication of gorse and eucalyptus seedlings while the second phase (long term) involves the continued control of exotic invasion and selective thinning of the eucalyptus grove for corridor enhancement. The long term may also include brush control if this action is warranted.

The first phase of enhancement activities for the Radio Ridge Planning Area should include the following:

a. The eradication of gorse seedlings. The key to handling the gorse problem is to take early control of it and prevent the loss of large areas of existing habitat due to the spread of this plant. Therefore, in this phase of enhancement the gorse seedlings must be eliminated.
b. Initiate a program to control the spread of the eucalyptus groves indicated in Figure VI-2 by removing the seedlings on the outer edge of each grove. This is particularly important for the grove at the entrance to the park because of its already large size and its vicinity to habitat and corridor areas.

The second phase, or long term, activities for this Planning Area should include:

a. Continued removal of invading seedlings of both the eucalyptus and gorse in order to control their spread.
b. Thinning of the eucalyptus grove, particularly the section of the grove which extends northeast around the bend of Guadalupe Canyon Parkway in order to open a corridor between the Saddle Planning Area and the rest of SBM.
c. Monitoring the spread of brush; if it appears that sensitive habitat areas or corridors are to be affected by encroaching brush, control of its spread should be implemented.

4. Saddle

The Saddle Planning Area consists of the western half of the open space to the north of Guadalupe Canyon Parkway. It shares its eastern boundary with the Guadalupe Hills planning area while on the west and north it is bordered by residential sections of Daly City (Figure VI-1). It includes the State parklands, Reservoir Hill, the Brisbane School Site and the parcel called "47 Units". Reservoir Hill is considered to be in the Saddle planning area

because it is a part of the land mass northwest of Guadalupe Canyon Parkway which was formerly contiguous with the County park lands, and because the two areas are so biologically similar.

The Saddle Planning Area is made up of rolling hills which are marked by ORV damage and sites of illegal dumping. The area is primarily a disturbed grassland with many introduced species, including gorse, eucalyptus and other evergreen trees. There are some spots, however, which are well populated with native bunchgrass.

Development proposed for the Saddle includes residential units on Reservoir Hill, the Brisbane School Site, "47 Units" and park facilities on park lands. Existing development includes two water tanks on Reservoir Hill, the roads which lead up to Reservoir Hill, and one delapidated road within the State Park.

The Mission Blue colony on Reservoir Hill is the only colony of endangered butterfly in the Saddle (it contains 2% of the entire population) an d may be extirpated by development. The remainder of this planning area does not provide much butterfly habitat for either Mission Blue or Callippe as it is primarily disturbed grassland and introduced woodland. Eradication or management of introduced species and re-introduction of the butterfly host plants are two of the biological tools proposed for this area, especially with regard to providing corridors of movement with other colonies so enhanced habitat in the Saddle Planning Area is open to colonization.

Since the Saddle contains such low grade butterfly habitat and is mostly disturbed, there exists the opportunity to try enhancement techniques and attempt to manipulate the environment to reclaim the unique ecology of the Mountain (i.e. chaining, burning, seeding, etc.). Therefore, the approach to the Saddle Planning Area is to proceed with proposed techniques of habitat enhancement in appropriate areas and accomplish some of the experimentation that is required.

Overview of Enhancement Activities for the Saddle Planning Area: Successful enhancement of the Saddle Planning Area hinges on the eradication of the exotics which have invaded the area. Two problem areas have been identified: the gorse on the main ridge of the park (Management Units 4-04-03 and 4-04-04) and the large grove of eucalyptus along Guadalupe Canyon Parkway (Unit 4-04-02). The evergreens which line the old road in the park are not marked for eradication because of their usefulness to the park; they may need to be thinned, however, and their spread into adjoining grassland should be controlled.

In order to lessen the burden of work demanded at one time and insure that particularly important areas receive thorough treatment, the enhancement measures should take place in phases. Phasing of eradication activities in some areas will also minimize the chances that erosion will occur. The first phase, to be achieved in the short term, will include the elimination of gorse and eucalyptus seedlings and the initiation of a complete eradication program to dispose of exotics in designated areas. The second phase involves more long term goals. Generally these goals are the completion of the above program by managing the spread of eucalyptus, and eliminating gorse to the extent that the native grassland is able to return and corridors between retained habitat areas are re-opened.

