Natural Resource Management Plan
Coyote Lake - Harvey Bear Ranch County Park

Prepared for
Santa Clara County Department
of Parks and Recreation

Prepared by
Rana Creek Habitat Restoration

January 2004

Rana Creek Habitat Restoration
35351 East Carmel Valley Road Carmel Valley, California 93924
Tele.(831) 659 - 3811 Fax.(831) 659 – 4851

Acknowledgments

Santa Clara County Parks and Recreation Department

Lisa Killough, Director

Paul Romero, former Director
Mark Frederick, Planning and Development Program Manager
Don Rocha, Resource Management Program Supervisor
Antoinette Romeo, Park Planner – Natural Resource Management Plan Project Manager
Elish Ryan, Park Planner

Environmental Science Associates

Chris Rogers, Senior Ecologist

Bellinger Foster Steinmetz Landscape Architecture

Lee Steinmetz, Principle

Consultants

Rana Creek Habitat Restoration

Paul Kephart
Ryan Heacock
Marc Mungaray
Dale Hameister
Tricia Lowe
Mark Stromberg, PhD
Matina Kalcounis-Rueppell, PhD
Craig Hohenberger
Randy Morgan

Technical Advisory Committee

Sue Tippetts, Director – Community Projects Review, Santa Clara Valley Water District
Don Kendall – Division Chief, California Dept. of Forestry (Retired)
Wiley Evans – Division Chief, California Dept. of Forestry
Frances Brewster – Water Resources Specialist, Santa Clara Valley Water District
Peter Forest – Manager, San Martin Water County District
Patrick Congdon – Resource Manager, Santa Clara County Open Space Authority
Bill Headley – Parks/Facilities Manager, City of Gilroy
Amber Grady – County Planner, San Martin Planning Advisory Com. Liaison
Mori Struve – Deputy Director, Public Works Dept., City of Morgan Hill
Kay Robinson – Coe Park Superintendent, Henry Coe State Park (Retired)
Rollo Parsons – Manager, Design and Construction, County Roads Dept.
David Wright – Entomologist, US Fish and Wildlife Service
Martha Schauss – Wildlife Biologist, California Department of Fish and Game
Bob Power – South County Coordinator, Bay Area Ridge Trail
Irene Zwielein – Chair of Amah Mutsun Tribal Band, Native American Heritage
Dana Peak – Historical Heritage Coordinator, County Planning
Melissa Dargis – Environmental Resources Planner, Santa Clara Valley Water District
Franklin Maggi – Historical Heritage Commission
Rachael Gibson – Board Aide, Supervisor Don Gage

EXECUTIVE SUMMARY

Introduction

The intent of this Natural Resource Management Plan (NRMP) is to provide Santa Clara County Parks and Recreation Department with natural resource management programs for the Coyote Lake-Harvey Bear Ranch County Park. The NRMP is based on the description of existing biological conditions and opportunities and constraints analyses. Guiding principles for resource management are explained, and specific resource management practices are outlined.

This NRMP will be used to help define natural resource management as well as guide master planning issues. Development of the Master Plan by Bellinger Foster Steinmetz for Coyote Lake-Harvey Bear Ranch County Park has proceeded concurrently with development of the NRMP. Both documents will be reviewed in the Environmental Impact Report (EIR) prepared by Environmental Science Associates (ESA).

This NRMP provides goals and standards developed to guide resource management implementation in the Park. Goals are often broad statements describing desired future conditions or ecological outcomes. Standards define the ecological or physical condition of a resource that must occur to meet the goals. Management will be adaptive; standards will be monitored for each management area to ensure that goals are being met. If they are not met, specific prescriptions will be developed to meet the standards for each management area. The overall goals and objectives of the NRMP are to:

- *Preserve, conserve and enhance natural resources and ecological processes of the Park.*
- *Manage the Parkland through adaptive management.*
- *Develop guidelines and standards for resource management activities.*
- *Protect rare and endangered species and habitats for such species.*
- *Manage and protect sensitive plant communities.*
- *Minimize impacts of developments and land use on natural resources.*
- *Manage and control invasive non-native species of plants and animals.*
- *Provide monitoring components of the Natural Resource Management Plan in order to assess the effects of the NRMP recommendations and actions.*
- *Identify and define resource management areas within the Park.*
- *Maintain water quality at a level that meets State and regional water quality guidelines.*

Methods Used to Establish Management Areas

Management areas are areas that have different management objectives or "prescriptions" in terms of goals and standards, public access, natural resource management and protection, facilities development, and park operations. These areas are based on various resource values including physical geography, ecological communities, specific management issues and objectives, existing and past land uses, and recreation experiences by visitors.

Methods Used to Collect and Display Baseline Data

Baseline data were compiled from both existing sources and field surveys. Existing sources of data included the National Wetlands Inventory, USFWS Critical Habitat for Bay Checkerspot Butterfly (USFWS 2001a), the Natural Diversity Database (CDFG 2001), and GIS land use and vegetation layers provided by Pacific Meridian. Field surveys were performed to identify and evaluate potential for sensitive communities, plant species, mammals, birds, and amphibians. Existing erosion hazards were also identified through field surveys.

Whenever possible, data collected were included in an ArcView® geographic information system format. These files can be updated easily as new information is discovered and maps can be readily produced from electronic files. Maps included in the NRMP address:

- Existing Vegetation
- Biological Survey Locations
- Soils and Geologic Features
- Slopes
- Erosion Features
- Ranch Road and Trail Slope Analysis
- Hydrological Resources
- Resource Constraints
- Current Land Use
- Existing Infrastructure
- Proposed Grazing Management Areas
- Proposed Management Areas
- Existing Ranch Road Network – Segments to Retain and Abandon (Proposed)
- Proposed Trails

Existing Conditions

The Natural Landscape and Regional Land Use

The landscape of Coyote Lake-Harvey Bear Ranch County Park is composed of steep grass covered hills, a central ridge covered with oak woodland savanna, and woodland canyons. The land ranges in elevation from 300 feet in the lowlands to 1,300 feet along the ridgeline. With a temperate Mediterranean climate, the land is exposed to long, dry, hot summers, and seasonal winter rain.

Land use in the valley to the west is primarily industrial, agricultural, and residential. Small ranches, homes, and open space are the primary land use in the foothills and mountains. Livestock grazing, hay production, and agriculture are still present, but in recent years the region has shifted to industrial and urban land uses. Regionally, there is protected open space to the east, northeast, and northwest of the

Park. Henry W. Coe State Park includes more than 87,000 acres approximately 2-3 miles east and northeast of Coyote Lake-Harvey Bear Ranch County Park. LakeView Meadows, which is co-owned by the Nature Conservancy (5330 acres) and Santa Clara County Open Space Authority (3151 acres), extends along Palassou Ridge between the eastern shore of Coyote Lake and Henry W. Coe State Park. Anderson Lake County Park (2764 acres) and Coyote Creek County Park chain (2545 acres) are just northwest of the Park.

Geology and Soils, Slopes, and Erosion Hazards

The Mt Hamilton Range is composed of rocks of the Franciscan series. Franciscan rocks are among the oldest and most exposed in the central coast range. The Franciscan series is very complex and consists of various minerals, metamorphic, and igneous rocks often mixed together. The Franciscan base and overlying unaltered marine sediments contribute to the soil types found in the Park. These soil types and all faults extending through the Park have been mapped. Understanding the mechanical and physical properties of the soil types of the Park may guide the management of the Park vegetation. Soils information also provides information on judging the suitability of soil types for locations of recreation areas, trails, roads, and facilities.

An analysis of slope was performed using the topographic layer of the GIS for the Park. Existing erosion hazards were mapped, photographed, and characterized as gullies, head cuts, landslides, or eroded stream banks. Erosion hazards in the Park occur mostly on cut slopes, steep banks, and near disturbed areas.

Hydrologic Resources

The Park area contains four springs and seeps, nine stock ponds, and several intermittent and perennial streams. These features, as well as troughs and water tanks, are mapped. Watershed and standard basin boundaries are also mapped. Drainage within the Park is divided within the eastern edge from the central ridgeline draining into Coyote Creek (Coyote Creek Watershed). The springs and creeks which originate along the western flank of the foothills (from the central ridgeline) flow west down into the floor of Coyote Valley.

Sensitive Communities and Species

Several sensitive plant communities and one rare plant species occur in the Park. Sensitive plant communities include valley oak woodland, blue oak woodland, native grassland, serpentine grassland, freshwater wetlands, and willow riparian woodland. Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) is the only rare plant species known to occur in the Park. These are described in more detail in the section on existing conditions.

Approximately 617 acres lies within the Bear Ranch Unit of critical habitat for the Federally threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*), as designated by the U.S. Fish and Wildlife Service in 2001 (USFWS 2001a). Grasslands that support the butterfly's host plant species, California plantain (*Plantago erecta*), owl's clover (*Castilleja densiflora*), and *C. exserta* var. *exserta*) are considered critical habitat. These host plants occur in the Park, although there have been no confirmed sightings of the Bay checkerspot butterfly on the property.

Western pond turtle (*Clemmys marmorata*), a Protected California Species of Special Concern, occurs in the pond north of Bear Ranch House. No definitive sightings of the Federally threatened California red-legged frog (*Rana aurora draytonii*) were made in any of the ponds during 2001 surveys, nor were larvae of the Federal Candidate Species, California tiger salamander (*Ambystoma californiense*), found in seine hauls. However, potential exists for both species to occur in the Park.

Fourteen rare bird species were observed within Coyote Lake – Harvey Bear Ranch County Park during 1997 and/or 2001 surveys. Sixteen additional rare species are likely to occur in the Park but were not detected during surveys. No evidence of rare mammal species was observed during surveys.

Agricultural Resources and Land Use

The primary historic land use in the Park has been livestock grazing and hay production. Grazing has occurred continuously for well over one hundred years. Old fields and fencelines are evidence of past farming and grazing practices.

The primary current land use in the Park remains cattle grazing (Current Land Use Map) with public access and recreation permitted in the area immediately surrounding Coyote Lake. A small residential area is located in the western portion of the Park. County office and operations buildings are located in the southeastern portion of the Park (see Infrastructure Map and Hydrological Resources Map).

Management and Monitoring Guidelines

Grazing

The objective of the grazing prescription is to manage and promote perennial grass seedlings and/or relict native grass stands of the Park. Grazing may be used to reduce yellow star thistle and other broadleaf weed infestations. Grazing may also be used to reduce the standing dead biomass at the end of each growing season so that wildfire risks are minimized. An important aspect of grazing management will be to use grazing to reduce annual grass growth and litter build up that can compete with native annual wildflowers and forbs. These grassland flowers and herbs are important components of the habitat for listed Bay checkerspot butterfly

Grazing management areas are mapped and a grazing plan is provided. The grazing plan assigns stocking rates, schedules, and appropriate grazing intensities to each grazing management area.

Reducing the seed bank of exotic plants and favoring the regeneration of native species with grazing requires carefully monitored programs. Monitoring standards and procedures are provided.

Prescribed Fire

Some of the benefits of fire are that it: 1) can be timed to prevent seed maturation in annual exotic pest plants, 2) can help achieve biomass management objectives, and 3) can invigorate new growth in woody shrubs thereby enhancing browse for deer and other foragers. Periodic burns effectively remove the mulch layer, stimulate native plant regeneration and enhance the vigor of many bunch grasses (Bartolome 1980).

Careful consideration must be made before fire is used in a particular management area. This plan does not recommend the use of fire until detailed planning has been conducted and reviewed. Guidelines for development of a prescribed fire plan are presented. Monitoring methods are also provided.

Grassland Restoration

This section provides descriptions of several appropriate species for grassland restoration in the Park. Guidelines for collecting grass seed, controlling weeds, and planting seed are presented. A timetable for grassland restoration and monitoring is also provided.

Monitoring Methods and Success Criteria for all Grassland Restoration/Enhancement Techniques

Monitoring methods and success criteria are outlined for various grassland restoration and enhancement techniques (e.g. seeding, grazing, and burning).

Oak Woodland Restoration

Establishment of young oak trees is a stated natural resource management objective of this plan. Methods for collecting, processing, and planting acorns are provided. The plan also outlines monitoring methods and success criteria and provides a timetable for restoration and monitoring activities.

Protection and Enhancement of Freshwater Resources

The following are general Best Management Practices for protection and enhancement of the freshwater resources within the Park:

- Manage vernal basins, lakes, ponds, and riparian stream vegetation by controlling the frequency, timing, and duration of livestock exposure.
- Exclude livestock grazing activities by installing temporary or permanent fencing around stock ponds.
- Survey and identify invasive plant and animal species that could pose a threat to sensitive species.
- Restore degraded habitats and create new habitats that promote biodiversity and sensitive species.
- Manage livestock to prevent degradation of water quality in creeks and in Coyote Lake.

Planting native riparian and marsh vegetation around stock ponds will greatly increase habitat value for birds and amphibians. Methods for stock pond revegetation are provided including appropriate species, timing, and location.

Water quality and riparian/wetland vegetation should be monitored regularly to: 1) assess habitat quality for aquatic organisms; and 2) assure that recreational use and management activities within the Park are not degrading freshwater resources. Regular monitoring of freshwater resources will allow park management to quickly diagnose and address any impairment to water quality resulting from overuse by visitors, livestock, or wildlife (e.g. wild pigs). Monthly visual surveys of bank erosion and vegetative cover along stream banks, pond banks, and seasonal wetlands are recommended. Periodic sampling of nutrients and *E. coli* bacteria is also recommended. Monitoring methods and success criteria for each parameter are summarized.

Erosion Control

Many road banks, drainage areas, and stock ponds in the Park have been subject to recent and significant erosion events. These events are a result of heavy rain patterns, road cuts, and bare soil conditions. Erosion may lead to impaired water quality, destruction of native vegetation, and loss of valuable wildlife habitat. In addition, erosion may create safety hazards for Park staff and visitors. Therefore, it is imperative that erosion features be repaired and restored. Furthermore, proper management practices should be implemented to prevent future erosion. Several erosion control techniques as well as monitoring guidelines are provided.

Exotic Species Control

Invasive exotic plant species can be a major concern in managing relict native habitats. This section discusses basic precautions used to prevent introducing or spreading noxious weeds. Photographs and descriptions of invasive exotic species that occur in the Park are provided. Weed control methods, monitoring methods, and success criteria are also provided.

Sensitive Species Management

This section describes specific management and monitoring actions to protect sensitive species and their habitat. Guidelines are provided for species known to occur in the Park as well as those with potential to occur in the Park. Avoidance and mitigation measures are provided for trail construction activities where appropriate. These measures also appear in the recreation section summarized below.

Proposed Trail Plan

Potential environmental impacts from recreational trails proposed in the Master Plan are summarized. The proposed Parks Trail Plan is evaluated in detail. Recreational use has been restricted in several areas of the Park due to steep slopes, sensitive species/plant communities, or restoration maintenance issues. Trail construction and maintenance guidelines are provided for each of these areas. Long-term maintenance issues associated with the trail plan are also discussed, including restoration of abandoned roads. Finally, methods for reducing conflicts between grazing and visitor use are provided.

Proposed Management Areas and Maintenance Prescriptions

Proposed management areas are identified and maintenance prescriptions for each area are summarized. Proposed management areas are as follows: Annual Grassland/Mixed Chaparral, Sensitive Habitat – Blue Oak Woodland, Exotic Species Control, Sensitive Habitat – Native Grassland, Oak Woodland, Ranch Roads, Restoration/Erosion Control, Sensitive Habitat – Serpentine Grassland, Sensitive Habitat – Freshwater Resources, Special Status Species Habitat, and Geologic Fault Zone.

Potential Community Involvement Opportunities, Pilot Projects, and Review of Existing Successful Projects

A number of opportunities exist for community involvement in development and preservation of the Park. Potential volunteer programs are briefly discussed. Potential pilot projects are also identified for future consideration by the Parks Department.

TABLE OF CONTENTS

LIST OF MAPS

LIST OF APPENDICES

1. Introduction

1.1 Park Location and History

Coyote Lake – Harvey Bear Ranch County Park is located in the western foothills of the Mt. Hamilton Range, a sub-division of the Diablo Range of the Inner South Coast Ranges of California. The 4,448-acre Park lies east of the City of Gilroy in southern Santa Clara County. The site encompasses the entire western side of Coyote Lake, straddles the ridgeline that separates the upper Coyote Creek watershed and Coyote Lake from the Santa Clara Valley, and reaches to the valley floor near the community of San Martin. Drainage within the Park is divided with the eastern edge from the central ridgeline draining into Coyote Creek (Coyote Creek Watershed). The springs and creeks which originate along the western flank of the foothills (from the central ridgeline) flow west down onto the floor of Coyote Valley.

Coyote Lake Park was established in 1969 when the County entered into a long term lease with Santa Clara Valley Water District (SCVWD) to operate and maintain a park for recreational purposes. The SCVWD owns 760 acres including the lake and 125 acres contiguous to the lake. These leased lands, plus 36 acres of County owned lands comprise the original Park. In 1998 Santa Clara County Parks and Recreation Department acquired the Harvey Bear and Mendoza ranches, these acquisitions coupled with a small acquisition in 1997, have increased the size of the Park to 4,448 acres. The Park is now called Coyote Lake – Harvey Bear Ranch County Park.

In 1998, the Coyote Lake County Park - Resource Management Transition Plan was prepared. This plan has provided the Parks Department with natural resource management and restoration programs with which to administer the natural resources of the land until a Master Plan could be completed. The 1998 Transition Plan was a source of background and some baseline information for this Natural Resource Management Plan (NRMP). The NRMP, in turn, will establish the strategy for natural resource management in the Park as well as provide guidance for master planning issues. Development of the Master Plan for Coyote Lake-Harvey Bear Ranch County Park has proceeded concurrently with development of the NRMP. The Final Master Plan will encompass the NRMP. Both the Master Plan and the NRMP will be covered in the Environmental Impact Report (EIR) for the Park.

1.2 Purpose of the Natural Resource Management Plan for the Park

The intent of this Natural Resource Management Plan is to provide the Santa Clara County Parks and Recreation Department with natural resource management programs for the Coyote Lake-Harvey Bear Ranch County Park. The NRMP is based on the description of existing biological conditions and opportunities and constraints analyses. Guiding principles for resource management are explained, and specific resource management practices outlined.

Effective understanding of ecosystem processes and function requires biological analysis, which is addressed in detail in this document. This plan describes existing conditions including classification of native plant communities, soils, hydrology, and natural features. The objectives of the assessment and classifications are to:

- Describe current baseline information regarding the conditions of natural resources.
- Provide a basis for ecologically based management strategies.
- Describe recommendations for management methods aimed at maintaining and/or improving ecological status.

- Guide monitoring of the effects of prescribed management actions.

- Guide monitoring of recreation and development impacts on natural resources.

The monitoring of vegetation, water quality, sensitive habitat, erosion, and trail condition are key components of this plan. The resource management actions will be monitored in order to track the relative success of management activities. Based on monitoring, the resource management may be modified and/or adapted in order to reach the stated resource management goals.

1.3 Goals and Objectives of the Natural Resource Management Plan for the Park

The overall goals and objectives of the NRMP are to:

- Preserve, conserve, and enhance natural resources and ecological processes of the Park.

- Manage the Parkland through adaptive management.

- Develop guidelines and standards for resource management activities.

- Protect rare and endangered species and habitats for such species.

- Manage and protect sensitive plant communities.

- Minimize impacts of developments and land use on natural resources.

- Manage and control invasive non-native species of plants and animals

- Provide monitoring components of the Natural Resource Management Plan in order to assess the effects of NRMP recommendations.

- Identify and define resource management areas within the Park.

- Maintain water quality to a level that meets State and regional water quality guidelines.

2. Methods Used for Collection of Baseline Data

Based on the goals and objectives outlined/stated in Section 1.3, baseline environmental data were acquired to develop "management areas" (as defined in Section 2.1) for the Park. Baseline data were compiled from both existing sources and field surveys. The specific methods employed for mapping and field surveys are discussed below. Results are discussed in Section 3 (Existing Conditions).

2.1 Definition of Terms

The process of developing a management plan is based on the collection of baseline information. Baseline information is then analyzed and integrated, and often presented as an analysis of "opportunities and constraints". A similar process is used by the U. S. Department of Interior Bureau of Land Management (BLM) Resource Management Plans, and in the General Plan for California State Department of Parks and Recreation (CDPR). The product includes two aspects:

1) Management Areas, with associated Management Guidelines/Prescriptions

Management areas are areas that have different management objectives or "prescriptions" for public access, natural resource management and protection, facilities development, and park operations. Management areas are based on several factors including:

physical geography
ecological communities
specific management issues and objectives
existing and past land uses
desired uses

2) Goals and Standards

Goals are often broad statements describing desired future conditions or ecological outcomes. Standards define the ecological or physical condition of a resource that must occur to meet the goals. Standards will be monitored for each management area to ensure that goals are being met. Management will be adaptive; if standards are not met, specific prescriptions will be developed to meet the standards for each management area.

2.2 Methods for Defining Management Areas

A list of management areas and their definitions is provided in the table below.

Definition of Management Areas for Coyote Lake-Harvey Bear Ranch County Park

Management Area	Definition
Grazed Annual Grassland/Mixed Chaparral	Areas identified as annual grassland and chaparral in the GIS vegetation layer produced by Space Imaging.
Sensitive Habitat - Grazed Blue Oak Woodland	Areas defined as blue oak woodland in the GIS vegetation layer produced by Space Imaging.
Exotic Species Control	Areas identified during field surveys as infested with exotic pest plants (usually yellow star thistle).
Sensitive Habitat – Native Grassland	Areas identified as native grassland in the GIS vegetation layer produced by Space Imaging.
Grazed Oak Woodland	Areas identified as either coast live oak woodland or valley oak woodland in the GIS vegetation layer produced by Space Imaging.
Ranch Roads Trails	Existing roads and trails identified in the GIS land use layer produced by Space Imaging.
Restoration/Erosion Control	Areas identified during field surveys as erosion features.
Sensitive Habitat - Serpentine Grassland	Areas identified as serpentine grassland in the GIS vegetation layer produced by Space Imaging.
Sensitive Habitat - Freshwater Resources	Areas defined as wetland or riparian in the National Wetlands Inventory and/or the GIS vegetation layer supplied by Space Imaging.
Special Status Species Habitat	All areas known to support special status species according to one or more of the following sources: field surveys, USFWS Critical Habitat for Checkerspot Butterfly, the CDFG Natural Diversity Data Base.
Geologic Fault Zone	Based on GIS data from Santa Clara County Parks.

2.3 GIS Mapping

Whenever possible, data collected were included in an ArcView® geographic information system format. These files can be updated easily as new information is discovered, and maps can be readily produced from electronic files. Mapping included legal boundaries, hydrological features (streams, ponds, wetlands, water troughs, springs, lake shore, and watershed boundaries), soils, slopes, existing vegetation communities, ranch roads, adjacent city roads, vista points, structures, habitat for administratively listed sensitive species, power lines, pipelines, picnic areas, camping areas, and associated boat launches, restrooms, etc.

Maps included address:

- Existing Vegetation
- Biological Survey Locations
- Soils and Geologic Features
- Slopes
- Erosion Features
- Ranch Road and Trail Slope Analysis
- Hydrological Resources
- Resource Constraints
- Current Land Use
- Existing Infrastructure
- Proposed Grazing Management Areas
- Proposed Management Areas
- Existing Ranch Road Network – Segments to Retain and Abandon (Proposed)
- Proposed Trails

2.4 Baseline Survey Methods

2.4.1 Vegetation Surveys

Rana Creek Habitat Restoration performed two series of reconnaissance-level botanical surveys between 1997 and 2001. The first surveys were conducted on Bear and Mendoza Ranch lands in May, June, and July of 1997 as part of the Resource Management Transition Plan prepared by Rana Creek Habitat Restoration (1997). The second series of botanical surveys was conducted in April, May, and June of 2001 to update and expand on earlier survey results.

Plant communities were mapped (Existing Vegetation Map) during field surveys using a combination of aerial photographs and GPS. All survey data were then incorporated in the GIS database for the Park. A plant species list (Appendix 1) was also compiled during surveys.

The presence or absence of rare, threatened and endangered plant species, or habitat for such species, was determined in the field and through literature review. The California Native Plant Society *Inventory of Rare Vascular Plants of California* (CNPS *2000*) and The California Natural Diversity Data Base (CDFG 2001) were utilized for identification of known populations of State and federally listed rare, threatened and endangered plant species on or in the vicinity of the study site. Plant identification was validated using *The Flora of the Mount Hamilton Range of California* (Sharsmith 1945) and *The Jepson Manual* (Hickman 1993).

2.4.2 Wildlife Surveys

Initial reconnaissance - level field surveys to assess existing wildlife habitat conditions were conducted in 1997 during the botanical surveys. The survey identified habitat for sensitive wildlife, initiated a checklist of species that occur on the property, and a list of species with potential to occur on the property. A literature review and consultation with Resource Management Program Supervisor, Don Rocha provided the baseline information for the wildlife analysis. Dr. Mark Stromberg of the Hastings Biological Field Station located in Monterey County prepared the list of potentially occurring wildlife species. The 1997 surveys focused on evaluating potential habitat for two special status amphibians, California tiger salamander (*Ambystoma tigrium californiense*) and California red-legged frog (*Rana aurora draytonii*), as well as several special status bird species: Burrowing Owl (*Athene cunicularia*), White-tailed Kite (*Elanus caeruleus*), California Horned Lark (*Eremophila alpestris actia*), Loggerhead Shrike (*Lanius ludovicianus*), and Tricolored Blackbird (*Agelaius tricolor*).

