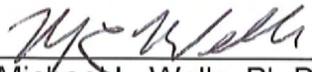


# Vegetation Management Plan Cuyamaca Rancho State Park

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## I. INTRODUCTION

The California Department of Parks and Recreation manages parks containing the entire ecological spectrum ranging from nearly undisturbed wilderness to completely landscaped urban parks. Cuyamaca Rancho State Park is a mountain park, decidedly closer to the former, with a variety of land uses including state wilderness, wildlands, cultural and natural preserves and a range of recreation facilities. The surroundings are a mixture of public wildlands and private lands with a varying density of homes and other human developments (Maps 1-5).

This is a comprehensive management plan designed to address the overall issues of park vegetation restoration and management into the future. Zedler and Krofta (1996) noted, "... because of climatic fluctuations, the forest of Cuyamaca has probably never been stable. Relative species abundance and the extent of forest area have probably all varied substantially." The plan is designed to restore habitats based on a range of historical and projected conditions, as opposed to one based on a snapshot in time or an overly specific habitat model.

Context: Change is an acknowledged element of this ecosystem and the trend during the past few decades has been one of drought and warming. Combine these changes with the results of fire suppression since at least the early 20<sup>th</sup> century, leading to the subsequent dramatic increase in forest stand density (measured in basal feet per acre) of 200 percent to 300 percent since the 1920s (Goforth and Minnich 2008), and the result is the devastation left by the 2003 Cedar Fire (Map 3). It was a type-converting unnatural crown fire – a sign of ecosystem failure brought on by fire suppression and the resulting extreme buildup of forest and chaparral fuels. Only 5 percent of the mixed conifer forest was left unburned (Goforth and Minnich 2008). Although the fire reduced fuels and temporarily reduced the threat of another catastrophic fire, it can be expected to happen again in the near future, if significant changes in vegetation and fire management are not made.

Changing our management approach will not be easy. Albright (1998) pointed out one of the confounding problems: "A management dilemma exists in an urbanized second-growth mixed conifer forest where more urbanization requires more fire protection, which in turn contributes to vegetation changes that increase the potential for high intensity stand-replacement fires."

The only practical means to the ambitious goal of restoring Cuyamaca's ecosystem is through a sustained and cooperative effort by State Parks and its partnering local, state and federal agencies and the public.

### A. Purpose

This plan will direct the long-term vegetation management in the Park to document vegetation management activities for the benefit of future Park managers, to evaluate the effectiveness of the effort and to manage for a

healthier, more sustainable ecosystem. For the purposes of this management plan, emphasis will be placed on the Mixed Conifer Forest and the Pine-Oak Woodland vegetation types where the Specified Planting Areas and other vegetation treatments occur. Non-native plant species control and removal will continue within all vegetation types.

This plan is a continually improving map to guide the ongoing restoration process. The specific purpose is to:

1. Maintain ecological functioning by: a) reestablishing forest canopy, b) restoring damaged habitats and c) preserving biodiversity.
2. Reduce hazards to humans, facilities and cultural sites.
3. Direct long-term adaptive management efforts; the plan is long-term and adaptive rather than a final solution.
4. Document vegetation management activities for the benefit of future managers.

## **B. Scope**

1. Developed Area Vegetation Management (Maps 4 and 5). Wild and prescribed fire plans (Gaidula and Biswell 1983 and amendments) are key elements of this plan.
2. Wildland Area Vegetation Management (Maps 5 and 6); this includes State wilderness, cultural and natural preserves, and underdeveloped State parklands. Wild and prescribed fire plans (Gaidula and Biswell 1983 and amendments) are key elements of this plan.

## **II AUTHORITY**

### **A. Public Resources Code (PRC)**

- PRC §4291** – Covers the state's responsibility for fire protection around structures.
- PRC §5001.65** – Commercial exploitation of resources is prohibited.
- PRC §5002.2** – Declaration of Purpose (long-range management objectives consistent with park classification). Declaration of Resource Management Policy.
- PRC §5003** – Authorizes the Department to manage the lands under its jurisdiction.

**PRC §5019.50** – Operational restrictions dependent upon park classification.

**PRC §5019.53** – The purpose of State Parks is to preserve outstanding natural and cultural values.

**PRC §5024.5** – Requires DPR to inventory, preserve and maintain historical resources on State Park property.

**PRC §5097.9** – Prohibits public agencies from damaging Native American sacred sites or cemeteries.

## **B. California State Park and Recreation Commission**

Cuyamaca Rancho State Park General Plan, 1986. The plan includes appropriate Natural and Cultural Resource Management Goals and Guidelines, State Wilderness, Natural and Cultural Preserves designations.

## **C. Department Operation Manual (DOM) Policy**

Plant Resources – **DOM §310**

Tree Hazard Program – **DOM §1104**

Pesticide Use Policy – **DOM Chapter 0700**

Prescribed Fire Management Policy (if applicable)

## **D. Other Related Laws and Regulations**

U.S. Endangered Species Act

California Endangered Species Act

California Environmental Quality Act (CEQA)

Forest Practices Act: The Department is exempt from preparing Timber Harvest Plans {**PRC §4584(f)**}. However, the Department is not exempt from Professional Foresters Law {**PRC §750-783**}.

### **1. Permits**

a. Burn Permits: issued by the responsible fire suppression agency.

b. Smoke Management Permit: issued by the local Air Quality Management District or Air Pollution Control District.

- c. California Department of Fish and Game Streambed Alteration Agreement (when applicable) [California Fish and Game Code, Sections 1600-1616].

### **III GOALS**

#### **A. Developed Areas (Map 4)**

1. Mitigate potential impacts to natural resources from Park infrastructure (facilities, trails, roads, etc.) by various means such as vegetation screening and treatment of exotic species.
2. Reduce the various undesirable wildfire impacts to Park operations and infrastructure through prudent vegetation management.
3. Improve safety for public and staff from tree hazards. In addition to the routine two-year time cycle carried out under the Department's Tree Hazard Program for hazardous trees around "facilities" (as defined by CDPR), implement vegetation management on a ten-year time horizon.
4. Create defensible space against wildfire. Reduce the threat of fire to humans and facilities by implementing scheduled fuels management in and around (in a buffer zone) developed areas i.e. structures, such as buildings, residences, parking lots, picnic areas, campgrounds or areas of heavy human use, etc. Fuel management methods may include prescribed fire, trimming, thinning and using appropriate plantings. The design of escape routes and fire safe zones will be taken into consideration.
5. Design plantings of native species and modify vegetation around development to reduce both tree hazards and fire hazards. For example, in campgrounds or in proximity to historic structures or sites, plant native trees that will maximize esthetics and/or historic settings, such as providing shade, a desirable appearance and that are low maintenance, while also providing the least hazard from fire or tree falls.
6. Strive to mimic the natural vegetation community structure in developed areas as much as possible in order to: a) provide maximum esthetic value for the public; b) acquaint the public with the natural plant communities using interpretive materials and programs, and c) keep the vegetation as natural as possible to maximize its habitat value to the unit's ecosystems.

#### **B. Wildlands Areas**

Vegetation management activities in the wildlands areas of Cuyamaca Rancho State Park shall seek to restore healthy forest, woodland, montane meadow, riparian and chaparral ecosystems through active management that may include selective cutting, thinning and prescribed burning. These and other

activities may be engaged in for the purposes of perpetuating and restoring mature growth and uneven-aged stands of natural vegetation, controlling the effects of certain insects and diseases within these natural communities and to reduce the potential impacts from hazardous or catastrophic wildfires.

1. Maintain a mosaic of native habitat types (plant communities) represented within the Park. Emphasis will be given to restoring the most impacted habitats such as the pine forest and mixed conifer forest. An example is the reestablishment of sugar pines on Middle Peak because they are not expected to regenerate naturally within decades (if not centuries).
2. Reduce the chances of catastrophic habitat type-conversion wild fires (a.k.a. stand replacement fires) through habitat specific prescriptive treatments such as fuel reduction, creating defensible fuel breaks, maintaining optimum tree density and chaparral mosaic.
3. Reduce the impacts from insects and disease through forest practices thereby maintaining an overall healthy forest ecosystem.
4. Reestablish the forest canopy where appropriate.
5. Minimize the spread of non-native plant species.
6. Improve safety for public and staff from the threat of wildfires.
7. Preserve and restore native wildlife habitat and wildlife diversity.
8. Improve native plant communities and plant diversity.

