State of California
The Resources Agency
Department of Fish and Game

FINAL DRAFT BONNY DOON ECOLOGICAL RESERVE MANAGEMENT PLAN

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BONNY DOON ECOLOGICAL RESERVE MANAGEMENT PLAN

Prepared by: Jeannine M. DeWald
Department of Fish and Game
20 Lower Ragsdale
Monterey, CA 93940
(831) 649-2934

Regional Contact: Christina Fabula
Department of Fish and Game
P.O. Box 47
Yountville, CA 94599
(707) 944-5538

Approved by:

Robert Floerke Date	Sonke Mastrup Date
Regional Manager	Deputy Director

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I. INTRODUCTION

A. Purpose of Acquisition

The Bonny Doon Ecological Reserve (BDER) contains the largest and most pristine remaining occurrences of several rare plant communities which are limited to ancient marine sand deposits in Santa Cruz County. These communities contain three plant species which are considered to be rare or endangered: Santa Cruz cypress (*Cupressus abramsiana*) and Santa Cruz wallflower (*Erysimum teretifolium*), both listed as Federal and State endangered at the time of acquisition; and Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*), which has subsequently been listed as Federal endangered.

The distribution of these communities has been further reduced and fragmented by urban development and sand mining. The BDER acquisition represented a unique opportunity to preserve a comparatively large area of rare habitat in nearly pristine condition.

B. Acquisition History

The majority of the BDER property is part of a 525-acre parcel which was owned by Teachers Management and Investment Corporation (TMI) as an investment. During TMI's ownership of the property, a number of development proposals were put forward, and one developer had an option to buy the property and had obtained county approval for a 300-acre vineyard on the site. The site was listed as a Significant Natural Area in 1988. Early in 1989, The Nature Conservancy (TNC) negotiated the purchase of the property from TMI. In May of 1989, the Wildlife Conservation Board (WCB) approved the purchase of 505 acres of the property from TNC. An additional 10 acres were conveyed to the State by TNC in February of 1990. (The remaining 10 acres, containing several houses, were sold to a private individual).

An additional 37 acres adjacent to BDER was left to TNC as a bequest by Mrs. Ella Alluisi, an early supporter of the establishment of the Reserve. TNC’s donation of this property to DFG for inclusion in the Reserve was approved in March 1998, bringing the total size of BDER to 552 acres.

C. Purpose of This Management Plan

This plan is intended to serve the following purposes:

- To guide management of habitats, species, and programs described herein to achieve the Department's mission to protect and enhance fish, wildlife, and native plant values.

- To serve as a descriptive inventory of fish, wildlife and native plant habitats which occur on or use this property, and outline appropriate public uses of these resources.

- To provide an overview of the area's operation and maintenance, and personnel requirements to implement management goals and objectives. It serves as a budget planning aid for annual budget preparation.

Figure 1. Location of Bonny Doon Ecological Reserve

- To provide a description of potential and actual environmental impacts and subsequent mitigation which may occur during management, and contains environmental documentation to comply with state and federal statutes and regulations.

Development of the management plan requires consideration of the long-range goals which the Department hopes to achieve through its management of the property. Goals and objectives for specific elements within the plan are intended to contribute toward these broad-scale goals. The overall management goals for BDER are:

- To protect and enhance the rare plant species and communities present on BDER;
- To promote public use consistent with resource protection, including education;
- To increase our knowledge of the resources by fostering scientific research.

II. PROPERTY DESCRIPTION

A. Geographical Setting

BDER is located on Ben Lomond Mountain in Santa Cruz County, approximately three miles northeast of Davenport and eight miles northwest of Santa Cruz (Figure 1). The site is accessed via Martin Road. The bulk of the property is on the Davenport quadrangle; a small portion on the eastern edge of the reserve is on the Felton quadrangle (USGS 7.5 minute series). BDER occupies portions of Sections 13 and 24, T.10S., R.3W., and Section 19, T.10S., R.2W. (Mt. Diablo Meridian).

B. Property Boundaries and Adjacent Lands

The BDER boundaries are somewhat complex (Figure 2); while all boundaries have been surveyed, they are not all marked and those boundaries which are not aligned with public roads are difficult to locate in the field. The legal description of the property (Appendix 1) describes the boundaries as surveyed for county records. BDER is surrounded by private lands; these are primarily residential, but commercial timber harvest is carried out on some nearby parcels.

C. Geology, Soils, Climate, Hydrology

The property slopes moderately from northwest to southwest, with steep sandstone outcroppings in the northwest and northeast portions. Elevations range from 1200 to 1890 feet mean sea level (MSL). The site is underlain primarily by quartz diorite (intrusive igneous granite rock) in contact with schist (metasedimentary rock) materials in the northeast, east, and south sections (Brabb 1970). Santa Margarita sandstone overlies these bedrock materials as a sedimentary capping layer in the northeast, northwest, and central portions of the site above 1500-foot elevation.

The USDA soil survey for Santa Cruz County (Figure 3) characterizes the soil series on site as: Lompico-Felton complex, 5-50% slopes, in the south and east portions of the property; Ben Lomond-Catelli-Sur complex, 30-75% slopes, in the Laguna Creek drainage, Maymen Variant sandy loam, 5-30% slopes, on outcroppings in the northwest corner of the property; Xerorthents-Rock

outcrops in the northern portions; and Zayante coarse sand, 5-30% slopes, overlaying the Santa Margarita

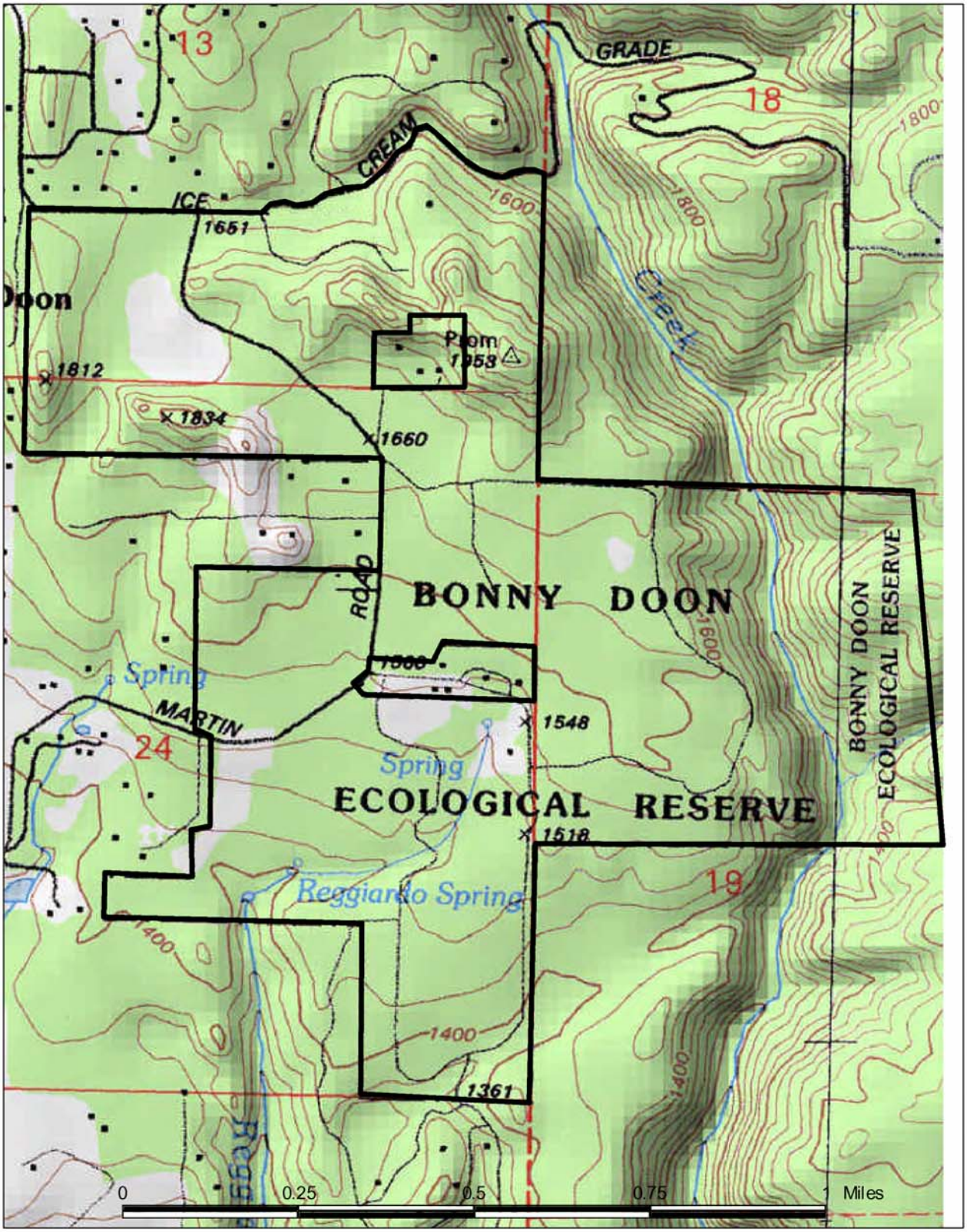


Figure 2. Boundaries of Bonny Doon Ecological Reseerve

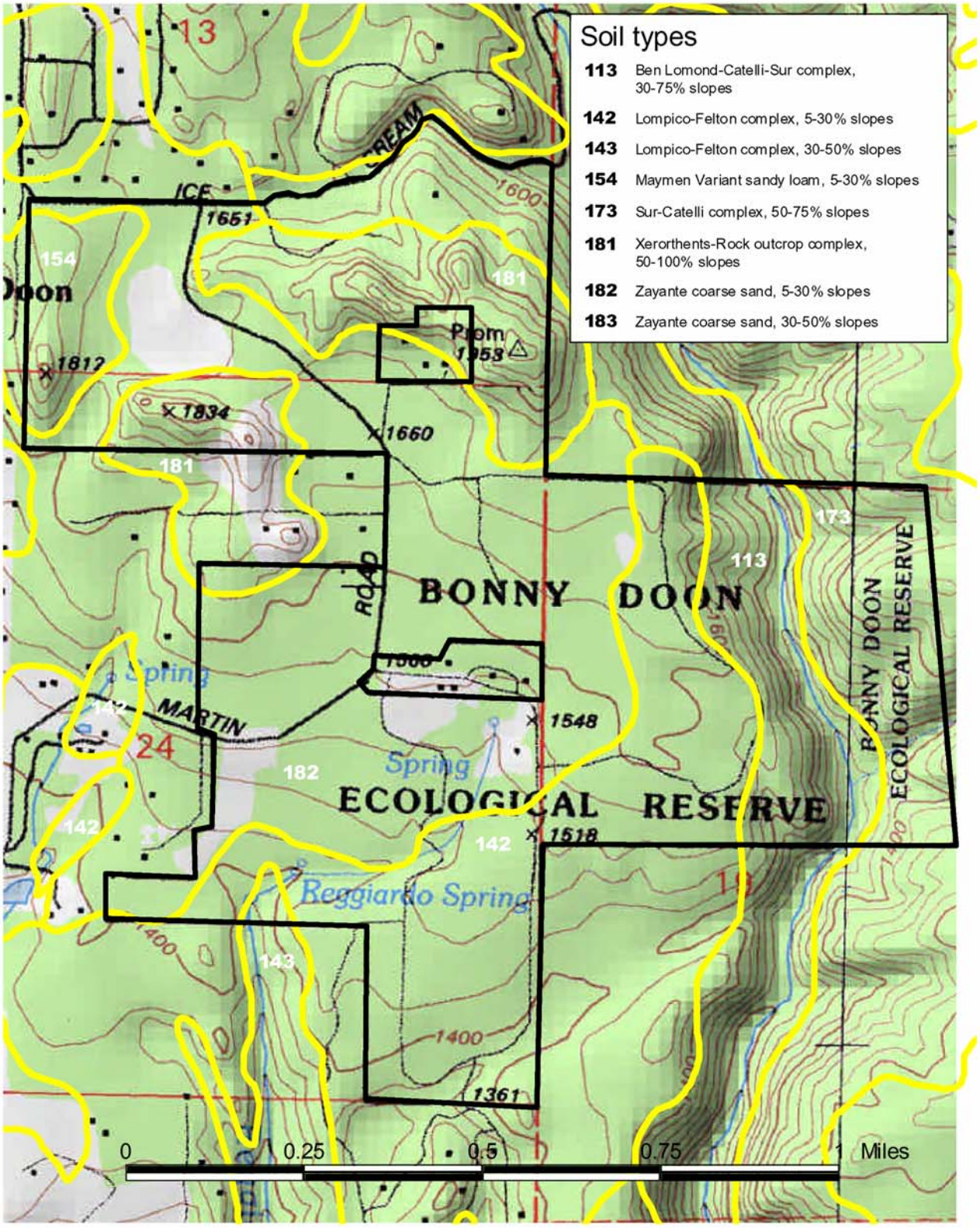


Figure 3. Soil complexes of the Bonny Doon area

sandstone in the north and central portions of the site. Soil depths and fertility vary considerably between locations and soil types. Santa Margarita sandstone-derived soils are shallow, poorly developed, and low in organic content and major nutrients (Bowman and Estrada 1980). When disturbed or subjected to concentrated runoff, the Zayante soils are highly erosive, sometimes forming significant gully systems after a single intense storm (U.S. Soil Conservation Service, n.d.)

The site features a Mediterranean-type climate with cool, wet winters and warm, dry summers. Most precipitation in the area is in the form of rainfall. Annual rainfall averages approximately 47 inches according to data recorded by the National Oceanic and Atmospheric Administration (NOAA). Precipitation is rather variable, particularly during the late fall-early spring period when most rain falls. Temperatures are mild and seasonal variation is moderate, with average temperatures ranging from approximately 49° F in January to approximately 68° F in August. The area is sufficiently high in elevation to escape most of the coastal fog.

Hydrologically, the eastern portion of the site drains into Laguna Creek; a half-mile reach of this creek lies within the property. The southwest portion of the site drains into Reggiardo Creek, which originates from a spring on the property. The northwestern corner of BDER appears to drain off the property into Mill Creek and one of its tributaries.

D. Cultural Features

1. Archaeology

Before settlement by the Spanish, Santa Cruz County was inhabited by the Ohlone (also known as Costanoan) people, a group of linguistically related tribes. It is of interest to note that the Ohlone were known for their practice of burning brush. After the founding of Mission la Exaltacion de la Santa Cruz in 1791, the Ohlone were brought in to the mission to be Christianized. Exposure to European diseases and stress due to cultural disorientation devastated the Ohlone population; by 1832, the Indians had been reduced to 20% of their pre-mission numbers (Dillon 1992).

No archaeological surveys have been done at BDER to date. However, two sites located within one-half mile of the reserve have been intensively studied and provide information on Ohlone use of the area (Hylkema 1991). Both sites appear to have been used as residential bases for foraging activities; this is inferred from the abundance and diversity of artifacts found, and the presence of a human burial. It appears that large quantities of shellfish were collected and brought back to the residential bases for cooking. Tools for milling acorns and hard seeds were also found.

Faunal remains indicate that hunting activities were predominantly focused on deer (over 70% of the remains on one site). Older levels contain a higher proportion of shellfish remains and a lower percent of deer remains, possibly indicating a shift in foraging activities and diet over time. The Bonny Doon area appears to have been occupied by the Ohlone at varying times from about 2,730-500 years before present, with use declining later in this range.

2. Historic land use

The BDER property has repeatedly been subject to development pressure. In 1877, the central part of BDER was bought by Louis Martin, who planted a 50-acre vineyard and a small orchard. The late 1800s saw the establishment of a number of vineyards and wineries in the Santa Cruz Mountains; the quality of grapes from this area was highly touted. An outbreak of phylloxera in 1906 impacted a number of vineyards; it is unknown whether the Martin property was affected. Martin sold the property to a Mr.

Burk in 1908. Winemaking was stopped by Prohibition in the 1920s. Frank Hellenthal, Sr. purchased 325 acres in 1933 and made an unsuccessful attempt to grow Christmas trees. Hellenthal expanded the property in the late 1950s and 1960s through purchase of adjacent properties, creating the 525-acre block which was eventually bought by TNC. Hellenthal planned to build a golf course and homes; this plan was never approved. The property was sold to a Fresno partnership, who in turn sold it in 1971 to TMI (Marilyn Hummel, neighbor; personal communication, November 14, 1992).

In 1977, the California Coastal Commission designated a Forestry Special Treatment Area including most of BDER. This designation was based on the high scenic value of the area and its significant habitat values. Despite this, plans for development of the property continued. James Beauregard acquired an option on the property in 1979, and proposed clearing 300 acres to develop a vineyard. Although the county approved this proposal, it was never implemented. By 1989, the property had been divided into 11 parcels and was being actively marketed by TMI, prompting the WCB purchase of the land.

As a scenic and largely unsupervised block of land, the BDER site has been subject to a great deal of less formal land use. Sandstone outcroppings on the property were reportedly used as a silent movie location early in the century (Hummel, op. cit.). More recently, the area has been used by local residents and others for hiking, equestrian activity, nature study and photography. Unfortunately, it has also been abused by off-road vehicle use, dumping of cars and rubbish, and carving of graffiti in the sandstone. The large sandstone outcrops in the northern part of BDER, known as “The Moon Rocks”, have been commonly used for nighttime parties and bonfires for decades, especially during full moons and other celestial events.

3. Existing structures

There are no remaining structures on BDER.

III. HABITAT AND SPECIES DESCRIPTION

A. Vegetation Communities, Habitats and Plant Species

The diversity of soil types and topography at BDER give rise to a variety of plant communities. Using the WHR classification system, the following communities are found at BDER (Figure 4).

- **Ponderosa Pine**. This includes the NDDB category of Maritime Coast Range Ponderosa Pine Forest. The ponderosa pine community at BDER is restricted to Zayante coarse sands on south and west-facing slopes of less than 15% (Davilla 1980), and covers approximately 83 acres. Associated species include Douglas fir, coast and canyon oak, madrone, tanoak, yerba santa, poison oak, manzanita, and ceanothus. The ponderosa pine community in Santa Cruz County forms a disjunct distribution; the nearest ponderosa pines are 30 miles away in the Mount Hamilton area. The Santa Cruz populations were at one time considered to be a different species (*Pinus benthamiana*), and may be sufficiently distinct to warrant subspecific status (McCully 1984); such reclassification would make this taxon a rarer entity. Ground fires are considered beneficial in maintaining ponderosa pine stands; however, crown fires favor conversion to montane chaparral (Mayer and Laudenslayer 1988).

The Ponderosa pine forest habitat type in the Santa Cruz Mountains is qualitatively and floristically different from occurrences elsewhere in California. Ponderosa pine forest on the Zayante sands forms a unique community known as sand parklands. This community is characterized by open stands of scattered

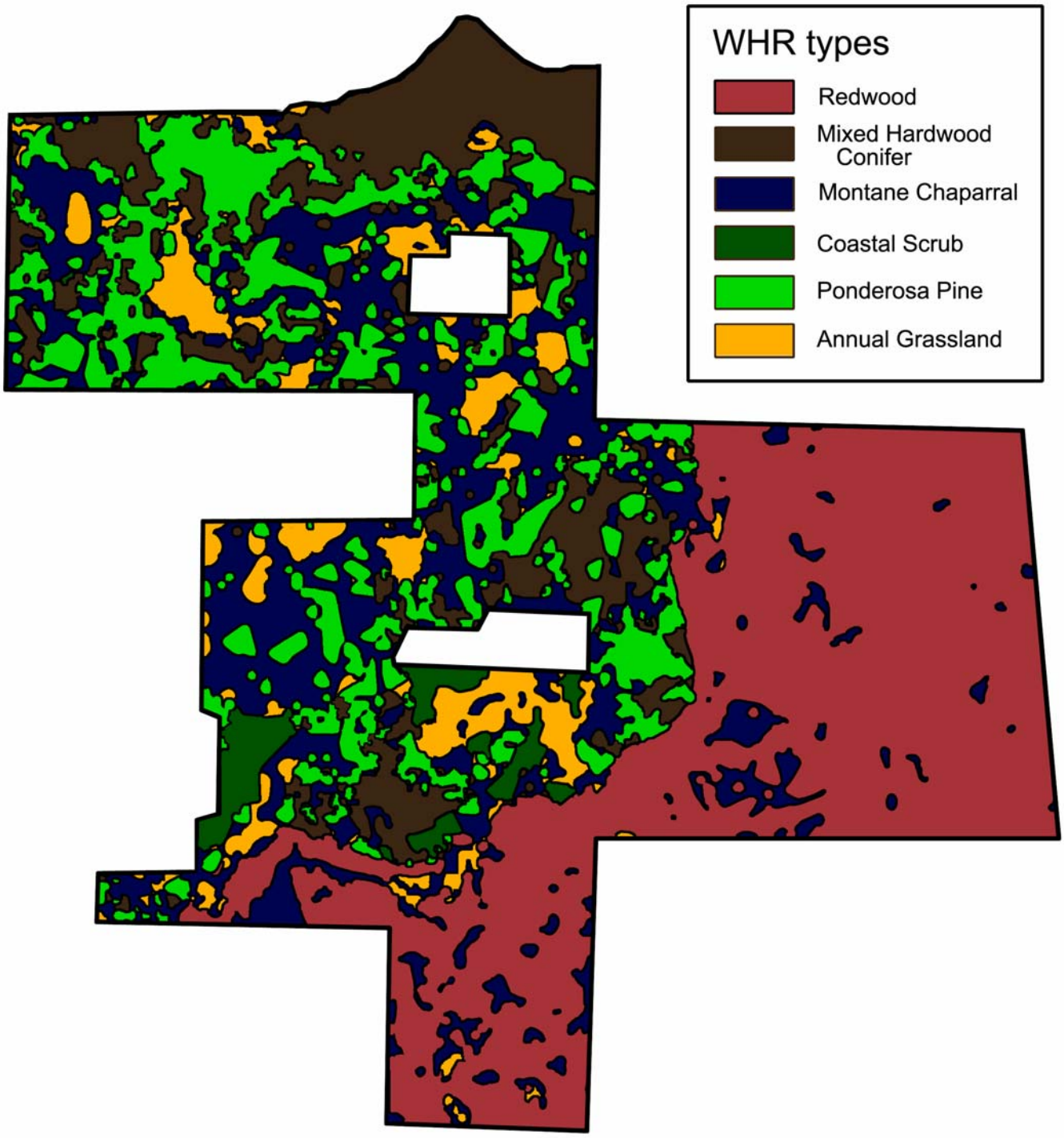


Figure 4. Generalized WHR habitat types at BDER

trees with comparatively little shrub understory, and an herbaceous component featuring several endemic species. The listed wildflower species present at BDER (Santa Cruz wallflower and Ben Lomond spineflower) are found only in this sand parklands community. The sand parklands community is unique to Santa Cruz County.