In developing this management plan, additional information was gathered on birds, amphibians, and mammals (Appendix 2). The survey methods used for each group of wildlife are described below. All survey locations have been incorporated in the GIS database for the Park and mapped (Biological Survey Locations Map).

2.4.2.1 Amphibian Surveys

All amphibian, fish, and Western pond turtle surveys were performed under the direction of Dr. Mark Stromberg of the Hastings Biological Field Station located in Monterey County. In May and early June 2001, all ponds with water at Bear Ranch were seined for non-native fish, salamanders, frogs, and toads (Biological Survey Locations Map) and searched for Western pond turtle. In addition, pond edges and several areas within stream corridors were surveyed for California red-legged frogs (*Rana aurora draytonii*) and Western pond turtle. All species observed in either the 1997 or 2001 survey are included in Appendix 1.

2.4.2.2 Bird Surveys

Craig Hohenberger of the Ventana Wilderness Society Big Sur Ornithology Laboratory performed all bird surveys. Bird surveys were conducted June 3 and June 15, 2001 using area search methods. Three areas were searched on June 3rd (Biological Survey Locations Map): 1) a 1-km transect at the south end of Coyote Lake; 2) a 0.5-km transect at the north end of Coyote Lake near the dam; and 3) a 2-km transect to the west of Coyote Lake. All but the third transect were surveyed again on June 15th. Each search area was completely surveyed by the observer, and all birds detected by sound or site recorded by species. Density was calculated for each species based on the areas surveyed. All species observed in either the 1997 reconnaissance-level or the 2001 area transect survey are included in Appendix 1. A more complete description of the methods and results of these surveys may be found in Appendix 2 (*Breeding Bird Inventory Report for Coyote Lake-Harvey Bear Ranch County Park*)

2.4.2.3 Mammal Surveys

Dr. Matina Kalcounis-Rueppell of the Museum of Vertebrate Zoology, U.C. Berkeley, conducted mammal surveys during August 10-12, 2001. The specific placement of the traps (standard Sherman and B&B style traps) is shown in the Map of Biological Survey Locations. Traps were set in straight transects that had a trap placed approximately every 5 or 10 meters (approximated by counting paces). An effort was made to trap in the following representative habitat types: contiguous forest, rock-outcrops, grassland, and riparian edge. Surveys included a total of 190 trap nights. The full mammal report is attached in Appendix 2.

All mammals that were seen, captured, or for which evidence was observed are listed in Appendix 1. The list also includes those mammal species that have distributions that fall within the range of the property. In some cases, the habitat requirements of the species are not specifically met on the property and sightings and captures of the species are not expected.

2.4.3 Soil and Erosion Hazard Surveys

Available data relating to geologic features, soils, slopes, and aspects were incorporated in the aforementioned GIS database. Existing soil data were then verified through field surveys and mapped (Soils and Geologic Features Map).

Current erosion features were mapped using GPS and included in the database. In addition, an analysis of erosion potential was conducted by cross-referencing slope and aspect data against erodability ratings for individual soil types. Both current erosion features and areas of high erosion potential are delineated in the Erosion Features Map. Trail and road slopes are defined in the Road and Trail Slope Analysis Map.

3. Existing Conditions

3.1 The Natural Landscape

The landscape of Coyote Lake-Harvey Bear Ranch Park is composed of steep grass covered hills, a central ridge covered with oak woodland savanna, and woodland canyons that drain toward Coyote Lake. To the west, the property borders low elevation farmland and developed subdivisions. The land ranges in elevation from 300 feet in the lowlands to 1,300 feet along the ridgeline. With a temperate Mediterranean climate, the land is exposed to long, dry, hot summers, and seasonal rain. It rarely snows and, if it does, the snow does not persist.

A broad spectrum of plants and animals exist in the Park. The natural processes and interrelationships have developed over eons, and human kind has been a part of the nature and character of this magnificent landscape. Located in the western portion of the Mt. Hamilton range, this park provides a wonderful opportunity to connect and manage this land as a part of the greater mountain range and link this land to other Parkland, Open Space, and Natural Areas located to the north and east.

Fire, drought, grazing, and their interactions have influenced the composition of the natural landscape on a plant community and species scale. On a landscape level, the grasslands, chaparral, and woodland communities are closely associated with soils and hydrology. On drier sites, with nutrient deficient soils, chaparral species thrive. On well-developed soils that retain moisture, forest and native grasslands persist. The plant community composition of the Mt. Hamilton range has been highly altered due to the invasion of exotic species. Most of these invaders are drought, fire, and grazing adapted annual grasses and herbaceous plants. Where perennial grass, chaparral, and woodland species dominate, resistance to invasion of annuals is high.

The ridge top of the Bear Ranch overlooking Coyote Lake Reservoir

3.2 Regional Land Use

Land use in the valley to the west is primarily industrial, agricultural, and residential. Small ranches, homes, and open space are the primary land use in the foothills and mountains. Livestock grazing, hay production, and agriculture are still present, but in recent years the region has shifted to industrial and urban land uses. Regionally, there is protected open space to the east, northeast, and northwest of the Park. Henry W. Coe State Park includes more than 87,000 acres approximately 2-3 miles east and northeast of Coyote Lake-Harvey Bear Ranch County Park. LakeView Meadows, which is co-owned by the Nature Conservancy (5330 acres) and Santa Clara County Open Space Authority (3151 acres), extends along Palassou Ridge between the eastern shore of Coyote Lake and Henry W. Coe State Park. Anderson Lake County Park (2764 acres) and Coyote Creek County Parkchain (2545 acres) are just northwest of the Park.

3.3 Geology and Soils

The Mt. Hamilton Range is composed of rocks of the Franciscan series. Franciscan rocks are among the oldest and most exposed in the central coast range. Franciscan rocks have their origin as marine sediments lain down during the early Jurassic period. The geologic features are highly faulted, folded, and intruded with large quantities of igneous rocks. Franciscan series is very complex and consists of various minerals, metamorphic, and igneous rocks often mixed together. The Franciscan base and overlying unaltered marine sediments contribute to the soil types found in the Park. These soil types and all faults extending through the Park are delineated in the attached map (Soils and Geologic Features Map).

Understanding the mechanical and physical properties of the soil types of the Park may guide the management of the Park vegetation. The soils information also provides information on judging the suitability of soil types for locations of recreation areas, trails, roads, and facilities. The soils map contains the following soil types, the descriptions of which are provided below. The Park soil formations include edges of valleys, terraces, and ridges. Soils found there are of mostly clay subsoil.

Arbuckle-Pleasanton association

Arbuckle loam and Pleasanton loam: These soils are found on nearly level to sloping hills along the valley edges and consists of well-drained gravelly loams. These soils are often found on older alluvial fans created from sedimentary rock. These well-developed soils are suitable for dry land and irrigated agriculture. In some areas this association is suitable for development.

Cropley-Rincon association

Cropley clay and Rincon clay loam: These soils are well-developed, well-drained clays and clay loams dark in color and with gravelly substratum. They are mostly found in uplands on sloping hills and shallow slopes. These soils are suitable for irrigated crops and some land use but are more difficult to manage because of the high clay content.

Azule-Altamont association

Azule clay loam and Altamont clay: This soil is found mostly on uplands and foothills and consists of a wide variety of parent rock. The soil type is found mostly on steep hills and slopes. This soil type is suitable for range and watershed protection, but is not suitable for development.

Los Gatos-Gaviota association

Los Gatos and Gaviota are typically very steep, well drained, and shallow to deep gravelly loams. Gilroy clay loam, which is found in the Park, is also a part of this association but makes up a small percent. These soils are found mostly in the uplands.

Montara-Inks-Heneke association

Climara clay makes up a percentage of this association. This soil is often underlain by serpentine bedrock and is found on mostly steep to very steep excessively drained soils and also shallow gravelly clay and clay loams. The soils are shallow and vegetation consists of shrubs, pine, and scattered grass. The soils are primarily suitable for range and watershed protection.

Hillgate-San Ysidro association

Hillgate silt loam and San Yisidro loam are usually level to steep, moderately well drained silt loams and loams consisting of small percentages of clay. These soils are developed from alluvium and sedimentary rock. These soils are suitable for range, watershed protection, trails and secondary roads.

3.4 Slopes

An analysis of slope within the Park was performed. Results are illustrated in the attached maps (Slopes Map and Road and Trail Slope Analysis Map).

3.5 Erosion Hazards

Erosion hazards are found mostly on cut slopes, steep banks, and near human caused disturbances.
The following table provides the area or length of surveyed gullies, head cuts, landslides, and eroded stream banks. The locations of these features are provided in the Erosion Features Map. In addition, most of these features have been photo-documented (Appendix 3).

Landslide and gully complex

COYOTE LAKE – HARVEY BEAR RANCH COUNTY PARK EROSION HAZARDS	
Erosion Feature	**Area (ft^2) -length (ft)**
Gully 1 (G1)	7167.22ft^2
Gully 2 (G2)	9330.73ft^2
Gully 3 (G3)	16372.04ft^2
Gully 4 (G4)	20306.81ft^2
Gully 5 (G5)	5782.97ft^2
Headcut 1 (H1)	17025.52ft^2
Headcut 2 (H2)	16062.41ft^2
Headcut 3 (H3)	11929.11ft^2
Headcut 4 (H4)	3739.40ft^2
Landslide 1 (L1)	20020.09ft^2
Landslide 2 (L2)	3280.38ft^2
Landslide 3 (L3)	323986.32ft^2
Landslide 4 (L4)	94017.84ft^2
Landslide 5 (L5)	188838.00ft^2
Landslide 6 (L6)	33445.23ft^2
Landslide 7 (L7)	11362.57ft^2
Landslide 8 (L8)	79267.43ft^2
Landslide 9 (L9)	38115.87ft^2
Landslide 10 (L10)	112866.05ft^2
Landslide 11 (L11)	11612.03ft^2
Landslide/Headcut Complex 1 (LH1)	6101.12ft^2
Stream Channel Erosion 1 (SCE 1)	12585.63 ft
Stream Channel Erosion 2 (SCE 2)	1701.06ft
Stream Channel Erosion 3 (SCE 3)	19602.88ft
Stream Channel Erosion 4 (SCE 4)	62203.95ft
Stream Channel Erosion 5 (SCE 5)	22299.23ft
Stream Channel Erosion 6 (SCE 6)	5587.44ft
Stream Channel Erosion 7 (SCE 7)	6030.82ft
Stream Channel Erosion 8 (SCE 8)	7903.62ft

3.6 Hydrologic Resources

Drainage within the Park is divided with the eastern edge from the central ridgeline draining into Coyote Creek (Coyote Creek Watershed). The springs and creeks which originate along the western flank of the foothills (from the central ridgeline) flow west down onto the floor of Coyote Valley. The attached map (Hydrologic Resources Map) provides the locations of all ponds, streams, springs, troughs, and water tanks in the Park. In addition, watershed and standard basin boundaries are delineated on this map. Nine ponds, four springs, and 18.48 miles of intermittent and perennial streams occur in the Park. Measures for protection and management of freshwater resources are described in Section 4.6.

3.7 Plant Communities

The vegetation of Coyote Lake-Harvey Bear Ranch County Park is highly diverse and includes several

sensitive communities such as serpentine grassland, blue oak woodland, and wetlands. Each of these communities is described below and delineated in the attached map (Existing Vegetation Map). There are a number of plant classification systems currently in use by vegetation ecologists. We have cross-referenced our plant community descriptions below to the recognized community classifications defined by Holland (1986), Sawyer and Keeler-Wolf (1995), and CNDDB (2002). Plant communities have also been cross-referenced to the California Wildlife Habitat Relationships System developed by CDFG (Mayer and Laudenslayer 1998).

3.7.1 Non-sensitive Plant Communities

3.7.1.1 Mixed Chaparral

Diablan sage scrub occurs in few scattered locations on isolated rocky outcrops and as a component of the oak woodlands. Approximately 9.5 acres is dense shrubland vegetation dominated by shrubs of California sagebrush (*Artemisia californica*), coyote brush (*Baccharis pilularis*), and chamise (*Adenostoma fasciculatum*). Herbaceous plants are scattered throughout the shrubland understory. Foothill needlegrass (*Nassella lepida*), soap plant (*Chlorogalum pomeridianum*), monkey flower (*Mimulus aurantiacus*), and golden yarrow (*Eriophyllum confertifolium*) are commonly found associated with the larger shrubs. Isolated patches of scrub are found on steep rocky slopes and rock outcrops.

Community Classifications:

CNDDB (2002): California Sagebrush Scrub 32.010.00
Holland (1986): Diablan Sage Scrub 32600
Sawyer and Keeler-Wolf (1995): California Sagebrush Series
CDFG CWHR (1998): Mixed Chaparral (in part); Coastal Scrub (in part)

Chaparral area dominated by California sagebrush (*Artemisia californica*)

3.7.1.2 Annual Grassland

Native grasses and plants once dominated the grassland and woodland plant communities of the coast ranges of California. Native perennial grasses have been gradually replaced by non-native introduced annual grasses and weeds primarily by soil tillage, farming, and intensive overgrazing. Non-native grasslands of the Park contain ryegrass (*Lolium multiflorum*), wild oats (*Avena barbata*), soft chess (*Bromus hordaceous*), ripgut brome (*Bromus diandrus*), and rattail fescue (*Vulpia myuros*). Most dominant are ryegrass and forbes such as filaree (*Erodium cicutarium*), black mustard (*Brassica nigra*), thistle (*Cirsium* spp.), rose clover (*Trifolium hirtum*), and yellow star thistle (*Centaurea solstitialis*).

Most of the annual grassland, including the annual herbaceous understory of the blue oak woodland, is dominated by annual introduced grasses. The aforementioned non-native grasses and forbs have become naturalized and, without intensive restoration efforts, will remain as a stabile plant community. The non-native grasslands are found primarily on westerly facing, gently sloping hills and swales at lower elevations of the properties. A great majority of the non-native grasslands have been invaded by yellow star thistle and, in some instances, large dense stands form closed canopy monocultures. Non-native annual grassland occupies 2,296.66 acres of the Park.

Community Classifications:

CNDDB (2002): California Annual Grassland 42.040.00
Holland (1986): Non-native Grassland 42200
Sawyer and Keeler-Wolf (1995): California Annual Grassland Series
CDFG CWHR (1998): Annual Grassland

Annual grasslands in winter

Annual grasslands in summer

3.7.1.3 Coast Live Oak Woodland

Coast live oak woodland occurs in the eastern portion of the property on gently sloping hills, swales, and canyons. Coast live oak woodland is scattered over 440.25 acres and dominated by coast live oak (*Quercus agrifolia*) in all areas, but buckeye (*Aesculus californica*) is often present as an associate species. Native understory plants include wild blackberry (*Rubus ursinus*), bugle hedge nettle (*Stachys ajugoides*), wood fern (*Dryopteris arguta*), and poison oak (*Toxicodendron diversilobum*). Toyon (*Heteromeles arbutifolia*) is occasional in openings. Non-native grasses dominate the oak woodland understory.

Oaks provide habitat for nesting and migratory birds. Thousands of insect species also inhabit the oak woodlands. The understory environment supports many shade tolerant shrubs. The associated vegetation is typically composed of wild blackberry (*Rubus ursinus*), snowberry (*Symphoricarpos albus*), miner's lettuce (*Claytonia perfoliata*), blue wild rye (*Elymus glaucus*) and poison oak (*Toxicodendron diversilobum*). Yampa (*Perideridia kelloggi*), bedstraw (*Galium californicum*), and sanicle (*Sanicula crassicaulus*) are herbaceous plants frequently found among the oak woodland understory.

Year-round livestock grazing, type-conversion from perennial grass to annual grass understory, increased populations of pocket gophers, development, and firewood harvesting have had significant impacts on oak forests throughout California. In the Park, oak regeneration is mostly confined to steep canyon side slopes inaccessible to livestock and ground squirrels. Coast live oak seedlings are sporadically found but very few valley or blue oak seedlings occur.

Community Classifications:

CNDDB (2002): Coast Live Oak Forest and Woodland 71.060.00
Holland (1986): Coast Live Oak Woodland 71160
Sawyer and Keeler-Wolf (1995): Coast Live Oak Series
CDFG CWHR (1998): Coastal Oak Woodland

Live oak woodland with some scattered valley oaks

3.7.2 Sensitive Plant Communities

Several sensitive plant communities and one rare plant species occur in the Park. Sensitive plant communities include: valley oak woodland, blue oak woodland, native grassland, serpentine grassland, freshwater wetlands, and willow riparian woodland. Big-scle balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) is the only rare plant species known to occur in the Park (Section 3.8.1).

3.7.2.1 Valley Oak Woodland

Valley oak woodland typically occurs on deep, alluvial soils in valleys. Valley oaks (*Quercus lobata*) are usually the only trees present in this open-canopy woodland. Eighty-five acres of the Park contain valley oaks. Annual grasses most often dominate the understory. Creeping wild rye (*Leymus triticoides*), poison oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), and California rose (*Rosa californica*) are common native species.

Valley oak woodland occurs along swales and canyons, particularly in the eastern portion of the Park. Valley oak seedlings are rare in these areas, apparently reflecting trends in valley oak regeneration throughout much of California over the past 75-125 years (Pavlick et al. 1991). Agriculture and urbanization have severely reduced the extent of this community, particularly in the Central Valley. Due to its rarity and to slow regeneration, valley oak woodland is considered a sensitive community by the California Department of Fish and Game (CDFG 2002).

Community Classifications:

CNDDB (2002): Valley Oak Woodland 71.040.08
Holland (1986): Valley Oak Woodland 71130
Sawyer and Keeler-Wolf (1995): Valley Oak Series
CDFG CWHR (1998): Valley Oak Woodland

Valley oak (*Quercus lobata*) in winter

3.7.2.2 Blue Oak Woodland

Blue oak woodland is dominated by blue oak (*Quercus douglasii*), a highly drought tolerant species adapted to growth on thin soils in the dry foothills. Blue oaks grow slowly in these soils and may take decades to reach maturity. Blue oak woodland areas are small. Only 14.72 acres of the Park contain this sensitive plant community. Buckeye (*Aesculus californica*), and gray pine (*Pinus sabiniana*) are associate tree species in this community. Understory species include annual grasses, holly-leaf cherry (*Prunus ilicifoia*), poison oak (*Toxicodendron diversilobum*), and coffeeberry (*Rhamnus californica*). Blue oak woodland is considered a sensitive community by the California Department of Fish and Game (CDFG 2002) when the following association is present: Blue oak – valley oak – coast live oak/grass. This association occurs in the Park.

Community Classifications:

CNDDB (2002): Blue Oak Woodland 71.020.00
Holland (1986): Blue Oak Woodland 71140
Sawyer and Keeler-Wolf (1995): Blue Oak Series
CDFG CWHR (1998): Blue Oak Woodland

Blue oaks with other associated species

3.7.2.3 Native Grassland

Native grasslands classified as needlegrass (*Nassella* spp.) series are found on the open hills and extend into chaparral and oak woodland glades. Native species dominate this plant community. Small intact remnants are found scattered throughout the upper elevations and are quite extensive. The grasslands typically are found on slopes, glades, and swales where seasonal moisture retention is high. The native grasslands, while small and fragmented, are relatively high in species diversity. Foothill needlegrass (*Nassella lepida*), purple needlegrass (*Nassella pulchra*), and blue wild rye (*Elymus glaucus*), are the most common grasses found there. Perennial flowers such as dwarf star lily (*Zigadenus fremontii*), blue-eyed grass (*Sisyrinchium bellum*), blue dicks (*Dichelostemma capitatum*), Johnny jump-ups (*Viola pendunculata*), and the delicate mariposa lily (*Calochortus luteus*), occupy moist soil sites.

Portions of the native grassland of the Mendoza area contain remnant species typically identified with coastal grasslands. California oat grass (*Danthonia californica*) is located near the big pond at the southern boundary. This finding represents an eastern range extension for this species in central California. California oat grass is an associate of foothill needle grass (*Nassella lepida*) and salt grass (*Distlichlis spicata*).

As a result of over one hundred years of year-round grazing, the prairie soils and plant composition have been radically altered throughout California and much of the subject property. Lack of periodic fire has also played an important role in the decline in diversity. To a large degree, much of the prairie has been type converted to introduced annual grasses and weeds and is characterized by loose, bare soil and large populations of gophers (*Thomomys bottae*), particularly on farmed land.

Fragmented and disjunct, the prairie habitat has seen a dramatic decline in distribution and species diversity in the last one hundred years. Remnant native grasslands dominated by purple needlegrass, foothill needlegrass, blue wildrye, or California oatgrass are now classified as "threatened" in the California Department of Fish and Game Natural Diversity Database, and must be afforded protection through CEQA review. Intact native grassland within the Park is found in areas that have not been tilled and where soil type supports long-lived perennial plants. Native grassland is found on 551.50 acres of Park land.

Community Classifications:

CNDDB (2002): Purple Needlegrass 41.150.00; Foothill Needlegrass 41.110.00
Holland (1986): Valley Needlegrass Grassland 42110
Sawyer and Keeler-Wolf (1995): Purple Needlegrass Series; Foothill Needlegrass Series
CDFG CWHR (1998): Perennial Grassland

Nassella pulchra in the grasslands of the Park

3.7.2.4 Serpentine Grassland

Serpentine soils are derived from serpentine rock. They are ultra basic, nutrient-poor, and have a low calcium to magnesium ratio (USFWS, 1988). Serpentine soils may also be high in heavy metals. These soil properties make it difficult for plants to survive there. A number of native species have evolved adaptations that allow them to grow in this difficult environment. In addition, because few introduced species found in non-native grassland grow well in these soils, weed competition is reduced for those natives that can tolerate the adverse soil conditions. Serpentine grassland provides habitat for rare plants and animals and is considered sensitive by the California Department of Fish and Game (CDFG 2002). Serpentine grassland in the northeastern portion of the Park provides habitat for the federally threatened Bay checkerspot butterfly. While serpentine rock is not found on the Park, soils that support serpentine grassland (Montara-Inks-Heneke association) are found on 23.80 acres.

Community Classifications:

CNDDB (2002): Purple Needlegrass 41.150.00; Foothill Needlegrass 41.110.00
Holland (1986): Serpentine Bunchgrass Grassland 42130
Sawyer and Keeler-Wolf (1995): Purple Needlegrass Series; Foothill Needlegrass Series
CDFG CWHR (1998): Perennial Grassland

3.7.2.5 Wetlands: Freshwater Seeps, Vernal Basins, Stock Ponds

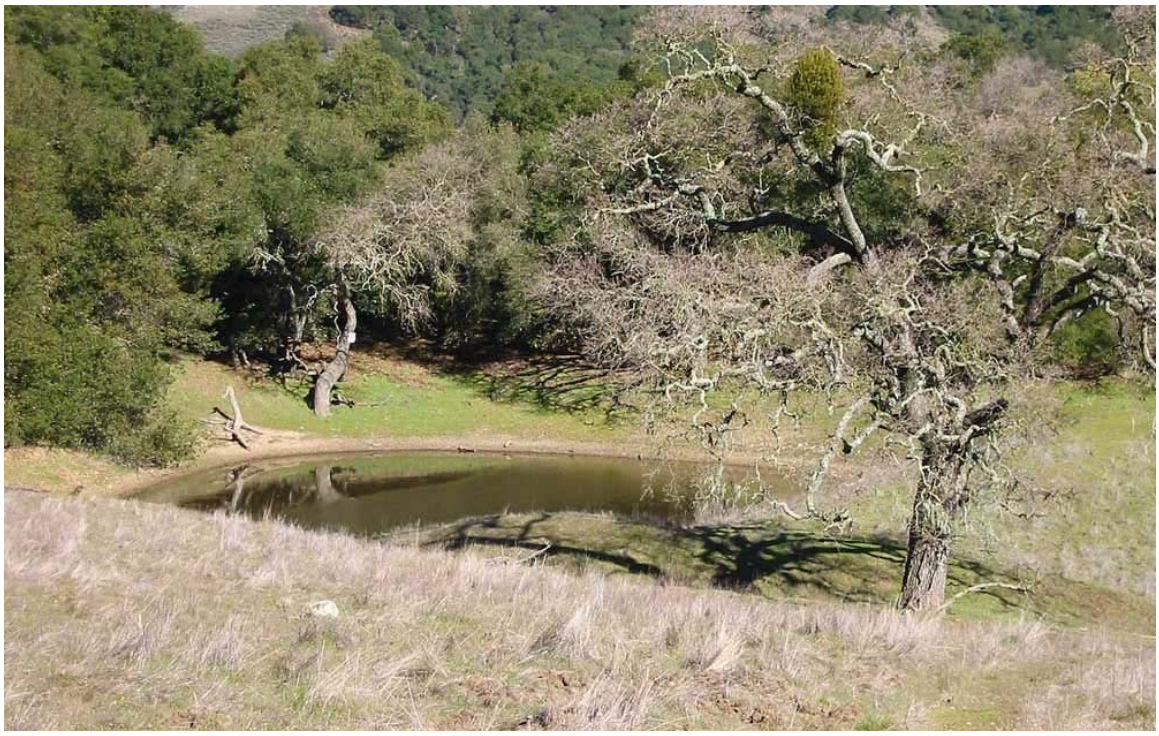
Vernal basins are found in grassland swales throughout the Park. The basins have been impacted from year-round livestock grazing. Vernal basins are seasonal, and dry out in the spring resulting in a profusion of vernal marsh vegetation. Common vernal pool plants such as eryngium (*Eryngium vaseyi*), crypsis (*Crypsis vaginifolia*), and lilaea (*Lilaea scilloides*) are found in these areas.