#### **IV. GENERAL SITE DESCRIPTION**

##### **A. Setting**

Cuyamaca Rancho State Park was classified as a state park in 1962. It is located in the Peninsular Ranges in east central San Diego County, about 40 miles east of the San Diego metropolitan area (Map 1). It is roughly 11.5 miles long by seven miles wide and 24,768 acres in size. The Park is predominantly wildlands. Plant communities include mixed conifer/hardwood forest, chaparral, montane meadows and grasslands. More than half the Park is classified as State Wilderness and there are four cultural preserves and one natural preserve (Map 5). The majority of developed land is adjacent to State Highway 79 and includes park-related facilities such as hiking, biking and equestrian trails; campgrounds; horse camps; picnic areas; staff residences; the San Diego Outdoor School Camp and administrative and maintenance buildings.

## **B. Geography**

The Park is located in the Cuyamaca Mountains, within the Peninsular Ranges of Southern California (Maps 1 and 2). Roughly two-thirds of the Park is steep, rugged terrain and the remainder is fairly level and rolling. There are six named peaks higher than 5,200 feet (1,586 m), the highest being Cuyamaca Peak. Elevations range from 3,400 feet (1,036 m) to 6,512 feet (1,985 m). The Park is divided by Green Valley and its perennial watercourse, the Sweetwater River, which runs from northeast to southwest.

## **C. Geology and soils**

The Park lies within the Peninsular Ranges Geomorphic Province and is made up primarily of granitic, schist and gneiss rock (Map 12). Rock types range from dark gabbros to quartz monzonites and various granitics. The closest active fault zones are the San Jacinto (18.6 miles away) and the Elsinore (4.4 miles away). Cuyamaca soils are of a generally highly erodible nature. Because of this, vegetation plays a crucial role in maintaining soil stability. Refer to Goforth and Boyce (2003) for detailed maps of soil units.

## **D. Weather/Climate**

The climate of the Park is Mediterranean consisting of warm, dry summers and cool winters. Most precipitation (87 percent) occurs between November and April with periodic rain in late summer (Map 10). The 106-year average annual precipitation measured at Lake Cuyamaca Dam (elev. 4,640 feet) is 37.5 inches (95.27 cm). Precipitation is likely to be considerably higher on peaks up to 2,000 feet above the lake. Temperatures range from near 100 °F in summer to well below freezing in winter. The coolest month is January which averages a maximum of 50.8 °F and a minimum of 29 °F. The warmest month is July which averages a maximum of 84.5 °F and a minimum of 54.8 °F. Summer thunderstorms generate an average of two to three lightning strikes per 247 acres (1 km sq.) per summer. Prevailing winds are from the west, but high velocity Santa Ana offshore winds from the northeast generate extremely serious fire conditions in fall, winter and early spring. Danger from wildfire is highest in the dry, windy conditions of September through November.

## **E. Watersheds and Hydrology**

There are six watersheds in the Park (Map 2). The most prominent among them is Sweetwater River, a perennial creek that flows southwest through the heart of the Park. It receives many of the Park's drainages such as Stonewall Creek, Harper Creek, Cold Stream, Japacha Creek, Juaquapin Creek, Arroyo Seco and Descanso Creek. The percent of total park area covered by each watershed is: Sweetwater River: 63 percent; Boulder Creek: 23 percent; King Creek: 8 percent; Pine Creek: 5 percent, and Cedar Creek: 1 percent. Lake

Cuyamaca, which drains into the San Diego River, is adjacent to the Park and forms 3.6 miles (5.8 km) of the northern Park boundary.

There are major erosion features along the Sweetwater River, the Stonewall area and in East Mesa as a result of a long history of livestock grazing and barley cultivation (Green Valley). Creeks were dammed for cattle ponds in many areas such as along the road to Los Vaqueros Group Camp and along the Little Stonewall Creek. Erosion accelerated following the Cedar Fire.

## F. Plant Life

### 1. Vegetation Types

Vegetation within the Park has been classified into types that are defined by dominant species (abundant species with a high crown cover in relation to other species) and variable factors such as elevation, slope/aspect, precipitation and fuel-habitat type (Map 6).

The following is a summary of the vegetation types used in this plan. See Appendix A for a detailed description of the types, subtypes and species composition.

- a. **Mixed Conifer Forest** is generally found above the 5,400 foot elevation on major peaks in the western portion of the Park. The dominant species are White Fir, Incense Cedar, Jeffrey Pine and Sugar Pine.
- b. **Pine-Oak Woodland** is generally found below the 5,400 foot elevation, depending on slope and aspect, and is scattered throughout the Park below the higher peaks where it intergrades with chaparral and other vegetation types. The dominant species are Jeffrey Pine, Coast Live Oak, Canyon Live Oak, California Black Oak and Coulter Pine.
- c. **Pine Woodland** is generally found below the 4,000 foot elevation, with limited distribution in West Mesa and a small area south of East Mesa. The dominant species are Coulter Pine and Jeffrey Pine.
- d. **Oak Woodland** is generally found below the 4,800 foot elevation and is scattered throughout the Park. It is dominated by Coast Live Oak, Canyon Live Oak and California Black Oak.
- e. **Chaparral** covers the greatest area and is distributed throughout the Park. It varies widely in elevation and species composition according to slope/aspect, soil type and amount of annual precipitation. It is a shrub-dominated type with any combination of species listed under the chaparral subtypes in Appendix A.

- f. **Montane Meadow/Grassland.** These two types have been combined in this plan because no management actions have been proposed other than exotic plant control and removal. Montane Meadows are vernal wet, low-lying areas dominated by ephemeral annual species. Grassland has a dominant cover of perennial and non-native annual grasses, is drier and intergrades with Montane Meadow. This type has the highest occurrence of sensitive plant species in the Park. See Appendix A for a detailed description of species composition for the two subunits.
- g. **Riparian Woodland.** Vegetation occurs along major perennial watercourses and tributary drainages, as well as intermittent streams. No management actions, other than exotic plant control and removal, are proposed in this vegetation type. Typical plant species are willows, cottonwoods, White Alder and Western Sycamore with an understory of other water-loving species.

## 2. Sensitive Plant Habitats

Cuyamaca Rancho State Park is known for several rare, uncommon or sensitive plant species, especially in the northern portion of the Park, which lies within the Cuyamaca Valley watershed with its relatively high rainfall and unusual topographic features such as mima mounds and pebble plains (Map 5). All wetlands within the Park, such as perennial watercourses, springs, seeps, vernal wet swales, meadows, grasslands and clearings within the Mixed Conifer Forest, with gabbro rock derived soils, have the highest occurrence of sensitive plant species in the Park. Several sensitive plant surveys and mapping efforts have been done within the Park because of its unique flora. Areas with "pebble plain" are habitat for some endemic or sensitive plant species.

The Cuyamaca Meadows Natural Preserve near Stonewall Mine was created to protect habitat for the three State-listed plant species: Lake Cuyamaca Downingia (*Downingia concolor* var. *brevior*), Parish's Meadowfoam (*Limnanthes alba* ssp. *parishii* [*L. gracilis* ssp. *parishii*]) and Cuyamaca Larkspur (*Delphinium hesperium* ssp. *cuyamaca*).

## 3. Sensitive Plant Species

Sensitive plants species are state-listed as rare, threatened or endangered by the California Fish and Game Commission of the California Department of Fish and Game ([www.dfg.ca.gov](http://www.dfg.ca.gov)), including Federal Species of Concern (FSC), and species that may not be state- or federally-listed but are considered to be rare or endangered in California by the California Native Plant Society (see California Native Plant Society's Inventory of Rare and

Endangered Plants of California. <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>).

The Department of Parks and Recreation is mandated by law to record the locations and to protect populations of state-listed plant species within its park units and, in cooperation with the California Department of Fish and Game, Natural Heritage Division, records (GIS) the locations of these and non-listed rare or uncommon species. Also, the Colorado Desert District records the locations of regionally uncommon species, called Locally Limited Distribution species (LLD). These are species which may be at the edge of their known range or may be disjunct, that is, they are geographically separated from their "home range." See Appendix B for a list of known sensitive plant species in the Park.

#### **4. Non-Native Plant Species**

There are several invasive annual plants within the Park, but for practical purposes, biennial or perennial non-native species have been targeted for control and removal in the District's non-native plant removal plan (Jorgensen 1996.)