- **Redwood**. Redwood habitat occurs along the Laguna and Reggiardo Creek drainages and is a significant component of the plant cover, occupying about 167 acres. Davilla described the redwoods at BDER as second growth, and the absence of larger size classes supports this description. The redwoods form a closed canopy, densely shaded environment. Common associates include tanoak, Douglas fir, madrone, California bay, huckleberry, salal, and several fern species. Redwood regenerates relatively quickly after disturbance, but does not depend on disturbance to maintain the habitat.

- **Closed-cone Pine Cypress**. This includes the NDDB category of Northern Interior Cypress Forest. The closed-cone community at BDER is dominated by Santa Cruz cypress and knobcone pine. These species occur primarily on sandy soils west of Martin Road; there are a few stands of knobcone pine on Lompico-Felton soils in the southeastern portion of the reserve. Bonny Doon manzanita, ceanothus, and chamise are associated with the closed cone community. The Santa Cruz cypress stands west of Martin Road consist primarily of large older trees and include numerous fallen dead trees; a recent field visit indicated that seedlings and young trees comprised less than 10% of the community. The closed-cone conifers are dependent on fire to release their seeds from the serotinous cones; exclusion of fire from the community is probably responsible for the low recruitment rate.

- **Mixed Hardwood Conifer**. Dominant species in this community include Douglas fir, tanoak, and madrone. Associated species include canyon and live oak, bigleaf maple, chinquapin, poison oak, huckleberry, and California coffeeberry. Mixed hardwood conifer habitat comprises about 80acres, and is found on the north-facing slopes of the Reserve's sandstone outcrops, and in the transitional zone between redwood habitat and the sandy soils in the central Reserve. Mixed hardwood conifer is generally considered a climax community; regeneration after disturbance is rapid.

- **Montane Chaparral**. This includes the NDDB category of Northern Maritime Chaparral. The chaparral associated with Zayante coarse sands in the central part of the reserve is dominated by Bonny Doon manzanita, which forms nearly pure stands in some areas. Associated plant species in these areas are primarily herbaceous, including yerba santa, sticky monkey flower, Blake's happlopappus, and bush lupine. Santa Cruz wallflower also occurs in discrete patches within this community. Chaparral on Lompico-Felton soils in the southeastern portion of the reserve differs in species composition. The dominant species on these soils are brittle-leaved manzanita, warty-leaved ceanothus, and California coffeeberry; associated species include yerba santa and coyotebush. The Lompico-Felton-based chaparral is tall and dense, and appears to be senescent. This is a logical result of the exclusion of fire from the property. There are approximately 162 acres of chaparral at the Reserve.

- **Coastal Scrub**. A small amount of coastal scrub (13 acres) persists in openings in the Ponderosa pine community on sandy soils. This community is highly variable across its range; at BDER coyotebush, monkeyflower, lupines, and bracken fern are prominent species. Santa Cruz wallflower also occurs in discrete patches within this community.

- **Annual Grassland**. This habitat type mainly occurs just south of the inholding east of Martin Road and probably is the result of past land clearing activities. Less than 10% of the Reserve (46 acres) is in annual grassland. A variety of shrub species, both native and exotic, are invading the grassland and will

result in conversion to chaparral over time unless prevented by management activities. Exotic species in this area are eucalyptus, acacia, and French broom.

Over 260 species of vascular plants are known to occur at BDER. This is based on information from Neal Kramer's 1996 field work, Davilla's 1980 report, and a master's thesis written by Marangio (1985). A list of known species is given in Appendix 2. Management activities at the reserve will focus on protecting and enhancing populations of the Federal and State listed species: Santa Cruz cypress, Santa Cruz wallflower, and Ben Lomond spineflower.

B. Animal Species

Very little recent field data exists on the wildlife community at BDER. For the purposes of this management plan, existing sources were supplemented by consulting the Natural Diversity Data Base and Wildlife Habitat Relationships system. The resulting lists of species are provided in Appendix 3, with species occurrence classified as known, probable, or potential. According to available sources, BDER is potentially occupied by the following:

- 11 amphibian species
- 14 reptile species
- 94 bird species
- 42 mammal species

Little information exists on fish (although steelhead are known to inhabit Laguna Creek), and almost no information on invertebrates.

In general, the wildlife community at BDER reflects the diversity of the habitat, with species characteristic of both wetter forested habitats and the more xeric chaparral. The riparian zones and redwood forests in the southern part of the reserve provide suitable habitat for the moisture-dependent amphibians and species such as the rubber boa which utilize rotting logs and debris for shelter. The wooded areas also provide roosting and nesting areas suitable for a number of bird and bat species, as well as cover for blacktailed deer. Dryer and more open areas provide habitat for species which are less dependent on water supply. Deer and the larger predators such as mountain lion, bobcat, coyote, and gray fox would use the entire reserve.

The wildlife species known or likely to occur at BDER are predominantly common and widespread. Management will therefore focus on the plant communities, and on preserving viable and diverse habitat.

C. Threatened, Rare or Endangered Species

Three plant and two animal species at BDER are listed by the State or Federal governments. (The Bonny Doon manzanita was formerly a Federal candidate species, but was removed from candidacy in the U.S. Fish and Wildlife Service's restructuring of the candidate list.) The listed species are:

- Santa Cruz cypress (*Cupressus abramsiana*)
  Federal and State endangered

- Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*)

Federal endangered

- Santa Cruz wallflower (*Erysimum teretifolium*)
  Federal and State endangered
- Steelhead trout (*Oncorhynchus mykiss*)
  Federal threatened
- California red-legged frog (*Rana aurora draytonii*)
  Federal threatened

The U.S. Fish and Wildlife Service have been contacted regarding their concerns relative to the Federal listed and candidate species (Appendix 4). The California Endangered Species Act requires Department employees to confer on any Department project which may affect a State-listed species. A document entitled "Information on the Effects of Implementation of the Management Plan on Special Status Species" has been prepared to address management concerns regarding the Santa Cruz cypress and Santa Cruz wallflower (Appendix 5).

The California redlegged frog, recently listed as threatened by the Federal government, may occur on the Reserve. BDER contains no other wildlife species listed as threatened or endangered at present either by the State of California or the Federal government. The sharpshinned hawk, a Species of Special Concern, is known to occur at BDER. Nine other Species of Special Concern may occur, including foothill yellowlegged frog, southwestern pond turtle, California horned lizard, Cooper's hawk, golden eagle, merlin, longeared owl, purple martin, and badger.

BDER may contain suitable habitat for two invertebrate species which are endemic to the sand parklands. The U.S. Fish and Wildlife Service have listed both species as endangered (see letter, Appendix 4). These species are the Mt. Hermon june beetle (*Polyphylla barbata*) and the Zayante band-winged grasshopper (*Trimerotropis infantilis*). According to the U.S. Fish and Wildlife Service, neither the june beetle nor the grasshopper occurs at BDER (FWS 1998). A proposal to list a third species, the Santa Cruz rain beetle (*Pleocoma conjugens conjugens*), was withdrawn because additional information indicated that the species is more widespread than previously known.

Two other species which are not officially considered sensitive are nonetheless of biological interest. The Santa Cruz kangaroo rat was formerly present at BDER, but recent field studies found it only at one site, not on the Reserve. Predation by domestic cats has been blamed for its extirpation. The subspecies is considered locally unique by the Santa Cruz County Planning Department. Another unlisted BDER species of interest is the Kincaid's colletid bee, an extremely primitive solitary bee. The Kincaid's bee forms nesting colonies in rock outcroppings. The Moon Rocks at BDER are the only known permanent nesting site for this species (Moldenke 1980). Kincaid's colletid bee is not considered to qualify for any official listing status.

IV. MANAGEMENT GOALS AND ENVIRONMENTAL IMPACTS

A. Definition of Terms Used in This Plan

1. Element: An element refers to any biological, public use, or facility maintenance program as defined below for which goals and objectives have been prepared and presented within this plan.

2. Biological element: These elements consist of species, habitats, or communities for which specific management goals and objectives have been developed within the plan.

3. Public use elements: Public use elements are any recreational, scientific, or other uses appropriate to and compatible with the purposes for which this property was acquired.

4. Facility maintenance element: This is a general purpose element describing the maintenance and administrative program which must be implemented in order to maintain orderly and beneficial management of the area.

5. Biological goal: A biological goal is the statement of intended long-range results of management based upon the feasibility of maintaining, enhancing or restoring species populations and/or habitat.

6. Public use goal: A public use goal is the statement of the desired type and level of public use compatible with the biological element goals previously specified within the plan.

7. Objective: Objectives are statements of the intended results of management actions which promote the biological, public use, or operations/maintenance goals on the property.

8. Tasks: Tasks are the individual projects or work elements which implement the objective and can be useful as an aid in budget planning for the property.

B. Biological Elements: Goals, Objectives and Environmental Impacts

Distribution of biological elements discussed below is shown on Figure 5. In many cases, plant communities and plant and wildlife species share common features which make it appropriate to group them for planning purposes. This allows a more unified approach to management and reduces redundancy.

Some elements present at BDER, such as aquatic habitats, mixed hardwoods, and redwood, have not been included in the focused discussion below. This is not meant to imply that these elements will be ignored, but rather that no specific management needs have been identified for these elements at this time, and that the overall goal of protecting and maintaining habitat quality will apply. If specific needs are found, the management plan will be modified to address them.

- **Element: Listed Plant Species**

  Santa Cruz wallflower and Ben Lomond spineflower are both early-successional species requiring an open habitat with low vegetative cover for survival. Suppression of fire since European colonization of the Santa Cruz Mountains is considered by the U. S. Fish and Wildlife Service (FWS) to be a significant factor in the declines of both species (U. S. Fish and Wildlife Service 1997). Fire suppression impacts these species in two ways; woody species become more abundant and directly shade out the wallflower and spineflower, and increased amounts of dead plant material on the ground (duff) cause any fires which do occur to be more destructive. Competition from non-native annual grasses is also considered a threat to the spineflower.

  Goal: Enhance wallflower and spineflower populations.

  Objective: Improve and maintain habitat.

  - Task: Reduce woody species and duff in habitat areas through controlled burning or other appropriate method.

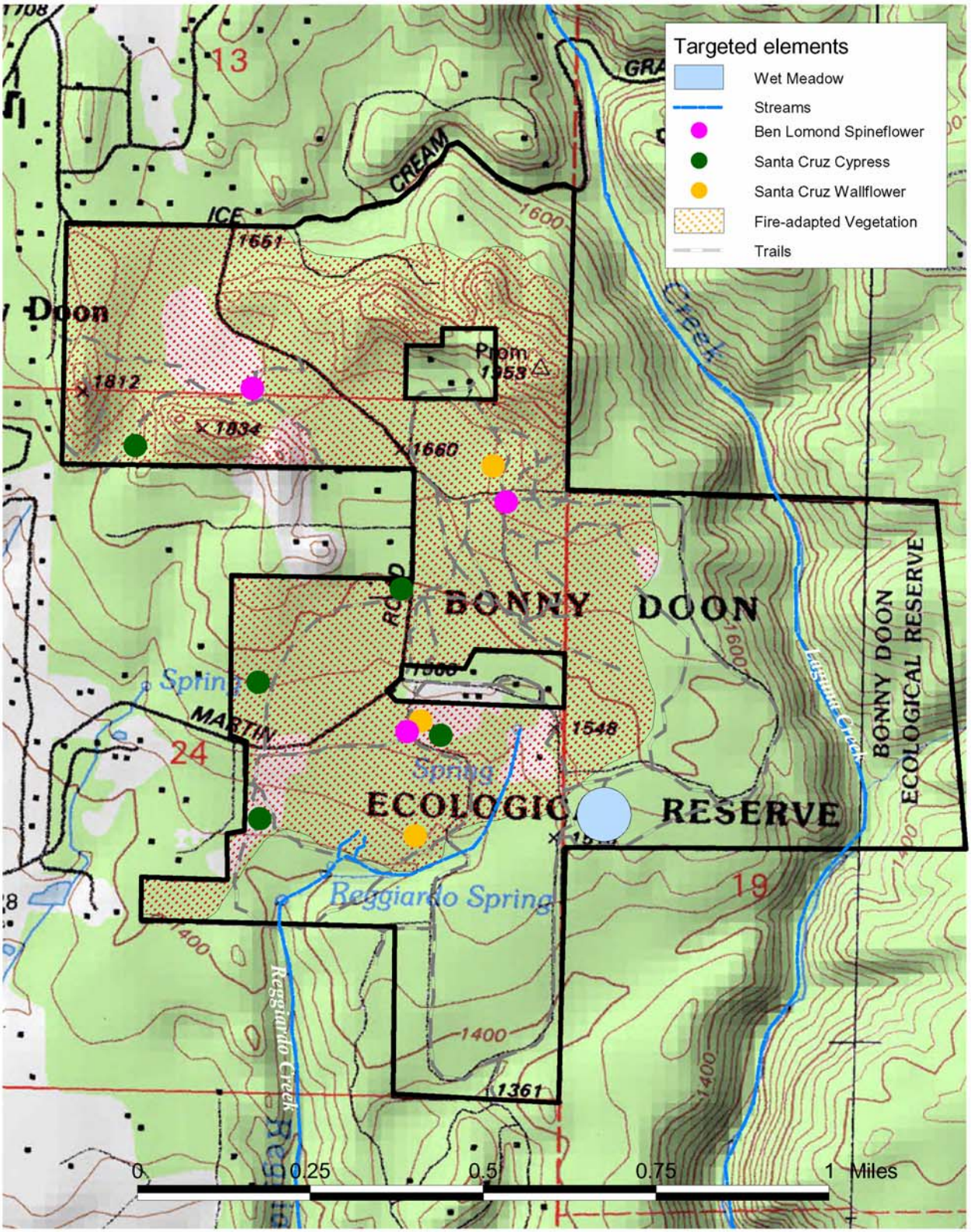


Figure 5. Location of targeted biological elements

- Task: Remove non-native species to eliminate competition.

- Task: Monitor trail condition and reduce erosion.

- Task: Monitor extent, density, and demographics of populations to determine success.

Without active management, populations of these species at BDER will continue to decline. The listed tasks, which follow FWS's recommendations, will need to be done on an ongoing basis to avoid this.

The **Santa Cruz cypress** population at BDER is part of the Bonny Doon population, which is the type locality and the largest known population (U.S. Fish and Wildlife Service 1996). The majority of the cypress on site occur west of Martin Road, but individuals and small groups are scattered throughout BDER. Disease and genetic contamination from introduced Monterey cypress, and reduced seedling survival resulting from competition with French broom are considered threats to the species. While the cypress is considered fire-adapted, the importance of fire in maintaining its viability is not known. Mechanical disturbance appears to be effective in promoting germination and seedling establishment. FWS's recommended conservation actions for protected cypress stands focus on research to better understand the demographics and management requirements of this species.

Goal: Maintain long-term viability of the BDER cypress stand.

Objective: Enhance seedling establishment.

- Task: Remove French broom and other shrubby exotics from cypress habitat.

- Task: Control duff layer through appropriate use of fire or mechanical means.

Objective: Reduce threat of disease and genetic contamination.

- Task: Monitor condition of stand in coordination with knowledgeable individuals or agency personnel.

- Task: Determine whether Monterey cypress are present adjacent to BDER, and if necessary encourage private landowners to remove them.

- **Element: California Red-legged Frog**

According to David Pereksta (FWS), the red-legged frog may occasionally be present on the reserve near the headwaters of Reggiardo Creek. This species would be adversely affected by degradation of the creek and predation by domestic pets. The probability of finding the frog on site at any given time is considered too low to warrant specific surveys, although any future survey workers in Reggiardo Creek should be aware of their potential occurrence. DFG will work on the assumption that the frog may use the area, and suitable habitat should be maintained. The tasks below will protect the suitability of Reggiardo Creek.

Goal: Maintain the suitability of Reggiardo Creek for red-legged frog.

Objective: Avoid potential impacts of trail use.

- Task: Reroute loop trail to avoid crossing Reggiardo Creek and exclude horses.
- Task: Inform visitors of leash-law requirements.
- Task: Monitor bank stability and water quality in Reggiardo Creek and implement more restrictive measures if needed.

- **Element: Fire-adapted Plant Communities (Ponderosa Pine, Closed-cone Pine Cypress, Mixed Chaparral)**

The dominant shrub and tree species of these communities rely on fire to foster reproduction by release of seeds from serotinous cones or by enabling seeds to germinate, and to reduce invasion by non-fire-adapted species. In the absence of fire, stand vigor and population levels decline as recruitment fails and older individuals senesce and die. Many of these species produce high levels of flammable resins. As the stand ages, fuel loads and risk of wildfires destructive to both habitat and property increase. Many of the characteristic herbaceous species in these communities require areas of low shrub cover, and benefit from the reduction in canopy that follows fire. This includes both the Santa Cruz wallflower and Ben Lomond spineflower. While germination of fire-adapted species can be promoted by other methods (for instance, mechanical abrasion), these methods cannot duplicate the full ecological effects of fire. It is therefore considered desirable to reintroduce fire into the BDER ecosystem if this can be done safely and effectively.

The presence of homes adjacent to BDER and within inholdings increases both the importance and the difficulty of planning fuel management. An uncontrolled fire in the area could result in tremendous property damage. The California Department of Forestry and Fire Protection (CDF) is working with DFG staff and local experts to develop a Fuels Management Plan. A variety of fuel reduction methods are available, including mechanical treatments and chemical treatments as well as prescribed fire. Funding for plan development and several years of treatment has been secured through the ***

Goal: Maintain and enhance populations of sensitive species and associated communities while protecting public safety.

Objective: Develop mosaic of different-aged chaparral stands to reduce fire risk and maintain biological diversity.

Objective: Reduce fuel loads and protect adjacent properties from wildfire.

Objective: Develop vegetation management program to accomplish above goals.

- Task: Determine relationships of sensitive species with fire (fire return interval, reproduction, appropriate burn windows, other fire parameters).
- Task: Work with Department of Forestry to develop Vegetation Management Program.

Objective: Develop GIS database for BDER to assist in tracking populations and management actions over time.

- Task: Map populations of Santa Cruz cypress, Santa Cruz wallflower, and Ben Lomond spineflower using GPS technology for inclusion in database.

- Task: Develop GIS data layers on fire history and vegetation treatments to help track their effects on sensitive species.

An overly hot or poorly timed fire could kill individuals of the cypress, wallflower, and spineflower. Any burns will be designed to avoid direct impacts to wallflower and spineflower populations by designating appropriate location, season, and burn prescription. Burns in cypress habitat will be done only after experimental burning of slash piles, with ashes to be raked into the soil to accelerate nutrient recycling and seed germination. Information from these burns will be used to determine whether fire or mechanical treatment is most appropriate.

Also, errors in burn design could adversely affect stand health of sensitive species. The U.S. Fish and Wildlife Service and biologists familiar with the target species will be consulted during the design process to assist in developing appropriate treatments. Burns in sensitive species habitat will be done on a pilot basis, with small areas being treated and monitored. Expansion of these pilot burns will be contingent on the results.

There is a risk that an escaped fire could threaten neighboring property. This risk is reduced by the fact that rural homeowners are required by law to maintain a 30-foot low fuel buffer around their homes to reduce fire risk. To further reduce the risk of escape, burns will be carried out when weather conditions and fuel moisture are conducive to controlling the fire. Fuel or fire breaks will be created between burn areas and homes as needed to allow control of fire. Creation of fuel or fire breaks will be done using hand crews to the maximum extent possible.

This is a conceptual overview of impacts and issues associated with fuel management at BDER. A more detailed fuel management program is being developed in cooperation with CDF and a citizens' group of specialists in botany and forestry, and will be incorporated as an addendum to this management plan when complete.

- **Element**: **Wetlands**

There are several wetland areas at BDER, which appear to be supported by small seeps. Some of these occur along currently-used trails.

Goal: Protect wetlands.