Four seasonal wetland springs and seeps originate at the mid-elevations on the western and eastern facing slopes of the Park (Hydrological Resources Map). Freshwater plants of marsh and seep communities include toadrush (*Juncus bufonius*), spikerush (*Eleocharis macrostachys*), sedges (*Carex* spp.), rabbitsfoot grass (*Polypogon monospeliesis*), popcorn flower (*Plagiobothrys* sp.), spreading rush (*Juncus patens*), iris leafed rush (*J. xiphiodes*) and stinging nettles (*Urtica dioica* var. *holosericea, U. urens*). Seasonal seeps also contain watercress (*Rorippa nasturtium-aquaticum*). The seeps and springs surface in open grassland swales.

Riparian corridor and close-up view of emergent vegetation

Wet seep with some disturbance by wild pigs and a close-up view of emergent vegetation

Several stock ponds have been developed in the Park (Hydrological Resources Map), and it appears historic vernal basins have been enlarged for livestock usage. The stock ponds provide habitat not otherwise available to amphibians. These basins are currently not fenced and are used for watering cattle. While the stock ponds are suitable for native amphibians, including the Pacific tree frog, California red-legged frog, Western toad, California newt, and California tiger salamander, an increase in emergent vegetation and shaded cover at the waters edge would be beneficial.



The ponds of the Bear Ranch range from a seasonal depression within the grassland to year-round ponds with wooded edges and abundant emergent vegetation.

Community Classifications:

CNDDB (2002): Meadow and Seep Habitats 45.300.00; Sedge 45.110.00; Spikerush 45.200.00 Bulrush 52.101.00; Bulrush-Cattail Wetland 52.102.00; Vernal Marsh 52.100.04

Holland (1986): Freshwater Seep 45400; Coastal and Valley Freshwater Marsh 52410; Vernal Marsh 52500

Sawyer and Keeler-Wolf (1995): Sedge Series; Spikerush Series; Bulrush Series; Bulrush-Cattail Series

CDFG CWHR (1998): Fresh Emergent Wetland

3.7.2.6 Willow Riparian

The riparian plant community occurs primarily along the Coyote Creek Arroyo near the old Bear Ranch headquarters. At the State level, riparian plant communities are considered sensitive and have been identified by the California Department of Fish and Game (CDFG) as a habitat of special concern (Wetlands Resource Policy, California Department of Fish and Game Commission 1987). Typically, over 90% of the bird and mammal species on a California ranch occur only in the riparian habitat. Many species of wildlife depend entirely on riparian habitat, which forms dense thickets if undisturbed. The small drainage arroyo flowing toward the Bear Ranch barn contains some remnants of riparian vegetation. Few trees have been left and most of the historic vegetation is gone. Corrals that are used on a regular basis adjacent to the seasonal creek are barren wastelands with weeds, resulting in contamination of freshwater with dung and soil. The remaining overstory consists of a few arroyo willows and red willows (*Salix lasiolepis, S. laevigata*). Typical riparian plants include mugwort (*Artemisia douglasiana*), California blackberry (*Rubus ursinus*), and rushes (*Juncus* spp.).

Willow riparian area in summer

Community Classifications:

CNDDB (2002): Central Coast Arroyo Willow Riparian 61.201.01
Holland (1986): Central Coast Arroyo Willow Riparian 61230
Sawyer and Keeler-Wolf (1995): Arroyo Willow Series
CDFF CWHR (1998): Valley Foothill Riparian

3.8 Sensitive Plants

3.8.1 Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)

Big-scale balsamroot is the only rare plant species known to occur in the Park (Resource Constraints Map). This species is a perennial herb up to 2 feet tall with yellow flowers. Big-scale balsamroot typically blooms between March and June and may be found on grassy slopes in the northeastern portion of the Park. Big-scale balsamroot is a California Native Plant Society List 1B species, meaning that it is rare, threatened, or endangered in California and elsewhere. CNPS List 1B plants meet the definitions of Section 1901, Chapter 10 or Secs. 2062 and 2067 of the CDFG Code and must be fully considered under CEQA.

Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) photo© 1998 Dean Wm. Taylor

3.9 Sensitive Wildlife

3.9.1 Insects

3.9.1.1 Bay checkerspot butterfly

A portion of the Park, approximately 617 acres, lies within the Bear Ranch Unit of Critical Habitat for the Federally threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*) as designated by the U.S. Fish and Wildlife Service in 2001 (USFWS 2001a) (Resource Constraints Map). The Critical Habitat lies within a greater area of approximately 10,597 acres located within San Mateo and Santa Clara Counties, and the Park is recognized as the southernmost limit of its range. The Park's natural biological features are considered essential to conservation of the species. The habitat consists of shallow, serpentine-

derived, or similar infertile soils, which support the butterfly's food sources. Grasslands that support the butterfly's host plant species, California plantain (*Plantago erecta*) and owl's clover (*Castilleja densiflora* and *C. exserta* var. *exserta*) are considered Critical Habitat. These host plants occur in the Park, although there have been no confirmed sightings of the Bay checkerspot butterfly on the property.

The Bay checkerspot butterfly lives for approximately one year and reproduces once in its lifetime. Adults emerge early in the spring and feed on the nectar of California goldfields (*Lasthenia californica*), tidy-tips (*Layia platyglossa*), lomatium (*Lomatium* spp.), scythe-leaved onion (*Allium falcifolium*), false babystars (*Linanthus androsaceus*), and others (USFWS 1998). Adults live an average of 10 days during which they feed, mate, and lay eggs (USFWS 1998). Eggs are deposited in March and April near the base of a host plant. California plantain (*Plantago erecta*) serves as the primary host plant. Owl's clover (*Castilleja densiflora* and *C. exserta*) are used less frequently.

Larvae hatch in approximately 10 days. They feed primarily on California plantain and require at least 2 weeks to reach the fourth instar (molt) (USFWS 1998). At this stage, the larvae enter a period of summer dormancy spent under rocks or in soil cracks (Weiss 1996). Larvae emerge after the onset of winter rains to feed and then pupate. Adults emerge 2-4 weeks later (USFWS 1998).

3.9.2 Amphibians

No definitive sightings of the federally threatened California red-legged frog (*Rana aurora draytonii*) were made in any of the ponds during 2001 surveys. Nor were larvae of the federal candidate species, California tiger salamander (*Ambystoma californiense*), found in seine hauls. [Note that both species are also California species of special concern (CDFG Jan. 2003a).] Although neither of these rare species was observed, potential exists for both species to occur in the Park. There was evidence of Bullfrogs (*Rana catesbeiana*) in all ponds. This introduced species is known to compete with and even prey upon Red-legged Frogs and salamanders.

The pond north of Bear Ranch House was the most intact pond surveyed. Western pond turtles, Bullfrogs (20-30 seen jumping), Pacific tree frogs (thousands of larvae), Western toads (thousands of newly metamorphosed toadlets) and abundant insects were observed there. In contrast, the pond south of Bear Ranch House, adjacent to the county road, was almost devoid of insects. Only 3-5 Bullfrogs were seen there. No additional amphibians were caught in seine hauls. An isolated pond in the canyon southwest of Bear Ranch House was similarly limited to a few Bullfrogs, suggesting warm water fish (potentially bass) in the pond.

3.9.3 Reptiles

3.9.3.1 Western Pond Turtle

Western pond turtle (*Clemmys marmorata*), a California species of special concern (CDFG Jan. 2003a), occurs in the pond north of Bear Ranch House (Resource Constraints Map). Western pond turtles typically live in calm water with aquatic vegetation and suitable logs or rocks for basking sites. Their food includes aquatic plants, invertebrates, carrion, and fish (Stebbins 1985).

Western Pond Turtle
(*Clemmys marmorata*)

Western pond turtles lay their eggs April-August in buried nests, usually near water. Although the eggs hatch in 10-12 weeks, the young remain in nests throughout

the winter. A number of animals prey on eggs, hatchlings, and juveniles. Predators include Raccoons, dogs, Coyotes, Great blue herons, snakes, Largemouth bass, and Bullfrogs (Stebbins 1985).

The carapace of Western pond turtles may be olive, brown, or black and is commonly marked with a network of spots, lines, or dashes that radiate from the growth centers of the shields (Stebbins 1985). Two subspecies are found in California, the Northwestern pond turtle (*Clemmys marmorata marmorata*) and the Southwestern pond turtle (*Clemmys marmorata pallida*). These two subspecies overlap in range just south of San Francisco Bay.

3.9.4 Birds

Sensitive bird species known to occur or likely to occur within the Park are listed below in the Sensitive Bird Species Table. This list includes those species listed as sensitive in the Natural Diversity Database (CDFG Jan. 2003a) as well as those listed as riparian dependent or riparian focal species by California Partners in Flight.

Seventy-three species of birds were detected in the June, 2001 surveys alone. For a more complete summary and analysis of 2001 bird survey results, including non-sensitive species, see the Breeding Bird Inventory Report (Appendix 2). In addition, a list of all bird species likely to occur in the Park is provided in Appendix 1.

Wild Turkeys (*Meleagris gallopavo*) on the Bear Ranch

Sensitive Bird Species Known to Occur or Likely to Occur Within Coyote Lake – Harvey Bear County Park * indicates species recorded in Park during 1997 and/or 2001 surveys

Species	Breeding Evidence**	Potential Breeding (B) or Wintering (W)Habitat in Park	Conservation Status***
Great Blue Heron* (*Ardea herodias*)		B: marsh, lake shore	CDF: Sensitive
Osprey (*Pandion haliaetus*)		W: lake	DFG: CSC; CDF: Sensitive
Northern Harrier (*Circus cyaneus*)		B: grassland, oak savanna, marsh	DFG: CSC
White-tailed Kite* (*Elanus leucurus*)		B: oak savanna, grassland, riparian woodland, marsh	DFG: Fully protected; FWS: MNBMC
Golden Eagle* (*Aquila chrysaetos*)		B: oak savanna and semi-open woodlands	DFG: CSC; DFG: Fully protected
Bald Eagle (*Haliaeatus leucocephalus*)		W: lake	FT; FPD; SE; CDF: Sensitive; DFG: Fully protected
Sharp-shinned Hawk (*Accipter striatus*)		W: oak and riparian woodlands	DFG: CSC
Cooper's Hawk* (*Accipter cooperi*)		B: semi-open riparian woodland	DFG: CSC
Ferruginous Hawk (*Buteo regalis*)		W: grassland, oak savanna	DFG: CSC; WL; FWS: MNBMC
Merlin (*Falco columbarius*)		W: open woodland, oak savanna, grasslands with fence posts/lookouts	DFG: CSC
Prairie Falcon (*Falco mexicanus*)		W: grassland	DFG: CSC; WL
Burrowing Owl (*Athene cunicularia hypugea*)		B: grassland	DFG: CSC; FWS: MNBMC
Vaux's Swift (*Chaetura vauxi*)		migrant; unlikely to breed in Park	DFG: CSC; FWS: MNBMC; WL
Nuttall's Woodpecker* (*Picoides nuttallii*)		B: oak and riparian woodlands, chaparral	WL
Pacific Slope Flycatcher* (*Empidonax difficilis*)		B: riparian woodland	FWS: MNBMC
Olive-sided Flycatcher (*Contopus borealis*)		Unlikely to breed within Park; prefers coniferous forest.	WL; FWS: MNBMC; PIF
Warbling Vireo* (*Vireo gilvus*)		B: riparian woodland	RFS
Bank Swallow* (*Riparia riparia*)		B: earthen banks near water	ST
Oak Titmouse* (*Baeolophus inornatus*)		B: oak and riparian woodlands	WL
Bewick's Wren* (*Thryomanes bewickii*)		B: oak and riparian woodlands, chaparral	RD
Rock Wren* (*Salpinctes obsoletus*)	FY	B: rocky areas	RD
Loggerhead Shrike (*Lanius ludovicianus*)		B: oak savanna, chaparral, open woodland	DFG: CSC; FWS: MNBMC
California Horned Lark (*Eremophila alpestris actia*)		B: grassland	DFG: CSC
Yellow Warbler (*Dendroica petechia brewsteri*)		B: riparian woodland	DFG: CSC

Species	Breeding Evidence**	Potential Breeding (B) or Wintering (W)Habitat in Park	Conservation Status***
Black-headed Grosbeak* (*Pheuticus melanocephalus*)	FL	B: riparian woodland	RFS
Song Sparrow* (*Melospiza melodia*)	FL	B: riparian woodland, marsh	RFS
Yellow-breasted Chat (*Icteria virens*)		B: riparian woodland	DFG: CSC; FWS: MNBMC
Tricolored Blackbird (*Agelaius tricolor*)		B: marsh or riparian woodland near marsh	DFG: CSC; FWS: MNBMC; WL; PIF
Lawrence's Goldfinch (*Cardeulis lawrencei*)		B: near water in oak and riparian woodlands and chaparral	PIF; FWS: MNBMC; WL
Lesser Goldfinch* (*Cardeulis psaltria*)		B: oak savanna, oak woodland edges, and chaparral	RD

**** Breeding evidence codes**
FL=recently fledged young
DIS=displaying
NE=nest
FY=feeding young
C=courtship
P=pair

***** Conservation status codes**
CDF: **Sensitive:** California Dept. of Forestry Sensitive Species
DFG: CSC: Calif. Dept. of Fish and Game California Special Concern Species
FPD: Federally proposed for delisting
FWS: MNBMC: Fish and Wildlife Service Migratory Non-game Bird of Management Concern
PIF: Partners in Flight Watch List
RFS: Partner's In Flight Riparian Focal Species
RD: Partner's In Flight Riparian Dependent Species
ST: State-listed as threatened
WL: Audubon Watch List

3.9.5 Mammals

No evidence of rare mammal species was observed during surveys. Seventeen of 47 possible mammal species on the Park property were either seen, captured, or assumed present from visible evidence. A total of 190 trap nights yielded 36 small mammal captures of the following species: Piñyon mouse (*Peromyscus truei*; n=15), Deer mouse (*Peromyscus maniculatus*; n=10), Brush mouse (*Peromyscus* boylii; n=5), and Western harvest mouse (*Reithrodontomys megalotis*; n=6). Juveniles of both the Western harvest mouse and the Piñyon mouse were captured, suggesting that the breeding season in the Park, at least for small mammals, is year-round.

Evidence of the California vole (*Microtus californicus*) was seen in the form of old runways with clipped vegetation and fecal pellets characteristic of this species. Evidence of Botta's pocket gopher (*Thomomys bottae*) was seen in the form of mound tailings characteristic of this genus. Evidence of the Dusky-footed woodrat (*Neotoma fuscipes*) was seen in the form of piles of fecal pellets at the base of two hollow oak trees and evidence of nest construction within, and at the base of these trees. In addition to the captures and evidence described above, sightings of the following species were made on the property itself or on the road adjacent to the property at the shore of Coyote Lake Reservoir: Virginia opossum (*Didelphis virginiana*), Black-tailed deer (*Odocoileus hemionus*), Wild boar (*Sus scrofa*), Coyote (*Canis latrans*), Bobcat (*Lynx rufus*), Raccoon (*Procyon lotor*), Big brown bat (*Eptesicus fuscus*), Hoary bat (*Lasiurus cinereus*), Brush rabbit (*Sylvilagus bachmani*), and California ground squirrel (*Spermophilus beecheyi*).

Wild Boar (*Sus scrofa*) with piglets in a freshwater seep area.

Black-tailed Deer in the annual grassland

Habitat use patterns were clear with respect to rodent species captured. The Deer mouse and Western harvest mouse were found in the grassland habitat. The Brush mouse was found in riparian and rock-outcrop habitat. The Piñyon mouse was found in rock-outcrop habitat and grassland habitat on the edge of mature trees. All four species were additionally caught near flowing water either at the springs or along the riparian edge transect. Habitat associations for sightings are described in the Mammal Report in Appendix 2.

In all habitats, the occurrence of wood from old dead trees was the best predictor of productivity in terms of trap captures. The Piñyon mouse had a particular affinity to this woody microhabitat. In addition, the fecal pellets of larger species (Dusky-footed woodrats and California mice - *Peromyscus californicus*) were found on, in, or around wood from old, dead trees. Because this microhabitat type appeared to be important for a number of rodent species and deadwood is not that common on the property, an effort should be made not to disturb the patches of deadwood debris.

The level of bat activity on the property was extremely high. Although it is almost impossible to identify free-flying bats, the Hoary bat could be distinguished by its distinct wing coloration. Big brown bats were identified by their unique size and shape relative to other bat species present. Regardless of the particular species that make up the bat community on the property, the natural roosting requirements of these bats are relatively similar. Both the solitary and communally roosting bat species likely to be present on the property require large, old, live and dead trees, especially those that have a cavity created by a lightning strike, heart rot, or a primary cavity excavator like a woodpecker. An effort should be made to conserve this potential roosting habitat.

Occasional high levels of plague or hanta virus can occur in California mammals. Incidence of rodent-borne diseases that might be transmitted to humans should be monitored in coordination with the State of

California Department of Health Services, Vector Borne Disease Branch. Human contact with small mammals in structures should follow best management practices to avoid hanta virus.

3.10 Agricultural Resources and Land Use

The primary historic land use in the Park has been livestock grazing and hay production. Grazing has occurred continuously for well over one hundred years. Old fields and fencelines are evidence of past farming and grazing practices.

The primary current land use in the Park remains cattle grazing (Current Land Use Map) with public access and recreation permitted in the area immediately surrounding Coyote Lake. A small residential area is located in the western portion of the Park. County office and operations buildings are located in the southeastern portion of the Park (see Infrastructure Map and Hydrological Resources Map).

There are nine stock ponds in the Park. Other agricultural improvements include ranch buildings, barns, corrals, and water troughs.

3.11 Right of Ways, Deeds, Rights, and Easements

The following table summarizes existing deeds, rights, right of ways, and easements in the Park. None of these agreements pose constraints to actions proposed in this plan.

Right of Ways, Deeds, Rights, and Easements
Source: The Valley Title Company Preliminary Report (July 6, 1995)

ROW, Deed, Right, or Easement	Parties	Purpose
Public right to use roadway	Public right	Public may use Foothill Ave., San Martin Ave., New Ave., Church Ave., Church Lane, and San Martin Grade
Easement and right of entry	Granted in Deed from William M. Hersman to C.H. Phillips	Easement for pipes, ditches and flumes; right of entry for repairs and maintenance; water rights
Right as reserved in deed	Deed from J.M. Pollock to George T. Dunlap	Non-transferable right to explore for mineral or oils
Recitals as contained in deed	Deed executed by Spring Valley Water Company	Reserves riparian rights to Coyote Creek and its tributaries
Easement	Granted to the County of Santa Clara	Use of 66-foot wide strip as a public road and highway
Covenants, conditions and restrictions in deed	Executed by Spring Valley Water Company	Details of deed recorded in Book 291, Page 207 of Official Records. Deed recorded Dec. 30, 1926
Easement	Granted to Spring Valley Water Company	Use of 40-ft strip of land for road purposes
Condition in deed regarding above easement	From Spring Valley Water Company to Maria Ramelli	Right of way to be used by both parties their heirs, successors, or assigns
Easement	Granted to Pacific Gas and Electric Company	30-ft wide strip of land for pipe lines for the conveyance of gas, oil, and water
Easement	Granted to Santa Clara Valley Water Conservation District	40-ft wide strip of land for road purposes over the Coyote Dam Access Road

ROW, Deed, Right, or Easement	Parties	Purpose
Easement	Granted to Santa Clara Valley Water Conservation District	A single line of poles and wires for telephone purposes.
Reservation in deed	From Ramelli Rancho Co. to Elsa R. Wiel	Reserves recorded rights of way, water rights, rights, privileges and easements as well as the existing agreement by which water has been and is supplied to San Martin, California
Easement	Granted to Pacific Gas and Electric Company	54-ft wide strip of land for gas pipe line or lines
Easement	Pacific Gas and Electric Company	10-ft strip of land for gas pipe line or lines
Easement	Granted to Pacific Gas and Electric Company	10-ft wide strip of land for installation, maintenance, and use of cables and resistors
Easement	Pacific Gas and Electric Company	50-ft strip of land for installation and maintenance of gas pipe line or lines
Easement	Pacific Gas and Electric Company	Installation, maintenance, and use of devices and equipment for regulating gas
Covenants and Restrictions	Executed by Harvey L. Bear and Marjorie L. Bear	Covenants and restrictions imposed by a Land Conservation Contract executed pursuant to Sect. 51200 et seq. California Government Code
Easement	Granted to Pacific Gas and Electric Company	Construct, place, inspect, maintain, replace, and remove facilities
Easement	Granted to the USA	32.80-ft wide strip of land for providing electric power to appurtenances of the Santa Clara Conduit, and for ingress and egress
Easement	Granted to the USA	Temporary right and privilege for access
Easement	Granted to Pacific Gas and Electric Company	Construct, install, inspect, maintain, replace, remove, and use facilities

4. Management and Monitoring Guidelines

This section summarizes several aspects of natural resource management in the Park. For each, we provide management and monitoring guidelines based on issues identified during information gathering. We expect that these guidelines are only a starting point for adaptive management. As the resources are monitored, management may be changed or amended.

Most of the management and monitoring guidelines provided below relate to habitat restoration. Habitat restoration goals for the Park are listed below:

- Reduce cover of invasive, non-native plant species in the Park, particularly in grassland areas (Sections 4.1 – 4.4 and 4.8).
- Increase cover of native plant species in the Park, particularly in grassland areas (Sections 4.1 – 4.4 and 4.8).
- Establish coast live oak, valley oak, and blue oak seedlings in areas of the Park with poor regeneration (Section 4.5).
- Assure that restoration tools (e.g. livestock grazing and prescribed fire) do not negatively impact freshwater resources (Section 4.6).
- Protect and enhance habitat for sensitive species (Sections 4.6 and 4.9).

4.1 Grazing

4.1.1 Methods for Determination of Grazing Management Areas and Acreage Available to Grazing

The following guidelines were used to determine the number, size, and boundaries of the Grazing Management Areas for Coyote Lake – Harvey Bear Ranch County Park (see Proposed Grazing Management Areas Map):
1) Existing fences, troughs, and water sources were used as much as possible to reduce the need for additional fencing.
2) The size of each Grazing Management Area was designed to produce a consistent stocking rate based on the carrying capacity of each area.

The vegetation of Coyote-Harvey Bear Ranch Park was analyzed in order to prescribe stocking rates based on management areas (see Proposed Grazing Management Areas Map). The total area of the Park is 4448 acres. Based on the suitability of grazing a particular management area, 2389.97 acres of non-native grassland, 54.91 acres of exotic species, 540.10 acres of native grassland, and 755.01 acres of special status species habitat were identified for grazing. Other management areas, mostly steep woodland, riparian, and recreational areas are excluded from grazing calculations.

4.1.2 Overview

The objective of the grazing prescription is to manage and promote perennial grass seedlings and/or relict native grass stands of the Park. Grazing may be used to reduce yellow star thistle and other broadleaf weed infestations. Grazing may also be used to reduce the standing dead biomass at the end of each growing season so that wildfire risks are minimized. An important aspect of grazing management will be to use livestock to reduce annual grass production and thatch build up that can compete with native annual wildflowers and forbs. These grassland flowers and herbs are important components of the habitat for the listed Bay checkerspot butterfly. Also, animal impact can be used to "jump start" native seed banks in the soil and used to plant seeds. Reducing the seed bank of exotic plants and favoring the

regeneration of native species with grazing requires carefully monitored programs. The limiting factors of intensive grazing programs are related to animal nutrition, reproduction, water availability, and impacts to freshwater resources.

4.1.3 Management Guidelines

4.1.3.1 Principles

There are many factors involved in determining animal movement throughout the Park. Some general guidelines apply in getting animals to the right place at the right time.

- Managing vegetation: Livestock numbers will be prescribed to encourage native plants and discourage non-native weeds. The grazing season will be modified to reflect resource management conditions and annual forage availability. Certain areas of the Park, such as some recreational areas, are excluded from grazing.

- Controlling exposure to sensitive resources: Watering facilities should be relocated, repaired and enhanced to provide enough water to graze the units but also maintain and enhance sensitive habitats.

- Planning the timing, duration and intensity of grazing: Grazing events should be timed and the duration and intensity prescribed. Grazing can be effective for the control of annual grasses and weedy plants.

- Utilizing animal impact: Animal impact may be applied to control erosion and repair erosion features.

- Managing stock density: Applying the correct density of animals is key to controlling weeds and grazing uniformly. It is important to move livestock quickly during the fast growing season.

- Planning for drought: Deferring grazing and leaving extra forage in anticipation of drought.

4.1.3.2 Definitions

Animal impact: Animal impact may be a valuable activity to reverse the negative impacts of erosion, over-utilization, and loss of productivity, and to aid regenerative processes over a large landscape unit. Animal impact may be used to loosen compacted soils and to reshape eroded gullies. Animal impact will be timed to plant and compress seeds and organic materials into prepared seedbeds, and also intensify the recycling of nutrients and decay thereby enhancing beneficial soil microorganisms. The success of using animal impact depends on timing, duration, and intensity of exposure.

Carrying capacity: Carrying capacity is defined in Animal Unit Months (AUMs). An Animal Unit Month is the amount of forage required to sustain an adult cow and her calf on one acre of land for one month. An adult cow will consume up to thirty (30) pounds of air-dry forage per day. Therefore, one AUM is equal to approximately nine hundred (900) pounds of forage. Carrying capacity does not account for variances in terrain, forage quality, or management goals. It simply provides a maximum gross total of AUMs that can be supported on the property. Based on plan goals, carrying capacity is then allocated by area, season, and duration of exposure, with special focus on forage quality, water availability, terrain, and associated vegetation.