Regularly scheduled inspections are essential to monitor trends of invasive species and the effectiveness of treatment. Newly introduced species, such as the star-thistle listed below, must be removed immediately before they get out of control. Several exotic plants occur in sensitive plant habitats, primarily in wetlands, and are a threat to rare, endangered and threatened plant species.

The invasion of non-native annual grasses in meadows and forest openings is a serious concern. (Goforth and Minnich 2008) did not document significant levels of increased occurrence of non-native annuals after the 2003 Cedar Fire but Franklin (Franklin et. al. 2006) did. The question is how to address this problem and thus far, there does not appear to be a practical treatment other than a series of prescribed fires.

**Table 1 – Non-Native Plants**

The following is a list of non-native plant species targeted for control or removal.

Scientific Name	Common Name	Vegetation Type
* <i>Centaurea melitensis</i>	Tocalote, Maltese Star-thistle	Chaparral, Oak Woodland
<i>Cirsium vulgare</i>	Bull Thistle	Montane Meadow/Grassland, Riparian
<i>Elytrigia pontica</i> ssp. <i>pontica</i>	Turkish Wheatgrass	Montane Meadow/Grassland
<i>Hirschfeldia incana</i> ( <i>Brassica genticulata</i> )	Short-pod Mustard	Montane Meadow/Grassland
<i>Populus nigra</i>	Lombardy Poplar	Montane Meadow/Grassland
<i>Tamarix ramosissima</i>	Tamarisk/Salt Cedar	Riparian
<i>Ulmus parvifolia</i>	Chinese Elm	Montane Meadow/Grassland (historic sites)
<i>Verbascum thapsus</i>	Woolly Mullein	Riparian, Montane Meadow
<i>Vinca major</i>	Greater Periwinkle	Oak Woodland, Pine-Oak Woodland, historic sites

\* = annual species

## G. Animal Life

Six major biotic communities occur in the Park. The equivalent animal habitat, according to the California Wildlife Habitat Relationships System (WHR) (Mayer et. al. 1988) are in parentheses: mixed conifer forest (White Fir and Jeffrey Pine), pine-oak woodland (montane hardwood conifer, Jeffrey Pine and montane hardwood), meadow-grassland (wet meadow, perennial grassland and annual grassland), chaparral (mixed chaparral), riparian (valley foothill and montane riparian) and aquatic (lacustrine).

Prominent upland species include Mule Deer, Mountain Lion, Bobcat, Coyote, introduced Wild Turkey, a host of small mammals such as California Ground Squirrel, voles, pocket mice, etc. and bats. Western Gray Squirrel has declined in recent years.

Aquatic habitat is limited to perennial and intermittent streams and small seasonal ponds. Cuyamaca Lake is outside the Park, therefore the number of water birds found in the Park is quite limited.

Approximately 220 bird species have been recorded in the Park (Rogers s.d.) and of these, ten or more species have some special status.

Four rare species of birds were apparently eliminated from the Cuyamaca Mountains by the fire: California Spotted Owl, Red-breasted Sapsucker, Red-breasted Nuthatch and Golden-crowned Kinglet. The Southern Spotted Owl's required, specialized habitat of old-growth shady north-facing forested slopes, was destroyed in the fires of 2002 and 2003 and the known pairs (3-5) have not been found since. Small populations of four other locally and very rare nesting

species, isolated only on mountaintops, survived on lightly burned Cuyamaca Peak: the Dusky Flycatcher, Yellow-rumped Warbler, Green-tailed Towhee and Fox Sparrow.

Detailed animal species lists for each mapped plant community and fuel-habitat type can be found in Goforth and Boyce (2003).

Recent major studies: the San Diego Natural History Museum conducted a comprehensive five-year bird atlas program which includes Cuyamaca Rancho State Park. That data is published in the *San Diego County Bird Atlas* (Unitt 2003). The Museum also conducted a five-year (2004-2008) post-Cedar Fire bird study and a county-wide mammal atlas. The data are or will soon be available for both studies. The California Department of Fish and Game has been conducting a detailed study of Mule Deer herds in the Park, but results of the study have yet to be published. The University of California at Davis' Wildlife Health Center has looked at the ecology and behavior of the Mountain Lion population within Cuyamaca Rancho State Park (Sweaner et al. 2004), estimating population size, determining home ranges and identifying seasonal and daily movements for Mountain Lions (Pumas) within the Park.

Sensitive animal species: See Appendix C for a complete list of sensitive and rare species and their status. Species on the Federal Endangered list include Arroyo Toad, Three-spine Stickleback and occasional wintering Bald Eagles.

The Wild Turkey, which was never native to southern California, was introduced into the Park in 1994 by the California Department of Fish and Game and is thriving. Efforts are ongoing to reduce the population as much as possible.

#### **1. Sensitive Animal Habitats:**

All wetlands habitats such as montane meadows, rivers, stream courses, ponds, springs and seeps are considered to be sensitive natural areas.

The Cuyamaca Meadows Natural Preserve was created to protect habitat for the three state-listed plant species (see Sensitive Plant Habitats above).

The State Wilderness is where most of the vegetation treatments such as forest restoration, planting plots and fuel reduction occur. All necessary environmental review processes will have to be followed to insure adherence to protection regulations in these specially classified areas.

Snags (standing dead trees) and downed logs provide essential habitat for a number of animals, including sensitive/listed species. Steps need to be taken to insure that a sufficient amount of these features are retained in treated areas.

Clearings or meadows, including those within the various forests habitats, are highly sensitive habitats, often containing sensitive plants and animals. Although it might be convenient, all forest restoration activities such as fuel reduction, pile burning and the spreading of wood chips, are not allowed in any of these meadows or forest openings, unless specifically authorized by DPR.

Other especially sensitive animal habitats include riparian woodlands, mountaintops and shaded old growth forest. Riparian woodlands contain the highest density and diversity of species of any habitat in Cuyamaca. Cuyamaca mountaintops (Middle and Cuyamaca peaks) host several rare bird species that nest virtually nowhere else in the county. The state-listed endangered Southern Spotted Owl depends on shaded old growth (mature) forest for its year-around requirements. It suffered total or near total extirpation from habitat loss due to the Cedar Fire. The small remaining tracts and subsequent regrowth of suitable habitat are particularly sensitive and important. Treatment activities are excluded in all three of these habitats unless specifically authorized by DPR.

## **H. Land Use History**

### **1. Previous Land Use**

The information gathered on historic land use is taken from the January, 1986, General Plan. Four types of historic land use practices appear to have produced the most significant change in the vegetation composition and structure: Native American use, cattle grazing, mining and fire suppression.

Native American land use by the Kumeyaay Indians started in prehistoric times and ended its traditional use in the 1830s. The Kumeyaay were hunter gatherers who followed a seasonal subsistence pattern. They greatly affected the plant life in the area and managed it for both plant uses and animal management.

Cattle grazing occurred annually from around the 1840s until the 1950s in the Montane Meadow/Grassland vegetation type of the Park. Generally, intensive unmanaged grazing of the grassland and montane meadow plant communities has resulted in the decline of perennial bunchgrass and an increase in the invasive non-native annual grasses and forbs.

The Stonewall Mine, established in 1870, was a small community of 500 residents in what is now the Park. This town, the mining tailings, land disturbance and logging greatly changed the vegetation composition in this section of the Park.

Fire has played a significant role in the development of the native and non-native flora of Cuyamaca Rancho State Park. Low-intensity natural fires are believed to have been common in the region prior to the early to mid-1900s. Some (Anderson 2005; Blackburn and Anderson 1993; Lewis 1973; Shipek 1993) have suggested that low-intensity aboriginal burning was common throughout California during the pre-historic and early historic periods, though others (see e.g. Parker 2002) argue that the direct evidence of the impact of such "prescribed" burning on the landscape is somewhat tenuous. Regardless of the origins of such fires, successful fire suppression in the post 1950s era has led to changes in the Park's natural communities. The living and dead biomass of these communities has accumulated in the absence of periodic fires. This accumulation has occurred in the form of invasion by chaparral, an increase in woody shrubs, dense thickets of trees and accretion of woody debris. Shifts in stand structure within these natural communities, where human-altered fire regimes are present, may also occur (see e.g. Wells 2001). In 2003, the largest fire in California's recorded history, the Cedar Fire, burned some 280, 278 acres of San Diego County. More than 95 percent (some 24,000 acres) of Cuyamaca Rancho State Park was burned in the fire. The fire burned so intensely through the Park and that much of the Park's original coniferous forest was thoroughly burned. Very limited regeneration of the coniferous forest has been observed in the Park in the succeeding six years.