Objective: Reduce trail-use impacts.

- Task: Provide bridge or boardwalk crossings of wetlands where crossings are small enough to make this feasible.

- Task: Where impact areas are larger, relocate trail segments from wetlands areas to more appropriate alignments.

- Task: Monitor wetlands for recreational impacts and post or block access as needed.

Existing travel through wetlands causes trampling of vegetation, and may lead to changes in hydrology. Implementation of these tasks will enable visitors to avoid damage to wetlands.

- **Element**: **Wildlife Populations**

As stated above, little work has been done to determine wildlife use of BDER for species other than terrestrial mammals and birds. This deficiency needs to be rectified, particularly in view of the sensitive status of many bat species potentially present at the reserve and the recent Federal listing of the Mt. Hermon june beetle and Zayante band-winged grasshopper.

Goal: Identify species of invertebrates, fish, amphibians, reptiles, and bats which use BDER.

Objective: Conduct faunal inventory.

- Task: Develop plan of survey work needed.
- Task: Identify personnel and financial resources available to carry out plan.

Some volunteer survey work has already been done by students at the local university, a local biological consulting firm, and California Native Plant Society members. Within DFG, a Resource Assessment Program (RAP) has recently been established, and it appears to be likely that inventory work on DFG lands will be a high priority for action. RAP personnel and/or contractors may be available to assist in planning and do the necessary survey work.

C. Public Use Elements: Goals, Objectives and Environmental Impacts

The general regulations governing DFG ecological reserves are given in the California Code of Regulations (Title 14, Section 630). The regulations allow public access during daylight hours to pedestrians and equestrians. Bicycles and motor vehicles are not permitted. All or part of a reserve may be closed at the discretion of the DFG Regional Manager, and use may be limited to designated trails as needed to protect sensitive resources. Special regulations for individual reserves may be recommended, and if approved will be incorporated into Section 630. BDER was listed in Section 630 (and therefore subject to these regulations) on June 24, 1993.

As indicated above under “Historic Land Use”, BDER has traditionally been used by local residents as a hiking and equestrian area, and an extensive network of informal trails exists. Complete closure of the reserve to access over the long term would not be enforceable given the remoteness and seclusion of the area. Public access to BDER would also further DFG's mission of promoting public knowledge and appreciation of California's biological resources. The local residents have expressed willingness to cooperate with the Department in protecting sensitive resources at BDER and many have been active in attempting to control trespass, but have also expressed a strong desire to have some form of continued access to the reserve for recreational purposes (Appendix 6). Hikers and equestrians appear to be the predominant historic users, but some interest in mountain bike access has been expressed. Local school groups have also expressed an interest in classroom access to the reserve.

The RMC Lonestar company, which owns property adjacent to BDER, has an access easement across the Reserve. This easement, which has apparently existed since 1919, only came to light in 2003 when RMC used it to bring heavy equipment to their property for logjam removal from Laguna Creek. The easement coincides with the main existing road on BDER. RMC expects to use this road

on an intermittent basis for maintenance activities on their property, and would use it for logging access if a timber harvest was approved.

- **Element**: **Recreational Trail Use**

Public access to BDER has been the subject of considerable discussion. Aside from the unauthorized access which has occurred in the past, there is significant demand for access by people interested in the sensitive resources and scenic characteristics of the area. In addition to pedestrian access, there is demand for both equestrian and bicycle access.

Several of the soil types present at BDER are fragile and highly erodible. This imposes constraints on the type and level of recreational activities which can take place. Much of the flatter land in the northwest and central portions of the reserve consists of Zayante complex. The Natural Resources Conservation Service rates this complex as imposing "severe" restrictions on development of paths and trails, and states that "limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures" (Bowman and Estrada, 1980). The Ben Lomond-Catelli-Sur and Sur-Catelli complexes associated with Laguna Creek near the eastern border of the reserve are also considered to impose severe restrictions on trail development due to steep slopes. The Lompico-Felton complex soils, which are distributed in a band roughly west of Laguna Creek and south of the headwaters of Reggiardo Creek, are rated moderate for trail use; this indicates that problems "can be overcome or alleviated by planning, design, or special maintenance".

A trail committee was formed comprising local residents and representatives of DFG and TNC to look at the existing trails and determine where recreational use could be allowed. The criteria for trail use were soil suitability as evidenced by trail condition, location with regard to adjacent private residences, potential safety issues, potential impacts to sensitive resources, compatibility with fire protection, and projected maintenance needs. Existing trails were mapped by DFG personnel based on field reconnaissance. A soils specialist was also brought on site to evaluate the suitability of the existing trails for continued use. The committee determined that the most appropriate area for trail use is the area east of Martin Road and south of the rock outcrops. The main trail will follow the perimeter of the property and should also function as a fire break (Figure 6). A shorter loop trail was also identified to serve as an interpretive trail and for less active users.

Several factors are critical in determining appropriate trail use at BDER. These include the potential for fragile soils and steep slopes to erode, the need to protect sensitive plant species, and considerations of safe access to trails and possible disturbance to landowners adjacent to the Reserve. DFG staff and budget constraints preclude intensive trail maintenance, which will limit the potential for trails in some areas. A systematic monitoring program will be implemented to detect adverse impacts of trail use, and enable DFG to take corrective action (Appendix 7).

Goal: Designate a recreational trail system using the existing network to minimize disturbance of vegetation and wildlife.

Objective: Identify existing trails which may appropriately be used.

- Task: Identify locations of sensitive resources which might be impacted by trail use.
- Task: Post signs clearly indicating permissible and nonpermissible trail use.
- Task: Develop a map for public use showing available trails.

Objective: Close inappropriate trails.

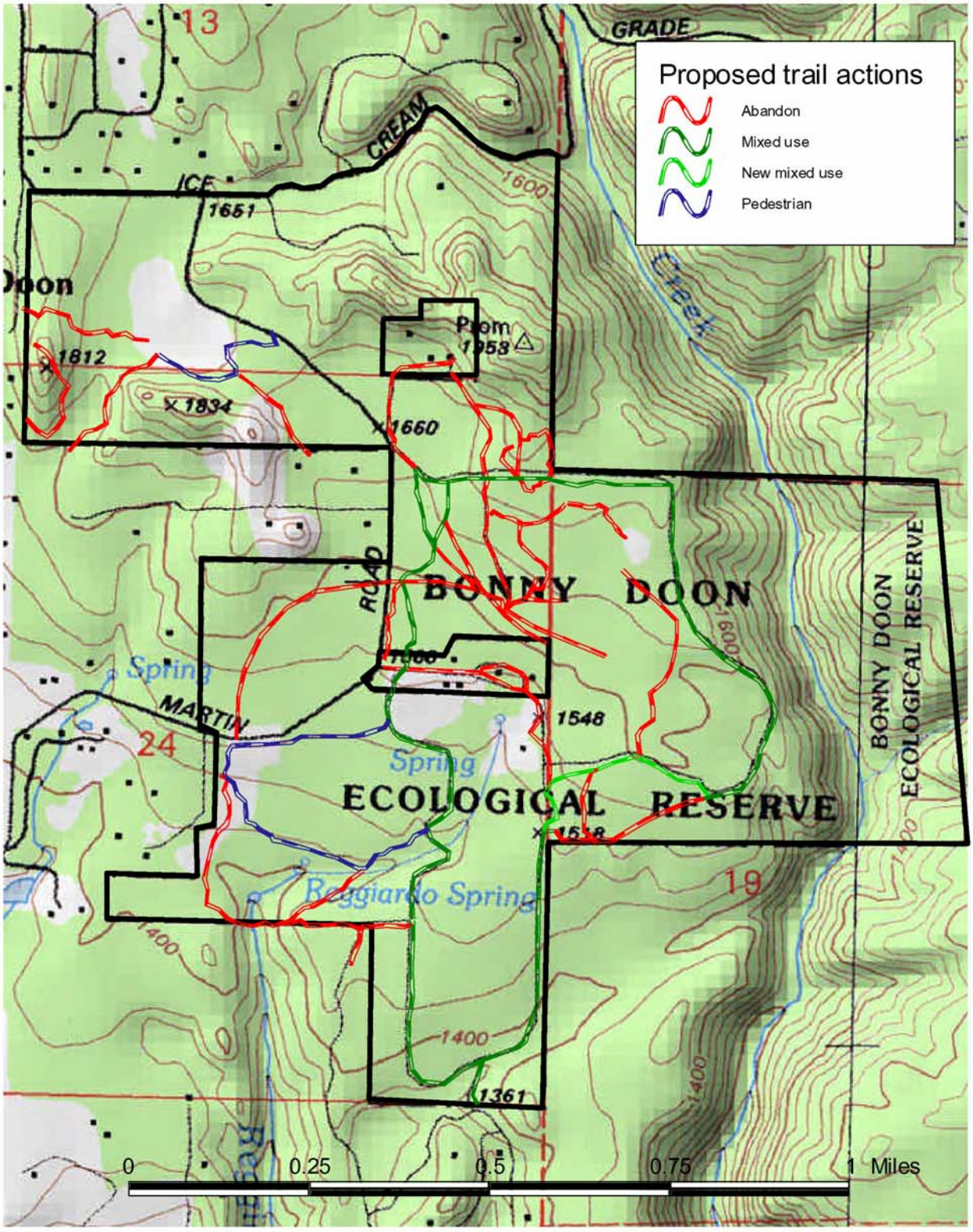


Figure 6. Conceptual map of proposed trails

- Task: Identify trails which should be closed to protect sensitive resources, avoid soil erosion, or which for other reasons are not suitable.
- Task: Post signs indicating trail closures and provide physical blockage where necessary.
- Task: Rehabilitate appropriate closed trails by revegetation.

Excessive or inappropriate trail use could result in damage to sensitive herbaceous species or young seedlings of shrub/tree species, as well as excessive erosion. These potential impacts can be alleviated by proper design and management. Trails which would adversely impact sensitive plant species will be closed. Trails which remain in service will be monitored to detect evidence of resource damage, and will be closed if necessary. Trail revegetation will include sensitive species where appropriate. Trails which would erode excessively will be closed. Trails which remain in service will be monitored for erosion; where necessary, drainage and soil stabilization measures will be implemented. Some trails may need to be closed during the rainy season. An erosion control specialist will be consulted regarding the need for erosion control measures.

Use of the trail crossing at Reggiardo Creek could lead to increased sedimentation. Equestrian use of this crossing has damaged the banks, and is a matter of concern since Reggiardo is a water supply creek. The loop trail will be rerouted to eliminate this crossing, and horses will be excluded from the loop trail.

- **Element**: **Equestrian Use**

Equestrian use is a popular activity in the Bonny Doon area. High levels of equestrian activity can cause serious erosion, particularly on fragile soils such as the Zayante sands. Henry Cowell State Park has experienced such problems (S. Singer, personal communication). Equestrian use at or near BDER in recent times appears to be limited to local residents, and is estimated at six to eight riders. Hoofprints show that riders do currently use BDER; examination of the trails showed that they were in good condition, with only very limited areas of erosion which appeared to be related to gradient rather than use. The exception to this is the trail crossing of Reggiardo Creek, which is used as an area to tie horses and rest. The banks have been damaged by this activity, resulting in bank failure and erosion in the storms of 1996-97. The trails committee concluded that low-level equestrian use on designated trails at BDER is consistent with sensitive plant protection and erosion prevention.

Goal: Provide equestrian use opportunities consistent with resource protection.

Objective: Identify existing trails which may appropriately be used.

- Task: Post signs clearly indicating permissible and nonpermissible trail use.
- Task: Install barriers where needed to restrict equestrian access.
- Task: Monitor trails and streams for potential adverse impacts.

High levels of equestrian activity will be discouraged. No support facilities will be developed and organized rides will not be permitted. Horses will be excluded from Reggiardo Creek to prevent further damage to fragile banks and impacts on water quality. Any impacts to other sensitive areas will be dealt with on an individual basis by posting or blocking the area.

The Department of Parks and Recreation (DPR) has recently acquired the Gray Whale Ranch property, which abuts Wilder Ranch State Park near the coast and extends north to meet BDER in Section 19. Wilder Ranch has a high level of equestrian use, and the acquisition of Gray Whale could lead to greatly increased numbers of riders wishing to enter BDER. This would entail crossing Laguna Creek, a known steelhead fishery. DFG has discussed this issue with DPR, and DPR has made a commitment to prevent establishment of trails leading to BDER.

Equestrian use could lead to seeding of nonnative species from horse excrement, or could pose erosion problems. The risk of these problems depends on a number of variables including intensity of use, and cannot be determined at this point. To minimize this risk, equestrian use will be permitted on a trial basis for one year following final adoption of this plan. Trails will be monitored during this period for evidence of equestrian-related problems. If problems occur, this use will be modified or discontinued as necessary.

- **Element**: **Mountain Biking**

While mountain biking is an increasingly popular activity in Santa Cruz County, there is a high potential for accidents if bicyclists and equestrians share trails. The narrow trails and blind corners at BDER do not provide sufficient sight distance for bicyclists to avoid startling horses; this could lead to severe injury or death for an equestrian. The continuous tracks left by bicycles also have a high potential for erosion. Because of the sensitivity of the plant resources and erodibility of the soils at the reserve, creation of new trails or widening of existing trails to resolve the safety issue would be expensive and environmentally damaging. For these reasons, bicycles will not be permitted at BDER. As indicated earlier, bicycles are not normally permitted on ecological reserves.

- **Element**: **Resource Interpretation**

Goal: Educate reserve visitors and provide a quality visit.

Objective: Provide interpretive materials for reserve visitors.

- Task: Identify and post an internal loop trail to serve as a self-guided nature trail.
- Task: Develop a trail guide keyed to the nature trail resources.
- Task: Develop an informative leaflet on the sensitive resources of the reserve.
- Task: Develop and implement a volunteer docent program to assist visitors.
- Task: Insure availability of materials by enlisting docents to assist in restocking.

Public education on the sensitivity of the resources at BDER will aid in protection and add to the quality of the visitor experience.

- **Element**: **Classroom Education and Research**

BDER is within easy driving range of public schools throughout northern and central Santa Cruz County, and is within reach of a number of colleges and universities in the South Bay area. The reserve could provide opportunities for nature education at the K12 level, and classroom study and student research at the college level.

Goal: Promote educational use of the reserve.

- Task: Provide information on the reserve as requested.
- Task: Coordinate with area colleges and universities to provide opportunities for student research projects and classroom use.

Formal educational programs and scientific investigations will require Departmental approval and will be subject to Fish and Game Commission regulations adopted in Section 630, Title 14, C.C.R. Potentially damaging activities will not be allowed unless they can be modified to avoid impact.

D. Facility Maintenance Elements: Goals, Objectives and Environmental Impacts

- **Element**: **Reserve Boundaries**

Goal: Control unauthorized access.

Objective: Establish clear boundaries at all probable points of entry.

- Task: Identify and post boundaries where trails enter the property.
- Task: Install additional fencing as needed to correct trespass problems.
- Task: Maintain fencing.

- **Element**: **Non-native Vegetation**

Goal: Protect native plant communities against invasion by non-native species.

Objective: Control invasive non-native vegetation.

- Task: Remove eucalyptus trees at border of inholding.
- Task: Remove invasive exotic species, including (but not limited to) French broom, acacia, and pampas grass where these occur.
- Task: Institute regular schedule of monitoring and removal to maintain control.

If prescribed burns or herbicides are used, appropriate safety precautions will be used to avoid impacts to non-targeted species.

- **Element**: **Parking Lot**

A parking lot of approximately 0.25 acre has been developed by the County on property adjacent to the Bonny Doon Volunteer Fire Station which now belongs to the Reserve. This lot is occasionally used by the County on an informal basis for equipment storage as well as providing parking for Reserve visitors. The lot is unsurfaced and develops erosion gullies in the wet season. The only vegetation in the parking lot is a small stand of oaks and associated understory, which has been

fenced to prevent vehicle access. Retention of this lot is environmentally preferable to developing another lot elsewhere on the Reserve, which would involve impacts to plant resources.

Goal: Maintain the parking lot in safe and usable condition.

Objective: Prevent development of deep surface gullies.

- Task: Periodically check parking lot condition.
- Task: Grade and surface lot with gravel as needed.

The parking lot does not support any sensitive vegetation or habitat. Erosion control work would be limited to the existing unvegetated area and would not impact any resource. The lot would be monitored to determine success.

V. OPERATIONS AND MAINTENANCE SUMMARY

A. Existing and Additional Personnel Needs Summary

1. Existing personnel

The area manager for BDER is the South Bay Unit Wildlife Biologist. This position has wildlife management responsibility for the Santa Cruz Mountains area, including Santa Cruz, San Mateo, San Francisco, and Santa Clara counties. The position is presently filled at the Associate Biologist level.

1 Associate Biologist (Wildlife) (approximately 0.2 PY)
Other Department personnel on an as-needed basis (estimated 0.05 PY at the Associate level)

The Associate Biologist (Wildlife) is currently responsible for all nonenforcement Department activities at the reserve, including maintenance, construction, habitat evaluation, and document preparation.

2. Additional personnel required

1 Wildlife Habitat Assistant (estimated 0.6 PY)
1 Interpreter I (estimated 1.0 PY)

The WHA is needed to work on maintenance of trails, fences, and signage, and to carry out monitoring of public use elements called for in this plan. The position should be established as full-time, and used for needed work at Department lands in Santa Cruz, San Mateo, Santa Clara, Alameda, Contra Costa, and Monterey counties.

The Interpreter I would be responsible for working with schools at the K12 level, and for coordinating volunteer activities. Ideally, a position would be created to handle these tasks and provide a Department presence at Watsonville Slough Ecological Reserve, which also offers opportunities for public education.

B. Operations and Maintenance Summary

Table 3 presents a summary of the goals and objectives identified above for biological, public use, and facilities maintenance elements. Associated costs represent estimates of the personnel, contract, and material resources needed to meet these needs. Personnel costs for Department personnel are based on

per hour wage and salary costs plus the overhead cost of benefits. Material costs are included in the identified costs.

Table 1. Operations and maintenance summary.

Goals and Objectives	Priority	Labor (PYs)	Personnel Class	Cost/yr.	One-time Cost
1. Enhance T&E species	1				
A. Monitor population status		0.02	Associate Biologist	1,590	
B. Implement enhancement tasks		0.04	WHA	2,169	
2. Manage fuels	1				
A. Determine T&E needs		0.02	Associate Biologist		1,590
B. Conduct fire risk assessment			CDF		∅
C. Plan fuel management program					
DFG personnel:		0.10	Associate Biologist		7,951
CDF personnel			CDF		∅
D. Implement program					
DFG personnel:		0.05	Associate Biologist		3,975
CDF personnel					∅
3. Manage non-T&E species	2				
A. Plan and conduct faunal inventory		0.05	Associate Biologist (RAP)		3,975
4. Designate trail system	1				
A. Map and post open trails		0.01	Associate Biologist		795
		0.25	volunteers		∅
B. Close inappropriate trails		0.04	WHA	2,169	2,000
		0.01	Associate Biologist		795
5. Develop interpretive materials	2				
A. Develop nature trail		0.02	Associate Biologist		1,590
		0.20	Interpreter I		15,912
B. Produce leaflets about resources		0.01	Associate Biologist	795	100
6. Promote educational use	3				
A. Provide information		0.60	Interpreter I	35,735	
B. Promote volunteer program		0.20	Interpreter I	11,912	
C. Coordinate with colleges		0.01	Associate Biologist	795	
7. Control access	1				
A. Maintain fences and gates		0.16	WHA	8,676	5,000
8. Control exotic vegetation	2				
A. Remove existing exotics		0.25	WHA	13,556	
B. Monitor regrowth		0.10	WHA		5,422
Subtotals		**0.25 PY**	**Associate Biologist**	**$3,180**	**$16,796**
		0.05 PY	**Assoc. Biol. (RAP)**		**3,975**
		1.00 PY	**Interpreter I**	**47,646**	**11,912**
		0.59 PY	**WHA**	**26,570**	**12,422**
Totals				**$77,396**	**$45,105**

At present all work is done by the Associate Biologist. Having a Wildlife Habitat Assistant and Interpreter to take over the designated tasks would allow more effective management and better public service, and would result in significant salary savings. Further savings would result from work taken over by these personnel on other DFG lands.

VI. REFERENCES

Bowman, R.H., and Estrada, D.C. 1980. Soil survey of Santa Cruz County, California. U.S. Department of Agriculture Soil Conservation Service in cooperation with University of California, Agricultural Experiment Station. 148 pp. + maps.

Brabb, E.E. 1970. Preliminary geologic map of the Central Santa Cruz Mountains, California. U.S. Geologic Survey and U.S. Department of Housing and Urban Development.

Davilla, B. 1980. A biotic assessment of the Bonny Doon Ranch. Submitted to County of Santa Cruz Planning Department, August 18, 1980. 50 pp. + app.

Dillon, B.D. 1992. Archaeological and historical survey of Soquel Demonstration State Forest, Santa Cruz County, California. CDF Archaeological Report No. 6. California Department of Forestry and Fire Protection. Sacramento. 177 pp.

Hummel, Marilyn. Personal communication, November 14, 1992.

Hylkema, M.G. 1991. Prehistoric Native American adaptations along the central California coast of San Mateo and Santa Cruz counties. M.A. Thesis, San Jose State University. 501 pp.