Heavy grazing: Stocking an area heavily during the growing season can remove almost all of the green biomass produced each year. The amount of plant material on the ground at the end of the growing season is called "Residual Dry Matter" (RDM). Repeated close grazing which results in less than 500-lb.

per acre residual dry matter typically favors low prostrate grasses such as ryegrass, dogtail, soft chess, and fillaree. The productivity of these forage plants is short-lived, with the height of palatability and nutrition occurring in the late spring. When soils are annually exposed and RDM values are 500-lb. per acre and less, yellow star thistle, mustard, and other troublesome weeds result. Constant, year-round grazing tends to decrease grass and forb species diversity. Grazing wet soils during the winter will compact the soil and reduces soil productivity, particularly if grazing is done every year for decades. Heavy grazing reduces nutrient cycling in the soil and soil microbial activity. With prolonged periods of over-utilization, the range is more subject to gully and rill erosion and loss of biodiversity.

Moderate grazing: Moderate grazing is defined as leaving 1000 lb. per acre RDM and appears to better favor species diversity and perennial native grasses. However, moderate grazing does not reduce the cover and abundance of less palatable and competitive weedy species such as yellow star thistle. Animal performance is high, range biological activity is sustained, and soil nutrient cycling is enhanced.

Light grazing: Light grazing, greater than 1,200 lb. per acre RDM, typically results in course decadent vegetation, reduction in forb and wildflower components, and persistence of exotic pest plants. Livestock production is limited and habitat values for species preferring short grass are reduced. For example, thistle and fennel can become abundant when previous grazing is suddenly curtailed.

Monitored grazing: Monitored grazing is a resource management term for "the intensity, duration, and frequency of grazing events, and the utilization of annual biomass production, which if managed correctly will achieve resource management goals" (Kephart, 1998). Monitored grazing evaluates range conditions, species diversity, and composition in site-specific areas. As a result of monitoring, the intensity, duration, and frequency of grazing events are adapted to the suitability of the site, based on results obtained from RDM and cover analyses. Adaptations are based on the trend or change from: 1) non-native pest species to native species; 2) increase in species diversity; 3) maintenance of native components; 4) green biomass production; and 5) remaining residual dry matter.

4.1.3.3 Grazing Plan

The following tables outline the Grazing Plan for the Park. The Grazing Plan is based on numbers of animals in a given management area. Numbers of animals in an area per month per year equal total animal unit months. Note that Area 3 (see Proposed Grazing Management Area Map) contains sensitive serpentine grassland, big-scale balsamroot, and critical habitat for the Bay checkerspot butterfly. The grazing timing and intensity prescribed for this area will protect these sensitive resources. Areas of sensitive blue oak and valley oak woodland occur outside of Area 3. However, proposed grazing prescriptions in these areas will not impact these communities. Although grazing can be a detriment to oak seedlings where density, duration, and intensity are too high, the grazing management recommendations proposed below will not adversely impact oak seedlings in the Park. Grazing can actually enhance growth of native perennial grasses in open oak woodland areas, to the benefit of oak seedlings. Purple needlegrass and many other perennial bunch grasses are deep-rooted and draw less moisture from the top few inches of soil than do non-native annual grasses, increasing moisture availability and survival of oak seedlings.

Sensitive freshwater resources occur throughout the Park. Specific grazing standards and monitoring protocols for these areas may be found in Sections 4.1.4.1, 4.6.1, 4.6.3, and 4.9.3.

Grazing Resources by Grazing Management Area

Grazing Management Area	Size (acres)	Animal Unit Months	Prescription
1	285.22	171.13	Intensive spring grazing
2	451.20	270.72	Intensive spring grazing
3	1040.23	624.14	Moderate late summer and early fall grazing
4	924.28	554.57	Intensive spring and summer grazing
5	884.33	489.65	Intensive summer and fall grazing

Grazing Resources by Grazable Management Area

Grazing Management Area	Size (Acres)	Annual Grass/ Mixed Chaparral (Acres)	Blue Oak Woodland (Acres)	Exotic Species Control (Acres)	Native Grassland (Acres)	Oak Woodland (Acres)	Serpentine Grassland (Acres)
1	285.22	268.29	0.00	0.00	11.46	4.31	0.00
2	451.20	146.28	0.00	23.00	260.38	12.37	0.00
3	1040.23	617.53	5.85	25.40	91.81	271.32	23.73
4	924.28	657.11	7.93	2.98	153.26	81.26	0.00
5	884.33	598.78	0.00	3.06	23.19	228.94	0.00

Animal Stocking Rates and Schedule by Grazing Management Unit

Category of Livestock by Animal Unit

Brood Cow=1
Brood Cow w/ calf (less than 8 months)=1
Bull (mature, 2 yrs and above)=1.5
Replacement Cattle(less than 2 yrs)=.5
Replacement Cattle(500-1000lbs)=.75
Horse=1.25

Stocking Rate Parameters

Pasture	Acres	Acres per AU
1	285.22	20
2	451.20	20
3	1040.23	20
4	924.28	20
5	816.08	20

Pasture	January	February	March	April	May	June	July	August	September	October	November	December	AUM Total
1			85	85									171
2			178	93									271
3								200	200	224			624
4				85	263	207							555
5						56	263	63	63	39			490
Total AUM	**0**	**0**	**263**	**263**	**263**	**263**	**263**	**263**	**263**	**263**	**0**	**0**	**2110**

4.1.4 Monitoring Guidelines

Two types of monitoring will be necessary in grazed areas at Coyote-Harvey Bear Ranch Park. The first type of monitoring will be used to determine whether grazing standards have been met. Grazing standards have been set to assure that: 1) livestock utilization of each area follows the grazing plan; 2) livestock do not harm freshwater resources or cause erosion; 3) livestock have adequate food and water and are protected from disease and predators; and 4) the grazing manager and SCCPRD communicate effectively regarding grazing practices. These grazing standards are presented in Section 4.1.4.1 and the Grazing Management Standards Table below. The second type of monitoring will be used to determine whether grazing practices are helping to restore grasslands, specifically whether grazing is reducing cover of exotic species and increasing cover of native species**.** ***Success criteria and monitoring methods for percent cover are briefly summarized in Section 4.1.4.2. A more detailed description may be found in Section 4.4, where success criteria and monitoring methods are provided for all methods of grassland restoration and enhancement discussed in this plan (grazing, prescribed fire, seeding).***

4.1.4.1 Grazing Standards

Coyote-Harvey Bear Ranch Park does not "depend" on domestic livestock grazing for any ecological function. However, since early in California's history, these highly altered grasslands have been grazed and grazing is a prevalent land use activity throughout California wild lands. With the spread of non-native, annual grasses during the past 200 years, the grassland ecosystem is now profoundly and forever changed. Grazing can be used to reverse some of the negative impacts of this habitat conversion and most likely encourage healthier habitats than if the annual weeds were allowed to flourish. The challenge is not to determine the maximum number of livestock that can be fed on the forage, but to determine how to manage the ecosystem using grazing as a tool to enhance diversity, reduce soil erosion, and promote native species. Grazing livestock have been removed from similar open space lands with the result being conversions of open grasslands to shrubby fields of weeds such as fennel and yellow star thistle. The overall biodiversity of these areas declines, specifically in relation to wildflowers and forbs.

California's coastal, arid grasslands are subject to enormous variations in annual precipitation and thus productivity. Also, the forage production is restricted primarily to the rainy cool season. Any decision to graze a certain number of animals must be based on a minimum estimate of forage production in a year, and in our area can be deceiving, often leading one to believe there is more productivity than actually exists. Often, by the onset of winter rains, the vegetative cover is all consumed. Wet, warm winters will produce more forage than is used, but cold dry winters will not produce enough. Regularly collected monitoring data is needed in order to determine needed adjustments in animal numbers. Each year, the grazing can be adjusted by changing the number of animals in an area (intensity), the season of grazing, the grazing duration, and finally the frequency of the grazing event. Decisions on how to make these adjustments depend on the amount of biomass estimated in an area. A conservative approach is necessary because our ability to measure the amount of biomass produced in a year is limited by four factors:

a. Not all of the herbaceous biomass is forage for a specific herbivore. Herbs, shrubs, trees and grass may not all be consumed equally.
b. Annual production of biomass varies according to species, and different plant species respond to grazing differently.
c. If plants have been historically over-utilized or repeatedly burned, it may take several years for the plants to recover productivity.
d. No technique used to determine plant biomass matches how domestic livestock consume plants. Therefore, our estimates of usable biomass are only approximate.

Residual Dry Matter Standards

Residual Dry Matter (RDM) is the amount of plant material remaining in a given field after the end of a grazing event and prior to a new grazing event. RDM consists of litter, stems, and dried plant material. RDM analysis provides the following information:

1. Visually estimates standing vegetation and range condition, bare soil, weeds, and other impacts.
2. Forecasts remaining forage to determine future levels of utilization.
3. Provides data that may be extrapolated over a larger grazing unit.
4. Allows monitoring of forage utilization to insure the grazing manager receives notification of grazing thresholds.
5. Determines resource management needs.

RDM is important in that it improves surface conditions for plant growth by the accumulation and decomposition of organic matter to the soil. Biological activity is enhanced by the utilization of insects. Seedlings of newly germinating plants are sheltered from the effects of wind and sun. In addition, the energy of raindrops is dissipated, thereby reducing erosion. RDM monitoring locations will be responsive to various levels and intensity of grazing. The RDM standards for Coyote-Harvey Bear Ranch Park are 500 lb. per acre, 800 lb. per acre, and 1000 lb. per acre, depending upon the area to be grazed. Some areas will require a greater degree of utilization; for example, areas that contain annual weeds. In these areas, a 500-pound/acre rate would be used. Other areas may contain rocky and thin soils, produce less biomass, and not recover rapidly. These fields or areas receive a 1000 lb. per acre threshold. And some fields are not harmed by close utilization in a given year or cycle, and require the average threshold for Coyote-Harvey Bear Ranch Park of 800 lb. per acre. The Grazing Standards Table (below) provides the RDM threshold for each area.

Residual Dry Matter Sampling Guidelines

In areas that are grazed during the grazing season, four pairs of sample plots should be sampled. One plot in each pair should be excluded from grazing using a small cage; the other should be grazed. This paired plot method requires establishing pairs of plots at selected key locations. Total biomass is measured in each of the plots. Biomass produced from the protected plot represents the total herbage produced and biomass from grazed plots represents unused herbage (RDM). The difference between the two weights is the amount of utilization. Utilization may be established by total weight of all herbage or by species. Grazing will be conducted primarily during the dormant season. Therefore, samples must be taken before and after the grazing event..

RDM monitoring can determine forage availability at the beginning of the grazing event and provides a method of visually estimating pounds of forage per acre. RDM monitoring provides permanent data collection points to determine trends in forage availability. RDM monitoring does not measure impacts to grassland species composition and impacts to soils and watersheds during the winter months. RDM bases future stocking rates on forage availability before grazing events, not during the event.

Direct Biomass Sampling Guidelines

Because of the limitations of RDM monitoring, additional sampling will take place. Clipping and weighing both grazed and non-grazed plots will be conducted to determine weight by the total herbage or by individual species. By clipping and weighing, we will be able to determine the total amount of biomass produced and utilized each year in our sample fields, thus future stocking rates may be determined. In addition, clipping and weighing provides a baseline for the amount of litter present. The variances in litter may have entirely different effects on plant regeneration and composition.

Monitoring sites will be sampled and, when biomass present drops below the stated thresholds, grazing animals will be removed. Grazing areas will sequentially be grazed down to thresholds depending upon the composition of the forage. Toward the end of the first growing season, monitoring will produce an estimate of the biomass present in each field. The estimates of biomass will be used to determine stocking rates in the following year.

COYOTE LAKE–HARVEY BEAR RANCH COUNTY PARK GRAZING MANAGEMENT STANDARDS			
Standard	**Parameter/Method of analyses**	**Frequency and type of monitoring and reporting**	**Remedial Measure/Corrective action**
1. Stocking levels and animal unit equivalents: The stocking level shall be assessed in animal unit months (AUM). The maximum number of animal unit months shall be 175. AUM levels shall be determined in accordance with the following system of animal unit equivalents (AUE): Brood cow = 1 AUE Brood cow with calf (not to exceed eight months old) = 1AUE Bull (mature male 2 years old and above) = 1.5 AUE Replacement cattle (up to two years old) = .50 AUE Replacement cattle (500-1000 pounds) = .75 AUE Horse = 1.25 AUE Stocking levels are subject to increase or decrease based on annual available forage.	GRAZER reports the number of AUE on the premises, by field quarterly. SCCPRD maintains records of AUE on premises using Excel-style spreadsheet or written log.	Written report prepared by grazing manager quarterly.	If AUMs are exceeded, SCCPRD may require GRAZER to remove all livestock to a suitable field, (a suitable field being one which has sufficient AUM's available and being above the residual dry matter alert levels) within 2 business days. In the event of drought, over-utilization, and/or other unforeseen natural resource condition SCCPRD may require GRAZER to decrease stocking rate. In the advent that the net productivity of the range increases, stocking levels may be increased as appropriate by mutual agreement by SCCPRD.

COYOTE LAKE–HARVEY BEAR RANCH COUNTY PARK GRAZING MANAGEMENT STANDARDS			
Standard	**Parameter/Method of analyses**	**Frequency and type of monitoring and reporting**	**Remedial Measure/Corrective action**
2. Supplemental feeding: Supplemental feeding shall be restricted solely for the correction of nutritional deficiencies in the range diet, not as a supplement for the lack of natural forage. Supplemental feeding will be allowed within designated feeding locations away from trails.	GRAZER shall obtain prior written approval by SCCPRD of all supplemental feeding type and the quantity of supplemental feed distributed, and source of feed. GRAZER shall notify SCCPRD with type of forage and location of feeding areas.	SCCPRD shall be notified of type and location.	If type and quantity of supplemental feed is not pre-approved by SCCPRD, it shall be removed to designated feeding lot location in the Park. In the advent of the need to supplemental feed livestock, the livestock may be relocated to designated feeding areas approved for feeding.
3. Dead or diseased livestock: GRAZER shall notify SCCPRD immediately upon discovery of dead and/or diseased livestock. GRAZER shall notify SCCPRD of any case of infectious disease.	Routine inspection by GRAZER or notification by Public or by SCCPRD.	GRAZER conducts routine herd inspections. Inspection by veterinarian**.**	So as not to endanger public safety, GRAZER shall (bury or dispose of) dead or treat diseased livestock within two business days of discovery or receipt of notification from SCCPRD, whichever occurs first. If diseased livestock poses a threat to public health and/or safety, the GRAZER shall remove dead and/or diseased livestock within two days.

COYOTE LAKE–HARVEY BEAR RANCH COUNTY PARK GRAZING MANAGEMENT STANDARDS			
Standard	**Parameter/Method of analyses**	**Frequency and type of monitoring and reporting**	**Remedial Measure/Corrective action**
4. Loose livestock, broken fences: Livestock shall be contained in the fields in which they are allocated. Fences shall be repaired and maintained.	GRAZER conducts routine visual inspections, or head counts. Public, and/or SCCPRD give GRAZER verbal notification.	GRAZER conducts routine herd inspections. SCCPRD conducts monitoring.	GRAZER shall by reasonable measures, take all actions necessary to return all loose livestock to the field within which they are allocated and, if applicable, repair the fence within two business days of notification. If GRAZER expects that actions will take longer than two days, GRAZER shall notify SCCPRD.

COYOTE LAKE–HARVEY BEAR RANCH COUNTY PARK GRAZING MANAGEMENT STANDARDS			
Standard	**Parameter/Method of analyses**	**Frequency and type of monitoring and reporting**	**Remedial Measure/Corrective action**
5. Residual dry matter standards: Statistical evaluation of residual dry matter and visual estimates of residual layer of both standing and fallen vegetation. Minimum standards are : (50-75% slope): <1200lbs/ac RDM (alert levels) 1000lbs/ ac RDM (minimum standard) (30-49% slope): <1000lbs/ac RDM (alert levels) 800 lbs/ac RDM (minimum standard) (0-29% slope): < 800lbs/ac RDM (alert levels) 500lbs/ac RDM (minimum standard) At no time shall residual dry matter standards fall below those standards set forth in the Natural Resource Management Plan. When alert levels are reached, GRAZER shall notify SSCPRD within (48) forty-eight hours of detection.	GRAZER shall complete an annual training to conduct statistical evaluation of residual dry matter, in order to establish visual estimate of RDM and report RDM values per field at the end of the growing season. Alert levels shall be reported weekly starting July 15th and ending October 15th. Time needed to sample RDM will be less than one week. An agreement between SCCPRD and the GRAZER should be reached to compensate the GRAZER for his time.	At the end of the growing season and as a threshold to trigger movement from one management area to another. No less than annual written reports and/or photo documentation. SCCPRD may conduct independent audits of RDM levels.	SCCPRD shall have the authority to decrease or increase carrying capacity depending on the RDM outcome. In the event that alert levels are reached, GRAZER would move livestock within two business days of notification or as soon as reasonably possible, so as not to exceed RDM minimum standards. If GRAZER expects that actions will take longer than 2 business days, GRAZER shall notify SCCPRD.
6. Impacts to freshwater resources: Freshwater resources including streams, springs, and seasonal wetlands shall be excluded from grazing on a prolonged basis. Grazing exposure will be planned in order to allow for a 90-day recovery interval between grazing events in any management area where freshwater resources are present. Impacts to freshwater resources due to natural disaster or conditions are exempt.	GRAZER will submit documentation of 90-day recovery intervals excluding livestock exposure to freshwater resources. SCCPRD will visually inspect management areas and conduct photo documentation.	Quarterly	Adjust frequency and timing of livestock exposure to freshwater resources. SCCPRD shall have the authority to limit grazing by installing fences, and/or excluding grazing.

COYOTE LAKE–HARVEY BEAR RANCH COUNTY PARK GRAZING MANAGEMENT STANDARDS			
Standard	**Parameter/Method of analyses**	**Frequency and type of monitoring and reporting**	**Remedial Measure/Corrective action**
7. Spring development and maintenance: Springs, troughs, tanks, and pipelines relating to livestock operation maintained in good working condition to provide an adequate supply of water to livestock.	GRAZER will submit maintenance logs and records, and/or photo- documentation that will record the facility maintenance program, frequency, and extent.	Inspections by SCCPRD on a quarterly basis.	SCCPRD will have the authority to hire subcontractor to repair and or maintain water facilities- GRAZER will provide financial surety or performance bond to SCCPRD.
8. Condition of trails and walkways standard: Livestock exposure to trails and walkways as depicted on map exhibit used by public shall be limited in order to lessen impacts of continuous livestock use. Trails and walkways shall be absent of gullies over 4"and the grade maintained. Trails and walkways shall meet SCCPRD trail standards.	SCCPRD will visually inspect management areas and conduct photo documentation.	Frequency and duration of exposure shall be monitored by GRAZER and by SCCPRD annually.	If trails and walkways are eroded and impacted by livestock, SCCPRD has the authority to repair and/or maintain trails and walkways. GRAZER will provide financial surety or performance bond.
9. Trapping, poisoning, or harassing wildlife and/or domestic animals predating upon livestock. Trapping, poisoning and harassing wildlife and/or domestic animals shall be carried out only upon written approval of the appropriate agencies with proper permits in place. SCCPRD shall be notified as soon as reasonably possible if instances of predation and/or harassment of livestock occur, and shall have the right to deny permission to trap, poison, or harass wildlife predating upon livestock.	GRAZER shall routinely inspect the livestock and notify SCCPRD of any instance of livestock predation by wildlife and/or domestic animals.	Routine visual inspection.	SCCPRD may remedy the predation by legal recourse governed by State law and regulated by the California Department of Fish and Game.

4.1.4.2 Percent Cover Sampling Guidelines

Percent cover of plant species should be estimated in grazed and ungrazed plots in order to determine the impact of grazing on percent cover of weed species and plant species composition. Percent cover should be measured in the spring when the majority of grassland plants are in flower and easily identified to species. Methods of estimating cover include point-transects and Daubenmire cover methods (Stromberg and Griffin, 1996). ***Daubenmire methods and success criteria are described in detail in Section 4.4***

4.2 Prescribed Fire

This section summarizes the use of prescribed fire as a grassland management tool. Accidental fires should always be extinguished immediately.

4.2.1 Overview

The effects of fire on habitats and plant communities will vary greatly depending on how frequently it is used as a management tool. Natural fire occurs fairly infrequently compared with human-caused burns. Fire can have direct effects that occur during the fire and indirect effects that occur following the fire. Both can significantly influence long-term ecological dynamics and process at a community level by altering wildlife population and changing habitats.

Some of the benefits of fire are that it: 1) can be timed to prevent seed maturation in annual exotic pest plants; 2) can help achieve biomass management objectives; and 3) can invigorate new growth in woody shrubs thereby enhancing browse for deer and other foragers. Periodic burns effectively remove the mulch layer, stimulate native plant regeneration and enhance the vigor of many bunch grasses (Bartolome 1980). Repeated burns also decrease the relative dominance of introduced grasses and increase the diversity and dominance of native wildflowers. Rapid regrowth of herbaceous plant species following fires provide abundant and high quality forage for herbivores (Peck 1986, Komareck 1985). This renewed resource attracts and facilitates increases in herbivore populations, such as deer, which will rapidly colonize a burned area. With the increase in herbivores follows an increase in predator populations, such as Coyotes. In general, large mammals may actually be more abundant in the first three to eight years following fire.

Fire can affect plant community succession. Habitat composition, structure, and resource availability for wildlife may be radically altered for up to eight years after a fire (Sauvajot 1995). Generally, some predictable ecological patterns result from fire. In the first one to three years, animal species most adapted to fire and open habitat conditions proliferate. Examples include adapted small rodents, large mammals, and predators. Similar patterns are found in bird populations. In the third to fourth year, as shrubs regrow, generalist species will dominate. After ten years, animals preferring dense shrubs become prevalent and the populations of fire-adapted species decline.

Conversely, fire can displace and/or kill native fauna, may increase the likelihood of soil erosion, and contributes to temporary reductions in air quality. For small vertebrates, fires can and do cause substantial mortality and can result in local declines and extinction (Wirtz 1974, McClure 1981, Peck 1986, Patton 1992). Habitat fragmentation at the urban interface may effect colonization of fire areas because of loss of connection from one natural area to another.

Careful consideration must be made before fire is used in a particular management area. Focused planning for using fire as a vegetation management tool should include clear definition of the intended outcome, and complete evaluation of potential risks to other resources. In addition, any prospective actions must include a pre-treatment baseline monitoring, and adequate follow-up monitoring. This plan

does not recommend the use of fire until such planning has been conducted and reviewed. If such planning were conducted and approved, further implementation planning would be required. To initiate a prescribed burn, a burn plan must be developed for CDF approval (see Section 4.2.2.2). The burn plan must include specific information pertaining to goals of the burn, vegetation, slope, aspect, climatic information, CDF-VMP coordination, burn area preparation, suppression activities, safety, and responsible parties.

A fire management program for the Park should identify features that contribute to fire preparedness and control activities. Roads, trails, ponds, and natural fuel breaks should be identified. A fire management program for the Park would help reduce risks associated with catastrophic wildfire, serve as an alternate to grazing to reduce fuel load, and develop management that supports rare species and fire adapted species of plants and animals. Emergency watershed protection measures should be developed for the Park. Evaluating the potential for wildfire, direct and indirect effects of fire, suppression activities, and post fire rehabilitation should be considered.

4.2.2 Management Guidelines

4.2.2.1 Principles

- Public safety is the first priority in prescribed fire management
- Prescribed fire is an essential ecological process.
- Prescribed fire management is an economically viable alternate to other resource management tools such as mowing and herbicide use.
- Prescribed fire management is based on the best available science.
- Prescribed fire management coordinates local, State, and Federal agencies.

4.2.2.2 Prescribed Fire Plan

All prescribed fires will comply with applicable Federal, State, and local laws and regulations. A prescribed fire plan shall be written well ahead of any proposed burn. A team including park staff, biologist(s), and prescribed fire specialist(s) should carefully consider location and timing. The plan should include a map of the burn area, objectives and success criteria for the burn, a description of how the project will meet air quality regulations, a risk assessment, and all agency coordination and notification requirements. In addition, the plan should provide a detailed implementation plan. Important aspects of the implementation plan include: 1) a description of pre-burn preparations; 2) an analysis of safety hazards and methods of addressing them; 3) provisions for a test fire; 4) a list of key parameters necessary to a successful burn (e.g. maximum acceptable wind speed); 5) duties of all personnel involved in the burn; 6) a plan for igniting, maintaining, and extinguishing the burn within prescribed guidelines; and 7) a contingency plan should the fire exceed prescribed parameters (National Interagency Fire Center 1998). A more detailed description of each of these items may be found in the *Wildland and Prescribed Fire Management and Policy: Implementation Procedures Reference Guide* prepared by the National Interagency Fire Center (1988).

Impact to the environment should also be considered in any burn plan. Erosion control is particularly important. Means of controlling erosion and associated impact to water quality and wildlife include: 1) avoiding burns on steep slopes and soils with high potential for erosion; 2) leaving a wide unburned margin around riparian and wetland areas; 3) erecting silt fence to prevent eroded soil from washing into streams and wetlands; and 4) seeding with appropriate native species.

Finally, a prescribed fire plan should include monitoring protocols to document conditions during the burn and to determine success/failure of the burn to increase native species cover and diversity. Specific items monitored are outlined in the following section.