In 2003, the damage caused by the Cedar Fire to the Park validated the statement listed above. The fire burned roughly 24,000 acres; more than 95 percent of the Park. The fire burned so intensely and so thoroughly that much of the original coniferous forest area was totally destroyed and there has been limited natural regeneration observed since the fire.

The General Plan presented five changes that have occurred to the pre-settlement plant communities in this Park. These trends have greatly changed since the Cedar Fire and are:

- Loss of natural age class structure;
- Unnatural changes in spatial relations and community structure;
- Decline in the health and vigor of forest and native grassland communities;
- Alteration of the reproductive functions in many native species;
- Alteration of the extent and distribution of many species.

Since the Cedar Fire we are now experiencing greater susceptibility to insects and disease notably the Goldspotted Oak Borer (*Agrilus coxalis*).

While most of the Park's trees are not recovering, there's a much greater increase in shrubs and downed wood, increasing susceptibility to another high intensity fire.

## 2. Current Land Use

The State of California acquired the first 20,735 acres of what was to become Cuyamaca Rancho State Park in March, 1933.

During the 1930s the Park's campgrounds, fire roads, erosion prevention, structures, picnic areas and residences were built with the assistance of the Civilian Conservation Corps.

The Green Valley Area consists of 81 campsites, two day-use picnic areas, a primitive camp site, campfire center, a trailer sanitation station and five restroom buildings.

The Paso Picacho Area includes 85 campsites, one day-use picnic area, two group camps, a campfire center, trailer sanitation station, six camping cabins and seven restrooms.

The greater park area includes shop and storage buildings, sector office, visitor center, park store, nine permanent and one seasonal residence and one historic house on property not yet open to the public.

The Green Valley campground is not used during the winter months, but is used heavily during the peak season between April and November. The Paso Picacho campground is open year-round. The average year-round occupancy for the six year fiscal period 2002-2008 for both campsites was 97,449 persons. Average day use for that period was 292,637 persons.

The Los Vaqueros group equestrian camp houses 45 people and horses and has one restroom facility.

The Cuyamaca School Camp, operated by the San Diego County Office of Education, holds 300 students and staff and consists of 15 permanent buildings.

The Park also consists of 13,200 acres classified as wilderness and 2,500 acres of cultural preserves. A total of 14,400 acres is currently used as wilderness and cultural preserves combined. The remaining 10,224 acres is currently used as scenic open space.

## I. Cultural Resources

A remarkable prehistoric and historic material record remains intact on the Cuyamaca Rancho State Park landscape. The cultural history and archaeological inventory of Cuyamaca Rancho State Park were compiled during two major inventory efforts. Comprehensive archaeological and historical research was completed for the General Plan (Foster 1981, Parkman 1981). This information was updated as a result of three years of inventory survey after the 2003 Cedar Fire (Mealey 2003, 2004 and 2005). Numerous smaller survey projects have been completed during the 76 years since the Park's creation; these are reviewed in Mealey's 2004 survey report. As a result of these efforts, approximately 550 cultural resource sites have been recorded in the Park. Four Cultural Preserves have been designated within the Park and the prehistoric village site of *Ah-ha'-Kwe-ah'-mac* has been listed on the National Register of Historic Places. The historic documents demonstrate the importance of the Cuyamaca region to the Native American occupants; six named *rancherias* were located within the Park boundaries, in Cuyamaca Valley, Green Valley, East Mesa and West Mesa. There are at least four areas listed in the Sacred Lands File maintained by the California Native American Heritage Commission. Historic sites of importance located within the Park include the nineteenth- and twentieth-century homesteads in Cuyamaca Valley and Green Valley, early transportation routes, "park rustic" facilities built by the Civilian Conservation Corps in the 1930s, the Stonewall Mine and Cuyamaca City, and numerous nineteenth- and twentieth-century ranching features.

These millennia of history have significantly influenced the Cuyamaca landscape. It is accepted by most archaeologists that Native Americans used fire to manage the natural environment and to maximize the use of plants for their own purposes. This situation of regular burning likely continued into the early historic period, based on descriptions of yearly wildfires by early settlers in the county. In addition, livestock grazing is documented as early as 1850 and grazing had a significant effect on the landscape. Although in the 1930s, the CCC participated in wildfire identification and suppression activities in the Park, early twentieth century photos illustrate a landscape still relatively free of dense growth. There have been several large wildfires including the Conejos Fire in the 1950s, the Cuyamaca Peak Fire in the 1970s and the Cedar Fire in 2003. These have been devastating to cultural resources. Post-fire inventories have documented the destruction of historic structures and facilities as well as severe impacts to prehistoric sites including the destruction of bedrock milling features and surface artifacts. Clearly, a method that reduces fuel loads while protecting the material cultural remains, is essential to cultural resource preservation.

With sufficient pre-project review, archival and field research, and implementation of appropriate protection measures, vegetation management activities can proceed with no significant impacts on cultural resources. To

ensure that no significant impacts occur to Cuyamaca Rancho State Park cultural resources the following measures should be implemented:

- 1) Accurately map the project area for all projects that potentially may involve ground-disturbing activities. Provide copies of the map to the Colorado Desert District's Associate State Archaeologist who will complete a records review to determine if the area has been surveyed previously for the presence of cultural resources. If the area has not been surveyed, or if survey conditions have substantially changed, the District archaeologist will complete a cultural resource survey of the area, including the preparation of a DPR 523 Archaeological Resource Record Form for any cultural resources discovered. A memo report, documenting the methods and results of the survey, shall be prepared by the archaeologist and a copy provided to the project manager.
- 2) The archaeologist shall work with the project manager to identify areas of potentially significant cultural resources and shall recommend strategies for avoidance of impacts to cultural resources during vegetation management activities. Strategies would include flagging of sensitive areas and directed archaeological monitoring.
- 3) The project manager, with assistance from the District archaeologist, shall ensure that flagging and provision for archaeological monitoring is implemented and that field supervisors and field crews have necessary maps and on-the-ground knowledge of sensitive cultural resource areas to be avoided. At the end of each season, a brief letter report, including DPR523 resource records for newly discovered sites, will be prepared by the archaeological monitor.

## V. DEVELOPED AREA VEGETATION MANAGEMENT PLAN

**The definition of Developed lands vs. Wildlands:** in general, this includes areas regularly used by people or areas where facilities attract human use, such as any building, parking lots, information stations, entry stations, picnic areas, campsites, propane tanks, etc. (Maps 4 and 5). The criteria used to separate developed land use zones from wildland zones in this report are, in general, the same as used by the Department to define the tree hazard target zone Technically, that includes *"locations where facilities are present or the visitor use occupancy exceeds 1 percent per annum plus a buffer area equal to the height of the mature trees."* It also includes those areas where the vegetation has been reduced to protect those facilities. Trails and fire roads, on their own, are not considered "developed" lands.

Prescriptions for developed areas include:

- A. Avoid unsafe plant species. Only safe species will be retained and no planting of certain undesirable species which may cause hazards (e.g. avoid Coulter

Pines, overly flammable types, exotic species and overly dense stands of Incense Cedar).

- B. Reduce fire hazard. As set forth in Public Resources Code (PRC) 4291, measures will be implemented to protect people and structures in the developed zone. This consists mainly of prescription thinning out to the boundary of the buffer to reduce hazard from fire.
- C. Reduce tree hazard. Routine department tree hazard standards will be implemented at a minimum of the standard two years interval.

## VI. WILDLAND AREA VEGETATION MANAGEMENT PLAN

Note: See the previous section "V" for a discussion on how the boundaries between wildlands vs. developed areas were defined.

The actions to be carried out under this plan are shown in matrix form in Table 2. Each habitat is treated separately and organized into three categories: Desired Conditions/Objectives, Constraints/Problems and Actions. The "actions" include all the steps and tools necessary to accomplish management objectives. They range from environmental review, to planting instructions, to fuel reduction, to prescribed fire, to exotic plant control, etc.