Marangio, M.S. 1985. Preservation study: sandhills biotic communities of Santa Cruz County, California. Master's thesis, University of California, Berkeley. 71 pp.

Mayer, K.E. and W.F. Laudenslayer, Jr., eds. 1988. A guide to wildlife habitats of California. California Department of Forestry and Fire Protection. Sacramento. 166 pp.

McCully, H. Letter to Adrienne Libby, 1984.

Moldenke, A.R. 1980. A biological assessment of Kincaid's *Colletes* solitary bee. In: Davilla, B. 1980.

National Oceanic and Atmospheric Administration. Climatological Data California. Asheville, North Carolina.

Natural Diversity Data Base. The Resources Agency, California Department of Fish and Game.

Pereksta, David. U.S. Fish and Wildlife Service. Site inspection, May 21, 1997.

Singer, Steve. Personal communication, July 24, 1993.

Thomas, J.H. 1961. Flora of the Santa Cruz Mountains of California. Stanford University Press: Stanford, CA. 434 pp.

U.S. Fish and Wildlife Service. 1997. Determination of endangered status for two insects from the Santa Cruz Mountains of California. Federal Register Vol. 62 No. 16, Friday, January 24, 1997.

U. S. Fish and Wildlife Service. 1997. Draft Recovery Plan for the Santa Cruz Cypress (*Cupressus abramsiana*). Portland, Oregon. 52 pp.

U.S. Fish and Wildlife Service. 1997. Withdrawal of proposed rule to list the Santa Cruz rain beetle (*Pleocoma conjugens conjugens*) as endangered. Federal Register Vol. 62 No. 16, Friday, January 24, 1997.

U. S. Fish and Wildlife Service. 1998. Recovery Plan for Insect and Plant Taxa from the Santa Cruz Mountains, California. Portland, Oregon. 83 pp.

U.S. Soil Conservation Service, n.d. Technical Guide for Santa Cruz County. Aptos Field Office. Aptos, CA.

Wildlife Habitat Relationships System. The Resources Agency, California Department of Fish and Game.

Appendix 1

Legal Description of the Property

88246-7

SCHEDULE C

THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SANTA CRUZ, AND IS DESCRIBED AS FOLLOWS:

BEING A PART OF THE LANDS OF SUMNER PECK, ET UX., AS SHOWN UPON THE RECORD OF SURVEY FILED FOR RECORD IN VOLUME 45, PAGE 5, SANTA CRUZ COUNTY RECORDS, SITUATED IN SECTION 19 T. 10 S. R. 2 W., AND SECTIONS 13 AND 24 T. 10 S., R. 3 W., M. D. B. & M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF THE ABOVE MENTIONED SECTION 19; THENCE ALONG THE NORTHERLY BOUNDARY OF SAID SECTION 19 SOUTH 89 DEGREES 53' 53" EAST 2806.25 FEET TO THE 1/4 SECTION CORNER ON THE NORTHERLY BOUNDARY OF SAID SECTION; THENCE ALONG SAID 1/4 SECTION LINE SOUTH 5 DEGREES 29' 15" EAST 2655.89 FEET TO THE CENTER OF SAID SECTION 19; THENCE ALONG THE 1/4 SECTION LINE RUNNING EAST AND WEST SOUTH 89 DEGREES 16' 19" WEST 3065.46 FEET TO THE WESTERLY 1/4 SECTION CORNER OF SECTION 19; SAID CORNER BEING ON THE TOWNSHIP LINE BETWEEN TOWNSHIP 10 SOUTH, RANGE 2 WEST, AND TOWNSHIP 10 SOUTH, RANGE 3 WEST; THENCE ALONG SAID TOWNSHIP LINE SOUTH 0 DEGREES 33' EAST 1934.84 FEET TO THE SOUTHEAST CORNER OF THE ABOVE MENTIONED SECTION 24; THENCE ALONG THE SOUTHERLY BOUNDARY OF SAID SECTION 24 NORTH 88 DEGREES 53' 08" WEST 1285.74 FEET TO THE SOUTHERLY 1/16 SECTION CORNER OF THE SOUTHEAST 1/4 OF SECTION 24; THENCE ALONG THE 1/16 SECTION LINE RUNNING NORTH AND SOUTH THROUGH THE CENTER OF SAID SOUTHEAST 1/4 OF SECTION 24 NORTH 0 DEGREES 20' 45" WEST 1325.89 FEET TO THE CENTER OF SAID SOUTHEAST 1/4 OF SECTION 24; THENCE ALONG THE 1/16 SECTION LINE RUNNING EAST AND WEST THROUGH THE CENTER OF SAID SOUTHEAST 1/4 OF SAID SECTION 24 SOUTH 89 DEGREES 46' 15" WEST 1287.50 FEET TO THE 1/16 SECTION CORNER ON THE WESTERLY BOUNDARY OF SAID SOUTHEAST 1/4 OF SECTION 24; THENCE ALONG THE 1/16 SECTION LINE RUNNING EAST AND WEST THROUGH THE CENTER OF THE SOUTHWEST 1/4 OF SECTION 24 SOUTH 89 DEGREES 53' 25" WEST 652.99 FEET TO THE SOUTHEAST CORNER OF THE LANDS OF ALFRED L. SANDRETTI, ET UX., AS SAID LANDS ARE DESCRIBED IN VOLUME 1633, AT PAGE 94, OFFICIAL RECORDS OF SANTA CRUZ COUNTY; THENCE LEAVING SAID 1/16 SECTION LINE AND ALONG THE EASTERLY BOUNDARY OF SAID LANDS SANDRETTI, NORTH 0 DEGREES 22' 06" WEST 330.00 FEET TO THE NORTHEAST CORNER THEREOF; THENCE PARALLEL TO THE LAST ABOVE MENTIONED 1/16 SECTION LINE RUNNING EAST AND WEST THROUGH THE CENTER OF THE SOUTHWEST 1/4 OF SECTION 24 NORTH 89 DEGREES 53' 25" EAST 653.52 FEET TO 1/4 SECTION LINE RUNNING NORTH AND SOUTH THROUGH THE CENTER OF SECTION 24; THENCE ALONG SAID 1/4 SECTION LINE NORTH 0 DEGREES 16' 32" WEST 350.00 FEET TO A FENCE LINE;

THENCE LEAVING SAID 1/4 SECTION LINE AND ALONG SAID FENCE LINE NORTH 79 DEGREES 01' 38" EAST 127.00 FEET TO THE PROJECTED INTERSECTION WITH THE PRODUCTION OF A FENCE RUNNING NORTHERLY AND SOUTHERLY; THENCE ALONG SAID LAST MENTIONED FENCE AND THE PRODUCTION THEREOF NORTH 1 DEGREE 21' 52" WEST 695.99 FEET TO THE NORTHERLY BOUNDARY OF MARTIN ROAD; THENCE ALONG SAID NORTHERLY BOUNDARY OF MARTIN ROAD NORTH 72 DEGREES 41' 06" WEST 117.04 FEET TO THE 1/4 SECTION LINE THROUGH THE CENTER OF SAID SECTION 24; THENCE LEAVING SAID ROAD AND ALONG THE SAID 1/4 SECTION LINE NORTH 0 DEGREES 16' 32" WEST 1217.60 FEET TO THE 1/16 SECTION LINE RUNNING EAST AND WEST THROUGH THE NORTHEAST 1/4 OF SAID SECTION 24; THENCE ALONG SAID 1/16 SECTION LINE NORTH 89 DEGREES 44' 44" EAST 1208.97 FEET TO A PIPE AT THE NORTHWESTERLY CORNER OF THE LANDS CONVEYED TO THE COUNTY OF SANTA CRUZ BY DEED RECORDED IN VOLUME 2030, PAGE 552, OFFICIAL RECORDS OF SANTA CRUZ COUNTY; THENCE ALONG THE WESTERLY AND SOUTHERLY BOUNDARY OF SAID LANDS CONVEYED TO THE COUNTY OF SANTA CRUZ, SOUTH 0 DEGREES 39' WEST 130 FEET TO A PIPE, EAST 135.23 FEET TO A PIPE; THENCE NORTHEASTERLY ON A CURVE TO THE LEFT WITH A RADIUS OF 20 FEET THROUGH AN ANGLE OF 89 DEGREES 21' 00" FOR A DISTANCE OF 31.19 FEET TO A PIPE ON THE WESTERN SIDE LINE OF MARTIN ROAD, AS SHOWN ON ABOVE MENTIONED RECORD OF SURVEY; THENCE ALONG SAID WESTERN SIDE LINE OF MARTIN ROAD NORTH 0 DEGREES 38' 43" EAST 939.60 FEET TO THE NORTHEASTERLY CORNER OF THE LANDS CONVEYED TO EDMUND E. MOQUIN, ET UX., BY DEED RECORDED IN VOLUME 873, PAGE 433, OFFICIAL RECORDS OF SANTA CRUZ COUNTY; THENCE LEAVING SAID SIDE LINE ALONG THE NORTHERLY BOUNDARY OF SAID LANDS OF MOQUIN TO AND ALONG THE NORTHERLY BOUNDARY OF THE LANDS CONVEYED TO EDMUND E. MOQUIN, BY DEED RECORDED IN VOLUME 749, PAGE 307, OFFICIAL RECORDS OF SANTA CRUZ COUNTY, SOUTH 89 DEGREES 42' 59" WEST 1377.30 FEET AND SOUTH 89 DEGREES 45' 24" WEST 1312.32 FEET TO A POINT ON THE 1/16 SECTION LINE RUNNING NORTH AND SOUTH THROUGH THE NORTHWEST 1/4 OF SAID SECTION 24; THENCE ALONG SAID 1/16 SECTION LINE AND THE 1/16 SECTION LINE RUNNING AND NORTH AND SOUTH THROUGH THE SOUTHWEST 1/4 OF SECTION 13, T. 10 S., R. 3 W., M. D. B. & M., NORTH 0 DEGREES 12' 06" WEST 496.96 FEET TO A PIPE AND NORTH 0 DEGREES 30' 37" WEST 1336.99 FEET TO A PIPE ON THE CENTERLINE OF ICE CREAM GRADE AS SHOWN ON ABOVE MENTIONED RECORD OF SURVEY; THENCE ALONG THE 1/16 SECTION LINE RUNNING EAST AND WEST THROUGH THE SOUTHWEST 1/4 AND THE SOUTHEAST 1/4 OF SECTION 13 NORTH 89 DEGREES 12' 54" EAST 1306.78 FEET AND THE NORTH 89 DEGREES 53' 44" EAST 1293.93 FEET TO THE CENTER OF SAID SOUTHEAST 1/4 OF SECTION 13; THENCE ALONG THE 1/16 SECTION LINE RUNNING NORTH AND SOUTH THROUGH SAID SOUTHEAST 1/4 OF SECTION 13 SOUTH 0 DEGREES 42' 53" EAST 1344.74 FEET TO THE 1/16 SECTION CORNER ON THE SOUTHERN BOUNDARY OF SAID SECTION 13; THENCE ALONG SAID SOUTHERN BOUNDARY NORTH 89 DEGREES 41' 55" EAST 1293.81 FEET TO A 2 INCH BY 2 INCH HUB AND TACK AT THE NORTHEASTERN CORNER OF SECTION 24, T. 10 S. R. 3 W., M. D. M.; THENCE ALONG THE EASTERN BOUNDARY OF SAID SECTION 24, SOUTH 0 DEGREES 05' 34" WEST 664.97 FEET

TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THE LANDS CONVEYED TO THE COUNTY OF SANTA CRUZ BY DEED DATED AUGUST 23, 1971, AND RECORDED IN BOOK 2129, PAGE 489, OFFICIAL RECORDS OF SANTA CRUZ COUNTY.

ALSO EXCEPTING THEREFROM THE FOLLOWING DESCRIBED REAL PROPERTY

SITUATE IN SECTION 13, TOWNSHIP 10 SOUTH, RANGE 3 WEST, MOUNT DIABLO MERIDIAN, SANTA CRUZ COUNTY, CALIFORNIA AND

BEING A PORTION OF THE LANDS CONVEYED TO BONNY DOON-FRESNO PLAZA, LTD., A LIMITED PARTNERSHIP, BY DEED DATED JANUARY 19, 1971, AND RECORDED MAY 14, 1971, IN BOOK 2094 OF OFFICIAL RECORDS AT PAGE 615, SANTA CRUZ COUNTY RECORDS, AND MORE PARTICULARLY BOUNDED AND DESCRIBED, TO WIT:

BEGINNING AT THE ONE-SIXTEENTH CORNER IN THE CENTER OF THE SOUTHEAST ONE-QUARTER OF SAID SECTION 13 FROM WHICH A ONE AND ONE-HALF INCH IRON PIPE AT THE ONE-SIXTEENTH CORNER IN THE EASTERN BOUNDARY OF SAID SOUTHEAST ONE-QUARTER, AS SHOWN AND DELINEATED ON THAT CERTAIN MAP ENTITLED "RECORD OF SURVEY MAP OF LANDS OF JEAN ALLUISI, ET UX," RECORDED ON THE 14TH DAY OF FEBRUARY, 1961, IN VOLUME 37 OF MAPS AT PAGE 14, SANTA CRUZ COUNTY RECORDS, BEARS NORTH 89 DEGREES 48' 05" EAST, 1298.57 FEET DISTANT;

THENCE FROM SAID POINT OF BEGINNING ALONG THE ONE-SIXTEENTH LINE RUNNING NORTH AND SOUTH THROUGH SAID SOUTHEAST ONE-QUARTER SECTION SOUTH 0 DEGREES 46' 55" EAST, 346.00 FEET; THENCE LEAVING SAID ONE-SIXTEENTH LINE AND PARALLEL WITH THE ONE-SIXTEENTH LINE RUNNING EAST AND WEST THROUGH SAID SOUTHEAST ONE-QUARTER SECTION SOUTH 89 DEGREES 48' 05" WEST, 1358.05 FEET TO A STATION FROM WHICH CENTERLINE OF THE TRAVELLED WAY OF MARTIN ROAD BEARS NORTH 77 DEGREES 00' WEST, 20.00 FEET DISTANT; THENCE PARALLEL WITH AND DISTANT SOUTHEASTERLY 20.00 FEET MEASURED AT RIGHT ANGLES FROM SAID CENTERLINE NORTH 13 DEGREES 00' EAST, 318.39 FEET TO A LINE THAT IS PARALLEL WITH AND DISTANT SOUTHERLY 20.00 FEET MEASURED AT RIGHT ANGLES FROM THE CENTERLINE OF ICE CREAM GRADE (AS TRAVELLED) AS SAID CENTERLINE IS SHOWN ON THE AFOREMENTIONED RECORD OF SURVEY MAP; THENCE ALONG SAID LAST MENTIONED PARALLEL LINE SOUTH 85 DEGREES 34' 10" EAST, 233.79 FEET; THENCE NORTH 79 DEGREES 32' 45" EAST, 160.63 FEET; THENCE NORTH 72 DEGREES 11' 55" EAST, 86.97 FEET TO THE ONE-SIXTEENTH LINE RUNNING EAST AND WEST THROUGH SAID SOUTHEAST ONE-QUARTER SECTION; THENCE ALONG SAID LAST MENTIONED LINE NORTH 89 DEGREES 48' 05" EAST, 807.85 FEET TO THE PLACE OF BEGINNING; AND SURVEYED AND COMPILED IN JUNE, 1989, BY BOWMAN & WILLIAMS, CONSULTING CIVIL ENGINEERS, FILE NO. 19868.

88246-7

ALSO EXCEPTING THEREFROM THE FOLLOWING DESCRIBED REAL PROPERTY;

SITUATE IN SECTION 19, TOWNSHIP 10 SOUTH, RANGE 2 WEST, AND SECTION 24, TOWNSHIP 10 SOUTH, RANGE 3 WEST, MOUNT DIABLO MERIDIAN, SANTA CRUZ COUNTY, CALIFORNIA, AND

BEING A PORTION OF THE LANDS CONVEYED TO BONNY DOON-FRESNEO PLAZA, LTD., A LIMITED PARTNERSHIP, BY DEED DATED JANUARY 19, 1971, AND RECORDED MAY 14, 1971, IN BOOK 2094, OF OFFICIAIL RECORDS AT PAGE 615, SANTA CRUZ COUNTY RECORDS, AND MORE PARTICULARL BOUNDED AND DESCRIBED, TO WIT:

BEGINNING AT AN ANGLE POINT IN THE SOUTHEASTERN LINE OF MARTIN ROAD AS SAID ROAD IS DESCRIBED IN DEED CONVEYING A 50 FOOT STRIP TO THE COUNTY OF SANTA CRUZ, DATED DECEMBER 21, 1959, AND RECORDED MAY 25, 1960, IN VOLUME 1320 OF OFFICIAL RECORDS AT PAGE 492, SANTA CRUZ COUNTY RECORDS, FROM WHICH A SET SPIKE ON THE CENTERLINE OF SAID STRIP BEARS NORTH 62 DEGREES 26' WEST, (AT 5.61 FEET, A FOUND 1/2 INCH IRON PIPE, RCE 6270) 28.04 FEET DISTANT AND FROM SAID SPIKE A FOUND SPIKE ON THE CENTERLINE OF SAID STRIP BEARS NORTH 0 DEGREES 39' EAST, 810.54 FEET DISTANT;

THENCE FROM SAID POINT OF BEGINNING ALONG THE EASTERN LINE OF MARTIN ROAD NORTH 0 DEGREES 39' EAST, 120.13 FEET TO A STATION FROM WHICH A FOUND 1/2 INCH IRON PIPE, RCE 6270, BEARS NORTH 0 DEGREES 39' EAST, 703.13 FEET AND NORTH 89 DEGREES 21' WEST 5.00 FEET DISTANT; THENCE LEAVING SAID ROAD SOUTH 89 DEGREES 21' EAST 483.81 FEET; THENCE NORTH 8 DEGREES 44' EAST 147.52 FEET; THENCE SOUTH 89 DEGREES 21' EAST, 714.65 FEET; THENCE SOUTH 0 DEGREES 39' WEST, 409.50 FEET; THENCE NORTH 89 DEGREES 21' WEST 1273.12 FEET; THENCE NORTH 35 DEGREES 31' WEST, 83.73 FEET TO A STATION IN THE SOUTHEASTERN LINE OF MARTIN ROAD, 50 FEET WIDE FROM WHICH A 1/2 INCH IRON PIPE, RCE 6270, BEARS NORTH 35 DEGREES 31' WEST 5.00 FEET DISTANT; THENCE ALONG THE SOUTHEASTERN LINE OF MARTIN ROAD NORTH 54 DEGREES 29' EAST, 128.31 FEET TO THE PLACE OF BEGINNING; AND FOR BEARING BASE AND MONUMENTATION AS SET FORTH IN THE ABOVE DESCRIPTION, REFERENCE IS MADE TO THE RECORD OF SURVEY ENTITLED, "RECORD OF SURVEY MAP OF PART OF THE LANDS OF FRANCES N. HELLENTHAL, ET VIR," RECORDED OCTOBER 29, 1958, IN BOOK 34 OF MAPS AT PAGE 28, SANTA CRUZ COUNTY RECORDS.

SURVEYED AND COMPILED IN JUNE 1989, BY BOWMAN & WILLIAMS, CONSULTING CIVIL ENGINEERS, FILE NO. 19868.

SECOND AMENDED **Order No. 135530-2**

The land referred to herein is situated in the State of California, County of Santa Cruz, Unincorporated Area and is described as follows:

PARCEL ONE:

BEING THE SOUTHEAST ONE QUARTER OF THE SOUTHEAST ONE QUARTER OF SECTION 13, T. 10 S., R. 3 W., MOUNT DIABLO MERIDIAN.