4.2.3 Monitoring Guidelines

The following parameters should be monitored as part of the prescribed fire plan:

- Weather conditions immediately before and during burn
- Fire behavior (flame length, rate of spread, and fire intensity)
- Smoke dispersal
- Fuel load
- Cost per acre of treatment
- Percent cover of exotic and native plant species before and after burn
- Transparency or turbidity in adjacent streams (sampled to allow before and after burn comparisons and upstream and downstream comparisons)

Success criteria and methods for estimating plant cover are discussed in Section 4.4.

4.3 Establishment of Native Grasses from Seed

4.3.1 Grassland Restoration Guidelines

Grassland restoration addresses four goals of the NRMP (Section 1.3): 1) preservation, conservation, and enhancement of natural resources and ecological processes; 2) protection of habitat for sensitive species (Bay checkerspot butterfly); 3) management and protection of sensitive habitats (native perennial grassland); and 4) control of invasive non-native plant species. Grassland restoration guidelines are presented below. Appropriate grass species, monitoring techniques, and a timetable are provided in the sections immediately following.

A first reasonable goal of grassland restoration is to establish the ecosystem foundation, and that means starting first with the grasses. Once a good layer of native grasses is growing, the spaces between can be systematically planted with a host of wildflowers. The entire process may take 1 to 3 years and will require some annual management including mowing once or twice and spraying or removing invasive exotic species. Once established, the grassland will slowly change over time, especially if the long-term management changes or ceases. Remember that the ecosystem you are planting may be present 500 years from now.

One of the first steps in grassland restoration is to locate seed sources. All seed for restoration efforts should be collected from local grasslands in order to preserve the genetic integrity of the population. However, to avoid damaging collection sites, only a small percentage of the total seed produced should be removed. If feasible, seed should be collected from a large number of plants varying in size, seed production, flowering time, and other characteristics of the population. Seeds of rare plants should never be collected without prior approval from the California Department of Fish and Game or U.S. Fish and Wildlife Service.

The greatest challenge to native seed establishment is weed competition. If possible it is best to begin weed control 6 months to a year in advance. This should consist of trying to sprout and then eliminate the weed seed bank in the top few inches of soil. This can be done by physical means such as disking, harrowing, tilling, burning, or by herbicide application. These cultural practices can be repeated 2 or 3

times as subsequent flushes of weeds emerge. It is best to use methods that cause fewer disturbances, as weed seed is scattered throughout the soil profile and will be brought to the surface with disking or tilling. Burning, if possible, is an excellent method, as is the use of Round-up® Herbicide at a 1.5 % rate. It is best to plant immediately following the weed control treatment. Weed seeds left in the soil will germinate and emerge before the natives.

The cheapest way to clear the weeds from the site before planting native grasses is to till the soil, starting in the fall, after the first rain. Based on techniques discovered in the earliest days of agriculture, one can use a disk to turn over the top layer of soil and bury the existing vegetation. On small areas, a roto-tiller works fine. A small tractor and spring-toothed harrow (see photo) works well. If the soil had been farmed for a long time, a layer of hardpan may be present a few feet below the surface. If that is the case, deep ripping with a bulldozer and a 5-foot long ripping bar may be required. As winter storms later arrive to wet the soil, the soil microbes attack the buried vegetation and break it down into a colloid of nutrients that is quickly bound up on soil particles and surfaces. Continue uprooting seedlings at the surface of the soil (using hoes, spring tooth harrow, chain harrow, etc.) as they germinate. If tilled before they can set any seed, they die and are returned to organic molecules (nutrients) in the soil. This process can be repeated 5-6 times over a winter. Each time a fine carpet of green seedlings emerges and harrow under, there are fewer weeds germinating. If one plows or discs deeply, this will only bring up the deeply buried seeds and increase the weed crop. Deep tilling should only be done once at the beginning of the project. If tillage is not possible, the application of a post-emergent herbicide (glyphosphate) can be substituted. A small ATV can be equipped with a sprayer bar and tank. If the seed bank in the soil is small, one might be able to remove most of the seeds in a single winter. This might be the case where a field had been farmed in the years immediately prior to the project, and all but the crop seeds had been removed for many years. If there is an extensive seed bank in the soil, it may take two winters of repeated harrowing after germination to clear the weeds from the top few inches of soil. Such repeated tillage also eliminates the gopher population from the patch, and gophers can be a major reason why native grass restoration projects fail (Stromberg and Kephart, 1996).

The most common weeds one will encounter in a new planting will probably include these species: annual ryegrass (*Lolium multiflorum*), rat-tail fescue (*Vulpia myuros*), rip-gut Brome (*Bromus diandrus*), soft brome (*Bromus hordaceous*), wild oats (*Avena spp*.), fox tail (*Hordeum murinum*), or filaree (*Erodium spp*.).

The ideal time to plant native seed is from mid-October to mid-January. The window for seeding can be extended to before or after these dates with irrigation. Seed can be incorporated into the ground by hand-broadcast application, drill seeding, or hydro-seeding. The seed bed should be firm and the seed should be planted to a depth that will stay in contact with soil moisture between rain events. A rake for hand seeding or ring roller for mechanical seeding is a good tool to firm the soil and ensure good soil-seed

contact. Since native seed can take 2 to 4 weeks to germinate during the cool season, it is possible to spray Round-up® on any weed seed that emerges before the native seed does. Minimal fertilizer should be used until the stand matures.

By the second year seed mix should be competitive and self-sustaining. Some management may be necessary to keep and maintain the health of the stand. The tools used thus far, herbicides, burning, mowing or grazing, can be applied as necessary, as a response to field growth and success of weed control.

Generally, steep hillsides make poor candidates for restoration of native, perennial grasslands. Most of the suggestions here apply to sites where a truck or a tractor can be driven. However, hillside restoration is feasible; it may, however, require more hand labor.

4.3.2 Appropriate Species for Grassland Restoration

Several native, perennial grasses that are appropriate for habitat enhancement, erosion control, and range improvement at Coyote Lake – Harvey Bear Ranch County Park are described below.

Purple Needlegrass (*Nassella pulchra*)
California's official state grass, purple needlegrass occurs over most of the state. Tough basal leaves in this bunchgrass stay green most of the year. Roots extend down 20 feet and can tap the soil moisture in a drought so effectively that large, old plants can out-compete any nearby young plants. Eventually, they space themselves relatively far apart so that all can survive droughts. Each year, mature plants produce a few seeds, shaped like a torpedo. Each seed has a long, thread-like awn attached, so the seed resembles a needle and thread. Use of this species is recommended in dry, clay soils, on hillsides and in forest openings. It thrives in deep, well-drained soils.

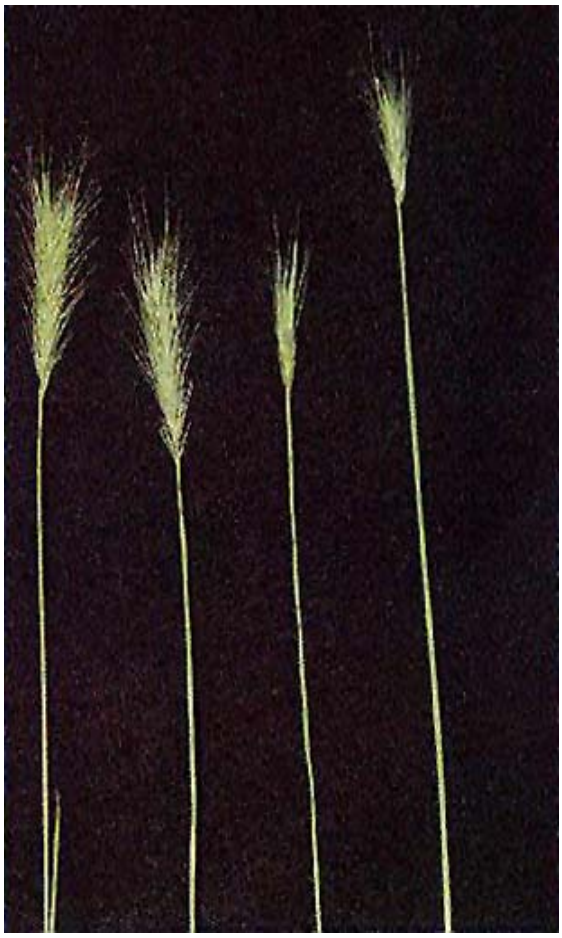
Purple needlegrass (*Nassella pulchra*)

Close up of the "needle and thread" seeds of (*Nassella pulchra*). The seed head has strong purple shading and, from a distance, the seed heads are clearly purple when young.

California Meadow Barley (*Hordeum brachyantherum*)

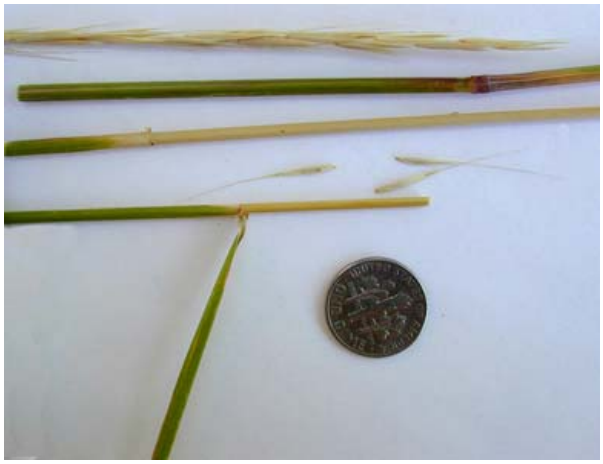
California meadow barley, although similar to foxtail, is surprisingly soft to the touch. Cattle will prefer this grass when it is available. This smaller bunchgrass can survive brief flooding and is recommended in wet soils (e.g. pond margins, seasonal wetlands, meadows). Its seeds have a small awn and rapidly break off the stalk, leaving small tufts. The basal leaves are soft to the touch and turn golden brown in the summer, and even with additional water, do not stay green. This grass is relatively low in stature, growing knee high in wet places.

When dry, the top seeds blow off meadow barley inflorescence, leaving a small tuft at the base of each flower head. These distinctive tufts remain most of the winter.



Meadow barley (*Hordeum brachyantherum*)

Blue wildrye (*Elymus glaucus*)
Blue wildrye is often found on the edge of an opening, in a transitional habitat between full sun and partial shade. This species is recommended along margins of coast live oak woodland, tucked under the edge of the tree canopy. A bunchgrass, it can grow to shoulder height, with long smooth, waxy stems. The basal leaves are of medium width and some turn brown and curl in the summers. The green stems slowly turn straw colored and the seeds fall in late summer.



Close up of seed heads of blue wild rye. Note smooth, large stem, and small seeds arranged in a distinct cylinder. When they break off, they lack the backward-pointing hairs of weedy grasses.

Creeping wildrye (*Leymus triticoides*)
Creeping wildrye is a low-growing (to 2 feet tall), mat-forming (rhizomatous) grass with blue-green leaves that recommended along creeks and in seasonally wet soil (e.g. swales, pond margins). Most leaves lean away from the main stem, forming a complex of flags, stems and seeds. Each seed head has three flowers. Seeds are often sterile, as the plant primarily reproduces by underground runners.

Creeping wildrye (*Leymus triticoides*) and close-up of inflorescence.

California brome (*Bromus carinatus*)
California brome is one of the most variable grasses found in California. It varies in height, color, fuzziness, and form across geographic areas, and between habitats in one site. The seed heads are strikingly flattened. The leaves are broad and green, and most stay green well into the summer.

Plant body grows to knee height, and keeps its bunch form. Other geographic races, for example those from the coast, remain prostrate and never grow much taller than ankle height. Seeds are relatively large and abundant. This grass grows rapidly and is a great choice to get native grass covering the ground quickly. However, it only lives a few years. It can serve as a quick-growing "nurse" grass to some of the longer-lived grasses like purple needlegrass or blue wildrye. California brome grows in many habitats, but is best suited to openings and edges of oak and riparian woodland in the Park.


California brome (*Bromus carinatus*)

4.3.3 Monitoring Guidelines

Percent cover should be monitored in seeded areas in order to track changes in species composition and determine whether weed control and seeding efforts have reduced weed cover and increased native species cover. ***Methods for monitoring percent cover are the same as those used to monitor grazed or burned areas and are summarized in Section 4.4. Section 4.4 also provides success criteria specific to seeded areas.***

4.3.4 Grassland Restoration and Monitoring Timetable

Time Period	Activity
Year 1	
January/February	Select site(s).
March/April	Monitor percent cover to establish baseline. Determine grass species to be sown and estimate seed requirements (# of lbs).
March/April (after baseline is established) until date seed is sown	Intensive pre-seeding weed control (soil cultivation, herbicide application, prescribed burn, etc.). Note that if a prescribed burn is intended, the burn plan should be in place by this time (see Section 4.2.2.2)
April/May	Identify, mark, and map grass seed sources.
May-July	Visit seed sources to assess seed ripeness. Collect seed at maturity but before it drops. [Use paper or cloth collection bags and spread seed out while it dries to prevent mold.] Have grass seed with long awns professionally "cleaned" to remove awns and impurities. Test seed germination.
August/September	Once seed has been cleaned, weighed, and tested for germination, determine whether seed collected will be adequate to cover selected site. If there is not enough seed consider: 1) beginning with a smaller area and using that area as a seed source for future restoration; or 2) setting back the restoration schedule by one year and contracting with an appropriate nursery to grow collected seed offsite for increase.
October 15-January 15	Broadcast or drill grass seed.
Year 2	
January-December	Control weeds.
March/April	Determine additional species to be sown and estimate seed requirements (# of lbs). Identify, mark, and map seed sources.
April-July	Visit seed sources to assess seed ripeness. Collect seed at maturity but before it drops. [Use paper or cloth collection bags and spread seed out while it dries to prevent mold.] Store seed once it is dry. Determine which species will be sown and which will be planted from containers. Species that will not be drill-seeded and do not have long awns will not require professional cleaning.
August-November	Propagate plants that will be planted from container stock (e.g. 6" cones) this winter
October 15-January 15	Broadcast seed. Plant container stock after rains have started.
Years 3, 4, and 5	
January-December	Control weeds.
March/April	Monitor percent cover. Assess progress toward success criteria (Section 4.4) and determine whether remedial planting and seeding are necessary.
April-December	Repeat schedule for Year 2 if necessary.

4.4 Monitoring Methods and Success Criteria for All Grassland Restoration/Enhancement Techniques (Grazing, Prescribed Fire, Seeding)

Species composition in a given "plant community type" is affected by cyclic germination and emergence of plant materials, climatic conditions, episodic disturbances such as fire, and management techniques (e.g. grazing). A useful way to track changes in species composition and assess the success of grassland management and restoration techniques is to sample the percent cover of plant species in treated areas and compare results to percent cover in untreated areas and/or to the same area prior to treatment. Methods that may be used to estimate percent cover are described below. Success criteria for different management strategies are also provided.

Step 1: Track and record natural resource management methods

The SCCPRD employee in charge of monitoring will first record the management method implemented, where conducted, and the date conducted. For each management area, maps will be prepared (based on USGS 7.5' quadrangles) to show each unit (field, paddock, hillside, etc.), which was grazed, restored or otherwise treated (e.g. burned). Corners of each polygon will be documented with GPS and recorded on the maps. Each unit on the map will be named (or numbered). Each map will have attached to it, or filed with it, a data sheet showing the date of treatments and/or grazing events. The specific methods used will be recorded, for instance names, seeding density and planting methods, mowing equipment used, and number and duration of grazing animals.

Step 2: Establish permanent monitoring stations

The SCCPRD employee in charge of monitoring shall establish permanent 20m x 50m monitoring plots to assess treatment effect (e.g. prescribed burn, intensive spring grazing, seeding) on native plant cover. At least 1 plot is recommended for each type of treatment. If only one plot is used per treatment, statistical comparison between treatments will not be possible. However, by placing the plot in an area that appears representative of the larger treatment area, a single plot can give the land manager a good idea of treatment effect at minimal cost. Although statistical comparison among large treatment areas will not be possible using one plot per treatment, statistical comparison among plots will be possible because each plot will be subsampled using 20 20cm x 50 cm quadrats (methods provided below). In addition, a single plot may be statistically compared at two different times to determine whether cover in that plot has changed during the interim.

Step 3: Sample grassland species composition

Plant cover monitoring is conducted in the spring during flowering, when plants are readily recognizable. Changes in the proportions of native versus non-native species indicate the effects of the prescribed management. Evaluations are based on the percent cover of plant species in a given area. For each plot, twenty cover estimates will be taken using a 20cm x 50cm quadrat that has been painted according to Daubenmire cover classes (Daubenmire 1959; Stromberg and Griffin 1996; see illustration below). A description of the recommended method is provided below. A sample datasheet is provided in Appendix 4.

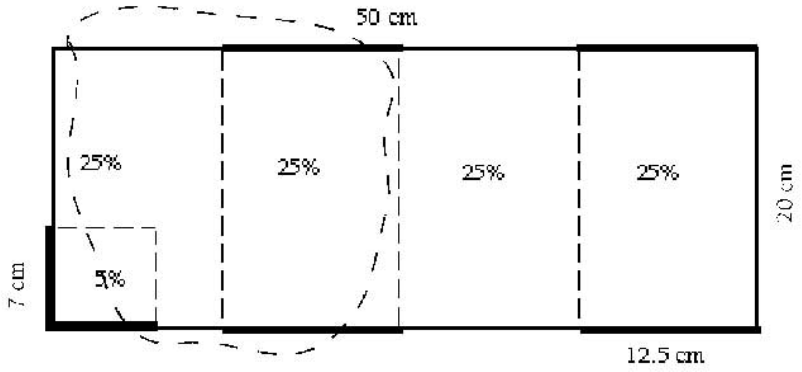
At least one 20m x 50m sampling plot is established for each treatment area (hand control, intensive late season grazing, mowing, seeding, or burning) (see Step 2 for guidelines on plot selection). To establish a plot, a start point is selected, permanently marked, and recorded with GPS to assist in relocation. From this point, a 50m transect tape is extended along any existing gradient in vegetation, and the compass heading of the line noted. The end point of the 50m transect is then marked and recorded with GPS. The

transect line will represent the centerline of the 20m x 50m plot (see below), the corners of which should also be permanently marked.

Each plot is sampled using 20 randomly placed quadrats. Random numbers can be selected prior to field work in order to save time in the field. The following method is recommended for selection of 20 random coordinates within the plot. First, select 20 random numbers between 0 and 99 [These units correspond to half-meter distances along the centerline of the plot]. Next, pick 20 numbers between 0 and 19 and place each number next to one of the first numbers chosen [These numbers correspond to half-meter distances to either side of the centerline]. Next, randomly assign either the left direction or right direction to each of the above number combinations [These directions correspond to the side of the centerline the quadrat should be placed]. You now have a 20 sets of two numbers and a direction that will define placement of each quadrat in the plot. For more efficient field sampling, these coordinates should be arranged in increasing order by the first number.

Each quadrat is placed so that the bottom left corner matches the random coordinates. Next, one of six cover classes (0-5%, 6-25%, 26-50%, 51-75%, 76%-95%, or 96-100%.) is recorded for each species present within the quadrat, based on the percent of the quadrat area occupied by that species. Note that the quadrat has been painted to assist the sampler in visual estimation of these cover classes. Once field sampling is completed, cover classes are entered in an Excel-style spreadsheet (available from Rana Creek Habitat Restoration upon request). The spreadsheet assigns the midpoint value to each cover class entered, and calculates mean cover for each species for all 20 quadrats. Mean percent cover of all native species combined is then calculated by adding mean cover values for individual native species.

Daubenmire Cover Method

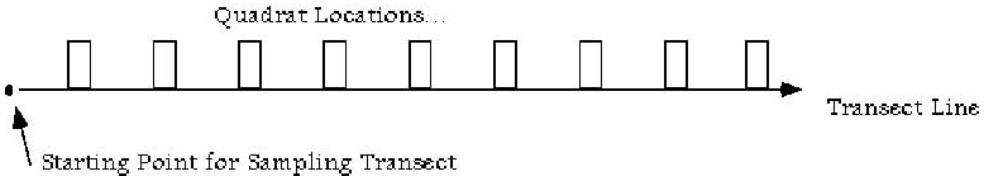


A steel frame, made from .25" wire, is welded in a flat rectangle to dimensions of 20 cm x 50 cm (area = .10 m ^{2}). The frame is then painted to show areas of 5%, 25%, 50%, 75%, as 95% (see above).

This frame is place on the ground and cover of each species is summed visually and placed in the following categories;

Category	Mid Point
1- 0-5%	2.5
2- 6-25%	15.5
3- 26-50%	38
4- 51-75%	44.3
5- 76-95%	85.5
6- 96- 100%	98

For example, the plant shown in outline, as seen from above, covers enough ground for category 3. In the field, only the score for each species in each quadrat is recorded. Scores for species on each quadrat are later assigned a numeric value of the mid-point of the range, and then averaged. At least 20 quadrats must be read along a transect placed in each larger sub-unit.



Percent Cover Success Criteria in Enhanced and Restored Grassland

Enhancement/Restoration Technique	Percent Cover Prior to Enhancement/Restoration	Success Criteria	Time to Reach Success Criteria
Grazing	5-10% cover native species	20% cover native species	5-10 years
	10-25% cover native species	50% cover native species	5-10 years
Prescribed fire followed by seeding	5-10% cover native species	30% cover native species	5-8 years
	10-25% cover native species	50% cover native species	5-8 years
Weed removal followed by seeding and ongoing weed control (mowing, grazing, and/or spot treatment with herbicide)	0-5% cover native species	75% or greater cover native species	3-5 years

4.5 Coast Live Oak, Valley Oak, and Blue Oak Woodland Management and Restoration

4.5.1 Restoration Guidelines for Oak Woodland

Acorn collection, processing, and planting

Establishment of young trees is a stated natural resource management objective of this plan. Valley oak, blue oak, and coast live oak acorns can be harvested and direct planted near oaks of the same species by volunteers, grazing managers, and monitoring personal. Protection from herbivores is required, and "tube type" or wire cage protective shelters may be used.

Acorns should be collected from local trees in the early fall – preferably directly from the tree rather than from the ground where they may dry out. Place the acorns in a bucket of water and discard all cracked or floating acorns. Remove the sinking acorns from the bucket, take off any remaining acorn caps, and quickly dip the acorns in a dilute bleach solution (~5-10% household bleach) before rinsing in fresh water. Next, place the acorns in small or medium Zip-Lock® style bags labeled with the species, collection location, and date. A handful of moist vermiculite in each bag will help to maintain adequate humidity but is not essential. Store the bags in a refrigerator and examine them weekly for signs of germination and mold. If the acorns are molding they should be rinsed and transferred to fresh bags. Within 30-90 days, the pointed part of some acorns will begin to crack, and the tip of the root will start to emerge.

Acorns may be planted at the first sign of germination as long as winter rains have moistened the soil or irrigation is provided. To avoid root damage, acorns should be planted before the root extends more than a quarter inch from the acorn shell. Scalp each planting area in a 2-foot radius circle to reduce weed competition. Next, dig a hole at least 6 inches deep, backfill it, and lightly compact the soil. This will loosen the soil below the acorn, encouraging faster root growth. Acorns should be planted on their sides approximately 1 inch below the soil surface. Two acorns may be planted in each spot to improve chances that at least one will germinate. However, if two are planted, they should be placed at least 4” apart so that one may be thinned without damage to the remaining plant. After planting, the scalped area should be mulched with weed-free mulch to help conserve soil moisture and reduce weeds. Deep watering 2-3 times during the summer is recommended for the first several summers (McCreary 2001). More frequent watering during the first summer (once a month) may increase survival and growth. Protective tubes or cages are recommended but should be removed and replaced with larger cages as oaks outgrow them. Cages should be draped with shade cloth for the first two summers or until seedlings outgrow the cages. A timetable for these and other oak woodland restoration activities is provided below.

In addition to planting acorns, oak woodland habitat could be enhanced by allowing dead wood to accumulate. Fallen dead wood is important to rodents such as Piñon Mice and Dusky-footed Woodrats, and is limited in the Park (see Section 3.9.5). Standing dead trees provide cavities for nesting birds as well as potential roosting sites for bats.

Establishment of understory species

Many areas of coast live oak, valley oak, and blue oak woodland in the Park have understories dominated by non-native annual grasses as a result of year-round grazing. Restoration of complex structure and native species diversity to these areas will enhance habitat value for wildlife. In particular, birds will benefit from a greater number and more diverse array of protected nesting and foraging sites. Restoration of native understory species could be accomplished using two methods: 1) weeding around clusters of native plants in the understory to allow these species to spread naturally by seed or rhizomes; and 2) collecting seed or rhizomes of native species for propagation and later planting. Species recommended for propagation and out-planting in coast live oak woodland include blackberry, coffeeberry, snowberry, hedge nettle, and blue wildrye. California buckeye, toyon, California coffeeberry, and purple needlegrass are recommended in blue oak woodland. Open areas of valley oak woodland could be enhanced by planting purple needlegrass on slopes and creeping wildrye in moister swale areas. Note that the plant species recommended above are only a few of the more common species. Additional species should be added with time. Planting densities and microhabitats for each species should be determined based on examples of less disturbed and more diverse oak woodlands of the same type. A range of comparison sites should be selected with similar soil, slope, and aspect.

4.5.2 Monitoring Guidelines for Oak Woodland Restoration Sites

Randomly chosen planted oaks may be monitored for survival. Each monitored oak should be marked with an identification number, mapped with a global positioning system (GPS), and recorded in the existing GIS database for the Park. Percent survival may be calculated for various time intervals (1 year, 5 years, 10 years). Success criteria should be set at 75% survival 5 years after planting. This figure assumes that seedlings are planted in suitable locations, watered 2-3 times for the first several summers, protected by tubes or cages where necessary, and shaded for the first 2 summers.