Starting in 2008, initial efforts to restore forest canopy were carried out on Middle and Cuyamaca peaks, planting 3,500 Jeffrey Pine seedlings (locally obtained) in each area (Map 8). The work was done by Cal Fire who supervised inmate crews and park staff. Follow-up maintenance by staff was augmented by some volunteer help. Seedling survival has yet to be quantified, but initial mortality is on the order of 30 to 75 percent after one year, depending on planting area. This is not surprising given the natural low recruitment of pines (seedling survival rate) and drought conditions.

The sites selected for additional canopy restoration are shown on Map 7, as "Optimal Planting Areas." The map has a legend which outlines the set of criteria used to select these preferred planting sites. Forestry specialists familiar with Cuyamaca and its fire history were responsible for identifying the criteria which were used to select the "Optimal Planting Areas."

Natural regeneration of pines has been nonexistent or minimal for all species but Coulter in the burned mixed conifer forest, 95 percent of which was burned, most of it severely (Map 11). Franklin (unpublished data) started surveying the Park for pine regeneration in 2008 (Map 13). We await the conclusions of that detailed survey, but some generalization can be made. Sugar Pine regeneration in lightly burned portions of Cuyamaca Peak is apparently normal, but non-existent on severely burned Middle Peak. Likewise, Jeffrey and Ponderosa Pine regeneration is absent in severely burned areas and undocumented elsewhere.

As expected, Coulter Pine, with serotinous cones which are adapted to wildfire, appears to be re-colonizing many areas, including those that were heavily burned (Map 13).

Regeneration of other forest tree species, such as shade tolerant Incense Cedar and White Fir, is not quantified but appears to be moderate to good depending on burn severity and whether seed sources are nearby. Because these two species and Coulter Pine regenerate well on their own, there are no plans to focus planting efforts on them. To date, no tree species except oaks appear to be regenerating significantly on Middle Peak.

The plan covers all habitats, but due to the dramatic loss of forest canopy (Map 3), focuses on the restoration of those habitats which are not regenerating naturally and would restore the canopy. These include mixed conifer forest and pine woodlands. In this case, the greatest need is for replanting of Sugar Pine and Jeffrey Pine, neither of which are growing back in the intensely burned areas. Coulter Pine, White Fir and Incense Cedar are regenerating on their own, to some degree, and will be planted if and when needed.

Research needs. Because the removal of Ceanothus, brush often has been a part of site preparation for tree planting activities and fire control; it would be useful to determine if it plays an important role in nitrogen fixation and hence a role in the regenerative capacity of the soil. Studies to date (Delwiche et al, 1965, and Kummerow et al, 1978) are inconclusive. We recommend new work be initiated to clarify its role. If it turns out that Ceanothus contributes a significant amount of nitrogen to the soil, our site preparation policy, as it relates to brush clearing, needs to be re-evaluated.

## **A. Operation Plan for Canopy Restoration**

Note: This Operation Plan focuses on canopy restoration. See Table 2 for an operational plan organized by vegetation type in matrix format covering all vegetation types and thus habitats.

### **1. Site Selection**

#### **a. Optimal Planting Areas (Map 7)**

##### **1.) GIS Model: parameters used to select planting areas**

- a.) The distribution of conifer woodland before the Cedar Fire.
- b.) Accessibility within a quarter mile of road.
- c.) Sensitive cultural and natural resources (avoid or get specialist's approval)
- d.) Soils (avoid rocky areas)
- e.) Slope (under 40 percent)

- f.) Relationship to existing seed source (distance to nearest viable seed source, plant upslope vs. down slope)
  - g.) Aspect, northerly @ 337 to 90 degrees
  - h.) Elevation (include all areas above 5,400 feet for mixed coniferous forest)
  - i.) "Top down" priority: trees planted at higher elevation provide greater down slope dispersal of seed due to gravity.
  - j.) Density of existing live and dead vegetation may in some cases dictate a preference to plant an area.
  - k.) Proximity to public view may, in some cases, be desirable for educational/PR purposes.
- 2.) Limitations and re-specifications: the GIS model is meant to be used as a tool to help identify the best areas for planting. We need to appreciate that all models have imperfections that limit their accuracy. The GIS model is not intended to dictate where planting can take place for the duration of the project.
- 3.) Environmental Review: all areas proposed for fuel modification or planting will be surveyed for sensitive, cultural and natural resources.

## 2. Site Preparation

### a. Methods

- 1.) Clearing by hand or machine: availability of resources (money, labor and equipment), wildfire danger, urgency of planting and accessibility will mainly dictate the method and intensity of clearing.
- 2.) Prescribed fire (pile or area burning): this is a long-term and essential element of the plan and there will have to be significantly more extensive burning than in the previous decades, if this plan is to be successful.

### b. Timing

- 1.) Seasonal considerations: these include worker safety (heat, tree hazard) and must be timed to coincide with the planting schedule.
- 2.) Crew availability: when crews are available, their use must be maximized during windows of time before and after fire season or other emergencies. This means scheduling a significant amount of work in late winter through early summer.

### 3.) Planting

#### a.) Methods

- 1.) Species: priority is given to non- or slow-regenerating species such as Sugar, Jeffrey and Ponderosa Pine. Lower priority species include Incense Cedar, White Fir and Coulter Pine. There are no plans to plant others such as oaks, willows or shrubs.
- 2.) Planting stock availability and pre-planting handling: refrigeration, maximum storage and handling time.
- 3.) Planting instructions: crew supervision by a forester, micro-site location in partial shade or moist areas when available such as north side of log, avoid "J" rooting, hole depth to accommodate entire root length, compaction of soil to remove air spaces, basin construction to receive rain or supplemental water, installation of two foot sleeves using two bamboo stays, watering as needed.

#### b.) Density

Density will be determined by the forester in charge. It will depend on the number of trees available, size of area and projected survival rate. Generally it will be significantly higher than optimum final density due to expected mortality and may be on the order of ten to 20 foot on center.

- c.) Timing: the optimal time is when soil moisture is adequate; this is generally from January 1 through March 31.

### 4. Maintenance of the forest canopy

#### a.) Desirable Conditions

- 1.) Basal area: the target or desired basal area (measured as the amount of total tree cross section at DBH in square feet per acre) in the restored areas is roughly 50 to 100 square feet per acre with a range of diameter classes. This approximates what was found 75 years ago, before the effects of fire suppression occurred. This is in contrast to the pre-Cedar Fire numbers which were on the order of three times that amount (Wieslander 1935, Zedler and Krofta 1996, Goforth and

Minnich 2008). These targets may vary depending on climate or other factors.

- 2.) Density or stocking: the trend in density is similar to basal area, that is, it has roughly doubled since fire suppression began. Goforth and Minnich (2008) note a change from 47 percent cover in 1928 to 89 percent in 1995. The target is to approximate the pre-fire suppression era at closer to 47 percent.
- 3.) Stand composition: the above-noted studies show that higher densities were mainly a result of an increase in small diameter class shade-tolerant Incense Cedar and White Fir. Therefore, the target of this plan is to recreate a composition more like the pre-fire suppression era with higher proportion of pines than was present in the last decades.
  - a.) Inspection (see monitoring)
  - b.) Corrective measures
    - 1.) Stand manipulation: based on monitoring results and observations, adjustments will be made on a site by site basis to reach target goals. This will be done by thinning, prescribed burns or supplemental planting.
    - 2.) Protecting existing seed sources and trees: Methods include an aggressive use of prescribed fire, thinning live and dead vegetation (to reduce threat from fire, disease outbreak and water stress by overstocking), and pest (squirrels etc.) and disease protection (pine blister rust) as needed.

## 5. Monitoring

- a.) CCAR (California Climate Action Registry) Protocol: this set of data is collected every five years to quantify the amount of carbon in each randomly selected plot. The data is extrapolated to estimate the overall amount of carbon in the forest habitats. Measurements are taken of live trees, regeneration (new seedlings and stump sprouted trees), shrub cover and dead trees (standing or downed). Refer to the Cal Fire website for standard CCAR protocol.

b.) Annual live tree monitoring: the conservation biology class at the University of San Diego will conduct systematic annual stem counts of live trees in three categories: seedlings, saplings and trees. This will be a sample of randomly selected plots.

c.) Additional data

Diseases and insect infestation: all staff and surveyors need to note and report any possible evidence of forest health issues during annual field work.