EXCEPTING THEREFROM THE LANDS CONVEYED BY A. S. MAHAN AND AMANDA A. MAHAN HIS WIFE TO MERLE E. WHITESELL, AND MARY ADELLA WHITESELL HUSBAND AND WIFE AS JOINT TENANTS BY GRANT DEED DATED DECEMBER 14, 1938 AND RECORDED JANUARY 12, 1939 IN VOLUME 361 OF OFFICIAL RECORDS AT PAGE 411 SANTA CRUZ COUNTY RECORDS, AND

ALSO EXCEPTING THEREFROM THE LANDS CONVEYED BY JEAN ALLUISI AND ELLA ALLUISI, HIS WIFE TO OLIVER K. WARNECKE AND DOROTHY M. WARNECKE HIS WIFE, AS JOINT TENANTS BY GRANT DEED DATED MAY 26, 1964 AND RECORDED MAY 29, 1964 IN BOOK 1620 OF OFFICIAL RECORDS AT PAGE 677 SANTA CRUZ COUNTY RECORDS, AND

ALSO EXCEPTING THEREFROM THE FOLLOWING DESCRIBED LANDS:

BEING A PORTION OF THE SOUTHEAST ONE QUARTER OF THE SOUTHEAST ONE QUARTER OF SECTION 13, T. 10 S., R. 3 W., MOUNT DIABLO MERIDIAN, AND

BEING A PART OF PARCEL ONE OF THE LANDS CONVEYED TO JEAN ALLUISI AND ELLA ALLUISI, HIS WIFE BY JOINT TENANCY DEED DATED MAY 4, 1960 AND RECORDED MAY 18, 1960 IN VOLUME 1319 OF OFFICIAL RECORDS AT PAGE 194 SANTA CRUZ COUNTY RECORDS AND A PORTION OF THE LANDS CONVEYED TO JEAN ALLUISI AND ELLA ALLUISI, HIS WIFE BY JOINT TENANCY DEED DATED JANUARY 11, 1956 AND RECORDED JANUARY 18, 1956 IN VOLUME 1055 OF OFFICIAL RECORDS AT PAGE 466 SANTA CRUZ COUNTY RECORDS AND MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS TO WIT:

BEGINNING AT A FOUND 1 1/2" IRON PIPE AT THE SOUTHWESTERN CORNER OF THE FIRST MENTIONED LANDS OF ALLUISI SAID PIPE BEING AT THE 1/16 CORNER IN THE SOUTHERN BOUNDARY OF SAID SOUTHEASTERN ONE QUARTER OF SECTION 13 AS SHOWN AND DELINEATED ON THAT CERTAIN MAP ENTITLED "RECORD OF SURVEY OF THE NORTH BOUNDARY OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 AND THE WEST BOUNDARY OF THE SOUTHEAST 1/4 OF THE SOUTHEAST 1/4 OF SECTION 13, TOWNSHIP 10 SOUTH, RANGE 3 WEST M.D.B.& M." FILED FOR RECORD ON THE 24TH DAY OF AUGUST 1964 IN VOLUME 42 OF MAPS AT PAGE 17 SANTA CRUZ COUNTY RECORDS

THENCE FROM SAID POINT OF BEGINNING, ALONG THE SOUTHERN BOUNDARY OF SAID SECTION 13, NORTH 89°42' EAST (AT 268.00 FEET A FOUND 1/2 INCH IRON PIPE RCE 6270) (AT 558.00 FEET A FOUND 1/2 INCH IRON PIPE RCE 6270 IN THE ROOT OF A 14 INCH PINE TREE) AT 713.67 FEET AN 8 INCH SPIKE WITH BRASS TAG LS 5513 SET IN A SANDSTONE ROCK) (AT 722.67

SECOND AMENDED Order No. 135530-2

FEET AN 8" SPIKE SET IN A SANDSTONE ROCK) 723.67 FEET TO A STATION; THENCE NORTH 0°43'30" WEST (AT 228.25 FEET A SET 1/2 INCH IRON PIPE WITH BRASS TAG LS 5513, 10 FEET EASTERLY OF AN EXISTING WOODEN WATER TANK BEARS SOUTH 89°42' WEST 10.00 FEET DISTANT) 465.00 FEET TO A STATION; THENCE SOUTH 89°42' WEST 165.67 FEET TO THE NORTHEASTERN CORNER OF THE AFORESAID LANDS CONVEYED TO JEAN ALLUISI AND ELLA ALLUISI, HIS WIFE BY JOINT TENANCY DEED DATED JANUARY 11, 1956 AND RECORDED JANUARY 18, 1956 IN VOLUME 1055 OF OFFICIAL RECORDS AT PAGE 466 SANTA CRUZ COUNTY RECORDS; THENCE ALONG THE NORTHERN BOUNDARY OF SAID LAST MENTIONED LANDS SOUTH 89°42' WEST 290.00 FEET TO THE NORTHWESTERN CORNER OF SAID LAST MENTIONED LANDS; THENCE ALONG THE WESTERN BOUNDARY OF SAID LANDS SOUTH 0°43"40" EAST 125.00 FEET TO A FOUND 1/2" IRON PIPE TAGGED RCE 6270 AT THE NORTHWESTERN CORNER OF THE LANDS CONVEYED TO OLIVER K. WARNECKE AND DOROTHY M. WARNECKE, HIS WIFE AS JOINT TENANTS BY GRANT DEED DATED MAY 26, 1964 AND RECORDED MAY 29, 1964 IN BOOK 1620 OF OFFICIAL RECORDS AT PAGE 677 SANTA CRUZ COUNTY RECORDS; THENCE ALONG THE NORTHERN BOUNDARY OF SAID LANDS NORTH 89°42' EAST 75.57 FOOT TO A 1/2" IRON PIPE; THENCE ALONG THE EASTERN BOUNDARY OF SAID LANDS SOUTH 0°41' EAST 94.01 FEET TO A STATION; THENCE SOUTH 17°25'10" WEST 242.29 FEET TO THE SOUTHEASTERN CORNER OF SAID LANDS FROM WHICH THE AFOREMENTIONED 1/2 INCH IRON PIPE IN THE ROOT OF A 14 INCH PINE TREE BEARS SOUTH 0°43'30" EAST 15.00 FEET DISTANT; THENCE ALONG THE SOUTHERN BOUNDARY OF THE LANDS CONVEYED TO RICHARD O. WARNECKE AND BEVERLY J. WARNECKE HIS WIFE BY DEED DATED AUGUST 13, 1956 AND RECORDED SEPTEMBER 11, 1956 IN VOLUME 1093 OF OFFICIAL RECORDS AT PAGE 116 SANTA CRUZ COUNTY RECORDS SOUTH 89°42' WEST 268.00 FEET TO A FOUND 1/2 INCH IRON PIPE AT THE SOUTHWESTERN CORNER OF SAID LANDS OF WARNECKE ON THE 1/16 SECTION LINE RUNNING NORTH AND SOUTH THROUGH THE AFORESAID SOUTHEAST 1/4 SECTION; THENCE ALONG SAID 1/16 LINE SOUTH 0°43'30" EAST 15.00 FEET TO THE PLACE OF BEGINNING.

PARCEL TWO:

BEING THE WEST 40 FEET OF THE SOUTH 100 FEET OF THE NORTHEAST ONE-QUARTER OF THE SOUTHEAST ONE-QUARTER OF SECTION 13, T. 10 S., R. 3 W. MOUNT DIABLO MERIDIAN AND

BEING THE SOUTH 100 FEET OF THE NORTHWEST ONE-QUARTER OF THE SOUTHEAST ONE-QUARTER OF SECTION 13 T. 10 S., R. 3 W. MOUNT DIABLO MERIDIAN,

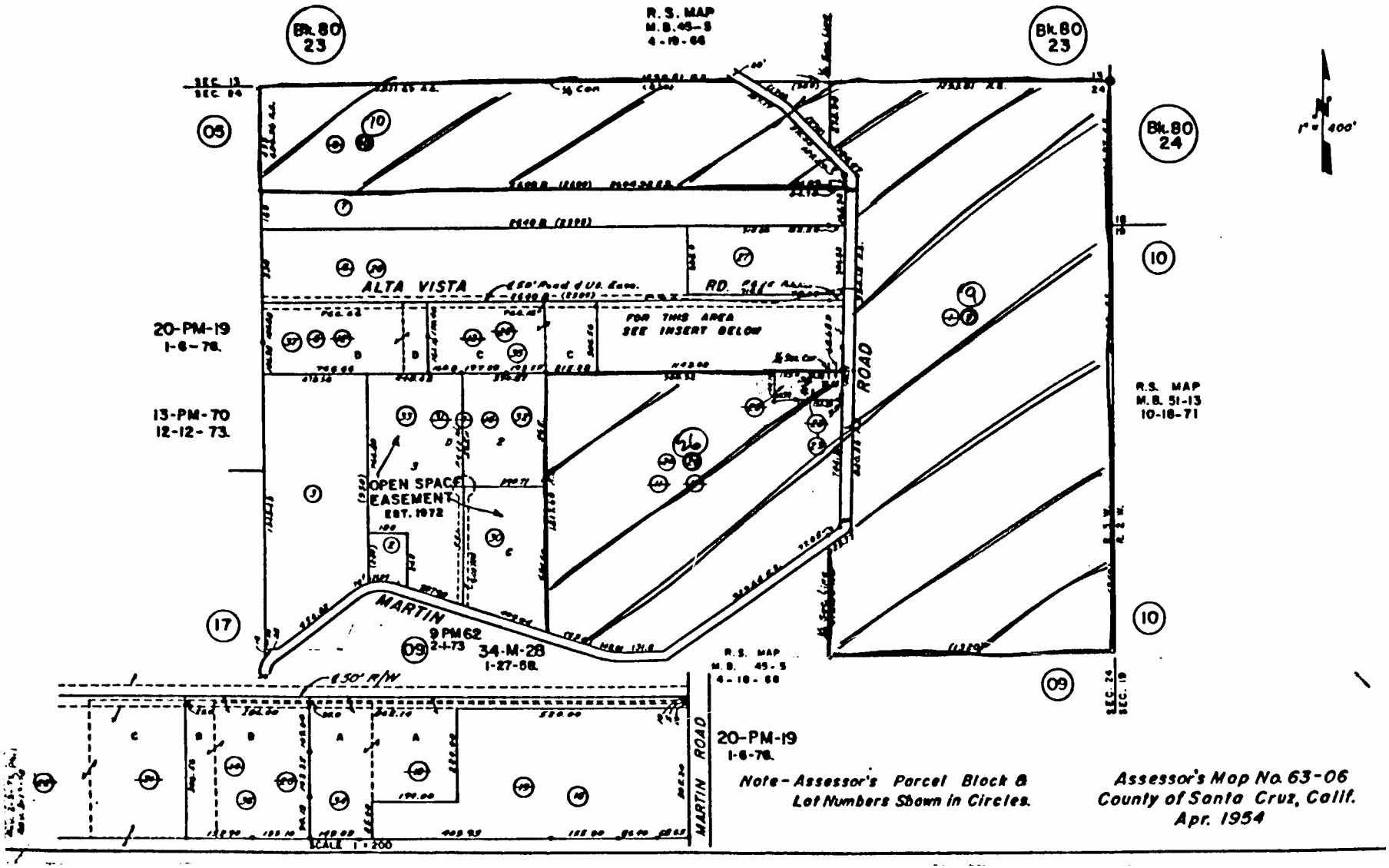
EXCEPTING THEREFROM THAT PORTION OF THE LANDS WHICH LIES NORTH OF THE CENTERLINE OF THE COUNTY ROAD KNOWN AS ICE CREAM GRADE.

A.P. No.: 080-191-19 (PARCEL TWO)
A.P. No.: 080-231-40 (PARCEL ONE)

FOR TAX PURPOSES ONLY

POR. N. ½ SEC. 24, T.10S., R.3W., M.D.B.&M.

Tax Area Code 63-06
58-001



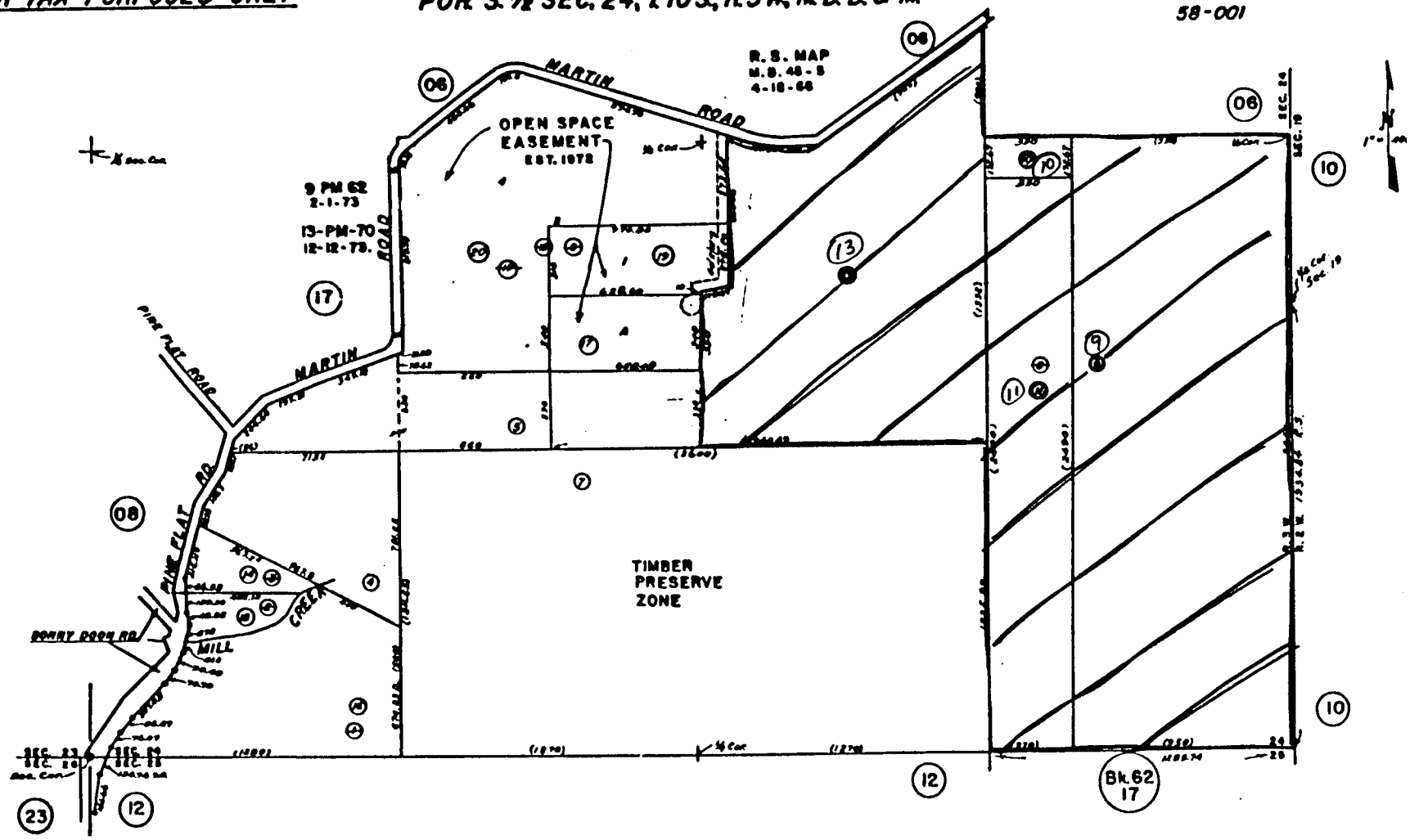
Note - Assessor's Parcel Block & Lot Numbers Shown in Circles.

Assessor's Map No. 63-06
County of Santa Cruz, Calif.
Apr. 1954

FOR TAX PURPOSES ONLY

POR S. 1/2 SEC. 24, T 10 S., R 3 W., M. D. B. & M.

Tax Area Code 63-0.
58-001



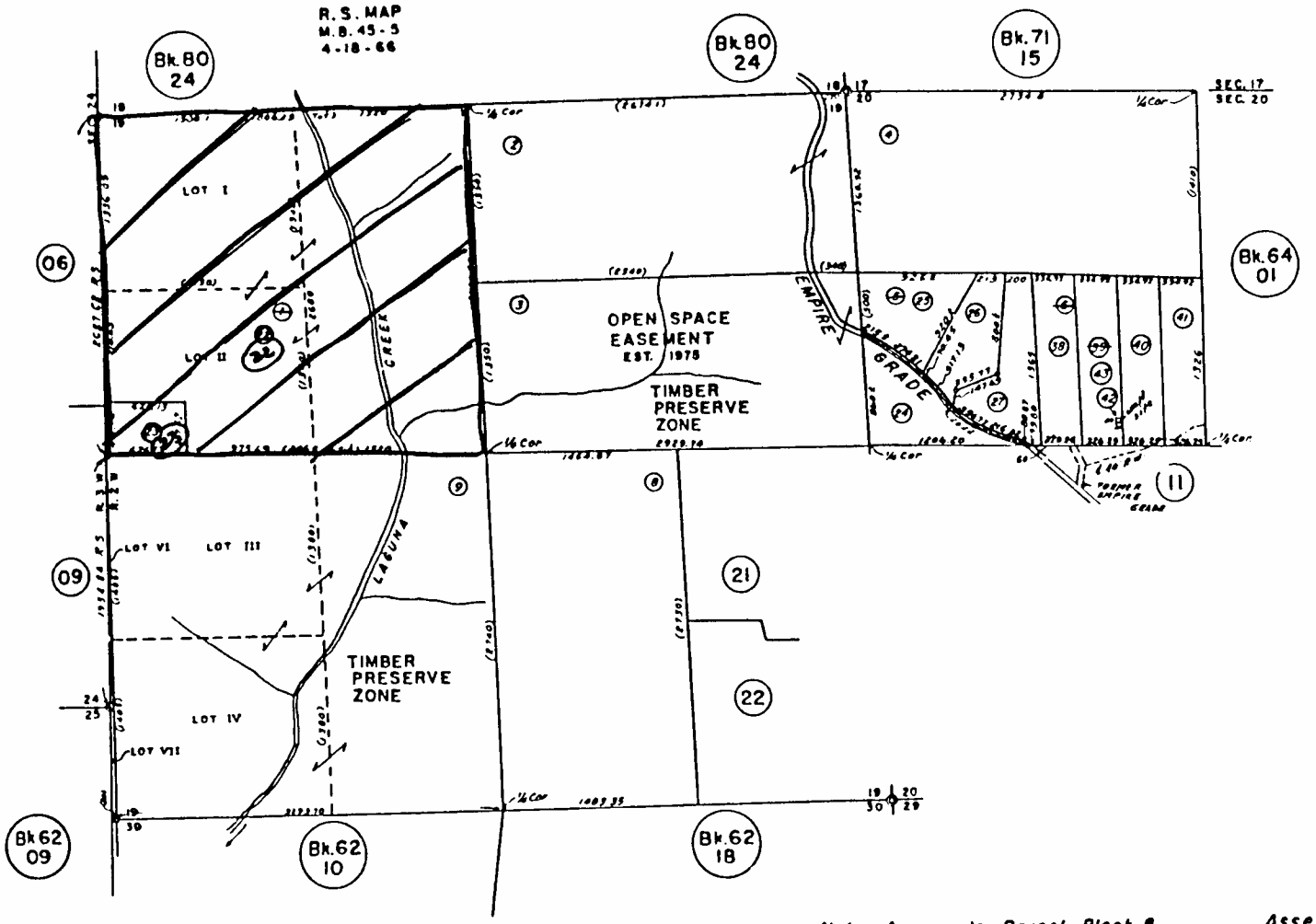
Note - Assessor's Parcel Block & Lot Numbers Shown in Circles.

Assessor's Map No. 63-0
County of Santa Cruz, Cal
Apr. 1954

? TAX PURPOSES ONLY

POR. SEC. 19 & 20, T. 10 S., R. 2 W., M. D. B. & M.

Tax Area Code 58-001 63-10



Note - Assessor's Parcel Block & Lot Numbers Shown in Circles.

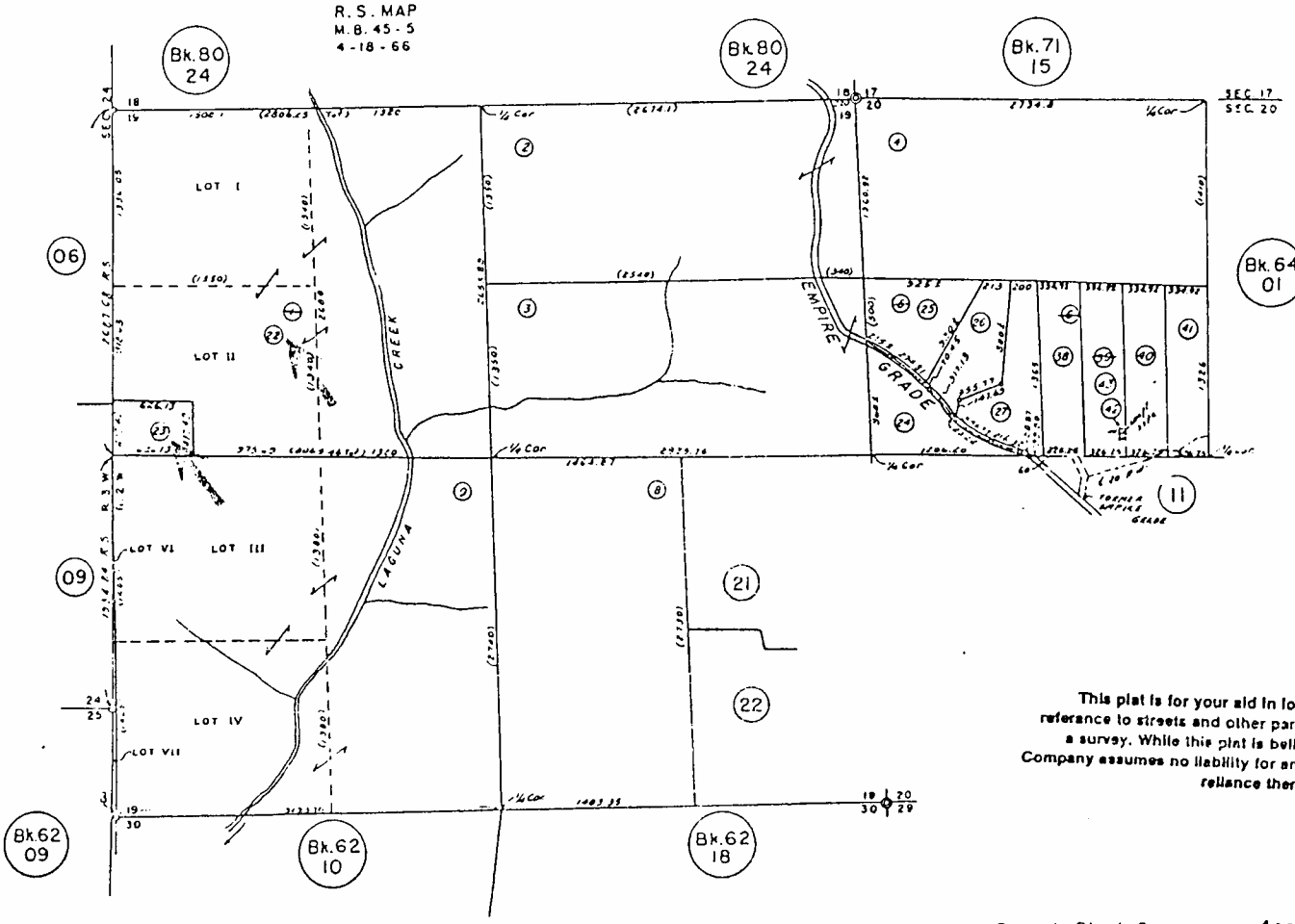
Assessor's Map No. 63-10
County of Santa Cruz, Calif.
Apr. 1954

1.9

FOR TAX PURPOSES ONLY

POR. SEC. 19 & 20, T. 10 S., R. 2 W., M.D.B. & M.