Photo monitoring is another valuable sampling tool for tracking changes in vegetation. Photo monitoring can be done simply and cheaply and can provide illuminating observations on a time scale that isn't often appreciated. Photo monitoring provides documentation of vegetation trends and the results of prescribed vegetation management activities. At each monitoring point, a permanent marker is installed. For each monitoring point, a standard heavy-duty steel "thumb tack" style datum will be pounded into the ground. GPS location data are taken and recorded for each such center stake. The temporary stakes should be painted each year during monitoring with some fluorescent red for easy identification. For each monitoring, a camera is attached to a PVC pole fitted over the center datum. A 2m tall, 2" diameter PVC pipe is set into the center datum. The same camera mounting pole (about 1.5m tall) and radial poles are used each year. For each location, two photos are taken of each cardinal direction. The first includes some sky and the radial PVC standpipe. The second photo centers on a measuring tape stretched between the radial standpipe and the central pole with the camera. This second photo gives a more detailed view of the species in the ground vegetation.

4.5.3 Oak Planting and Monitoring Timetable

Time Period	Activity
Year 1	
Year-round as needed*	Control weeds (pre- and post-planting) in seeding locations.
September/October	Collect and process acorns.
October-December	Store acorns.
November-December	Plant acorns after rains begin and acorns are ready.
Year 2	
Year-round as needed*	Control weeds near oak seedlings.
February/March	Carefully thin seedlings (if 2 acorns per hole were planted). Randomly select seedlings to be monitored for survival next year (see Section 4.5.2). Mark and map those seedlings.
Late April until first heavy rain	Water deeply at least 2-3 times over summer; water monthly if possible. While watering, check that shade cloth is in place. If wire cages were used, trim cages as necessary to accommodate growth.
Years 3, 4, and 5	
Year-round as needed*	Control weeds near oak seedlings.
January	Monitor oak survival (see Section 4.5.2).
Late April until first heavy rain	Water deeply 2-3 times over summer. Maintain cages as described under Year 2. Cages should be cut off as they are outgrown.

*Summer watering of oak seedlings will extend the time period during which weeding is necessary.

4.5.4 Effects of Grazing on Oak Woodland

Grazing can be a detriment to oak seedlings where density, duration, and intensity are too high. However, the grazing management recommendations proposed in Section 4.1 will not adversely impact oak seedlings in the Park. Grazing can actually enhance growth of native perennial grasses in open oak woodland areas, to the benefit of oak seedlings. Purple needlegrass and many other perennial bunch grasses are deep-rooted and draw less moisture from the top few inches of soil than do non-native annual grasses, increasing moisture availability and survival of oak seedlings.

4.5.5 Sudden Oak Death

Sudden Oak Death (SOD) is caused by an exotic fungus-like pathogen, *Phythophora ramorum,* that is currently spreading through California woodlands. There is no known cure or prevention for SOD at this time. SOD was first observed in Marin County in 1995, and has subsequently spread through twelve coastal counties in central and northern California. The pathogen has also been identified in a few locations in Oregon, and on nursery stock in Germany, the U.K., and the Netherlands. First identified in coast live oak and tanoak, SOD has now been found in other species, including California black oak, Shreve oak, rhododendron, California bay laurel, big leaf maple, madrone, manzanita, huckleberry, California honeysuckle, toyon, California buckeye, and California coffeeberry.

Phythophora ramorum is known to cause several plant diseases, many of which cause foliar damage but do not kill the host plant as in SOD. Some plant species develop trunk cankers and appear to be more susceptible to SOD. Other plant species harbor the pathogen on foliage and shoots without developing SOD. The latter species may assist in spreading SOD to more susceptible species.

SOD has not yet been observed at the Park. *Phythophora* spores spread in water, mud, and in the air. Recommended precautions to prevent the spread of SOD include cleaning tires, boots, and tools when moving from an area of known infestation, and not transporting wood, foliage, firewood, or other wood products from any of the known host species out of infested zones into disease-free areas.

4.6 Protection and Enhancement of Freshwater Resources

4.6.1 Management Guidelines

The following are general Best Management Practices for protection and enhancement of the freshwater resources within the Park:

1. Manage vernal basins, lakes, ponds, and riparian stream vegetation by controlling the frequency, timing, and duration of livestock exposure.
2. Exclude livestock grazing activities by installing temporary or permanent fencing around stock ponds.
3. Survey and identify invasive plant and animal species that could pose a threat to sensitive species.
4. Restore degraded habitats and create new habitats that promote biodiversity and sensitive species.
5. Manage livestock to prevent degradation of water quality in creeks and in Coyote Lake.

Fencing stock ponds, seeps, and springs will greatly benefit nesting birds, amphibians, and native plant species regeneration. Development of pipelines and troughs for grazing are recommended in some fields (see Proposed Grazing Management Areas Map). Chronic overgrazing and trampling results in low species diversity of wildlife species due in part to reduced cover and biological activity. While short grass grazing is preferred by gophers, killdeer, and horned larks, prolonged over utilization results in little cover in littoral zones of freshwater ponds, streams, and lakes. Loss of streamside vegetation can increase water temperatures and can have a negative effect on freshwater fishes and amphibians.

Maintaining and monitoring water quality in Coyote Lake and ephemeral creeks is a critical resource management objective. Monitoring water quality involves identification of freshwater resources and identification of potential locations of non-point source pollution (NSP). Non-point source pollution is defined as an alteration of the quality of State waters to a degree that adversely affects their beneficial uses. Non-point source pollution consists of diffused discharges of pollutants throughout the environment. Examples of non-point source pollution may include high levels of nitrates in pond water from agricultural runoff or sediments in a creek from improperly maintained roads or natural landslides.

Concentrations of livestock may contribute to NSP when best management practices are not observed. Erosion caused by excessive concentrations of livestock for extended periods will contribute to sediment and lower water quality. The USDA Natural Resource Conservation Service reports that sheet and rill erosion is a problem on 1/3 of California rangeland, and contributes on average 3.3 tons/acre/yr. of sediments on 19 million acres (Ranch Water Quality Management Planning 1996).

Leaching of concentrated nutrients from corrals, holding pens and stables can also degrade freshwater resources. Nitrate and phosphate are the primary nutrients of concern. Localized contamination from pathogens in the form of fecal coliforms may be caused from sick livestock and/or wildlife. Maintaining a healthy herd will help prevent risk of contaminants.

Roads can contribute to poor water quality. Sections of road may require regrading, culvert installation, slope and outfall adjustment, installation of adequate energy dissipaters, and revegetation.

4.6.2 Revegetation of Stock Ponds

Planting native riparian and marsh vegetation around stock ponds will greatly increase habitat value for birds and amphibians. Appropriate species include willows (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), and rushes (*Juncus* spp.). Cattails (*Typha domingensis)* and tule (*Scirpus acutus* var. *occidentalis*) also provide excellent cover. However, these species spread rapidly in shallow water and could quickly eliminate open water areas in more shallow ponds.

Planting methods for recommended species are outlined in the table below. All plants listed, with the exception of pondweed, are known to occur in the Park and should be propagated from local stock to protect the genetic integrity of plant populations. Pondweed, an aquatic plant, may occur in the Park and have been overlooked during surveys. This species provides excellent aquatic cover for frogs and basking sites for turtles and should be planted if observed in or near the Park.

Planting should be done after the onset of winter rains in order to reduce watering needs. Care should be taken to position plants appropriately relative to the high water level for each pond (see table below). For example, cattails should be planted below the high water line, while willows and cottonwoods should be planted above the high water line but within the area of seasonally moist soil around the banks. Although herbaceous vegetation should not require any summer watering if planted early in the winter (January or earlier if steady rains allow), all trees should be watered through the first summer/fall. Watering should be performed once every 1-2 weeks depending on soil moisture retention. Weed control around all plants should be done by hand or with a weed whacker in the spring and summer.

Note that riparian vegetation consumes large amounts of water and may speed drying of ponds. California red-legged frogs, although not known to exist within the Park, may use the stock ponds now or in the future. Because this species requires standing water through July for successful breeding (USFWS 2001b), it is recommended that only a small area of pond bank be revegetated in ponds likely to dry before the end of July. In addition, a portion of each pond should be left unshaded to provide warm, shallow areas and sunny banks for tadpoles and juvenile frogs and sunny deeper areas with basking sites for turtles (see Section 4.9.3).

Plant Species	Plant Type	Planting Location	Container Size/Planting Method
arroyo willow (*Salix lasiolepis*)	tree	pond banks in areas of seasonally moist soil	1" diameter poles cut from branches or 1 gallon tree pots
red willow (*Salix laevigata*)	tree	pond banks in areas of seasonally moist soil	1" diameter poles cut from branches or 1 gallon tree pots
Fremont cottonwood (*Populus fremonti*)	tree	pond banks in areas of seasonally moist soil	1 gallon tree pots
blue elderberry (*Sambucus mexicana*)	large shrub or small tree	pond banks in areas of seasonally moist soil	1 gallon tree pots
meadow barley (*Hordeum brachantherum* var. *californicum*)	perennial grass	just above high water line to seasonally moist soil along banks	seed
slender hair grass (*Deschampsia elongata*)	perennial grass	just above high water line to shaded, seasonally moist soil along banks	seed

brown-headed rush (*Juncus phaeocephalus*)	rhizomatous perennial	just above high water line	seed, rhizomes, or 4" pots
iris-leaved rush (*Juncus xiphioides*)	rhizomatous perennial	just above high water line	seed, rhizomes, or 4" pots
spikerush (*Eleocharis macrostachya*)	rhizomatous perennial	just above high water line	seed, rhizomes, or 4" pots
three square (*Scirpus americanus*)	rhizomatous perennial	at or below water's edge to 2" depth	rhizomes
pond weed (*Potamogeton* spp.)	rhizomatous perennial	in standing water of perennial ponds.	rhizomes

4.6.3 Monitoring Guidelines

Water quality and riparian/wetland vegetation should be monitored regularly to: 1) assess habitat quality for aquatic organisms; and 2) assure that recreational use and management activities within the Park are not degrading freshwater resources. Monthly visual surveys of bank erosion and vegetative cover along stream banks, pond banks, and seasonal wetlands are recommended (see table below). Excessive bank erosion and loss of vegetation may indicate impacts from livestock grazing or from visitor use. Periodic monitoring of bank stability will enable park managers to address erosion problems quickly before they result in significant degradation of freshwater resources.

High nutrient and *E. coli* bacteria levels in creeks and ponds may result from overgrazing near freshwater resources or from excessive use by wildlife (e.g. wild pigs). Regular monitoring for nitrate, ammonia, phosphate and *E. coli* (see table below) will allow park management to quickly address any impairment to water quality and habitat for aquatic organisms. Permanent sampling locations for nutrients and bacteria should be selected according to the following criteria: 1) the location provides potential aquatic habitat for sensitive reptiles and/or amphibians; 2) the location has standing or running water at least throughout the rainy season; 3) the location is within an area of potential impact from grazing; 4) the total number of sampling stations does not strain Park resources. Note that any budget for water quality monitoring should include funding for one person to oversee the ordering of supplies, data collection and management, and delivery of nutrient and coliform samples to a state-certified lab for testing. This person should be in charge of quality control for the project and be responsible for training all people that will be collecting samples.

The table below summarizes appropriate monitoring procedures and success criteria. Date, time of day, weather conditions, date of last rain, site conditions (e.g algal bloom), and any other information that may affect monitoring results should also be collected during each monitoring visit. Although inexpensive test kits are available for measuring nutrients, use of a lab will save time and eliminate the need to dispose of hazardous chemicals associated with some of these kits. If a state-certified lab is used, it is important to consult lab technicians on proper sampling containers and storage for each kind of analysis well in advance of sampling. Lab technicians should also be told ahead of time when to expect the samples to assure they will have the time to process them. Lab processing of nutrient and coliform samples is expensive. It may not be financially feasible to send samples from each water quality sampling station each month. The most important time to sample these parameters is after the first heavy rains when nutrients and coliform are more likely to wash into ponds and streams.

At least one set of data should be collected prior to initiating grazing in the Park in order to estimate worst-case baseline conditions. These data should be collected immediately after the first heavy rain of the season in order to maximize nutrient and bacteria levels.

Standard	Success Criteria	Monitoring Method	Frequency	Remedial Measure
Freshwater resources including streams, stream banks, and seasonal wetlands shall be protected from potential erosion and siltation arising from motor vehicles, grazing, public access, or operations in connection with maintaining roads and trails.	Estimated cover of vegetation at least 75% along all undeveloped stream, pond, and lake banks. No visible erosion from livestock use, road runoff, trail maintenance or recreational use.	SCCPRD will visually estimate coverage of vegetation and soil conditions near freshwater resources. Inspections shall verify that riparian/vegetation is intact and that excessive erosion has not occurred within or adjacent to freshwater resources.	Monthly, year-round. Monthly, year-round.	SCCPRD should implement corrective actions including, but not limited to exclusionary fencing, restoration, modification of road and trail locations and maintenance.
E. coli bacteria should remain low.	*E. coli* less than 126 CFU per 100 ml	Bring samples to state-certified laboratory for analysis (5-5-5 multiple tube fermentation). Consult lab on collection bottles/storage.	Monthly until dry or at least after heavy rain once a winter.	Determine potential source of high coliform levels (livestock, wild pigs) and consider installing protective fencing or increasing the already protected buffer around freshwater resources. Note that pig fence may need to be installed along livestock fences where pigs are suspected of polluting the water. Fencing should not restrict movement of small wildlife such as turtles.
Nitrate (mg/L) levels shall not result in algal blooms or adversely impact sensitive aquatic organisms.	Nitrate as N should be less than 1.13 mg/l.	Bring samples to state-certified laboratory for analysis (EPA method 300.0). Consult lab on collection bottles/storage.	Monthly until dry or at least after heavy rain once a winter.	Determine potential source of high nutrient levels (livestock, wild pigs) and consider installing protective fencing or increasing the already protected buffer around freshwater resources. Note that pig fence may need to be installed along livestock fences where pigs are suspected of polluting the water. Fencing should not restrict movement of small wildlife such as turtles.

Standard	Success Criteria	Monitoring Method	Frequency	Remedial Measure
Ammonia (mg/L) levels shall not adversely impact sensitive aquatic organisms.	Ammonia as N should be less than 0.023 mg/l.	Bring samples to state-certified laboratory for analysis (EPA method 350.1). Consult lab on collection bottles/storage.	Monthly until dry or at least after heavy rain once a winter.	Determine potential source of high nutrient levels (livestock, wild pigs) and consider installing protective fencing or increasing the already protected buffer around freshwater resources. Note that pig fence may need to be installed along livestock fences where pigs are suspected of polluting the water. Fencing should not restrict movement of small wildlife such as turtles.
Total phosphate (mg/L) levels shall not result in algal blooms or adversely impact sensitive aquatic organisms.	Total phosphate as P should not exceed 0.12 mg/l.	Bring samples to state-certified laboratory for analysis (EPA method 365.4). Consult lab on collection bottles/storage.	Monthly until dry or at least after heavy rain once a winter.	Determine potential source of high nutrient levels (livestock, wild pigs) and consider installing protective fencing or increasing the already protected buffer around freshwater resources. Note that pig fence may need to be installed along livestock fences where pigs are suspected of polluting the water. Fencing should not restrict movement of small wildlife such as turtles.

4.7 Erosion Control

4.7.1 Management Guidelines

Many road banks, drainage areas, and stock ponds in the Park have been subject to recent and significant erosion events. These events are a result of heavy rain patterns, road cuts, and bare soil conditions. Erosion may lead to impaired water quality, destruction of native vegetation, and loss of valuable wildlife habitat. In addition, erosion may create safety hazards for Park staff and visitors. Therefore, it is imperative that erosion features be repaired and restored. Furthermore, proper management practices should be implemented to prevent future erosion. Several erosion control practices are suggested below:

1. As road maintenance is done on the property, roads should be sloped to the outside edge for sheet runoff. The in-slope drainage should be minimized to prevent erosive cutting. Prior to grading, silt fence should be installed to protect freshwater habitats from siltation.

2. After grading roads, bare soils should be seeded to prevent erosion and exotic species invasions.

3. Rolling waterbars should be installed to effectively drain road surfaces and prevent erosion and sedimentation, while allowing continued road traffic during the rainy season.

4. Rip-rap or other impact reducing mechanisms should be installed at the outfall of each waterbar and/or culvert to dissipate the potential cutting energy of water collected prior to dispersal.

5. Filter berms should be installed to collect sediments deposited into existing drainage ways or riparian channels. Filter berms are recommended to both filter out sediment and to dissipate the cutting energy of the drainage water.

6. Straw bales are recommended around drainage devices during the winter storm season and will filter water, collect sediments, and dissipate water energies. Small gaps (approximately 1-2" wide) must be left between the bales for effective passage of drainage water; if gaps are not left, trapped fine sediments in the water can "plug" the surface of the bales and may cause flooding and secondary erosion.

4.7.2 Monitoring Guidelines

Standards	Monitoring Method	Frequency	Remedial Measure
No soil loss or erosion: topsoil layer intact, well-dispersed accumulation of litter from past year's growth plus smaller amounts of older litter.	Monitor will visually inspect property and conduct photo documentation. Permanent photopoints should be established to monitor recovery of large erosion scars such as those in Appendix 3 and the Erosion Features Map. Methods for establishing photopoints are described in Section 4.5.2.	Annually during rainy season	Remedial measures will depend upon the severity and type of erosion. First, surface water should be directed away from the erosion feature, and the energy of the water controlled in its new location so as not to cause additional erosion. Next, the eroded area should be repaired and contoured to prevent concentration of runoff (see above). Waterbars may also be installed (see above). All surfaces that have been repaired should be revegetated with appropriate, fast-growing native species to prevent erosion of newly worked soil.

4.8 Exotic Species Control

4.8.1 Management Guidelines

Weeds can be a major concern in managing relict native habitats. Weeds are often defined as "a plant out of place", and in California, 17 percent of the current California flora (or 1,025 species) are now exotic species (Rejmanek and Randall 1994). Each year, new weeds arrive and some have amazing rates of spread. Most weeds are moved by people's activities and first show up along roadsides. In California's native grasslands, the further one gets away from roads, the fewer weeds one sees, and the dominance of native grasses increase. In general, care should be taken to assure that earthmoving equipment is steam cleaned between jobs, that trucks used to haul feed or cattle are cleaned between deliveries, and that all cattle delivered are contained for 24 hours so that any weed seed consumed elsewhere will remain at the holding site. These same precautions would apply in California to slow the spread of other non-native, disease organisms, for example hoof and mouth (USDA, 2001) and Sudden Oak Death (Storer et al. 2001). For a review of current best management practices in controlling weeds in California wildlands, see Tu et al. (2001), available online (see Section 10, References).

Grazing, burning, mowing, hand pulling, introduction of biological control agents, and herbicide application are all methods used to control exotic species. The best management strategy often includes the integrated use of several tools. In the case of yellow star thistle, a tractor mounted rotary and/or flail mower is recommended for mowing large, level patches of thistle. Spot spraying should be used to target outlying, small colonies and individuals throughout the Park. In 1997, the herbicide Transline was released in California for use on yellow star thistle. This broad-spectrum herbicide is extremely effective on yellow star thistle but also will eliminate other composites, legumes, and clovers. Transline kills growing plants as well as seeds in the soil, thus preventing annual regrowth. A prescription for product and application rate must be provided by a licensed pesticide applicator. For more information on current weed management in California, please refer to the California Exotic Pest Plant Council (CALEPPC, 2001) or The Nature Conservancy's Wildland Invasive Species Program (TNC, 2001). Information on weed management can be found at the University of California Weed Research and Information Center (WIRC, 2001), or California Pest Notes (UC-IPM, 2001).

The former cabin site at Coyote Lake is recommended as a high priority area for weed control. Additional suggestions for restoration projects are provided in section 8 (Potential Pilot Projects). Monitoring to determine the percent cover of exotic and native species should be done each year in the spring prior to herbicide and/or mowing treatments. Percent cover monitoring methods are described in section 4.4.

4.8.2 Common Exotic Plant Species Present in the Park and Recommended Control Measures

Several weeds can be particularly difficult to control. Some will be discussed briefly below, but there are many more weeds. Control methods are summarized for several species in a table following the descriptions.

Yellow star thistle (*Centaurea solstitialis*)
Yellow star thistle (YST), or (*Centaurea solstitialis*), is one of the very few deep-rooted, late-season plants in the California annual grasslands. Yellow star thistle starts as small leaves on the ground, and then sends up a stem later in the growing season. The stem has distinct flattened ridges running parallel to each stem. Photos of the leaves and mature plant are provided below.

YST is often the only green, tall plant in a field of weeds in late July. YST can invade openings between native bunch grasses where it may produce thousands of seeds that remain viable for 5-10 years. Leaves of YST are highly poisonous to horses. Mature YST plants have long, sharp needles that prevent cattle, horses, and people from walking through an area. A variety of control methods are in use including fire (Hastings, 1996), grazing, mowing, herbicides and the use of host-spedific insects (Lanini, 1995, DiTomaso 2000, DiTomaso et al., 2000). Clopyralid ("Transline") is a newly registered growth regulator, a post-emergent herbicide, that which shows particular promise for control of YST without harming most other native grasses and wildflowers (DiTomaso, 1999).

Yellow star thistle (*Centaurea solstitialis*)

Rat-tailed fescue (*Vulpia myuros*)

Rat-tailed Fescue (*Vulpia myuros*)

This grass is probably the most abundant and widespread grass in California. It ranges in from many tightly packed slender, short stems in the understory, to scattered, tall plants that eventually lean over to form a tangle of slender stems. It is one of the first to green up in late winter. The many, fine stems each produce a fine row of individual flowers. Easily pulled up, the base of the plant is distinctly darker than the upper stems.

Rip-gut Brome (*Bromus diandrus*)
Rip-gut grass breaks off easily into single slender "seeds" that each have a buzz of backward-pointing stiff hairs that, although too small to be seen by the naked eye, can be felt. If you hold the seed between your fingers, you can only pull it one way. Able to embed itself in your socks or clothes, it can only be pulled out sharp end first, and is able to work its way into the eyes and soft tissue of domestic animals. It is a most noticeable weed. It tends to grow in what look like bunches of several stems, but each bunch has roots only a few inches deep and can be pulled from the soil very easily.

Rip-gut brome (*Bromus diandrus*)

Close-up of rip-gut brome seeds

Soft chess or soft brome (*Bromus hordaceous*)
Soft brome is well named; it is soft to the touch. When the seeds shatter, the naked stem sports a series of pairs of papery glumes that resemble small boats. Often the interiors of the small boat-like glumes have a dark streak. Soft brome can mature at only a few inches, with only one or a few flowers in the pair of papery glumes. Or, the glumes may hold many, many flowers, as shown in the photo below. Generally, the plant does not look like a bunchgrass, as most stems are separate. It has shallow roots and is easily pulled from the soil.

Soft chess (*Bromus hordaceous*). Note the bi-colored, flattened seed in the right photo.

When green, *B. hordaceous* is very soft to the touch and is eaten by grazing animals. Like all the other annual weedy grasses, this grass makes large seeds by moving all the carbohydrates and nutrients from the roots, stems, and leaves to the seeds. The large seeds are then dropped where they wait for the next winter rains. However, the forage value of the remaining standing dead material is very low.

\

Wild oats (*Avena spp*.)

Wild oats (*Avena spp*.)
Two species of wild oats occur over most of California, a slender one (*A. barbata*) and a chunky form (*A. fatua*). The flag-like glumes of these oats persist as golden banners, often scattered at right angles along the main stem of the plant. Each pair of papery glumes only hold two flowers. Seeds are relatively large, and each has a dark, almost black spike arising from a fuzzy base. Another annual that appears to grow in a bunch of many stems, but again, each bunch has shallow roots and is easily pulled from the soil.

Barnyard foxtail or squirrel tail (*Hordeum murinum*)
Squirrel tail can grow as a single seed head or in a small "bunch" that includes many stems, each with a few seed heads. The "bunch" can be pulled out of the soil very easily. The seeds tend break off, often leaving only a tuft of the lowest 3-4 seeds. The long spikes on the seed heads are bristly and harsh to the touch. This plant looks similar to domestic barely.

Filaree (*Erodium spp*.)
Filaree is not a grass, but is a very distinctive indicator of non-native, annual grassland in California. Filaree may occur in the bare soil between clumps of native, perennial grasses, but is common on any disturbed soil. Two species are important: the larger (*E. botrys*), and the smaller, cut-leafed filaree (*E. cicutarium*). Both produce the familiar corkscrews that twist into the soil as they go through daily cycles of wet and dry, each time forcing the sharp seed deeper into the soil. The corkscrews eventually fall off. The broad, flat leaves start life early in mid-winter, and can turn bright red in a cold spell. These broad, flat expanses of leaves quickly smother other seedlings.