## 6. Evaluation

An annual evaluation process will include a review meeting of key agencies and their staff before each field season.

- a.) Evaluate overall progress and the last year's efforts
- b.) Stand composition: will be evaluated at each inspection interval for conformity to the target goals.
- c.) Plan the coming year's work including apportioning tasks.
- d.) Make any needed adjustments including in-treatment prescriptions.

Note: The table below outlines the management plan into a matrix format for all vegetation types, not just the forest canopy restoration, which is addressed above in the "Operation Plan."

**Table 2 – Wildland Vegetation Management Plan**

<b>Vegetation Type: Mixed Conifer Forest</b>		
<b>Desired Conditions/Objectives</b>	<b>Constraints</b>	<b>Action</b>
1) Implement an ecologically based forest restoration plan, sensitive to the microhabitat variations within MCF. This implies the overriding goal is to base restoration on the ecosystem rather than other factors. 2) Reduce the risk of uncontrollable wildfire and insect and disease outbreaks. 3) Enhance pine regeneration	1) The threat of stand-replacing fires remains, in unburned and restored areas. After 25 years since implementation, Rx burning has not kept up with the dangerous buildup of fuels from more than doubling increases in tree density and canopy cover in the MCF. 2) Most of this habitat suffered a high intensity fire in 2003.	1) Implement Rx burning where appropriate, focusing on protection of unburned patches. Thin live trees per prescription. 2) Protect all sugar pines, especially cone-bearing trees, from squirrels, fire and overly dense competition. Reduce local fuels, cull dense trees and collect seeds whenever possible, especially in years when there is a sufficient cone crop. 3) Determine which exotic plants are

<p>by protecting living trees and their seed crops, initially targeting sugar pine.</p> <p>4) Stimulate forest growth and diversity (includes trees &amp; herbaceous plants) by removing overstocks of selected live trees and shrubs, especially in the unburned MCF.</p> <p>5) Control exotic plants at strategic locations where it is most feasible and useful.</p> <p>6) Retain selected dead trees (diameter breast height or dbh depends on species) as wildlife habitat.</p> <p>7) Recreate a mix of conifers in burned out areas.</p> <p>8) Enhance the visitor's experience by providing a good example of a productive and relatively safe forest environment and providing interpretive information to explain forest ecology and restoration efforts.</p> <p>9) Protect Park resources such as cultural, air quality, visual, geological, etc.</p>	<p>High densities of standing &amp; fallen dead tree remain in some areas. These pose a hazard as fuel, and to nearby plantings if they fall.</p> <p>3) Invasive exotic grasses and herbaceous plants have expanded in burned areas. They pose a serious fire hazard and as competition to the natural ecosystem.</p> <p>4) Stand replacement of MCF by oak woodland and shrubs is underway in large portions of this former habitat. It could take decades or centuries to return to MCF and may not due to long-term climate change.</p> <p>5) In some areas, such as Middle Peak, virtually all conifers were killed in 2003. Natural regeneration, especially of pines, may require planting.</p> <p>6) Efforts to plant pines will be hampered by competition from dense new chaparral growth, high seedling mortality from lack of water and herbivory and, in open areas, by low soil moisture, erosion and invasion by exotics plants, especially grasses.</p>	<p>practical &amp; desirable targets to remove. Monitor and control selected species such as mullein in forest openings or any invading trees.</p> <p>4) Forest treatment prescription: tree density depends on microsite, but target range is likely to be 50-100 basal square feet per acre. Will require plantings and culling of live trees.</p> <p>5) Plantings will include identified species of local genetic origin and of species which are not regenerating fast enough. Trees not regenerating and in need of planting include Sugar, Jeffrey and Ponderosa Pine. They will be planted in specified areas (Maps 7 &amp; 8). Because there appears to be sufficient natural regeneration of White Fir, Incense Cedar and Coulter Pine, there will be less emphasis in planting these species. The number and location of planting sites will be determined through a number of factors, but plots should be small enough, accessible and perhaps one acre each, so as to receive adequate care and monitoring. Post-planting care includes watering for about two years or as needed, brush clearing (likely at least every 5 years) and tree culling, in a 30 ft. radius, removal of standing dead hazard trees, and monitoring of tree survival and growth. Plant trees on a small-scale at varied and selected sites in the lower, mid and upper elevations, where they have the least chance of regenerating naturally. Conduct planting before spring/summer to insure highest survival rate.</p> <p>6) Establish basal area sampling plots across a range of sites to monitor both natural and restored tree growth and establishment.</p> <p>7) Multiple Treatment plots: Establish a series of plots (a minimum of 4) to assess key factors such as: elevation, aspect, planting methods, densities and species composition. Techniques such as clearing, trimming and planting will be employed. For example, set up plots to sample lower elevation</p>
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		<p>Coulter pine habitat and higher elevation sugar pine habitat.</p> <p>8) Conduct all necessary environmental reviews for cultural and sensitive natural resources, for all planting and fuel modification activities.</p> <p>9) Provide the public (and staff) with information on the restoration efforts to enhance their knowledge and enjoyment. This could include signs, written information or inclusion in interpretive programs.</p> <p>10) Implement measures to protect cultural resources.</p>
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<b>Vegetation Type: Pine-Oak Woodland</b>		
<b>Desired Condition</b>	<b>Constraints</b>	<b>Action</b>
<p>1) Protect Park resources such as cultural, air quality, visual, geological, etc.</p>	<p>1) There is still a threat of stand-replacing fires in unburned and recently burned areas. After 25 years since implementation, Rx burning has not kept up with the dangerous buildup of fuels from more than doubling increases in tree density and canopy cover.</p>	<p>1) Implement Rx burning where appropriate, focusing on protection of unburned patches Thin live trees per prescription.</p> <p>2) Plant appropriate pine species in specified planting areas (Maps 7 &amp; 8).</p> <p>3) Conduct all necessary environmental reviews, such as CEQA, for all planting and clearing activities.</p> <p>4) Implement measures to protect cultural resources.</p>

<b>Vegetation Type: Pine Woodland</b>		
<b>Desired Condition</b>	<b>Constraints</b>	<b>Action</b>
	<p>1) There is still a threat of stand-replacing fires in unburned and recently burned areas. After 25 years since implementation, Rx burning has not kept up with the dangerous buildup of fuels from more than doubling increases in tree density and canopy cover.</p>	<p>1) Implement Rx burning where appropriate, focusing on protection of unburned patches. Thin live trees per prescription.</p> <p>2) Plant appropriate pine species in specified planting areas (Maps 7 &amp; 8).</p> <p>3) Conduct all necessary environmental reviews for all planting and fuel modification activities.</p>

		4) Implement measures to protect cultural resources.
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<b>Vegetation Type: Oak Woodland</b>		
<b>Desired Condition/Objectives</b>	<b>Constraints</b>	<b>Action</b>
1) Reduce the risk of uncontrollable wildfire and insect and disease outbreaks. 2) Stimulate growth and diversity of herbaceous and woody undergrowth. 3) Control targeted exotic plants at strategic locations where it is most feasible and useful. 4) Promote the development of a healthy and diverse woodland, capable of sustaining the natural elements of a functioning ecosystem. 5) Protect park resources such as cultural, air quality, visual, geological, etc.	1) The majority of this habitat burned in 2003, causing erosion problems, invasion of exotic plants, loss of some herbaceous and woody species and an excessive load of dead fuel. 2) Some areas of former woodland may experience type conversion to chaparral or take decades to naturally return to woodland habitat. 3) There is still a threat of stand-replacing fires in unburned and recovering areas. After 25 years since implementation, Rx burning has not kept up with the dangerous buildup of fuels from an increase in tree and shrub density.	1) Implement Rx burning where appropriate, focusing on protection of unburned patches. Thin live trees per prescription. 2) Remove overstocks of selected live trees, especially in the unburned areas by mechanical means or Rx fire. 3) Retain selected dead trees as wildlife habitat. 4) Determine which exotic plants are practical & desirable targets to remove. Monitor and control selected species, such as mullein, in forest openings or any invading exotic trees. 5) Because of natural regeneration, there are no plans to plant any oak species in the wildlands. 6) Implement measures to protect cultural resources.