Tax Area Code 63-10
58-001



This plat is for your aid in locating your land with reference to streets and other parcels. It may or may not be a survey. While this plat is believed to be correct, the Company assumes no liability for any loss occuring by reason of reliance thereon.

Note - Assessor's Parcel Block & Lot Numbers Shown in Circles.

Assessor's Map No. 63-10
County of Santa Cruz, Calif.
Apr. 1954

951

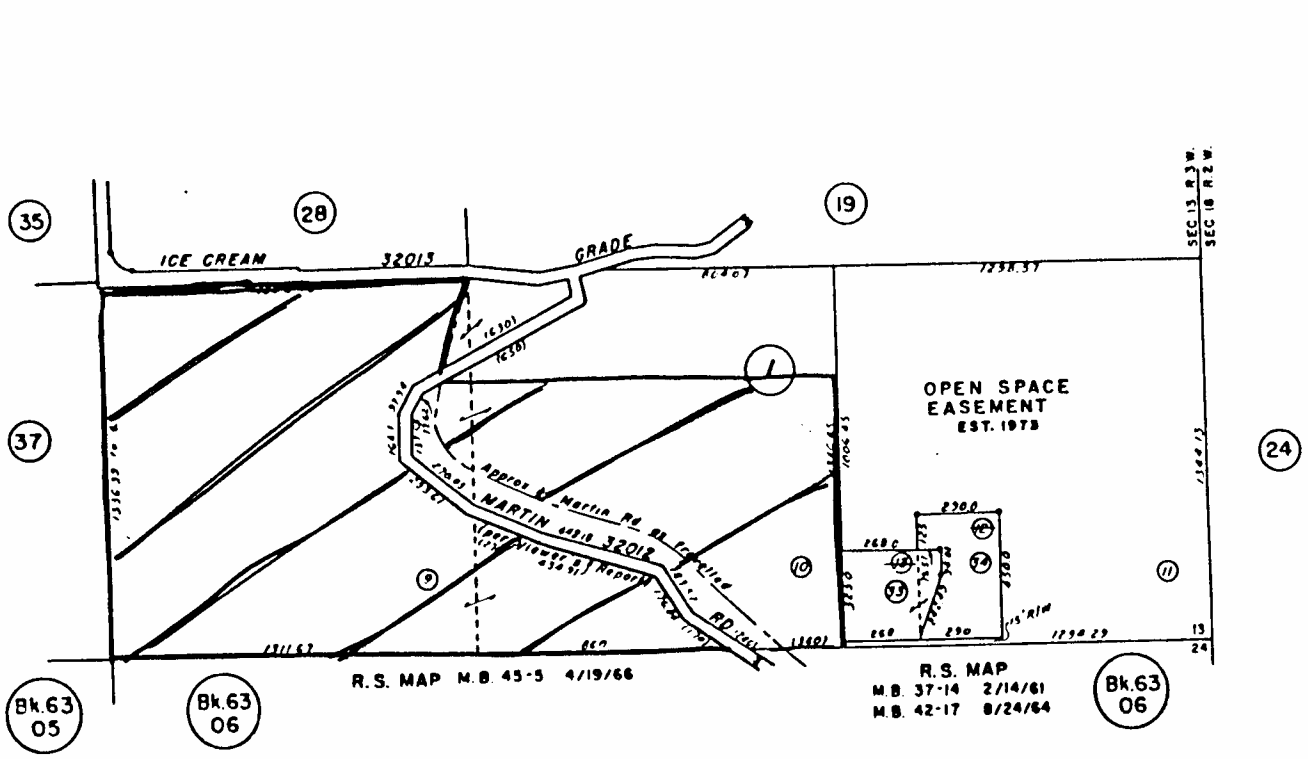
1.10

FOR TAX PURPOSES ONLY

POR. S. 1/2 SEC. 13, T. 10 S., R. 3 W., M.D.B.&M.

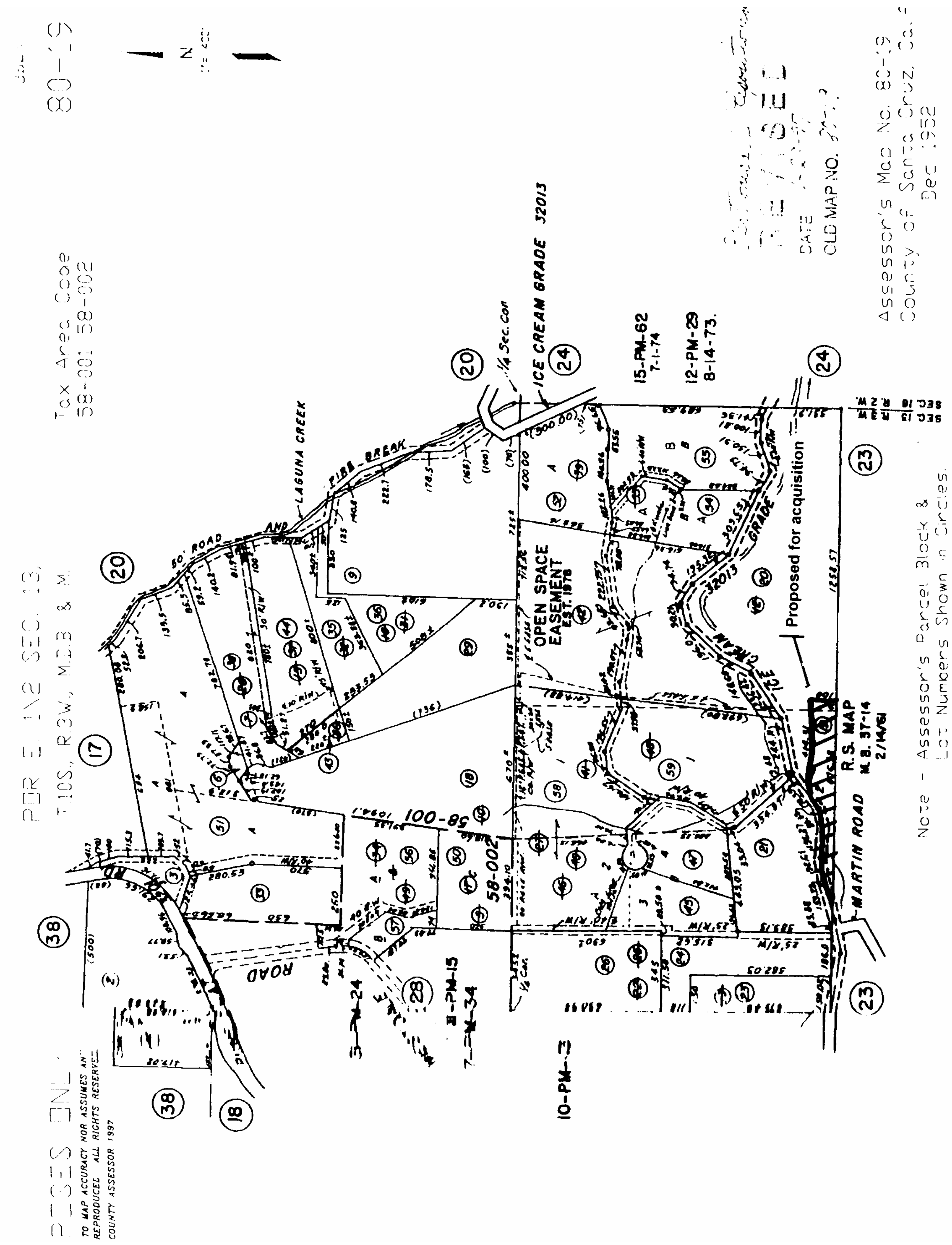
Tax Area Code
58-001

80-23



Note - Assessor's Parcel Block & Lot Numbers Shown in Circles

Assessor's Map No. 80-23
County of Santa Cruz, Calif.
July 1967


Tax Area Code
58-001 58-002
80-19
LAGUNA CREEK
FIRE BREAK
ICE CREAM GRADE 32013
1/4 Sec. Cor.
15-PM-62
7-1-74
12-PM-29
8-14-73.
OPEN SPACE
EASEMENT
EST. 1978
Proposed for acquisition
R.S. MAP
M.B. 37-14
2/14/61
MARTIN ROAD
58-002
58-001
10-PM-3
OLD MAP NO.
Assessor's Map No. 80-19
County of Santa Cruz, Cal.
Dec 1952
Note - Assessor's Parcel Block &
Lot Numbers Shown in Circles.
TO MAP ACCURACY NOR ASSUMES ANY
REPRODUCED. ALL RIGHTS RESERVED
COUNTY ASSESSOR 1997

Appendix 2

Vascular Plant Species of Bonny Doon Ecological Reserve

Vascular Plants of Bonny Doon Ecological Reserve
Compiled by Neal Kramer, CNPS
(Nomenclature according to Jepson, 1993)

FERNS and FERN ALLIES	Common Name	Spore Production	Status
BLECHNACEAE			
Blechnum spicant	deer fern	August-Jan.	
Woodwardia fimbriata	giant chain fern	Nov.-June	
DENNSTAEDTIACEAE			
Pteridium aquilinum var. *pubescens*	bracken fern	Sept.-Jan.	
DRYOPTERIDACEAE			
Athyrium filix-femina	lady fern	June-August	
Dryopteris arguta	coastal wood fern	May-Oct.	
Polystichum munitum	western sword fern	May-Nov.	
EQUISETACEAE			
Equisetum telmateia var. *braunii*	giant horsetail	March-May	
POLYPODIACEAE			
Polypodium californicum	California polypody	June-Sept.	
PTERIDACEAE			
Adiantum aleuticum	five-finger fern	June-Oct.	
Pentagramma triangularis ssp. *triangularis*	golden-backed fern	July-August	

CONIFERS	Common Name		
CUPRESSACEAE			
Calocedrus decurrens *	incense cedar		
Cupressus abramsiana	Santa Cruz cypress		FE, SE, List 1B
PINACEAE			
Pinus attenuata	knobcone pine		
Pinus contorta *	lodgepole pine		
Pinus ponderosa	ponderosa pine		
Pseudotsuga menziesii	Douglas fir		
TAXODIACEAE			
Sequoia sempervirens	coast redwood		

FLOWERING PLANTS - DICOTS	Common Name	Flowering Period	
ACERACEAE			
Acer macrophyllum	big-leaf maple	March-May	

ANACARDIACEAE		
Toxicodendron diversilobum	poison oak	March-May
APIACEAE		
Osmorhiza chilensis	wood sweet-cicely	April-Sept.
Sanicula crassicaulis	Pacific sanicle, gamble weed	Feb.-June
Torilis arvensis *	field hedge-parsley	June-July
APOCYNACEAE		
Vinca major *	greater periwinkle	year-round.
ARALIACEAE		
Aralia californica	elk clover	June-August
ARISTOLOCHIACEAE		
Asarum caudatum	wild-ginger	April-July
ASTERACEAE		
Achillea millefolium	yarrow	April-July
Adenocaulon bicolor	trail plant	May-Sept.
Agoseris grandiflora	large-flowered agoseris	April-Sept.
Arnica discoidea	rayless arnica	May-July
Artemisia douglasiana	California or Douglas mugwort	June-Nov.
Baccharis pilularis	coyote brush	August-Oct.
Cirsium vulgare *	bull thistle	June-Oct.
Conyza canadensis *	horseweed	June-Oct.
Erechtites glomerata *	cut-leaved coast fireweed	May-Dec.
Ericameria arborescens	golden-fleece	July-Oct.
Ericameria ericoides	mock heather	Sept.-Nov.
Eriophyllum confertiflorum var. *confertiflorum*	golden yarrow	March-Nov.
Filago californica	California filago	April-May
Filago gallica *	narrow-leaved filago	April-May
Gnaphalium californicum	green everlasting, California cudweed	May-August
Gnaphalium canescens ssp.*beneolens*	fragrant everlasting	July-Sept.
Gnaphalium purpureum *	purple cudweed	April-June
Gnaphalium straminium	everlasting cudweed	year-round.
Heterotheca grandiflora	telegraph weed	March-Oct.
Heterotheca sessiliflora ssp.*echioides*	bristly golden-aster	June-Sept.
Hieracium albiflorum	hawkweed	June-August
Hypochaeris glabra *	smooth cat's ear	March-Sept.
Hypochaeris radicata *	rough or hairy cat's ear	Feb.-August
Lactuca virosa *	wild lettuce	August-Sept.
Lessingia filaginifolia var. *filaginifolia*	California aster	May-Oct.
Madia graclis	slender tarweed, gumweed	May-July
Madia madioides	madia tarweed, woodland madia	April-Sept.
Picris echioides *	bristly ox-tongue	April-Dec

Psilocarphus tenellus var. *tenellus*	slender wooly-marbles	March-May	
Senecio aphanactis	California groundsel	Jan.-Mar.	
Solidago californica	California goldenrod	July-Nov	
Solidago canadensis ssp. *elongata*	Canada or meadow goldenrod	August-Nov.	
Stylocline gnaphaloides	everlasting nest straw	April-May	
BERBERIDACEAE			
Vancouveria planipetala	redwood ivy	April-Sept.	
BORAGINACEAE			
Myosotis latifolia	wood forget-me-not	March-May	
BRASSICACEAE			
Cardimine californica var. *californica*	milk maids, toothwort	Dec.-May	
Cardamine oligosperma	few-seeded bittercrest	Feb.-June	
Erysimum teretifolium	Santa Cruz wallflower	April-Sept.	FE, SE, List 1B
CAMPANULACEAE			
Campanula prenanthoides	California or Durand's harebell	June-Sept.	
CAPRILIFOLIACEAE			
Lonicera hispidula var. *vacillans*	hairy honeysuckle	May-June	
Symphoricarpos mollis	creeping snowberry	April-June	
CARYOPHYLLACEAE			
Cardionema ramosissimum	sand mat	April-August	
Cerastium fontanum ssp. *vulgare* *	larger mouse-eared chickweed	March-July	
Cerastium glomeratum *	mouse-ear chickweed	Mar.-Jan.	
Silene gallica *	common catchfly	April-Oct.	
Silene verecunda ssp. *platyota*		May-Sept.	
Spergula arvensis ssp. *arvensis* *	stickwort, starwort	Mar.-June	
Spergularia rubra *	red sand-spurrey	April-Sept.	
Stellaria nitens	shining chickweed	Feb.-April	
CELASTRACEAE			
Euonymus occidentalis var. *occidentalis*	western burning-bush	April-June	
CHENOPODIACEAE			
Chenopodium murale *	nettle-leaved goosefoot	June-Oct.	
CISTACEAE			
Helianthemum scoparium	common rush rose	April-August	
CRASSULACEAE			
Crassula connata	sand pygmy-weed	Feb.-May	
ERICACEAE			

Arbutus menziesii	madrone	March-May	
Arctostaphylos andersonii	heartleaf or Santa Cruz manzanita	Nov.-March	FSC, List 1B
Arctostaphylos nummularia	sensitive manzanita	Jan.-May	
Arctostaphylos silvicola	Bonny Doon or silver-leaved manzanita	Nov.-March	FSC, List 1B
Arctostaphylos tomentosa ssp. *crustacea*	brittle-leaved manzanita	Feb.-April	
Gaultheria shallon	salal	April-July	
Ledum glandulosum	Labrador tea	May-July	
Rhododendron macrophyllum	California rose bay	April-July	
Rhododendron occidentale	western azalea	May-July	
Vaccinium ovatum	California huckleberry	Feb.-June	
EUPHORBIACEAE			
Eremocarpus setigerus	turkey mullein, dove weed	June-Oct.	
Euphorbia pelus *	petty spurge	year-round.	
FABACEAE			
Acacia dealbata *	silver wattle		
Genista monspessulanus *	French broom	March-July	
Lathyrus latifolius *	perennial sweet pea	June-August	
Lathyrus vestitus var. *vestitus*	common Pacific pea	March-May	
Lotus formosissimus	coast hosackia	March-July	
Lotus heermannii var. *orbicularis*	wooly trefoil	May-Nov.	
Lotus micranthus	small-flowered trefoil	April-June	
Lotus purshianus var. *purshianus*	Pursh's trefoil	April-Oct.	
Lotus scoparius var. *scoparius*	California broom, deerweed	May-Oct.	
Lotus strigosus	strigose trefoil	March-Sept.	
Lupinus albifrons var. *albifrons*	silver lupine	March-June	
Lupinus bicolor	annual or miniature lupine	March-May	
Medicago polymorpha *	burclover	March-June	
Pickeringia montana var. *montana*	chaparral pea	May-July	
Rupertia physodes	Rupert's scurf-pea, California tea	March-July	
Thermopsis macrophylla var. *macrophylla*	false lupine	March-July	
Trifolium dubium *	shamrock	May-June	
Trifolium hirtum	rose clover		
Trifolium hybridum *	alsike clover	May-June	
Trifolium willdenovii	Willdenov's or tomcat clover	March-May	
Vicia americana var. *americana*	American vetch	March-May	
Vicia sativa ssp. *nigra* *	narrow-leaved vetch	March-July	
FAGACEAE			
Chrysolepis chrysophylla var. *minor*	golden chinquapin	July-August	
Lithocarpus densiflorus var. *densiflorus*	tanbark oak	May-July	
Quercus agrifolia	coast live oak	Feb.-April	
Quercus chrysolepis	canyon live oak	May-June	
Quercus wislizenii var. *wislizenii*	interior live oak	April- May	

GENTIANACEAE		
Centaurium davyi	Davy's centuary	April-July
GERANIACEAE		
Erodium botrys *	storksbill, long-beaked filaree	March-July
Geranium carolinianum	Carolina geranium	April-Oct.
Geranium dissectum *	cut-leaved geranium	April-Oct.
Geranium molle *	dove's-foot geranium, cranesbill	Feb.-June
GROSSULARIACEAE		
Ribes menziesii	canyon gooseberry	March-June
HYDROPHYLLACEAE		
Eriodictyon californicum	yerba santa	April-July
Nemophila parviflora var. *parviflora*	small-flowered nemophila	March-June
HYPERICACEAE		
Hypericum anagalloides	tinker's penny, creeping St. John's wort	March-August
Hypericum perforatum *	Klamath weed	June-Sept.
LAMIACEAE		
Lepechinia calycina	pitcher sage	April-July
Monardella undulata	curly-leaved monardella	May-August
Monardella villosa ssp. *villosa*	villose coyote mint	May-Sept.
Prunella vulgaris var. *lanceolata*	self-heal	April-Dec.
Satureja douglasii	yerba buena	May-August
Scutellaria tuberosa	tuberose or Dannie's skull-cap	March-June
Stachys ajugoides var. *rigida*	rigid bugle hedge nettle	May-Oct.
LYTHRACEAE		
Lythrum hyssopifolium *	hyssop loosestrife	April-Oct.
MYRICACEAE		
Myrica californica	wax myrtle	April-June
MYRTACEAE		
Eucalyptus globulus *	blue gum	Dec.-May
ONAGRACEAE		
Camissonia contorta	Douglas' evening primrose	March-June
Camissonia micrantha	small primrose	April-July
Camissonia ovata	sun cup	Feb.-June
Clarkia purpurea ssp. *quadrivulnera*	four-spot godetia	April-July
Epilobium spp.		
OROBANCHACEAE		
Boschniakia strobilacea	California ground cone	April-May

Orobanche fasciculata	clustered broom-rape	April-August	
OXALIDACEAE			
Oxalis corniculata *	creeping wood sorrel	Feb.-Nov.	
Oxalis oregana	redwood sorrel	Feb.-Sept.	
PAPAVERACEAE			
Dendromecon rigida	bush poppy	April- July	
Eschscholtzia californica	California poppy	March- Oct.	
PHILADELPHACEAE			
Whipplea modesta	modesty, yerba de selva	March- June	
PLANTAGINACEAE			
Plantago erecta	California plantain	Jan.-June	
Plantago lanceolata *	English plantain	April-Oct.	
Plantago maritima	maritime plantain	April-Nov.	
POLEMONIACEAE			
Collomia heterophylla	varied-leaved collomia	April-July	
Gilia tenuiflora ssp.		April-May	
Linanthus acicularis	bristly linanthus	April-May	
Navarettia atractyloides	holly-leaved or hooked navarettia	May-August	
Navarettia hamata ssp. *parviloba*			
Navarettia mellita	honey-scented navarettia	June-July	
Navarettia squarrosa	skunkweed	June-Oct.	
POLYGALACEAE			
Polygala californica	milkwort	April-July	
POLYGONACEAE			
Chorizanthe diffusa	diffuse spineflower	May-June	
Chorizanthe pungens var. *hartwegiana*	Ben Lomond spineflower	April-June	FE, List 1B
Eriogonum nudum var. *decurrens*	Ben Lomond buckwheat	June-August	List 1B
Polygonum persicaria *	lady's thumb	June-Oct.	
Rumex acetosella *	sheep sorrel	March-Sept.	
Rumex crispus *	curly dock	April-July	
Rumex salicifolius var. *salicifolius*	willow-leaved dock	May-August	
PORTULACACEAE			
Calandrina ciliata	red maids	Feb.-June	
Calyptridium umbellatum	pussy paws	June-July	
Claytonia perfoliata ssp. *perfoliata*	miner's lettuce	Feb.-May	
PRIMULACEAE			
Anagallis arvensis *	scarlet pimpernel	year-round.	
Trientalis latifolia	starflower	April-July	