Flowers of smaller filaree, *E. cicutarium*

Flower of (*E. botrys*) "storks bills" to 5" long

Recommended Control Methods for Selected Exotic Species

Species	Control Treatment	Timing
Annual grasses such as wild oats (*Avena* spp.)	Flower control – Mow or Graze intensively before seeds reach the milk stage. Prescribed fire in late fall may help to reduce seed on the soil surface. However, cracks in clay soils may shelter many seeds from the burn.	May to June October to November
	Herbicide control –Round-Up® applied with tractor sprayer equipped with spray hood at 2% with Blazon® blue agricultural dye. A wick applicator may also be used.	March to April
Harding grass (*Phalaris aquatica*)	Manual control – Dig mature plants manually or hand pull seedling plants. This is only practical for outliers. Follow-up is necessary as Harding grass produces abundant seeds and may also regenerate from rhizome material left in the ground (Bossard et al. 2000)	October to January
	Flower control – Cut flower tops back prior to seed maturation. Dispose of flower tops. Do not disperse or mulch.	June to August
	Herbicide control – Mow or graze plants and allow plants to produce 12" of new growth before spraying. Round-Up® applied at 2% with Blazon® blue agricultural dye. Replace Round-up® with Rodeo® and a surfactant approved for aquatic use near wetlands/streams.	April to June
bull thistle (*Cirsium vulgare*), milk thistle (*Silybum marianum*), and Italian thistle (*Carduus pycnocephalus*)	Manual control – Dig plants manually or hand pull seedling plants. Graze plants intensively in the rosette stage.	February to March
	Flower control – Weed eat or machete budding or flowering plants close to ground level prior to seed maturation. Dispose of all flower parts, whether or not seed is viable at the time of cutting. Do not disperse.	May to July
	Herbicide control – Spot spray Round-Up® applied at 2% with Blazon® blue agricultural dye.	March to April or September to October
yellow star thistle (*Centaurea solstitialis*)	Flower control – Mow or graze intensively after the star thistle has bolted but before the spiny stage.	May to June
	Herbicide control – Transline® applied at rate of 4-10 oz formulated product per acre	December to April
poison hemlock (*Conium maculatum*)	Manual control – Hand pull plants wearing gloves	December to March
	Flower control – Mow, machete, or weed eat plants in spring prior to seed set and again in late summer to kill plants grow back. Two to three years of this treatment may be necessary to eradicate the hemlock.	April to May and again July to August
	Chemical control – Spot spray rosettes using Round-Up® applied at a rate of 1lb glyphosate/acre with Blazon® blue agricultural dye.	March

4.8.3 Monitoring Guidelines for Exotic Plant Species Control

Success Criteria	Monitoring Method	Frequency	Remedial Measures
Exotic species will not exceed 10% of the absolute cover in a given management area where exotic species control programs are conducted. Exotic species will not be allowed to flower and reproduce.	Percent cover of exotic pest plants will be estimated using point intercept or Daubenmire cover analysis to verify visual estimates. Methods for Daubenmire cover analysis are provided in Section 4.4. A percent cover baseline will be established in order to compare before and after grazing/burning/mowing events.	In the spring, prior to seed set of exotic species.	Corrective actions include prescribed grazing, mowing, burning, selective use of herbicide, and restoration seeding with desirable species.

4.8.4 Feral Pig Control

Feral pigs (*Sus scrofa*) are common in Coyote Lake-Harvey Bear Ranch County Park. This exotic species is capable of rapid increases in population and is known to cause extensive soil disturbance through rooting activities. Feral pigs also present a danger to public safety and may charge when threatened. Currently a Memorandum of Understanding (M.O.U) exists between the California Department of Fish and Game and the Santa Clara County Department of Parks and Recreation for the purpose of managing feral pigs on Santa Clara County Park units. The goal of this program is to use site specific management schemes to prevent pig damage to native plant and animal species and to ensure public safety. The site specific management schemes are defined by unit management plans. Methods for development of park specific unit plans are as follows:

1) Identify areas of pig damage and how the damage affects the park or the general public.
2) Map locations of significant pig damage.
3) Control pig damage through education of staff and the public, management of the affected area to make it less attractive to feral pigs, exclusion fencing, trapping, and/or hunting.
4) Determine the success of the selected management alternative.
5) Prepare a bi-annual habitat evaluation form indicating monitoring results for management alternative selected.

Because pig rooting causes soil disturbance, enhancing the spread of invasive exotic plant species, we recommend developing a pig control plan for Coyote Lake-Harvey Bear Ranch County Park according to guidelines in the MOU. Note, however, that pig control in the Park will not be effective as long as pigs can enter from outside areas. Any plan developed should consider installation of perimeter fencing and/or development of regional agreements for pig control.

4.9 Sensitive Species Management and Monitoring

This section provides management and monitoring recommendations for sensitive species. Management recommendations for sensitive plant communities occur in the following sections: Section 4.5 (blue oak

and valley oak woodlands); Sections 4.1 – 4.4 (native grasslands); Section 4.1, grazing area 3, and Section 4.9.2 (serpentine grassland); and Section 4.6 (wetlands, and willow riparian).

4.9.1 Big-scale Balsamroot

Although there is no state or federal setback standard for protection of big-scale balsamroot, we suggest that trails be avoided within 50 feet of balsamroot locations (Sensitive Biological Resources Map). This will prevent direct impact to balsamroot through trampling/erosion. The 50-foot buffer will also help to insulate the area from indirect impacts of trail construction (e.g. alteration of local drainage patterns and spread of exotic plant species along trail margins).

Monitoring Guidelines

Surveys for big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) should be conducted annually during its March - June flowering period (CNPS 2001). Any new areas where this species occurs should be surveyed using GPS, and these locations incorporated into the existing GIS for the Park. In each area where balsamroot occurs, the total number of individuals should be counted and photographs taken to indicate the plant's location, habitat, and diagnostic features. Reproductive status should also be noted (%flowering, %fruiting, %vegetative), associated plant species, any signs of herbivory or disease, and any threats to the population (e.g. exotic species invasion, erosion from recreational use).

Grazing should be limited to August and September where big-scale balsamroot occurs. Residual dry matter (RDM) should be monitored within big-scale balsamroot habitat to assure that grazing prescriptions for the area (section 4.1.3.3) are being met. Methods for monitoring RDM are described in section 4.1.4.1.

4.9.2 Bay Checkerspot Butterfly

The Bay checkerspot butterfly (*Euphydryas editha bayensis*) is dependent on serpentine grasslands that support its host and nectar plants. Serpentine soils are ultra basic, nutrient-poor, have low calcium to magnesium ratio, and are often high in heavy metals (USFWS 1998). These soil conditions make serpentine soils inhospitable to most plants. However, many native plant species, including the host plants of the Bay checkerspot butterfly, are adapted to these conditions and benefit from reduced cover of introduced annual grasses in these areas.

Weiss (1999) suggests that populations of the Bay checkerspot butterfly in the south San Jose area are threatened by nitrogen enrichment of nutrient-poor serpentine grasslands. Weiss presents several lines of evidence linking dry nitrogen deposition from smog to soil nitrogen enrichment and invasion by annual non-native grasses. Annual grasses, in turn, displace native plant species including California plantain (*Plantago erecta*), the primary host plant of the butterfly.

Cattle grazing may help to maintain native biodiversity in serpentine soils of the south San Jose area (Weiss 1999). Although several populations of Bay checkerspot butterfly in this area crashed after removal of cattle, adjacent populations on grazed lands persisted (Weiss 1999). Cattle grazing results in a net export of nitrogen because cattle incorporate the nitrogen they eat into tissue and are then removed for slaughter (Weiss 1999). In addition, cattle select grasses over other species, allowing native forbs to persist. A comparison of winter/spring grazing to summer/fall grazing suggests that winter/spring grazing is more effective in reducing annual grass cover (Weiss 1999). However, Weiss points out that winter/spring grazing may crush some butterfly larvae, eggs, and pupae and suggests that multiple grazing regimes may help to balance the risk of direct mortality to butterflies with the risk of increased annual grass cover (Weiss 1999).

Bay Checkerspot Critical Habitat Standards

We recommend moderate summer/early fall grazing in areas of Bay checkerspot critical habitat (see map of proposed grazing areas and section 4.1.3.3). Grazing should be well-monitored (see monitoring guidelines below). If monitoring results suggest that the butterfly's host plants are declining and that RDM is too high, it may be necessary to graze during winter/spring for 1-2 years in order to reduce annual grass cover and maintain habitat for the butterfly's host plants. However, winter/spring grazing is more likely to harm eggs, larvae, and pupae than summer/fall grazing. USFWS should be consulted before any change in grazing regime in this area. A USFWS permit for incidental take may be required.

Some areas within the grasslands should be excluded from grazing. These include steep slopes and rock outcrops, which may support the federally endangered Santa Clara Valley dudleya (*Dudleya setchellii*).

Prescribed fire should be avoided within the Critical Habitat for the Bay checkerspot butterfly. Fire was implicated in the extirpation of this species from habitat on San Bruno Mountain (USFWS 1998). Fire may kill butterfly larvae lying dormant beneath rocks and in soil cracks during the summer (Weiss 1999).

Trail construction, maintenance, and use within the area of critical habitat for Bay checkerspot butterfly may impact the butterfly or its host plants and will likely require an incidental take permit from USFWS. Impact to the butterfly and its habitat can be avoided or greatly reduced through implementation of the following measures:

1) New trails should be built at least 50 feet from patches of *Plantago erecta* or *Castilleja* spp. and aligned to prevent short-cutting through these areas. There are no published state or federal setback requirements for Bay checkerspot butterfly host plants. We recommend a 50-foot buffer to reduce the likelihood of direct impact to the butterfly and its habitat as well as prevent the spread of exotic plants into areas supporting host plant species.
2) A pre-construction survey for adult and larval butterflies should be performed by a qualified biologist before any trail construction or maintenance (including mowing). In addition, before maintenance activities begin, the biologist should mark any patches of *Plantago erecta* or *Castilleja* spp. that occur within 50 feet of an existing trail. All heavy equipment should avoid the marked areas.
3) All trail construction and maintenance should take place between July and October and before the start of winter rains. Bay checkerspot larvae remain dormant under rocks or in soil crevices during the summer and early fall (Weiss 1996) and are less likely to be harmed.
4) Regular monitoring of existing trails (see below).

Monitoring Guidelines

We recommend that trails through Bay checkerspot butterfly critical habitat be monitored for short-cutting, erosion, and invasive exotic plant species on a regular basis. Any unauthorized trails should be blocked off immediately. Interpretive signs explaining the importance of the area to the Bay checkerspot are also recommended. Noxious weeds along trail margins should be quickly eradicated to prevent their spread. Appropriate erosion control should be implemented where necessary.

Residual dry matter (RDM) should be carefully monitored within Bay checkerspot butterfly critical habitat to assure that grazing prescriptions for the area (Section 4.1.3.3) are being met. Methods for monitoring RDM are described in Section 4.1.4.1.

We recommend that randomly selected patches of the butterfly's host plants (*Plantago erecta, Castilleja densiflora,* and *C. exserta* var. *exserta*) be monitored annually in this area during the spring in order to determine whether management activities may be adversely affecting species composition. Monitoring should begin one to two years prior to grazing these areas in order to provide baseline data. The edge of each randomly selected patch should be marked in the field,

mapped using GPS, and incorporated into the Park's GIS. Photographs of each patch should be taken from a permanent photopoint and compass heading (see Section 4.5.3). Any erosion or invasion of patches by non-native species should also be photographed. Finally, the person monitoring should record the date and location sampled, name of person monitoring, species present, number of photographs taken, and estimated percent cover of host plants within each patch. The same areas should be monitored each year.

We recommend that surveys for adult Bay checkerspot butterfly and postdiapause larvae be performed by a qualified biologist twice a year. Surveys for adults should take place in March and April when adults are likely to be laying eggs. Surveys for post-diapause larvae should take place in mid-late February after larvae have emerged to feed. At this time larvae are more easily seen basking and feeding in grassland vegetation (Murphy and Weiss 1988). Areas that support the species' host plants should be surveyed for larvae and adults. These host plants are: California plantain (*Plantago erecta*), owl's clover (*Castilleja densiflora*), and *Castilleja exserta* var. *exserta*. Butterfly eggs, larvae, and adults should not be handled during surveys and may only be handled with a permit from U.S. Fish and Wildlife Service.

4.9.3 Amphibians and Reptiles

Blue Oak Savanna Standards
Habitat management of blue oak savanna should include abundant down and dead material to provide both winter and summer habitat for native amphibians and reptiles. Reptiles will benefit from small piles of woody debris scattered throughout the woodland and will position themselves on top of or below branches to warm or cool themselves, respectively. Amphibians will benefit most from logs in shady, somewhat moist areas within a few hundred feet of creeks and wetlands.

Grassland Standards
The burrows of California ground squirrel and pocket gophers have been identified as important over-summer habitat for California tiger salamander (CTS), a California Species of Concern, and California red-legged frog (RLF), a Federally Threatened Species. In addition, populations of gophers and ground squirrels provide habitat or food for raptors, mammalian predators, and beneficial insects. Therefore, gophers and ground squirrels should be allowed to flourish in grasslands. Trapping and rodent poisons should be avoided.

Pond Standards
Nine ponds are located in the Park, one of which is inhabited by Western pond turtles (WPT), a California Species of Concern. Although WPT are most commonly found in permanent ponds with aquatic vegetation and basking sites, they may also use ephemeral ponds with little or no vegetation. Therefore, it is possible that WPT may colonize other stock ponds in the Park or use Coyote Lake.

Aquatic and aerial basking sites should be provided in ponds to encourage WPT to use these sites. Logs and rocks can be used to provide aerial basking sites. Floating logs anchored in deep water are particularly important as turtles may escape predators by diving from these logs into deep water. Submerged aquatic plants such as pondweed (*Potamogeton* spp.) provide aquatic basking sites. Pondweed also provides excellent habitat for RLF.

Park visitors and their dogs may disturb basking turtles, causing them to dive and seek shelter more frequently than they would from the threat of natural predators alone. Although a few additional disturbances each day is unlikely to harm the animals, frequent visitor disturbance could. Although there are no state or federal standards for setback distances to reduce disturbance to WPT, we recommend that visitors and their pets be kept 150 feet away from the pond north of

the Bear Ranch House. In addition, no trails should be built across turtle nesting sites. Nest sites are most likely to be found on fairly open, at least partially south-facing slopes within 600 feet of the pond (CDFG 1994). Non-invasive visual surveys for nests should be completed prior to routing trails in these areas.

All ponds provide potential habitat for CTS, and RLF. Although neither was observed during surveys, it is possible that these species already occur on site or that they may move into the Park from outside areas. Therefore, habitat improvements for these species are strongly recommended and are essential if re-introduction efforts are pursued. Note that any re-introduction efforts must be planned and executed under the guidance of USFWS and/or CDFG and will require permits.

Several ponds have margins that provide little vegetative cover. These areas should be planted with riparian vegetation (see section 4.6.2). In addition, the exotic bullfrog (*Rana catabiense*) and exotic fish (bass, etc.) have been identified as present in the springs and ponds of the Park. These species are predators of native amphibians as well as WPT. Seasonal drying of ponds, between mid-August and the start of winter rains, is recommended as a means of eradicating bullfrogs. Alternatively, bullfrogs could be removed using a seine. Note that USFWS and/or CDFG should be consulted prior exotic species removal where removal methods may impact rare species.

Grazing of cattle can be compatible with the continued presence of native amphibians and other wildlife. However, some improvements should be made:

1. Where possible, pipe water to troughs located outside the riparian zone. Piping clean fresh water away from stock ponds will result in increased weight gains and less parasitism.

2. Where feasible, fence ponds with a "V" shaped fence, point centered in the middle of the stock pond and open end spreading out to occupy about 1/4 of the pond basin. This will eliminate grazing from the area and allow emergent and wetland plants to recover and provide habitat for amphibians adjacent to the ponds.

3. Monitor grazing and allow for 90-day recovery between grazing events in areas of freshwater resources.

4. Exclude cattle from known turtle nesting areas. Periodic hand-removal of shrubs is recommended in these areas to maintain the open habitat required for turtle nesting. Percent cover of shrubs should be maintained at 5 - 25%..

Seasonal Marsh Standards

The lower part of Coyote Lake and seasonal ponds may provide habitat for CTS, other salamanders, and RLF. Reduction of exotic amphibians and management to provide year-round seeps may allow successful colonization by CTS and RLF. Shallow water provides suitable habitat for newts and other native amphibians, but must be allowed to dry seasonally to eradicate non-native competitive amphibians and fish.

Monitoring Guidelines

Although surveys were made, and no RLF or CTS were observed, these species are difficult to observe, and populations vary dramatically between years. Annual monitoring for CTS and RLF adults should continue, as well as monitoring for continued or expanded presence of Bullfrog and non-native fish that act as predators on native amphibian larvae. Monitoring protocols for RLF and CTS adults have been established by USFWS and CDFG, respectively, and are included in Appendix 4. All monitoring should be conducted by a qualified biologist and adhere to protocols.

RLF monitoring protocols are presently being revised; the USFWS should be consulted periodically for new developments.

Currently there are no CDFG survey protocols for Western pond turtle. However, we recommend that Western pond turtles be monitored at least twice annually in the Bear Ranch House pond during late spring (May/June) and early fall (August/September). Non-invasive visual surveys should be performed on warm days when turtles are likely to be active. During surveys, adults, juveniles, and hatchlings are counted and the presence/absence of predators (e.g. bass, bullfrogs, great blue herons, raccoons, and snakes) recorded. In addition, an attempt should be made to determine where turtles in this area may be nesting. Nests typically occur on slopes at least partially south-facing that are not shaded by dense shrub growth or trees and that are within 600 feet of the pond (CDFG 1994). Nests may be recognized by scrapes in the grass accompanied by turtle eggshell fragments.

Confirmed nest locations should be protected from recreational use and grazing. Manual removal of shrubs and tree seedlings may be necessary every 2-3 years to maintain open areas for nests in the absence of grazing. All maintenance and monitoring of nest areas should be carefully conducted to minimize trampling.

Western pond turtles may use other ponds within the Park or Coyote Lake. Therefore, these areas should also be surveyed for turtles twice a year.

4.9.4 Birds

Standards for oak woodland and riparian corridors

Implementation of the following standards will help protect habitat for birds that winter or breed in wooded areas of the Park. Sensitive bird species (Section 3.9.4) that may benefit from these standards include: White-tailed kite, Sharp-shinned hawk, Cooper's hawk, Nuttall's woodpecker, Pacific slope flycatcher, Warbling vireo, Oak titmouse, Bewick's wren, Purple martin, Yellow warbler, Black-headed grosbeak, Song sparrow, Yellow-breasted chat, Tricolored blackbird, and Lawrence's goldfinch.

1. Follow guidelines and participate as possible in the Oak Woodland Bird Conservation Plan (CalPIF 2002) available online (see References).
2. Follow guidelines and participate as possible in the Riparian Bird Conservation Plan (RHJV 2000) available online (see References).
3. Minimize clearing of underbrush. Some clearing may be necessary for fire prevention. However, underbrush provides critical forage and nesting habitat for many species (e.g. Song sparrow). Also, dense habitat makes it more difficult for the Brown-headed cowbird to locate nests of host species.
4. Avoid removal of snags or fallen dead trees and limbs. Standing and fallen snags provide nest cavity sites; standing snags are used as song and flycatching perches.
5. Pipe water to troughs outside of riparian vegetation (see Proposed Grazing Management Areas Map) to avoid degrading riparian vegetation and to prevent Brown-headed Cowbirds from locating nests of host species in disturbed areas.
6. Restore riparian vegetation and adjacent coast live oak woodland north of Coyote Lake (Bird Search Area 2; see Appendix 2) and along south shore of Coyote Lake (Bird Search Area 1; see Appendix 2). Control exotic weed species.
7. Keep new trails at least 125 feet from riparian vegetation along creek and pond margins to prevent disturbance to nesting birds.

Standards for oak savanna and grassland
Implementation of the following standards will help protect habitat for birds that winter or breed in oak savanna and grassland areas of the Park. Sensitive bird species (Section 3.9.4) that may benefit from these standards include: White-tailed kite, Golden eagle, Ferruginous hawk, Merlin, Prairie falcon, Burrowing owl, Loggerhead shrike, California horned lark, and Lesser goldfinch.

1. Consider placement of nest boxes for bluebirds and other cavity-nesting birds in areas of oak savanna.
2. Populations of gophers and ground squirrels provide food for raptors and burrow sites for Burrowing owl. Therefore, gophers and ground squirrels should be allowed to remain in grasslands
3. Areas should be grazed in order to maintain a diversity of grass heights that will meet the shelter, nesting, and foraging requirements for a variety of grassland bird species. Short-grass areas provide nesting habitat for Killdeer, California horned lark, and Burrowing owl (provided there are burrow sites).

Standards for chaparral
Implementation of the following standards will help protect habitat for birds that winter or breed in chaparral areas of the Park. Sensitive bird species (Section 3.9.4) that may benefit from these standards include: Nuttall's woodpecker, Bewick's wren, Loggerhead shrike, and Lesser goldfinch.

1. Minimize clearing of shrubs and brush piles. Some clearing may be necessary for fire prevention. However, shrubs and brush piles provide forage, cover, and nesting habitat for many species.

Monitoring Guidelines
1. Monitoring should be used to determine grassland bird response to various grazing, burning, mowing, and disking regimes used on site
2. Birds of the riparian areas are one of California's most vulnerable wildlife communities. The Park should participate in the riparian bird management plan that has been developed by the Point Reyes Bird Observatory (RHJV 2000; see Section 10, References, for online source) and is being implemented at several locations in California.
3. Bird search areas used by Hohenberger to prepare the Breeding Bird Inventory Report (Appendix 2: Wildlife Survey Reports) should be resurveyed twice each spring, fall, and winter in order to track seasonal and annual changes in bird species use of these areas. The locations of these search areas are mapped, photographed, and described in Appendix 2. Each search area should be completely surveyed and all birds detected by sight or sound recorded. Results may vary due to the skill of the observer and the date surveyed. Therefore, it is recommended that the same observer(s) perform surveys on approximately the same dates each year.
4. Public education should be an integral part of bird monitoring programs.

4.9.5 Mammals

The level of bat activity on the property was extremely high during mammal surveys performed August 10-12, 2001. Two species were identified during surveys, the Hoary bat and Big brown bat, neither of which is a special status species. However, sensitive bat species may also occur in the Park.

Standards for wooded areas: oak woodland and savanna, and riparian corridors
Regardless of the particular species that make up the bat community on the property, the natural roosting requirements of these bats are relatively similar. Both the solitary and communally roosting bat species likely to be present on the property require large, old, live and dead trees, especially those that have a cavity created by a lightning strike, heart rot, or a primary cavity excavator like a woodpecker. An effort should be made to conserve this potential roosting habitat.

Monitoring Guidelines

More intensive bat surveys are recommended to determine whether sensitive bat species occur in the Park. Surveys should be performed in the spring/summer by a qualified biologist and employ mistnetting and acoustic survey techniques.

5. Proposed Trail Plan

The Park Trails Plan strives to provide as many multi-use trails as feasible, and also creates limited use trails where applicable. Existing ranch roads were used where feasible, but due to steep terrain, soil condition, sensitive habitats, and safety and maintenance concerns, the trails outlined in this plan do not incorporate all existing routes. Some existing routes are proposed to be abandoned and/or realigned.

5.1 Potential Impacts of Trail Construction and Use on Natural Resources

Recreational use should be restricted in several areas of the Park due to steep slopes, sensitive species, or restoration maintenance issues. Trail construction, maintenance, and monitoring guidelines are provided for these areas in order to avoid or reduce impact to sensitive species or resources.

Areas where slope exceeds 40%
Trails should be avoided on slopes of 40% or more to reduce the likelihood of erosion. In areas where a trail must cross a steep slope, the trail should be out-sloped and have frequent, well-maintained water bars and energy dissipaters to prevent gullies from forming. In addition, signs should be placed at locations of likely short-cutting to encourage hikers to stay on the trail and to educate them about impact of erosion on surrounding vegetation and slope stability. We recommend that trails be monitored at least monthly for signs of short-cutting and erosion. Any problems observed should be immediately addressed through barrier placement and/or camouflaging of short-cuts. In some cases, seeding of appropriate native species may be necessary for recovery. Trail erosion is more likely during winter rains. Trails should be monitored more frequently at this time, and water bars and dissipaters repaired. Winter closure of some trails may be necessary.

Minimizing clearing of native vegetation and topsoil during trail construction is important on all trails, but particularly critical on steep slopes. Native vegetation acts to reduce erosion and deter weed invasion. Native topsoil, in turn, is critical to plant establishment.

Restoration areas
Restoration areas provide an excellent opportunity for public education, and trails should be permitted in these areas. However, the number of trails should be limited. In addition, careful thought should be given to trail location so that public use of the area will not interfere with restoration activities. If drip irrigation is used, all water control valves should be locked and hidden from view to prevent tampering. Finally, signs should be provided to educate hikers about restoration efforts and to encourage them to stay on the trail so that these sensitive areas may recover.

Chaparral and wooded area including valley oak blue oak, and coast live oak woodlands
Mowing, grading, and earthmoving for trail construction/maintenance in or near oak woodland or chaparral should avoid disturbance to nesting birds which (except English sparrows and European starlings) are protected by CDFG Code 3503 and the Migratory Bird Treaty Act. Impact to most nesting birds may be avoided if the disturbance takes place before March 1st or after July 31st. If construction/maintenance is to take place between March 1st and July 31st, pre-construction surveys for nesting birds should be performed. Construction near nest sites should be postponed until the birds are done nesting.

Oak trees 6 inches or greater in diameter at breast height should be protected during trail construction. In addition, soil disturbance and compaction below oak tree canopies should be avoided.

Freshwater resources
Riparian and marsh vegetation can be easily damaged where unlimited access to stream and pond banks is permitted. Birds nesting in riparian vegetation may also be disturbed by heavy visitor use of these areas. Therefore, a minimum 125-foot setback is recommended for trail sections that parallel stream and pond margins. Access to streams and ponds should be restricted to bridges at stream crossings and platforms/docks at pond margins. These structures should be located in areas that will minimize damage. Furthermore, stream crossings through riparian vegetation should be limited, as each crossing may reduce bird nesting in the area and create openings for cowbirds. Trails that cross wetlands en route to stream crossings or docks should be elevated on catwalks to prevent soil compaction, erosion, and damage to vegetation. Note that appropriate permits from the California Department of Fish and Game and the U. S. Army Corps of Engineers will be required for any trail construction that may impact wetlands or riparian areas.