<b>Vegetation Type: Chaparral</b>		
<b>Desired Conditions/Objectives</b>	<b>Constraints</b>	<b>Action</b>

<p>1) Reintroduce a more natural fire regime.                  2) Insure the health of valuable gabbro soils habitat and the endemic species found there.                  3) Minimize damage to habitat from wildfire fighting operations.</p>	<p>1) There is still a threat of stand-replacing fires in unburned and recently burned areas. After 25 years since implementation, Rx burning has not kept up with the dangerous buildup of fuels.                  2) Unplanned ignitions may further the Rx objectives but, in some cases, pose an unacceptable fire hazard and will be suppressed.                  3) Determining the optimum (or preferred) fire return interval.                  4) Actions taken during the haste of emergencies, such as wildfire, are sometimes done without proper review by park officials and can lead to serious impacts to natural areas.</p>	<p>1) Implement Rx fire plan using broadcast burning and any other methods available.                  2) Experiment with various fire intervals to determine what is optimum for the stands at Cuyamaca.                  3) Monitor and take necessary actions to insure health of gabbro soils habitat and its endemic plants such as Cuyamaca cypress.                  4) During wildfires, prevent the use of mechanical equipment off existing roads unless absolutely necessary.                  5) Establish an array of sampling plots to measure effectiveness of and need for Rx burning. Periodically evaluate and adjust the burn plan accordingly.                  6) No planting is contemplated.                  7) Implement measures to protect cultural resources.</p>
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<p><b>Vegetation Type: Meadow/Grassland</b></p>		
<p><b>Desired Conditions/Objectives</b></p>	<p><b>Constraints/Problems</b></p>	<p><b>Actions</b></p>

<p>1) Recreate a healthy, functioning meadow ecosystem with a diverse assemblage of native grassland plants &amp; animals.</p> <p>2) Minimize negative impacts from erosion &amp; runoff including downcutting in creeks and invasion of excessive sediments.</p> <p>3) Restore the role of natural fire where appropriate to reduce thatch, stimulate plant regeneration and recycle nutrients.</p> <p>4) Insure there are healthy populations of locally endemic sensitive/listed plants.</p> <p>5) Maximize the physical linkages with adjacent meadows and other natural wildland habitat.</p>	<p>1) Regulatory difficulty in restoring eroded areas in sensitive meadow habitat.</p> <p>2) Presence of sensitive cultural resources within the Cultural Preserves.</p> <p>3) Difficulty in preventing erosion problems originating upstream off park property.</p> <p>4) Existing downcut eroded creeks.</p> <p>5) Extensive amount of invasive exotic plants.</p> <p>6) Encroachment of sediments from highly eroded adjacent burned areas.</p> <p>7) Intensive public use in certain meadows from snow-play and nearby camping &amp; picnic facilities, results in trampling of plants and soil compaction.</p>	<p>1) Systematically conduct exotic plant removal, targeting woolly mullein, tumble mustard, bull thistle and other controllable invasives.</p> <p>2) Implement periodic Rx burning in adjacent habitats to protect riparian forests from fire. No Rx in riparian habitat.</p> <p>3) Monitor sensitive plant species populations to determine if management action is required.</p> <p>4) Monitor all human use activities, such as snow-play, campgrounds, trails, water control structures, etc., to insure impacts to meadows are avoided or minimized.</p> <p>5) Maintain vehicle barriers, signage and law enforcement controls which protect meadow habitat.</p> <p>6) Limit or remove unnatural barriers to the integrity of meadow habitat, such as roads, water control structures, bisecting trails, power line corridors, etc.</p> <p>7) Prevent detrimental soil compaction by minimizing foot or vehicle traffic in wet areas.</p> <p>8) Insure that natural hydrology of meadows is not impacted by water diversion of any sort including well pumping, flood control or construction activities.</p> <p>9) No planting is contemplated.</p> <p>10) Implement measures to protect cultural resources.</p>
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<b>Vegetation Type: Riparian Woodland</b>		
<b>Desired Condition</b>	<b>Constraints</b>	<b>Action</b>
	<p>1) There is still a threat of stand-replacing fires in unburned and recently burned areas. After 25 years since implementation, Rx burning has not kept up with the dangerous buildup of fuels from more than doubling increases in tree density and canopy cover.</p>	<p>1) Implement Rx burning where appropriate, focusing on protection of unburned patches Thin live trees per prescription.</p> <p>2) Because of sufficient natural regeneration of key plant species, there are no plans to plant in the riparian habitat.</p> <p>3) Implement measures to protect cultural resources.</p>

## **VII. INTERAGENCY RELATIONS, COMMUNITY RELATIONS AND PUBLIC EDUCATION**

- A. Partnerships: there are a number of agencies, groups and private parties with an interest in the restoration and the health of the Cuyamaca ecosystem. Cal Fire (California Department of Forestry) is an active partner in prescribed fire, fuel management, wildfire fighting and tree planting. Cal Fire helps direct inmate and other crew work in the Park, which, to date, has made up the bulk of the restoration labor effort. Their nurseries are growing out tree stock to be planted in the Park. Bureau of Land Management and U.S. Forest Service (Cleveland National Forest) are adjacent public land owners who cooperate with DPR in wild and prescribed fire efforts. Private companies may become more involved in the purchase of carbon offsets and in contracting to carry out various elements of forest restoration. San Diego State University and the University of California at Riverside and the University of California at Davis are among the institutions that support restoration-related research at Cuyamaca.
  
- B. Volunteers and Citizen Involvement: an important element of the labor-intensive reforestation program is the long-term participation of volunteers to help with planting and maintenance of young trees. This requires ongoing and increased efforts in recruitment, training and organization of community volunteers. Volunteers already have helped with the watering of seedlings. Volunteers can contribute in key roles as stewards, helping maintain tree seedlings in the acres of newly-planted and soon-to-be-planted forest. Volunteers can "adopt" certain plantings to provide ongoing maintenance such as watering and weeding. There is an immediate need for more volunteers as their role is crucial to the success of the survival of planted trees. We welcome citizen involvement, either by groups or individuals, to provide ideas and labor towards this ambitious undertaking.
  
- C. Education: there is a need for basic information explaining the reforestation program to Park visitors and interested community members. Interpretive signs explaining the program are to be placed at restoration sites or other strategic locations in the Park. Brochures and other printed material will explain the purpose and needs of the project and will help recruit volunteer support. DPR and Cal Fire will be the leads in this effort.

## **VIII. UNSCHEDULED DISTURBANCES**

Disturbance, such as flood or wildfire, shall be evaluated before any planned activity is carried out. Disturbances may void or alter scheduled management activities. The following issues are among those to be addressed immediately and at the annual "Evaluation" phase in the Operation Plan. When a major disturbance occurs, there will be an immediate assessment to determine if planned activities need to be adjusted. Questions to be addressed include:

- Has the disturbance occurred in the same location as a scheduled activity?
- Has the disturbance occurred in the vegetation type (but not in the same location) that has a scheduled activity?
- Has the disturbance voided or changed the priority of scheduled activities?
- Has the disturbance created an urgent priority that usurps all scheduled activities?

## **IX. REVIEW AND APPROVAL**

This plan requires two levels of review: first will be the review and signing of this initial plan document by the agencies involved; second is the annual ongoing review process, at which time one or more representatives of each participating agency will attend and be involved in the evaluation of last year's work and the planning of the coming year. This process will be essential to insure the plan is truly adaptive, that is, responsive to inevitable changes in the environment and lessons learned from experience.

## **X. MONITORING**

See section VI, A, 5 of the Operation Plan, Monitoring and Evaluation. Refer to the Cal Fire CCAR Survey Protocol.

## **XI. BUDGET**

Until there are firm funding sources, it is not possible to draw up a project specific budget. The USFS and Cal Fire have put together budget estimates for forest restoration of areas burned by the Cedar Fire that also address the issue of carbon offsets (compensating for carbon emissions with measured carbon sequestration through forest restoration).

Cost estimating and benefits: Friederici (2003) and others point out the cost of prevention and restoration is a fraction of fighting wildfire. Documented costs for forest restoration in the southwestern United States averages \$700 per acre (Friederici for Ponderosa Pine forest 2003), while the average cost of fighting wildfires exceed, and often far exceed, double that cost. According to Friederici, pine forest wildfires cost roughly \$1,700 per acre. Therefore, a crude estimate of the complete restoration of Cuyamaca's conifer forests (10,000 ac or 4,000 ha.) would be on the order of \$17,000,000.