For the short term (phase one) the activities recommended for enhancement are as follows:

a. In Management Unit 4-04-02, an area not proposed for park development (e.g. trails), thinning of the large grove of eucalyptus trees indicated in Figure VI-2 should be started, with the first step being the elimination of seedlings on the periphery of the grove.
b. In Management Unit 4-04-03, the area which comprises the main hiking/bicycle trail network, as many of the gorse and eucalyptus seedlings as possible should be eliminated (See Figure VI-2).
c. In Management Unit 4-04-04, which is the area designated to contain the majority of the park facilities, the exotics (gorse especially) should be eradicated during construction activities (Figure VI-2). If the park facility is not going to be built for another year or two, this area could be used for immediate experimentation of eradication techniques. The eucalyptus seedlings along Guadalupe Canyon Parkway, across from the County Park and Guadalupe Valley West areas should also be thinned so that the area can eventually be opened up for corridor use.

Phase two will consist of the following activities which should help achieve the long term goals of exotic eradication. In all areas the long term goal is to not only remove the exotics but also to control re-infestation by continually eliminating the invading plants.

a. The grove of trees in Management Unit 4-04-02 should eventually be thinned to the extent that it can be utilized as a corridor. It may be easiest to start a specific corridor area along the grove where it meets Crocker Avenue. If feasible, enhancement of the corridor with host plants may be one of the future activities.
b. Once an efficient method of gorse eradication is established the large patches of gorse in Management Unit 4-04-03 should be eliminated and reclaimed as butterfly habitat. This area could provide the sites needed for reclamation experimentation.
c. Once the gorse has been eradicated from Management Unit 4-04-04, host plants and native species should be re-introduced into the area, especially on sites denuded by removal of the exotics or grading. The grove of eucalyptus immediately adjacent to Guadalupe Canyon Parkway in this Unit should also be thinned to widen the area available as a corridor which will continue across Guadalupe Canyon Parkway into the County Park and Guadalupe Valley West Administrative Parcels.

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REFERENCES

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PERSONS AND ORGANIZATIONS CONSULTED

A World Seed Service, Redwood City, California
Association of Bay Area Governments, Berkeley, California Steve Goldman
California native Plant Society, San Francisco Bay Chapter, San Francisco, California Phoebe Watts, plant sale coordinator
Chevron Chemical Company, Ortho Division, Richmond, San Francisco and Fresno California
City of Daly City Department of Community Development, Daly City, California Steve Noack, Assistant Planner
Clyde Robin Seed Company, Incorporated, Castro Valley, California
County of San Mateo Department of Public Works, Redwood City, California Bob Sands, Assistant Director Frank Stagner, Assistant Civil Engineer Beauford Willis, Equipment Supervisor
East Bay Regional Botanic Garden, Berkeley, California Wayne Roderick, Director
Environmental Seed Producers, Incorporated, El Monte, California
Ironside and Associates, Meg Monroe
Martin-Carpenter Associates, Oakland, California Malcom C. Carpenter
Pacific Gas and Electric Company, Daly City, California James A. Wyatt, Industrial Power Engineer
Papenfuss, Ted, Ph.D., U.C. Berkeley, Research Herpetologist
Pecoff Brothers Nusery and Seed, Incorporated, Escondido, California
Redwood City Seed Company, Redwood City, California Craig Dreman
Royston, Hanamoto, Alley and Abey, Mill Valley, California Kem Shackelford
San Joaquin County Department of Agriculture (Agricultural Commissioner), Tracy, California Dan Giesling, Senior Agricultural Inspector
San Mateo County Department of Environmental Planning, Redwood City, California William Rosar, Planner
San Mateo County Sheriff's Department, Redwood City, California Sergeant Dennis Bentley
San Mateo County Department of Environmental Management, Parks and Recreation Division, Redwood City, California Ron Weaver, Ranger IV Bob Emert, Head Ranger Harry Dean, Jr., Landscape Architect
Santa Barbara Botanic Garden, Santa Barbara, California Dara Emery
Stanislaus County Department of Agriculture, Modesto, California Keith Mahan, Assistant Agricultural Commissioner
Target Chemical Company, San Jose, California
Theodore Payne Foundation, Sun Valley, California Mira Lighthart
United States Department of Agriculture Soil Conservation Service, Lockeford, California
United States Department of Agriculture Soil Consevation Service, Half Moon Bay, California Jim Kashiwagi
University of California Department of Agronomy and Range Science, Davis, California Burgess L. Kay, Wildlands Seeding Specialist
University of California Department of Botany, Davis, California Steven Radosevich, Ph.D.
Woolworth's Lawn and Garden Center, Palo Alto, California
Yerba Buena Nursery, Woodside, California Judith Lowry