RANUNCULACEAE			
Actea rubra	baneberry	March-May	
RHAMNACEAE			
Ceanothus cuneatus var. *cuneatus*	buck brush	Feb.-August	
Ceanothus papillosus var. *papillosus*	wartleaf ceanothus	April-May	
Ceanothus thyrsiflorus	blue blossom	March-May	
Rhamnus californica ssp. *californica*	California coffeeberry	May-July	
ROSACEAE			
Adenostoma fasciculatum	chamise	May-July	
Cotoneaster franchetii *	Franchet's cotoneaster	April-May	
Cotoneaster pannosa *	half-evergreen cotoneaster	April-June	
Crataegus spp. *	hawthorn		
Fragaria vesca	wood strawberry	May-July	
Heteromeles arbutifolia	toyon	June-July	
Horkelia cuneata ssp. *cuneata*	wedge-leaved horkelia	March-Sept.	
Horkelia marchinensis	Point Reyes horkelia	June-July	
Pyracantha angustifolia *	pyracantha, firethorn		
Rosa gymnocarpa	wood rose	April-Sept.	
Rosa spithamea	ground rose	May-August	
Rubus parviflorus	thimbleberry	March-August	
Rubus ursinus	creeping blackberry	April-August	
RUBIACEAE			
Galium aparine	goose grass	March-August	
Galium californicum ssp. *californicum*	California bedstraw	March-July	
SALICACEAE			
Salix scoulariana	Scouler's willow	Feb.-April	
Salix lasiolepis	arroyo willow	Feb.-April	
SAXIFRAGACEAE			
Boykinia occidentalis	brook foam	May-August	
Tiarella trifoliata var. *unifoliata*	lace flower, sugar-scoop	May-July	
SCROPHULARIACEAE			
Castilleja densiflora ssp. *densiflora*	owl's clover	March-May	
Castilleja foliolosa	wooly indian paintbrush	March-August	
Cordylanthus tenuis ssp. *vicidus*			
Digitalis purpurea *	foxglove	May-August	
Linaria canadensis	blue toadflax	Feb.-May	
Mimulus aurantiacus	sticky monkeyflower	March-July	
Mimulus guttatus	common monkeyflower	Jan.-Oct.	
Mimulus moschatus	musk monkeyflower	May-Nov.	
Mimulus rattanii	Rattan's monkeyflower	April-June	List 4
Verbascum thapsus	wooly mullein	June-Nov.	
Verbascum virgatum	wand mullein	May-Oct.	

SOLANACEAE		
Solanum americanum		
URTICACEAE		
Urticia dioica ssp. *holosericea*	hoary nettle	May-Oct.
VERBENACEAE		
Verbena lasiostachys var. *lasiostachys*	western verbena	May-Sept.
VIOLACEAE		
Viola ocellata	western heart's ease	March-June
Viola sempervirens	evergreen violet	Jan.-Oct.
Viola spp.		
VISCACEAE		
Phoradendron villosum	hairy or oak mistletoe	year-round.

FLOWERING PLANTS - MONOCOTS	**Common Name**	**Flowering Period**
CYPERACEAE		
Carex globosa	round-fruited sedge	May-August
Carex obnupta	slough sedge	April-Nov.
Carex spp.		
Cyperus eragrostis	tall or eragrostoid cyperus	May-Oct.
IRIDACEAE		
Iris macrosiphon	slender-tubed iris	March-June
Sisyrinchium bellum	blue-eyed grass	Feb.-May
JUNCACEAE		
Juncus balticus	Baltic rush	May-Oct.
Juncus bufonius var. *bufonius*	toad rush	May-Oct.
Juncus longistylis		
Juncus phaeocephalus var. *phaeocephalus*	brown-headed rush	March-August
Luzula comosa	hairy wood rush	Feb.-June
LEMNACEAE		
Lemna minor	small duckweed	June-Jan.
LILIACEAE		
Calochortus albus	white globe lily, fairy lanterns	April-June
Chlorogalum pomperidianum var.*pomperidianum*	indian soap plant, amole	May-June
Clintonia andrewsiana	Andrew's clintonia	April-June
Dichelostemma capitatum ssp. *capitatum*	blue dicks	Feb.-May
Disporum hookeri	Hooker's fairy bell	March-May
Lilium pardalinum ssp. *pardalinum*	leopard lily	June-Sept.

Smilacina racemosa	false Solomon's seal	March-May
Trillium ovatum ssp. *ovatum*	western trillium or wake robin	March-May
Xerophyllum tenax	bear-grass, indian basket grass	May-June
Zigadenus fremontia	Fremont's star lily or death camas	Feb.-Sept.
ORCHIDACEAE		
Corallorhiza maculata	spotted coralroot	April-July
Epipactis gigantea	stream orchid	April-August
Piperia transversa	transverse orchid	May-August
POACEAE		
Agrostis capillaris *	colonial bent	
Agrostis microphylla	small-leaved western bentgrass	May-July
Agrostis stolonifera	creeping bent	
Aria caryophyllea *	silver European hairgrass	March-June
Avena barbata *	slender wild oat	Feb.-June
Briza maxima *	rattlesnake grass	April-May
Briza minor *	quaking grass	Jan.-June
Bromus carinatus var. *carinatus*	California brome	March-July
Bromus diandrus *	ripgut grass	April-July
Bromus hordeaceus *	soft chess	March-June
Cortaderia jubata *	pampas grass	June-Oct.
Cynodon dactylon *	bermuda grass	May-Oct.
Cynosurus echinatus *	hedgehog or dogtail grass	June-August
Danthonia californica var. *californica*	California wild oatgrass	April-June
Deschampsia elongata.	slender hairgrass or elongate oatgrass	May-June
Elymus glaucus	blue wildrye	April-June
Holcus lanatus *	velvet grass	March-Oct.
Hordeum murinum ssp. *leporinum* *	wall barley, farmers foxtail	Feb.-July
Koeleria micrantha	June grass	April-June
Leymus triticoides	alkali wild rye	May-July
Lolium multiflorum *	Italian ryegrass	April-Oct.
Panicum acuminatum var. *acuminatum*	acuminate panic grass	May-July
Poa annua *	annual bluegrass	Feb.-Sept.
Vulpia microstachys var. *pauciflora*	Nuttall's or pacific fescue	April-May
Vulpia myuros var. *myuros* *	rattail or zorro fescue	March-May

* Introduced species.

Key to status codes:

FE = Federal endangered
SE = State endangered
FSC = Federal species of concern
List # = CNPS listing

Appendix 3

Wildlife Species of the Bonny Doon Ecological Reserve

Wildlife Species of the Bonny Doon Ecological Reserve

	Status	Occurrence
Fish		
Salmonidae		
➢Steelhead trout (*Oncorhynchus mykiss*)	FT	K
Amphibians		
Ambystomatidae		
➢Pacific giant salamander (*Dicamptodon ensatus*)		P
Salamandridae		
➢Rough-skinned newt (*Taricha granulosa*)		P
➢California newt (*Taricha torosa*)		K
Plethodontidae		
➢Ensatina (*Ensatina eschscholtzi*)		P
➢California slender salamander (*Batrachoseps attenuatus*)		P
➢Arboreal salamander (*Aneides lugubris*)		P
Bufonidae		
➢Western toad (*Bufo boreas*)		*p*
Hylidae		
➢Pacific tree frog (*Hyla regilla*)		P
Ranidae		
➢California red-legged frog (*Rana aurora draytonii*)	FT, CSC	*p*
➢Foothill yellow-legged frog (*Rana boylii*)	CSC	*p*
➢Bullfrog (*Rana catesbeiana*)		*p*
Reptiles		
Emydidae		
➢Southwestern pond turtle (*Clemmys marmorata pallida*)	CSC	*p*
Iguanidae		
➢Western fence lizard (*Sceloporus occidentalis*)		P
➢California horned lizard (*Phrynosoma coronatum frontale*)	CSC	P
Scincidae		
➢Western skink (*Eumeces skiltonianus*)		*p*
Teiidae		
➢Western whiptail (*Cnemidophorus tigris*)		*p*
Anguidae		
➢Southern alligator lizard (*Gerrhonotus multicarinatus*)		P

Colubridae		
➢Rubber boa (*Charina bottae*)		P
➢Western yellow-bellied racer (*Coluber constrictor mormon*)		P
➢Gopher snake (*Pituophis melanoleucus*)		P
➢Common kingsnake (*Lampropeltis getulus*)		*p*
➢California mountain kingsnake (*Lampropeltis zonata*)		*p*
➢Coast garter snake (*Thamnophis elegans terrestris*)		P
➢California red-sided garter snake (*Thamnophis sirtalis infernales*)		*p*
Viperidae		
➢Northern Pacific rattlesnake (*Crotalis viridis oreganus*)		P

Birds

Cathartidae		
➢Turkey vulture (*Cathartes aura*)		P
Accipitridae		
➢Sharp-shinned hawk (*Accipiter striatus*)	CSC	K
➢Cooper's hawk (*Accipiter cooperii*)	CSC	P
➢Red-shouldered hawk (*Buteo lineatus*)		P
➢Red-tailed hawk (*Buteo jamaicensis*)		K
➢Golden eagle (*Aquila chrysaetos*)	CSC, FP	P
Falconidae		
➢American kestrel (*Falco sparverius*)		K
➢Merlin (*Falco columbarius*)	CSC	P
Phasianidae		
➢California quail (*Callipepla californica*)		K
Columbidae		
➢Band-tailed pigeon (*Columba fasciata*)		K
➢Mourning dove (*Zenaida macroura*)		P
Cuculidae		
➢Greater roadrunner (*Geococcyx californianus*)		*p*
Tytonidae		
➢Common barn-owl (*Tyto alba*)		P
Strigidae		
➢Flammulated owl (*Otus flammeolus*)		K
➢Western screech owl (*Otus asio*)		P
➢Great horned owl (*Bubo virginianus*)		K
➢Northern pygmy-owl (*Glaucidium gnoma*)		P
➢Long-eared owl (*Asio otus*)	CSC	*p*
➢Northern saw-whet owl (*Aegolius acadicus*)		P
Caprimulgidae		
➢Common poorwill (*Phalaenoptilus nuttallii*)		K
Apodidae		

➢Vaux's swift (*Chaetura vauxi*)		K
➢White-throated swift (*Aeronautes saxatalis*)		K
Trochilidae		
➢Anna's hummingbird (*Calypte anna*)		K
➢Rufous hummingbird (*Selasphorus rufus*)		P
➢Allen's hummingbird (*Selasphorus sasim*)		P
Picidae		
➢Acorn woodpecker (*Melanerpes formicivorus*)		K
➢Nuttall's woodpecker (*Picoides nuttallii*)		P
➢Downy woodpecker (*Picoides pubescens*)		P
➢Hairy woodpecker (*Picoides villosus*)		K
➢Northern flicker (*Colaptes auratus*)		K
Tyrannidae		
➢Olive-sided flycatcher (*Contopus borealis*)		P
➢Western wood-pewee (*Contopus sordidulus*)		P
➢Ash-throated flycatcher (*Myiarchus cinerascens*)		P
➢Pacific-slope flycatcher (*Empidonax difficilis*)		P
➢Black phoebe (*Sayornis nigricans*)		P
Hirundinidae		
➢Purple martin (*Progne subis*)	CSC	*p*
➢Violet-green swallow (*Tachycineta thalassina*)		K
➢Cliff swallow (*Hirundo pyrrhonota*)		P
➢Barn swallow (*Hirundo rustica*)		K
Corvidae		
➢Steller's jay (*Cyanocitta stelleri*)		K
➢Scrub jay (*Aphelocoma coerulescens*)		K
➢Clark's nutcracker (*Nucifraga columbiana*)		*p*
➢Common raven (*Corvus corax*)		K
Paridae		
➢Chestnut-backed chickadee (*Parus rufescens*)		K
➢Plain titmouse (*Parus inornatus*)		K
➢Bushtit (*Psaltriparus minimus*)		K
Sittidae		
➢Red-breasted nuthatch (*Sitta canadensis*)		K
➢White-breasted nuthatch (*Sitta carolinensis*)		P
➢Pygmy nuthatch (*Sitta pygmaea*)		K
Certhiidae		
➢Brown creeper (*Certhia familiaris*)		P
Troglodytidae		
➢House wren (*Troglodytes aedon*)		K
➢Bewick's wren (*Thryomanes bewickii*)		K
➢Winter wren (*Troglodytes troglodytes*)		P
Sylviidae		

➢Golden-crowned kinglet (*Regulus satrapa*)	P
➢Ruby-crowned kinglet (*Regulus calendula*)	K
➢Blue-gray gnatcatcher (*Polioptila caerulea*)	K
Turdidae	
➢Townsend's solitaire (*Myadestes townsendi*)	*p*
➢Swainson's thrush (*Catharus ustulatus*)	K
➢Hermit thrush (*Catharus guttata*)	K
➢American robin (*Turdus migratorius*)	K
➢Varied thrush (*Ixoreus naevius*)	K
➢Western bluebird (*Sialia mexicana*)	K
Chamaeidae	
➢Wrentit (*Chamaea fasciata*)	K
Mimidae	
➢Northern mockingbird (*Mimus polyglottos*)	P
➢California thrasher (*Toxostoma redivivum*)	K
Bombycillidae	
➢Cedar waxwing (*Bombycilla cedrorum*)	P
Sturnidae	
➢European starling (*Sturnus vulgaris*)	K
Vireonidae	
➢Solitary vireo (*Vireo solitarius*)	P
➢Hutton's vireo (*Vireo huttoni*)	P
➢Warbling vireo (*Vireo gilvus*)	K
Parulidae	
➢Orange-crowned warbler (*Vermivora celata*)	K
➢Yellow-rumped warbler (*Dendroica coronata*)	K
➢Black-throated gray warbler (*Dendroica nigrescens*)	P
➢Townsend's warbler (*Dendroica townsendi*)	K
➢Wilson's warbler (*Wilsonia pusilla*)	K
Thraupidae	
➢Western tanager (*Piranga ludoviciana*)	P
Icteridae	
➢Brewer's blackbird (*Euphagus cyanocephalus*)	K
Fringillidae	
➢Black-headed grosbeak (*Pheuticus melanocephalus*)	K
➢Lazuli bunting (*Passerina amoena*)	P
➢Rufous-sided towhee (*Aimophila ruficeps*)	K
➢Brown towhee (*Pipilo fuscus*)	K
➢Chipping sparrow (*Spizella passerina*)	P
➢Fox sparrow (*Passerella iliaca*)	K
➢Song sparrow (*Melospiza melodia*)	K
➢Golden-crowned sparrow (*Zonotrichia atricapilla*)	K
➢White-crowned sparrow (*Zonotrichia leucophrys*)	K
➢Dark-eyed junco (*Junco hyemalis*)	K

➢Purple finch (*Carpodacus purpureus*)	P
➢House finch (*Carpodacus mexicanus*)	K
➢Red crossbill (*Loxia curvirostra*)	*p*
➢Pine siskin (*Carduelis pinus*)	P
➢Lesser goldfinch (*Spinus psaltria*)	K
➢American goldfinch (*Spinus tristis*)	P
➢Evening grosbeak (*Hesperiphona vespertina*)	*p*

Mammals

Didelphidae	
➢Virginia opossum (*Didelphis marsupialis*)	P
Soricidae	
➢Trowbridge shrew (*Sorex trowbridgii*)	K
Talpidae	
➢Broad-handed mole (*Scapanus latimanus*)	K
Vespertilionidae	
➢Yuma myotis (*Myotis yumanensis*)	P
➢Long-eared myotis (*Myotis evotis*)	*p*
➢Fringed myotis (*Myotis thysanodes*)	*p*
➢Long-legged myotis (*Myotis volans*)	*p*
➢California myotis (*Myotis californicus*)	P
➢Big brown bat (*Eptesicus fuscus*)	P
➢Red bat (*Lasiurus borealis*)	P
➢Hoary bat (*Lasiurus cinereus*)	P
➢Townsend's big-eared bat (*Plecotus townsendii*)	*p*
➢Pallid bat (*Antrozous pallidus*)	P
Molossidae	
➢Brazilian free-tailed bat (*Tadarida brasiliensis*)	*p*
➢Western mastiff bat (*Eumops perotis*)	*p*
Leporidae	
➢Black-tailed hare (*Lepus californicus*)	P
➢Audubon cottontail (*Sylvilagus audubonii*)	P
➢Brush rabbit (*Sylvilagus bachmani*)	P
Sciuridae	
➢California ground squirrel (*Spermophilus beecheyi*)	P
➢Merriam chipmunk (*Eutamias merriami*)	K
➢Western gray squirrel (*Sciurus griseus*)	K
Geomyidae	
➢Botta's pocket gopher (*Thomomys bottae*)	K
Heteromyidae	
➢California pocket mouse (*Perognathus californicus*)	P
Cricetidae	
➢Western harvest mouse (*Reithrodontomys megalotis*)	P

➢California mouse (*Peromyscus californicus*)		K
➢Deer mouse (*Peromyscus maniculatus*)		K
➢Brush mouse (*Peromyscus boylei*)		K
➢Pinyon mouse (*Peromyscus trueii*)		K
➢Dusky-footed woodrat (*Neotoma fuscipes*)		P
➢California meadow mouse (*Microtus californicus*)		P
Canidae		
➢Coyote (*Canis latrans*)		K
➢Gray fox (*Urocyon cinereoargenteus*)		K
Procyonidae		
➢Ringtail (*Bassariscus astutus*)	CFP	P
➢Raccoon (*Procyon lotor*)		P
Mustelidae		
➢Long-tailed weasel (*Mustela frenata*)		P
➢Badger (*Taxidea taxus*)	CSC	P
➢Spotted skunk (*Spilogale putorius*)		P
➢Striped skunk (*Mephitis mephitis*)		K
Felidae		
➢Mountain lion (*Felis concolor*)		P
➢Bobcat (*Lynx rufus*)		K
Suidae		
➢Wild boar (*Sus scrofa*)		K
Cervidae		
➢Black-tailed deer (*Odocoileus hemionus columbianus*)		K

Key to status codes:

F1 = Federal candidate category 1
F2 = Federal candidate category 2
CSC = California Species of Special Concern
CFP = fully protected

Key to occurrence codes:

K = known to occur
P = probably occurs
p = may occur

Appendix 4

Consultation with U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
Ventura Field Office
2140 Eastman Avenue, Suite 100
Ventura, California 93003

April 30, 1993

Ms. Jeannine DeWald
California Department of Fish and Game
P.O. Box 227
Davenport, California 95017

Subject: Bonny Doon Ecological Reserve Draft Management Plan

Dear Ms. DeWald:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Management Plan (Plan) prepared by the California Department of Fish and Game (Department) for the Bonny Doon Ecological Reserve (BDER) located in Santa Cruz County, California. The BDER contains the largest and most pristine remaining occurrences of several rare plant communities which are limited to old sand deposits in Santa Cruz County. We offer the following information and recommendations to aid you in planning for the preservation of sensitive wildlife habitats and federally-listed species within Santa Cruz County and as a means to assist you in complying with pertinent Federal statutes. The following comments are prepared in accordance with the Fish and Wildlife Act of 1956 (U.S.C. 742(a)-754), and other authorities mandating Department of the Interior concern for environmental values.

Pursuant to section 6 of the Act, a Cooperative Agreement for Endangered and Threatened Fish, Wildlife, and Plants exists between the Service and the Department which states that "the California Department of Fish and Game will carry out the activities identified in its program for the benefit of the endangered, threatened and rare fish, wildlife and plants which are resident in the State of California." According to the Plan, the overall management goals for the BDER are to protect and enhance the rare plant species and communities present on BDER; to promote non-consumptive public use consistent with resource protection, including education; and to increase our knowledge of the resources by fostering scientific research.

There are 94 species of vascular plants which are known to occur at the 515-acre BDER, including the federally endangered Santa Cruz cypress (Cupressus abramsiana), the federally proposed endangered Santa Cruz wallflower (Erysimum teretifolium), the federally proposed endangered Ben Lomond spineflower (Chorizanthe pungens var. hartwegiana), and the silver-leaved manzanita (Arctostaphylos silvicola), a category 2 candidate species.

Proposed management goals for the fire-adapted plant communities, including the Santa Cruz cypress, are to maintain and enhance populations of sensitive species and associated communities; reduce fuel loads and protect adjacent properties from wildfire; and to develop a mosaic of different-aged chaparral stands to reduce fire risk. As stated in the Plan, a fire management program will be developed to accomplish these goals and the California Department of Forestry will plan and implement cooperative burn projects at the BDER.