A fence should be erected between Willow Springs Road/Trail and the creek below in order to prevent cattle herded along this route and horses using the trail from damaging freshwater resources.

The Bear Ranch House pond contains Western pond turtles, a California species of special concern. Park visitors that approach the pond margin may disturb basking turtles, causing them to dive and seek shelter more frequently than they would from the threat of natural predators alone. Although a few additional disturbances each day is unlikely to harm the animals, frequent visitor disturbance could. Although there are no state or federal standards for setback distances to reduce disturbance, we recommend that public trails be kept 150 feet from this pond. The setback may be decreased if observations of turtles in the pond indicate that a shorter distance would be adequate to prevent disturbance. [Note: It appears that a proposed multiuse trail in this area is within 150 feet of the south end of the pond. This may disturb turtles in this portion of the pond.] Occasional, restricted use of the area immediately surrounding the pond is recommended only for monitoring or for educational purposes such as docent enrichment activities.

Non-invasive visual surveys for turtles and nests (Section 4.9.3) should be completed prior to routing trails within 600 feet of potential aquatic habitat. Nest sites are most likely to be found on fairly open, at least partially south-facing slopes within 600 feet of the pond but may occur in any habitat up to a quarter mile of ponds (CDFG 1994). The following are recommended avoidance and mitigation measures where turtles are detected in the project vicinity:

1) Appropriate erosion control implemented prior to construction to protect aquatic habitat.
2) A pre-construction survey conducted by a qualified biologist. Relocation of turtles found on the project site should occur only with prior approval of CDFG.
3) No trails should be constructed through known nest sites.
4) Construction within 1/4 mile of the pond should be avoided during the spring when most hatchlings emerge and during May and June when most nesting occurs (hatchling emergence and nesting season: CDFG 1994).

Although California red-legged frog (RLF) and California tiger salamander (CTS) were not observed during surveys, there is potential for both species to occur in the Park. Both RLF and CTS use burrows, soil cracks, and leaf duff in upland areas surrounding aquatic habitat and could be injured by ground disturbance. Essential upland habitat for RLF occurs within 300 feet of the frog's aquatic habitat (USFWS 2001b). Therefore, USFWS protocol surveys for RLF (Appendix 4) should be performed prior to any soil disturbance within 300 feet of potential aquatic habitat for RLF. CDFG protocol surveys for CTS (Appendix 4) should be performed prior to any soil disturbance 1,640 feet of potential breeding ponds for CTS (CDFG protocol: Appendix 4). Note that protocol surveys for CTS require permits from USFWS and CDFG. In addition, protocols for both CTS and RLF entail multiple, seasonally-timed surveys. Several months of surveys are required to meet CDFG protocols for CTS. If RLF are observed

in the Park during protocol surveys, a permit from USFWS for incidental take may be required prior to construction.

Impact to RLF and CTS can be reduced through implementation of the following recommended avoidance measures where either RLF or CTS have been detected during surveys:
1) Initial vegetation clearing and earth moving should take place at times when these species are not likely to move across the site. Specifically, no vegetation removal or grading should take place while it is raining.
2) Precautions should be taken to prevent puddling on site that may attract amphibians.
3) A qualified biologist should conduct pre-construction surveys for RLF and CTS, and monitor for RLF and CTS during initial vegetation clearing and grading activities.

Mowing, grading, and earthmoving for trail construction or maintenance near freshwater resources should avoid disturbance to nesting birds which are protected by CDFG Code 3503 and the Migratory Bird Treaty Act. Impact to most birds may be avoided if the disturbance takes place before March 1st or after July 31st. If construction/maintenance is to take place between March 1st and July 31st, pre-construction surveys for nesting birds should be performed. Construction near nest sites should be postponed until the birds are done nesting.

Silt fence should be erected to protect freshwater resources whenever soil disturbance will occur near streams and wetlands. All soil disturbance should take place during the dry season (April 15th-October 15th). All silt fence, seed, straw mulch, and any other erosion control measures necessary should be in place prior to the first rain (by October 15th). During construction, no refueling of equipment or storage of fuel or chemicals should be allowed within 150 feet of creeks or wetlands. Any accidental spills of fuel or chemicals anywhere on site should be cleaned up immediately.

Big-scale balsamroot area
Although there is no state or federal setback standard for protection of big-scale balsamroot, we suggest that trails be avoided within 50 feet of balsamroot locations (Sensitive Biological Resources Map). This distance should be adequate to protect the population from mowing and other trail maintenance activities as well as from trampling, erosion, and soil compaction caused by visitor use of trail margins. The 50-foot buffer will also insulate balsamroot from indirect impacts of trail construction such as spread of exotic plants along trail margins and alteration of local drainage patterns. Trails in the area should be carefully located so as not to encourage short-cutting through the balsamroot area. Noxious weeds invading disturbed trail margins should be quickly eradicated.

Critical Habitat for Bay checkerspot butterfly
Trail construction, maintenance, and use within the area of Critical Habitat for Bay checkerspot butterfly may impact the butterfly or its host plants and may require an incidental take permit from USFWS. The greater the soil disturbance in this area, the greater likelihood of impacting larval butterflies and butterfly host plants. However, impact to the butterfly and its habitat can be reduced through implementation of the following measures:
1) New trails should be built at least 50 feet from patches of *Plantago erecta* or *Castilleja* spp. and aligned to prevent short-cutting through these areas. There are no published state or federal setback requirements for Bay checkerspot butterfly host plants. We recommend a 50-foot buffer to reduce the likelihood of direct impact to the butterfly and its habitat as well as prevent the spread of exotic plants into areas supporting host plant species.
2) A pre-construction survey for adult and larval butterflies should be performed by a qualified biologist before any trail construction or maintenance (including mowing). In addition, the biologist should mark any patches of California plantain (*Plantago erecta*) or owl's clover (*Castilleja densiflora*, *C. eserta*) that occur within the construction envelope or maintenance area. All heavy equipment should avoid the

marked areas to prevent damage to larval butterflies that may have been overlooked during the pre-construction survey.
3) All trail construction and maintenance should take place between June and October and before the start of winter rains. Bay checkerspot larvae remain dormant under rocks or in soil crevices during the summer and early fall (Weiss 1996) and are less likely to be impacted at that time.
4) Trails through Bay checkerspot Butterfly Critical Habitat should be monitored for short-cutting, erosion, and invasive exotic plant species on a regular basis. Any unauthorized trails should be blocked off immediately. Interpretive signs explaining the importance of the area to the butterfly are also recommended. Noxious weeds along trail margins should be quickly eradicated to prevent their spread. Appropriate erosion control should be implemented where necessary.
5) Sections of abandoned road should be revegetated with California plantain, owl's clover, and native perennial grasslands to mitigate for habitat lost due to trail realignment.

5.2 Guidelines for Restoration of Abandoned Ranch Roads

Abandoned ranch roads should be revegetated with appropriate native species to reduce potential for erosion, prevent the spread of invasive weeds, and create habitat for wildlife. Prior to seeding and planting, the road surface should be scarified/ripped to 4-6 inch depth to reduce soil compaction. All ground preparation work should be done between April 15th and October 15th to avoid winter rains, between August 1st and February 28th to avoid disturbing nesting birds, and between June and October (prior to first rain) where trails fall within the Bay Checkerspot Butterfly Critical Habitat. Pre-construction surveys for the butterfly should be performed prior to soil disturbance in areas designated as Critical Habitat. In addition, all vehicles should remain on the road as much as possible in this area, and any new vehicle turnarounds should be approved by the biologist during pre-construction surveys.

Runoff should be diverted from the road restoration site by capturing water in drainage channels and routing the channels toward a detention basin equipped with straw bales or silt fence to dissipate energy and remove sediment. Small gaps (approximately 1-2" wide) must be left between straw bales for effective passage of drainage water; if gaps are not left, trapped fine sediments in the water can "plug" the surface of the bales and may cause flooding and secondary erosion.

Wetlands within 150 feet of road work should be protected from siltation with silt fencing. This silt fencing should be checked and maintained throughout the construction and revegetation period and should not be removed until plant cover on abandoned roads reaches at least 50%. If RLF are observed in the Park during protocol surveys (see Section 5.1.1), a permit from USFWS for incidental take may be required prior to construction within 300 feet of likely aquatic habitat for the frog. Impact to RLF and CTS can be reduced through implementation of the following measures during construction:
1) Earth moving should take place at times when these species are not likely to move across the site. Specifically, no ripping should take place while it is raining.
2) Precautions should be taken to prevent puddling on site that may attract amphibians.
3) A qualified biologist should monitor for RLF and CTS during initial ripping activities.

After the soil has been scarified, appropriate native grass species should be sown. Use of a seed drill would be highly effective on abandoned roads. However, grass seed may also be broadcast. After drilling or broadcasting, the soil should be covered with a thin layer of clean straw. Cattle should then be herded along the road to improve seed-to-soil contact and crimp the straw. During the second winter of revegetation, appropriate herbs, shrubs, and trees may be sown or planted on the abandoned roads. For instance, acorns could be planted in areas of oak woodland, and California plantain and owl's clover could be sown/planted inside the Critical Habitat for Bay checkerspot butterfly. The latter could be used as a mitigation measure to offset impacts of the proposed trail realignment on the butterfly (see Section 5.1.1).

Water bars and dissipaters should be placed as needed to prevent gullies from forming. The water bars, dissipaters, mulch, silt fence, drainage channels, and detention basin should be monitored after every storm to assure they are adequately controlling erosion on site. Repairs should be made and additional water bars and mulch placed as needed.

Control of invasive exotic plant species (e.g. yellow star thistle) should be performed each spring and summer until total vegetative cover on the roads reaches 75%, native plant cover reaches 50%, and invasive exotic species are absent.

5.3 Long-term Trail Maintenance

Long-term trail maintenance practices include:

1) Mowing trail edges

Grazing will be the primary means of weed control in grassland areas. However, mowing is recommended along trail margins and as a spot treatment where cattle have failed to produce the desired degree of control. Mowing should be appropriately timed to reduce potential impact to nesting birds and Bay checkerspot butterfly (see Section 5.1.1). The mower should be steam cleaned before use if it has been used outside the Park or in an area of yellow star thistle within the Park.

2) Erosion control

Water bars and dissipators should be used to reduce gully formation on trails. All waterbars and dissipators should be inspected regularly during the winter and maintained as necessary (see Section 5.1.2).

Trails that have experienced heavy erosion due to winter storms or that are likely to erode from winter use during moist soil conditions should be closed seasonally.

Signs should be placed at locations of likely short-cutting to encourage hikers to stay on the trail and to educate them about impact of erosion on surrounding vegetation and slope stability. Trails should be monitored at least monthly for signs of short-cutting and erosion. Any problems observed should be immediately addressed through barrier placement and/or camouflaging of short-cuts. In some cases, seeding of appropriate native species may be necessary for recovery.

3) Repairs Requiring Soil Disturbance

Unless immediate repair is necessary to prevent erosion or fix hazardous conditions, major trail repair work involving soil disturbance (e.g. recontouring) should be done during the summer and fall before it rains. Trails undergoing repair should be closed to visitor use. Appropriate measures such as silt fence installation, seeding, and placement of straw mulch should be taken to reduce and control erosion during and after repairs. Finally, areas of disturbed soil should be weeded frequently until native plant cover is restored to conditions prior to soil disturbance.

4) Exotic Species Control

Weed control is a crucial part of long-term trail maintenance, as trails may serve as conduits for invasive species. Exotic Species Control is discussed in Section 4.8.

5.4 Guidelines for Avoidance of Recreational Use/Cattle Grazing Conflicts

In order to reduce interactions between cattle and Park visitors, water troughs have been setback from trails and gates (Proposed Grazing Management Areas Map). To further prevent livestock from using trails, cattle should be fed away from trails and gates.

All cattle loading and off-loading activities in the Mendoza and West Flat Areas should be coordinated through the Park's event coordination system in order to prevent parking problems in the overflow parking area as well as any other possible conflicts with recreational use. In addition, the Willow Springs Road/Trail should be closed to recreational use whenever cattle are herded to/from the West Flat loading area along that route.

6. Proposed Management Areas and Maintenance Prescriptions

Management areas are areas that have different management objectives or "prescriptions" in terms of goals and standards, public access, natural resource management and protection, facilities development and park operations. These areas are based on various resource values including physical geography, ecological communities, specific management issues and objectives, existing and past land uses, and recreation experiences by visitors.

Proposed management areas are identified in the Proposed Management Areas map. The table below summarizes the definition and maintenance prescription for each management area. Specific management and monitoring guidelines for each prescription may be found in Section 4.

Management Areas and Maintenance Prescriptions for Coyote Lake-Harvey Bear Ranch County Park

Management Area	Definition	Maintenance Prescription(s)
Grazed Annual Grassland/Mixed Chaparral	Areas identified as annual grassland and chaparral in the GIS vegetation layer produced by Space Imaging.	Follow grazing plan guidelines for appropriate grazing management unit (Section 4.1.3.3). Develop burn plan for prescribed fire(s) (Section 4.2.2.2). Control exotic species (Section 4.8). Restore grassland (Section 4.3). Minimize disturbance during bird breeding season. Halt squirrel control efforts and allow them to recolonize. Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Sensitive Habitat - Grazed Blue Oak Woodland	Areas defined as blue oak woodland in the GIS vegetation layer produced by Space Imaging.	Follow grazing plan guidelines for appropriate grazing management unit (Section 4.1.3.3). Plant acorns and protect young trees from cattle (Section 4.5.1). Monitor survival of oak seedlings (Section 4.5.2). Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Exotic Species Control	Areas identified during field surveys as infested with exotic pest plants (usually yellow star thistle).	Pull, spray, mow, or graze weeds depending on species, time of year, and other factors (Section 4.8). Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Sensitive Habitat – Native Grassland	Areas identified as native grassland in the GIS vegetation layer produced by Space Imaging.	Follow grazing plan for appropriate grazing management unit (Section 4.1.3.3). Monitor percent cover of grassland species (Section 4.4). Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Grazed Oak Woodland	Areas identified as either coast live oak woodland or valley oak woodland in the GIS vegetation layer produced by Space Imaging.	Follow grazing plan for appropriate grazing management unit (Section 4.1.3.3). Plant acorns and protect young trees from cattle (Section 4.5.1). Monitor survival of oak seedlings (Section 4.5.2). Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Ranch Roads and Trails	Existing roads and trails identified in the GIS land use layer produced by Space Imaging.	Monitor and control erosion (Section 4.7). Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).

Management Area	Definition	Maintenance Prescription(s)
Restoration/Erosion Control	Areas identified during field surveys as erosion features.	Follow restoration guidelines for appropriate grazing management unit (Section 4.1.3.3). Monitor and control erosion (Section 4.7). Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Sensitive Habitat - Serpentine Grassland	Areas identified as serpentine grassland in the GIS vegetation layer produced by Space Imaging.	Follow grazing plan guidelines for Grazing Management Area 3 (Section 4.1.3.3). Follow management and monitoring guidelines for Bay checkerspot butterfly (Section 4.9.2), sensitive reptiles and amphibians (Section 4.9.3) and sensitive birds (Section 4.9.4). Follow trail and abandoned road guidelines (Section 5).
Sensitive Habitat - Freshwater Resources	Areas defined as wetland or riparian in the National Wetlands Inventory and/or the GIS vegetation layer supplied by Space Imaging.	Follow management guidelines to protect freshwater resources (Section 4.6.1). Revegetate appropriate stock ponds (Section4.6.2). Monitor water quality (Section 4.6.3). Control exotic species (Section 4.8). Stabilize eroded banks with riparian vegetation. Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).
Special Status Species Habitat	All areas known to support special status species according to one or more of the following sources: field surveys, USFWS Critical Habitat for Checkerspot Butterfly, the CDFG Natural Diversity Data Base.	Follow grazing plan guidelines for Grazing Management Area 3 (Section 4.1.3.3). Follow management and monitoring guidelines for big-scale balsamroot (Section 4.9.1), Bay checkerspot butterfly (Section 4.9.2), sensitive amphibians and reptiles (Section 4.9.3), and sensitive birds (Section 4.9.4). Avoid construction activities in this area. Follow trail and abandoned road guidelines (Section 5).
Geologic Fault Zone	Based on GIS data from Santa Clara County Parks.	Avoid building new structures in this area. Follow sensitive species management guidelines (Section 4.9). Follow trail and abandoned road guidelines (Section 5).

7. Potential Collaborative Projects and Community Involvement Opportunities

There are many opportunities for the local community to be involved with the development and preservation of the Park. The Santa Clara County Parks Department has a well developed volunteer program that could be expanded to include the Park. The county has an existing Trail Watch Academy, volunteer weeding and planting programs, night walks with rangers, and many other activities.

As many other local parks in the Bay area have done, the parks department or a community group could start a Friends of Coyote Lake / Bear Ranch Park group. At other established parks, these groups do a range of activities from guided hikes and education, to working with park staff to eradicate exotic species.

Another opportunity for public involvement would be to start a program modeled after the Return of the Natives (RON) project based at the Watershed Institute of CSU Monterey Bay on the former Fort Ord. The program trains elementary school teachers in the basics of propagating native plants in a small greenhouse, and then their students grow plugs or cones of predetermined native plants. When the plants are ready, RON organizes planting days where the students and their families come together to install the plants they grew. Programs such as RON really connect the people with the restoration project and give them a feeling of being involved from the beginning.

8. Potential Pilot Projects

Pilot projects can greatly assist management in testing and improving restoration methods prior to initiating similar work at a larger scale. Three pilot projects are recommended in the Park: 1) restoration of riparian vegetation and adjacent coast live oak woodland north of Coyote Lake (Bird Search Area 2; see Map of Biological Survey Locations) and along the south shore of Coyote Lake (Bird Search Area 1; see Map of Biological Survey Locations); 2) revegetation of the banks of the large stock pond just east of the Bear house; and 3) weed control and revegetation of the former cabin site on Coyote Lake. Methods for planting acorns and revegetating stock ponds are described in sections 4.5.1 and 4.6.2, respectively. Planting methods for riparian trees and shrubs described in section 4.6.2 may also be used to restore riparian vegetation near Coyote Lake. Exotic species control is discussed in section 4.8. It is recommended that volunteers assist with seed collection, planting, maintenance, and monitoring for these projects.

9. Review of Existing Successful Programs

Grassland Management

Rana Creek Habitat Restoration conducted trials involving five different management options for Native Grassland Management for the Mid Peninsula Open Space Russian Ridge Preserve from 1996 to 2000. The journal article from *Grasslands* (CNGA Vol. XI, No.1, Spring 2001) is attached in Appendix 5. The study showed that a combination of different management techniques could be used to help improve and restore sensitive native grassland habitat. The most effective methods were intensive grazing, burning, and herbicide application. The lessons learned at Russian Ridge can be applied at a larger scale to restore the grasslands of the Bear Ranch.

10. References

Bartolome, J. W., M. C. Stroud and H. F. Heady. 1980. Influence of natural mulch on forage production on differing California annual range sites. *Journal of Range Management*. 33(1):48.

Bioeconomics, Inc. January 2001. Draft economic analysis of critical habitat designation for the Bay checkerspot butterfly. Prepared for U.S. Fish and Wildlife Service, Division of Economics.

Bossard, C. C., J. M. Randall, and M. C. Hoshovsky, eds. 2000. Invasive plants of California's wildlands. University of California Press, Berkeley, California.

California, State of, Department of Fish & Game. 2003. Designated endangered, threatened or rare plants and candidates with official listing dates. Sacramento, CA.

California, State of, Department of Fish & Game. January 2003a. California natural diversity database: special animals. Available: http://www.dfg.ca.gov/whdab/spaminals.pdf.

California, State of, Department of Fish & Game. January 2003b. California natural diversity database: special vascular plants, bryophytes and lichens list. Available: http://www.dfg.ca.gov/whdab/spplant.pdf

California, State of, Department of Fish and Game. February 2002. List of California terrestrial natural communities recognized by the California natural diversity database. Available: http://www.dfg.ca.gov/whdab/natcom2000.pdf.

California, State of, Department of Fish & Game. 2001. California natural diversity database - rare find, quadrangle search.

California, State of, Department of Fish & Game. 1994. Amphibian and reptile species of special concern in California, western pond turtle. Available: http://www.dfg.ca.gov/hcpb/species/jsp/more_info.jsp?specy=reptiles&idNum=38.

California, State of, Department of Fish & Game. 1987. Wetlands Resource Policy.

Daubenmire, R. 1959. A canopy coverage method of vegetation analysis. *Northwest Science* 33:43-64.

California Native Plant Society. 2001. Inventory of rare and endangered plants of California (6th edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Covening Editor. California Native Plant Society, Sacramento, CA.

CalPIF (California Partners in Flight). 2002. Version 2.0. The oak woodland bird conservation plan: a strategy for protecting and managing oak woodland habitats and associated birds in California (S. Zack, lead author). Point Reyes Bird Observatory, Stinson Beach, CA. http://www.prbo.org/calpif/plans.html.

California State Parks. Draft Planning Handbook. California Department of Parks and Recreation, California State Parks, prepared by the General Plan Improvement Team. 1/12//98. 66 pp.

DiTomaso, 1999. Transline/Yellow star thistle

Hickman, J. 1993. The Jepson manual of higher plants of California. Berkeley: University of California Press.

Jameson, E.W., Jr. and H. J. Peeters. 1988. California mammals. Berkeley: University of California Press.

Kephart, Paul. *Grasslands* California Native Grass Association. Vol. XI, No.1, Spring 2001

Komarek, E.V. 1985. Fire's effects on wildlife habitat. USDA Forest Service, Intermountain Research Station, General Technical Report INT-186.

Mayer, K.E. and W.F. Laudenslayer, Jr., eds. 1988. A guide to wildlife habitats of California. State of California Resources Agency, Department of Fish and Game, Sacramento, California.

McClure, H.E. 1981. Some responses of resident animals to effects of fire in a coastal chaparral environment in southern California, pp. 86-99. In Cal-Nev Wildlife Transactions 1981. Western Section of the Wildlife Society, Smartsville, California.

McCreary, Doug. January 20, 2001. "Oak Tree Care". http://www.californiaoaks.org/ExtAssets/careacornssec.pdf

Murphy, D. D. and S. B. Weiss 1988. A long-term monitoring plan for a threatened butterfly. *Conservation Biology* 2:367-374.

National Interagency Fire Center. 1998. Wildland and prescribed fire management policy: implementation procedures reference guide.

Pavlick, B. M., P. C. Muick, S. G. Johnson, and M. Popper. 1991. Oaks of California. Cachuma Press and the California Oak Foundation. Cachuma Press Inc., Los Olivos, California.

Peck, J.M. 1986. A review of wildlife management. Prentice hall, Englewood Cliffs, New Jersey.

RHJV (RIPARIAN HABITAT JOINT VENTURE). 2000. Version 1.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. http://www.prbo.org/CPIF/Riparian/Riparian.html

Santa Clara County Parks. 1998. Transition Plan for Coyote Lake/Bear Ranch County Park.

Sauvajot, R.M. and Buechner. 1993. Effects of urban encroachment on Wildlife in the Santa Monica Mountains, pp. 171-180.

Sharsmith, C. 1945. The flora of the Mount Hamilton Range of California.

Sibley, D. A. 2000. The Sibley guide to birds. Alfred A. Knopf, New York, New York.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. Houghton Mifflin Company, New York, New York.

Stromberg, M. R. and J. R. Griffin 1996. Long-term patterns in coastal California grasslands in relation to cultivation, gophers and grazing. *Ecological Applications* 6(4): 1189-1211.

Tu, M., Hurd, C., and J.M. Randall, 2001. Weed Control Methods Handbook, The Nature Conservancy. http://tncweeds.ucdavis.edu, Version: April 2001

USDA Natural Resource Conservation Service. 1996. Ranch Water Quality Management Planning.

USDI BLM 2000. Draft Land Use Planning Handbook. U. S. Department of the Interior. Bureau of Land Management. 92 pp.

USDI National Park Service. 2001. Sect: 2.3.1.3 Management Zoning *In:* Management Policies http://www.nps.gov/refdesk/mp/.

United States Fish and Wildlife Service. 1998. Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area. Portland, Oregon.

United States Fish and Wildlife Service. 2001a. Endangered and threatened wildlife and plants; Final Determinations of Critical Habitat for the Bay Checkerspot Butterfly (*Euphydryas editha bayensis*); Final Rule. Department of the Intereior, Fish and Wildlife Service. 50 CRF Part 17. Federal Register 66 (83): 21449-21489.

United States Fish and Wildlife Service. 2001b. Endangered and threatened wildlife and plants; Final Determinations of Critical Habitat for the California Red-legged Frog; Final Rule. Department of the Interior, Fish and Wildlife Service. 50 CFR Part 17. RIN-1018-AG32. Federal Register. 66 (49): 14625-14674. wais.access.gpo.gov.

Valley Title Company. July 6, 1995. Preliminary report: Escrow No. 206252 (SH).

Weiss, S. B. 1999. Cars, cows, and checkerspot butterflies: nitrogen deposition and management of nutrient-poor grasslands for a threatened species. *Conservation Biology* 13:1476-1486.

Weiss, S. B. 1996. Weather, landscape structure, and the population ecology of a threatened butterfly, *Euphydryas editha bayensis.* PhD dissertation, Stanford University, Stanford, California.

Wirtz, W.O. 1974. Chaparral wildlife and fire ecology, pp. 7-18. In M. Rosenthal (ed) Symposium on living with the chaparral, procedings. Sierra Club, San Francisco, California.