Periodic wildfires are critical to maintaining Santa Cruz cypress habitat value. If fires are too frequent, (i.e., less than 10 years), then the cypress trees would not be able to reach reproductive age and the grove could become extirpated. Conversely, the prolonged absence of fire (i.e., 200 years or more) could lead to lowered post-fire reproductive capability and the

extinction of the grove (Bartel and Knudsen, 1982 in Habitat Restoration Group 1993). Botanists have estimated that a fire frequency of 35-40 years will restore population vitality (Davilla, 1980 in Habitat Restoration Group 1993).

The Service wishes to inform the Department of the presence of three insect species that are endemic to the Maritime Coast Range Ponderosa Pine Forest (also known as sand parklands) that occur in the Santa Cruz Mountains, including the BDER. These species are the Mount Hermon june beetle (Polyphylla barbata), Zayante band-winged grasshopper (Trimerotropis infantilis), and Santa Cruz rain beetle (Pleocoma conjugens conjugens). The Service has been petitioned to list the Mount Hermon June beetle and Zayante band-winged grasshopper as endangered under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (Act) and we have forwarded a recommendation to our Regional Office to list these 3 species as endangered. We request that the BDER be revised to include these species and management actions that will provide for the long-term viability of these species and their habitats. Therefore, we recommend that management objectives for the Plan include protecting and enhancing the rare plant and animals species and communities present on BDER.

The Department should note that if any or all these insects are listed pursuant to the Act and if implementation of the BDER Management Plan would result in take of a listed species, the Department must first obtain a section 10(a)(1)(B) incidental take permit from the Service prior to implementation of the Plan. Hence, the Service urges the Department to include these three species of insects in the management goals, objectives, and tasks of the BDER Management Plan.

The Service is currently developing a Recovery Plan (Plan) for the Santa Cruz cypress and we would like to coordinate with the Department concerning management action recommendations. We anticipate the Recovery Plan will include recommended management actions such as the establishment of a monitoring plan to determine insect and disease infestations, establishment of buffer zones to non-compatible adjacent land uses, and the potential for artificial regeneration.

In addition to these comments, we have added a few technical comments (see Appendix A). We offer our continued cooperation and guidance throughout this process and if you have any questions concerning these comments, please contact Ms. Ellen Dillon of my staff at (805)644-1766.

Sincerely,

Constance Rutherford

for Craig Faanes
Field Supervisor

References Cited

Bartel, J. and M. Knudson. 1982. In: Habitat Restoration Group. 1993. Preliminary Draft Recovery Plan for the Santa Cruz Cypress. Habitat Restoration Group, Scotts Valley, California.

Davilla, B. 1980. In: Habitat Restoration Group. 1993. Preliminary Draft Recovery Plan for the Santa Cruz Cypress. Habitat Restoration Group, Scotts Valley, California.

Appendix A: Technical comments to the Bonny Doon Ecological Reserve Draft Management Plan (submitted by C. Rutherford, botanist, USFWS)

1. Page 6, bottom; and top of page 14: It is more appropriate to refer to "vegetation communities" or "plant communities". The term "vegetative" is used to distinguish between growth strategies (eg. vegetative as opposed to reproductive growth).

2. Page 8: Add Chorizanthe pungens var. hartwegiana into the description of Mixed Chaparral.

3. Page 15: Should "erosible" be "erodible"?

4. Appendix 3: Species lists are rarely arranged in phylogenetic order. Although Thomas' nomenclature is being followed, the list would be more accessible to the readership if it were in alphabetic order, either by family or by genus. You could still maintain categories for ferns, conifers, monocots, and dicots.

5. Page 36: Common name for Calyptridium is "pussypaws".

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

July 3, 1997

Jeannine M. DeWald
Monterey Branch Office
Department of Fish and Game, Region 3
P.O.Box 227
Davenport, California 95017

Subject: Draft Management Plan for the Bonny Doon Ecological Resrve

Dear Ms. DeWald:

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to comment on the draft management plan for the Bonny Doon Ecological Reserve (Reserve). The Service is currently developing a draft recovery plan for two insects and three plants from the Santa Cruz Mountains region that includes the area of the Reserve. The draft management plan that the California Department of Fish and Game has developed will be useful in identifying recovery tasks required for those species that occur on the Reserve.

In general, the plan offers a good historical and biological foundation for the management goals. It is well-organized and the tasks appear to address the needs of the resources. Our comments are minor in nature and are included as a separate enclosure to this letter. Please contact Connie Rutherford or Dave Pereksta of my staff at (805) 644-1766 if you have any questions concerning our comments.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

Enclosure

Page 16: Under the section titled Wildlife Populations, one objective presented is to determine the presence of the Santa Cruz kangaroo rat at BDER. However, this taxon is not mentioned in the text or marked in the Appendix as being of special concern. The rationale for surveying for this taxon and not other wildlife taxa should be discussed.

Page 17: In the sentence starting with "(A) trail committee. . .", it might be more appropriate to use the word "comprising" in place of the work "incorporating".

Page 19, first paragraph: This paragraph would be more appropriately presented in the bulletized Goal/Objective/Task format.

Page 19, same paragraph: The plan states that "trail revegetation will include sensitive species where possible". We suggest that revegetation may be biologically possible in some sites, but not appropriate for other reasons (e.g., vulnerable to disturbance). The sentence could be reworded to reflect this.

Page 23: Table 3 is confusing. The accompanying text should be expanded, and the terms that are used should be consistent between the two tables. For example, the table should clearly display material resources that are mentioned in the text.

Appendix 2: The document should note the person(s) that compiled the list of plant taxa found on the Reserve.

Appendix 5: The first paragraph states that identification of a management-related adverse effect would trigger changes in management as needed to alleviate problems. We agree that such an adaptive managament approach is appropriate and should be highlighted even more strongly in the plan. This could be done by developing another subsection under the section on the monitoring program that discusses how management will be modified based on the results of monitoring.

Appendix 5

Information on the Effects of Implementation of the Management Plan on Special Status Species

Information on the Effects of the Management Plan on Special Status Species
Bonny Doon Ecological Reserve Management Plan

I. Summary

The subject management plan was developed for property owned and managed by the Department of Fish and Game (DFG) as permanent undeveloped open space for the protection of sensitive species. The property is occupied by two State-listed plant species, the Santa Cruz cypress (*Cupressus abramsiana*) and Santa Cruz wallflower (*Erysimum teretifolium*). The plan incorporates measures designed to improve habitat conditions and population health for these species while accommodating appropriate public use and education. The proposed project will not jeopardize the continued existence of either species or result in destruction or adverse modification of habitat essential to their continued existence.

II. Project Description

The Bonny Doon Ecological Reserve (BDER) is a 552-acre property located on Ben Lomond Mountain in northern Santa Cruz County. The Reserve was purchased by the Wildlife Conservation Board (WCB) in 1989 to preserve a prime example of a unique assemblage of plant species known as sand parklands. This assemblage consists of several endemic species tied to sandy soils derived from marine deposits, and is found only in northern Santa Cruz County.

The primary objective of the Department in managing the Reserve is to provide long-term habitat protection for the sensitive species which occur there. The management plan is intended to guide management of habitats and species found at BDER, to serve as a descriptive inventory of fish, wildlife and native plant habitats which occur on or use this property, and to provide an overview of the area's operation and maintenance, and personnel requirements to implement management goals and objectives. Elements of the plan include inventory of floral and faunal assemblages, controlled burning to reduce wildfire hazard and reintroduce fire into the ecosystem, regulated passive recreational use, and encouragement of scientific and educational use.

III. Listed Species

BDER is occupied by two State-listed plant species. These are the Santa Cruz cypress (*Cupressus abramsiana*) (State and Federal endangered), and the Santa Cruz wallflower (*Erysimum teretifolium*) (State and Federal endangered).

The Santa Cruz cypress is a densely branched, moderately tall tree found only on sandy soils in northern Santa Cruz and southern San Mateo counties at elevations from 1020 to 2550 feet. It is typically associated with chaparral and pine forest communities. The BDER population is the largest of only five known to exist (Federal Register). The cypress produces serotinous cones which release seed when heated or mechanically abraded. Seedlings establish only in areas which are clear of trees and shrubs. Regeneration of the species is therefore largely dependent on the occurrence of fire or other ground-clearing disturbance at intervals which will permit the growth and reproductive maturation of trees (between 10 and 200 years) (U.S. Fish and Wildlife Service). The Santa Cruz cypress stands at BDER consist primarily of large older trees and include numerous fallen dead trees; a recent field visit indicated that seedlings and young trees comprised less than 10% of the community. Further demographic information is needed for this population.

The Santa Cruz wallflower is a biennial member of the mustard family with unusual filiform leaves. It produces clusters of yellow flowers during the spring of its second year. The wallflower is found only

on Zayante sands in Santa Cruz County from 400 to 2000 feet in elevation. It is associated with ponderosa pine, silver-leaved manzanita, and western bracken fern, occurring in open areas within the pine forest or chaparral communities. Fire is considered important in preventing succession to a more densely vegetated state which would eliminate wallflower habitat (DFG).

IV. Sources of Information

Department biologists have visited the site, and have reviewed the management plan and available technical information.

V. Project Effects on Listed Species

By providing long-term habitat protection, the project will benefit both listed species. Fuel management will foster regeneration of Santa Cruz cypress, leading to rejuvenation of the currently senescent stand. Fuel reduction and an appropriate level of trail use will maintain the open character necessary for Santa Cruz wallflower.

Habitat improvement activities must be carefully conducted to avoid an overly-hot or poorly timed fire which could jeopardize stands of the cypress or wallflower. Errors in burn design could adversely affect stand health of sensitive species. Excessive or inappropriate trail use could result in damage to the wallflower or young cypress seedlings. Loss of individuals may occur as a result of burning or trampling. However, because burning and trail use will be designed to avoid impacts, it is less than the risk of loss under unmanaged conditions.

VI. Conditions to Avoid Jeopardy

Any burns will be designed to avoid direct impacts to wallflower populations by designating appropriate location, season, and burn prescription. Burns in cypress habitat will only be done after experimental burning of slash piles, with ashes to be raked into the soil to accelerate nutrient recycling and seed germination. Information from these burns will be used to determine whether fire or mechanical disturbance is more appropriate.

The U.S. Fish and Wildlife Service and biologists familiar with the target species will be consulted during the design process to assist in developing appropriate treatments. Burns in sensitive species habitat will be done on a pilot basis, with small areas being treated and monitored. Expansion of these pilot burns will be contingent on the results.

Trails which would adversely impact sensitive plant species will be closed. Trails which remain in service will be monitored to detect evidence of resource damage, and will be closed if necessary.

VII. Conclusion

If the above written conditions are agreed to and fully implemented by the Department of Fish and Game, DFG has determined that the proposed project would not likely jeopardize the continued existence of the Santa Cruz cypress or Santa Cruz wallflower.

Literature Cited

Department of Fish and Game, Endangered Plant Program. Endangered Plant Notebook.

Federal Register, Vol. 52, No. 5. 50 CFR Part 17. January 8, 1987

U.S. Department of the Interior, Fish and Wildlife Service. Letter dated April 30, 1993.

_____ _____

Sonke Mastrup Date
Deputy Director

Appendix 6

Public Input

Management Plan Scoping Meeting

A public scoping meeting was held at the Bonny Doon Elementary School on August 27, 1992. Twenty-nine members of the public, primarily neighbors of the Reserve, attended. The Department was represented by Jim Lidberg (Associate Wildlife Biologist, San Luis Obispo), Jeannine DeWald (Associate Wildlife Biologist, Santa Cruz/Reserve manager), and Teresa Le Blanc (Assistant Regional Lands Coordinator). Management of the Reserve and public use were discussed. Points of discussion and suggestions made by the public are listed below. Attendees were concerned about maintaining public access to the Reserve, particularly for hiking and equestrian use. There was a high level of concern about ongoing problems with trespass and vandalism, and a perceived lack of effective law enforcement. There was considerable support for protecting and enhancing habitat quality. A number of people offered to assist with data collection, mapping, cleanup, and sharing information on historic use of the Reserve.

Fire Management
prescribed burns
pickup/harvest of downed wood

Sensitive Areas
erosion of sandy soils (behind fire station)
vernal pool?
listed plants vs. Trails
Warren Drive/Locatelli property - illegal access?
cliffs (sand outcroppings - private property now...possible closure?)

Public Suggestions
more signs needed
rural crime alert
local access for residents
need better communication between WLP and Sheriff
multi-use trail access with Gray Whale Ranch (Laguna Creek)/Warren Drive
volunteer mapping of vegetation available (need base maps)
additional acquisition to expand reserve
historical background
equestrian and foot trails - environmental impacts
continue equestrian use (short loops vs. connecting trails to other properties; historic trail access)
interim permit program to allow volunteer work, educational opportunities, etc.
public access and liability
aerial photos - availability?
UCSC research potential
mountain biking potential
leash law
interpretive activities - docent program

BONNY DOON FARM
GROWERS OF
FINE
ENGLISH LAVENDER

3·22·94

Dear Ms. DeWald,

I appreciate this opportunity to comment on the Draft Management Plan and to voice my concerns as a neighbor who should be negatively impacted by issues not fully addressed.

We applaud the goals and objectives outlined in the Draft Management Plan and appreciate the thought that went into these issues. We feel very strongly about the impact of the following: recreational use pedestrian or, horses, bicycle use, would not only be an outrage in this Ecological Reserve, but would, as documented by both Fish and Game and State Park System, be a policeing headache.

SOAPS
&
FINE TOILETRIES

600 MARTIN RD. BONNY DOON SANTA CRUZ, CALIF. 95060 U.S.A.
(408) 459-0967 FAX (408) 459-6700

BONNY DOON FARM
GROWERS OF
FINE
ENGLISH LAVENDER

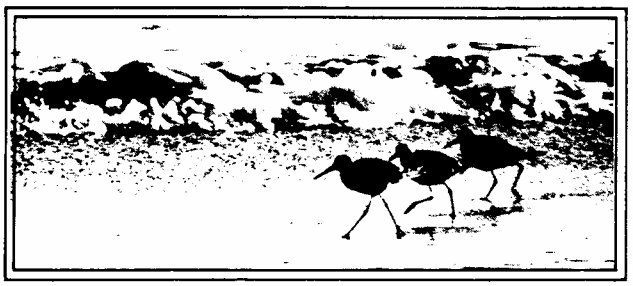
Wildlife withdrawal is a documented fact. We are opposed to any trail near our fence-line, the existing foot-traffic brings a distracting response from our dogs as they practice their watchful duties.

Educational use of the Reserve - we firmly support docent led tours of the Reserve to foster education, research and resource protection. The Reserve is a treasure to nurture

Most Sincerely
Gary Deichen

SOAPS
&
FINE TOILETRIES

600 MARTIN RD. BONNY DOON SANTA CRUZ, CALIF. 95060 U.S.A.
(408) 459-0967 FAX (408) 459-6700



City of Santa Cruz

CITY HALL - 809 CENTER STREET
SANTA CRUZ, CALIFORNIA 95060

Water Department

P.O.BOX 682 95061

ADMINISTRATION	429-3670
CUSTOMER SERVICE	429-3666
ENGINEERING	429-3676
LABORATORY	429-3679
WATER PRODUCTION	429-3680
LOCH LOMOND	335-7424
WATER CONSERVATION	429-3662

February 6, 1995

Bruce Elliott
Senior Biologist Supervisor
California Department of Fish and Game
20 Lower Ragsdale Dr., Ste. 100
Monterey, CA 93940

Dear Mr. Elliott:

The Water Department has been informed that horses are entering lands owned by the Department of Fish and Game which lie in the watershed of Lower Reggiardo Spring. The parcel is APN # 063-061-39. As you probably know this spring is a tributary of Majors Creek which is one of the City of Santa Cruz's drinking water sources.

It appears the animals are gaining access at two locations along Martin Road through the west portion of lands owned by Mr. Dave Jessen, APN # 063-061-40. We are concerned because horses are known carriers of the parasite *Cryptosporidium*, which causes the serious gastrointestinal disease cryptosporidiosis in humans.

Anything you are able to do to prevent these or any other large animals from encroaching on this or other watershed areas will provide an important service to the public and be greatly appreciated.

If you have any questions please call Terry Tompkins or me at the Water Department, 429-3670. Thank you very much for your attention to this matter.

Sincerely,

Bill Kocher
Water Director

TT
f&gregio.ltr

Appendix 7

Monitoring Program

Monitoring Program

In order to determine the effectiveness of DFG's management, including location and maintenance of trails, management of fuels, recovery of sensitive plant and animal species and habitats, monitoring of specific elements will be done on a scheduled basis. This will allow detection of any adverse impacts which might result from management activities. Identification of a management-related adverse effect will trigger changes in management as needed to alleviate the problem.

A. General vegetation monitoring

Permanent transects will be established to sample percent cover by species and fuel accumulation. Transects will be distributed throughout the reserve, allocated to adequately characterize each plant community and fuel management compartment. Transects will be 100 meters in length within homogeneous vegetation patches while length may vary based on patch size. Species will be noted at 1-meter intervals along each 100-meter transect (point intercept method). A five meter belt may also be utilized as a sampling regime to detect presence and absence of species as well. In addition, fuels will be characterized by size class along a plane that extends upward from the transect (plane intercept method). Data can be analyzed to determine vegetative associations, change in species composition over time, and fuel loading for fire management purposes.

B. Rare plant species monitoring

Demography of three rare plant species will be monitored: the Santa Cruz wallflower (*Erysimum teretifolium*), Santa Cruz cypress (*Cupressus abramsiana*), and Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*). Permanent plots will be established for the main population of Santa Cruz cypress, for each of two known colonies of Santa Cruz wallflower, and for two selected sub-populations of the Ben Lomond spineflower. Scattered individual cypress will also be monitored either with a global position system unit or by other means of locating the trees.

For Santa Cruz cypress and Santa Cruz wallflower, the plot will consist of the entire population or colony, gridded at a scale appropriate for the species; permanent stakes will mark the periphery of each grid. Populations will be measured to determine area extent of the population, number of individuals and location of each individual within the grid, size and age class of each individual, and reproductive output of each individual, or of a subset of the total number of individuals. Other information on human impact, herbivory, pollinators, pathogens, and estimated cover of associated species will be recorded. Data may be analyzed to determine population trends over time.

For Ben Lomond spineflower, two subpopulations will be identified for monitoring. The plot will consist of a grid established at the appropriate scale for the species; permanent stakes will mark the periphery of each grid. Populations will be measured to determine area extent of the population, number of individuals within each section of the grid, and reproductive output of a subset of the total number of individuals. Other information on human impact, herbivory, pollinators, pathogens, and estimated cover of associated species will be recorded.

C. Trail condition

Trails will be monitored for surface degradation, erosion, changes in width, and effects on adjacent vegetation. Surface degradation will be measured by difference in elevation between the trail and

ground adjacent to it on either side. Erosion will be monitored by visual inspection and designated photo stations. Trail segments expected to receive relatively heavy use will be periodically measured to detect changes in width. Vegetation transects will be established perpendicular to trails to monitor effects on vegetation. Where appropriate, vegetation transects parallel to the trail at short intervals may also be implemented to determine any effects on vegetation from trail use. All trail monitoring stations will be photographed to establish a visual reference for changes over time.

D. Water quality

Improper trail design or maintenance could lead to erosion, resulting in degradation of fisheries habitat. Regular monitoring of sediment, bedloading, and nutrient levels in Reggiardo and Laguna Creeks will be done to detect any problems.

ELEMENT	PARAMETER	METHOD	RESPONSIBLE PARTY	FREQUENCY/TIMING
GENERAL VEGETATION	SPECIES COMPOSITION, PERCENT COVER BY SPECIES, FUEL LOADING	10 PERMANENT 100 METER TRANSECTS, LINE INTERCEPT, PLANE INTERCEPT	DFG STAFF, VOLUNTEERS	1X/YEAR (SPRING PREFERRED)
SANTA CRUZ WALL-FLOWER	# OF INDIVIDUALS, REPRODUCTION, DISTRIBUTION	DEMOGRAPHIC (PERMANENT GRIDDED PLOTS, 1 PER POPULATION)	DFG STAFF, VOLUNTEERS	1X/YEAR, SPRING
SANTA CRUZ CYPRESS	# OF INDIVIDUALS, REPRODUCTION, DISTRIBUTION	DEMOGRAPHIC (PERMANENT GRIDDED PLOTS, 1 PER POPULATION)	DFG STAFF, VOLUNTEERS	1X/YEAR
BEN LOMOND SPINE-FLOWER	# OF INDIVIDUALS, REPRODUCTION, DISTRIBUTION	DEMOGRAPHIC (PERMANENT GRIDDED PLOTS FOR 2 POPULATIONS)	DFG STAFF, VOLUNTEERS	1X/YEAR, SPRING
TRAIL CONDITION	EROSION, SURFACE CHANGE, EDGE EFFECTS	TRANSECTS, PHOTOGRAPHY	DFG STAFF, VOLUNTEERS	2X/YEAR, SPRING AND FALL
WATER QUALITY	SEDIMENT	SUSPENDED SEDIMENT AND BEDLOAD SAMPLERS	DFG STAFF, VOLUNTEERS	PERIODICALLY TO INCLUDE ALL FLOW REGIMES