## XII REFERENCES CITED

- Albright, Dorothy. MS Thesis. 1998. *Vegetation Change in Second-Growth Mixed Conifer Forests of Western San Bernardino Mountains*. University of California at Riverside, California. 39 pp.
- Anderson, M.K. 2005. *Tending the Wild: Native American Knowledge and the Management of California's Natural Resources*. University of California Press, Berkeley. 526 pp.
- Arno, Stephen A., and Fielder, Carl E. 2005. *Mimicking Nature's Fire, Restoring Fire-Prone Forests in the West*. Island Press. 243 pp.
- Blackburn, T. and K. Anderson. 1993. Introduction: Managing the Domesticated Environment. Pp. 15-25 in T.C. Blackburn and K. Anderson (eds.), *Before the Wilderness: Environmental Management by Native Californians*. Ballena Press, Menlo Park, CA. 476 pp.
- California State Public Resources Code (PRC).
- California Department of Parks and Recreation. Unit Fire Plan. Cuyamaca Rancho State Park. Park files.
- California Department of Parks and Recreation, Cuyamaca Rancho State Park General Plan, June, 1986. 78 pages, plus figures and comments. Park files.
- California Department of Parks and Recreation. Department Operation Manual (DOM). Park files.
- Delwiche, C. C; Zinke, Paul J.; Johnson, Clarence M. 1965. *Plant Pathology*. 40: 1045-1047.
- Foster, D. G. 1981. *A Cultural Resources Inventory and Management Plan for Cuyamaca Rancho State Park, San Diego County, California*. Volume I. On file at DPR, Southern Service Center, San Diego.
- Friederici, Peter. Editor. 2003. *Ecological Restoration of Southwestern Ponderosa Pine Forests*. Society for Ecological Restoration. Island Press. 561 pp.
- Franklin, Janet; Spears-Lebrun, Linnea A.; Deutschman, Douglas H.; Marsden, Kim. 2006. *Impact of a High-Intensity Fire on Mixed Evergreen and Mixed Conifer Forests in the Peninsular Ranges of Southern California, USA*. *Forest Ecology and Management* 235 (2006) 18-29.

- Gaidula, P. and Biswell, H. H. 1983. *Prescribed Fire Management Program for Cuyamaca Rancho State Park*. California Department of Parks and Recreation, Sacramento, CA. Park files.
- Goforth, Brett and Minnich, Richard A. 2008. *Desification, Stand-Replacement Wildfire, and Extirpation of Mixed Conifer Forest in Cuyamaca Rancho State Park, Southern California*. *Forest Ecology and Management* 256 (2006) 36-45.
- Goforth, Brett and Boyce, Walter M. 2003. *Draft Prescribed Fire Management Plan for Cuyamaca Rancho State Park*. CDPR files.
- Jorgensen, Paul. 1996. *Policy for Non-Native Plants in the Colorado Desert District: Guidelines for Controlling Non-Native Plants and the Use of Appropriate Plant Species in Landscaping and Developed Areas*, November, 1996. Unpublished. DPR files.
- Kummerow, Jochen; Alexander, James B.; Neel, James W.; Fishbeck, Kathleen. 1978. *Symbiotic Nitrogen Fixation in Ceanothus Roots*. *American Journal of Botany*. 65(1): 63-69.
- Lewis, H.T. 1973. *Patterns of Indian Burning in California: Ecology and Ethnohistory*. Ballena Press, Ramona, CA.
- Mayer, Kenneth E.; Laudenslayer, Jr., William F.; Editors. 1988. *A Guide to Wildlife Habitats of California*. State of California, Resources Agency. 166 pg.
- Mealey, Marla. 2003 *Cuyamaca Rancho State Park Archaeological Survey and Monitoring Report*. Unpublished report prepared by Southern Service Center of California State Parks on file at the Begole Archaeological Research Center.
- Mealey, Marla. 2004 *Post Fire Archaeological Site Assessment Report for Portions of the Cedar Fire Burn Area within Cuyamaca Rancho State Park*. Unpublished report prepared by Southern Service Center of California State Parks on file at the Begole Archaeological Research Center.
- Mealey, Marla. 2005 *Post Fire Archaeological Site Assessment Report for Portions of the Cedar Fire Burn Area within Cuyamaca Rancho State Park*. Unpublished report prepared by Southern Service Center of California State Parks on file at the Begole Archaeological Research Center.
- Parker, A.J. 2002. Fire in Sierra Nevada Forests: Evaluating the Ecological Impact of Burning by Native Americans. Pp. 233-267 **in** T.R. Vale (ed.), *Fire, Native Peoples and the Natural Landscape*. Island Press, Washington D.C. 315 pp.

Parkman, E. B. 1981 *A Cultural Resources Inventory and Management Plan for Prescribed Burning at Cuyamaca Rancho State Park, San Diego, California*. Volume II. On file at DPR, Southern Service Center, San Diego.

Rogers, Geoff. 1997. *Checklist of Birds of Cuyamaca Rancho State Park*. DPR brochure. Cuyamaca Rancho State Park Interpretive Association.

Shipek, F. 1993. Kumeyaay Plant Husbandry: Fire, Water and Erosion Management. Pp. 379-388 in T.C. Blackburn and K. Anderson (eds.), *Before the Wilderness: Environmental Management by Native Californians*. Ballena Press, Menlo Park, CA. 476 pp.

Unitt, Philip. 2004. *San Diego County Bird Atlas*. Proceedings of the San Diego Society of Natural History. No. 39. 31 October, 2004. 645 pp.

Wells, M. L. 2001. *Human-Altered Fire Regimes and the Development of Stand Structure in Macrocarpae Pines*. Ph.D. dissertation, Department of Geography, University of California, Santa Barbara.

Wieslander, A. 1935. *A Vegetation Type Map of California*. Madrono. 3, 140-144

Zedler, Paul and Krofta, D. A. 1996: *Composition, Structure and Successional Patterns in Mixed Conifer-Hardwoods of the West Mesa Area, Cuyamaca Rancho State Park*. Final report on project # 84-24-002. CDPR files.

### XIII APPENDICES

#### APPENDIX A - VEGETATION TYPES

For management purposes vegetation in the park has been classified into the following types. Asterisk (\*) denotes non-native species.

- **Mixed Conifer Forest** – OVERSTORY: White Fir (*Abies concolor*), Incense Cedar (*Calocedrus decurrens*), Coulter Pine (*Pinus coulteri*), Jeffrey Pine (*Pinus jeffreyi*), Sugar Pine (*Pinus lambertiana*), Ponderosa Pine (*Pinus ponderosa*), Canyon Live Oak (*Quercus chrysolepis*), California Black Oak (*Quercus kelloggii*). UNDERSTORY: Palmer's Lilac (*Ceanothus palmeri*), Pink-bract Manzanita /Cuyamaca Manzanita (*Arctostaphylos pringlei* ssp. *drupacea*), Point-leaf/Mexican Manzanita (*A. pungens*), Chaparral Whitethorn/Whitebark Ceanothus (*Ceanothus leucodermis*), Hairy Ceanothus (*C. oliganthus* var. *oliganthus*), Western Bracken Fern (*Pteridium aquilinum* var. *pubescens*), Coffeeberry (*Rhamnus californica* ssp. *californica*, *Rhamnus tomentella* ssp. *tomentella*), Western Chokecherry (*Prunus virginiana* var. *demissa*), Skunkbrush (*Rhus trilobata*) and Snowberry (*Symphoricarpos albus* var. *laevigatus*, *Symphoricarpos parishii*).

- **Pine-Oak Woodland** – OVERSTORY: Coulter Pine (*Pinus coulteri*), Jeffrey Pine (*P. jeffreyi*), Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Q. chrysolepis*), California Black Oak (*Q. kelloggii*). UNDERSTORY: Grassland subunit species and Mixed Conifer Forest understory species.
- **Pine Woodland (Pine Phase)** – OVERSTORY: Coulter Pine (*Pinus coulteri*), Jeffrey Pine (*P. jeffreyi*). UNDERSTORY: Grassland subunit species, Mixed Conifer Forest understory species.
- **Oak Woodland (Oak Phase)** – OVERSTORY: Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Q. chrysolepis*), California Black Oak (*Q. kelloggii*). UNDERSTORY: Grassland subunit species and Mixed Conifer Forest understory species.
- **Chaparral** – a generalized vegetation type dominated by shrubs, including any combination of plant species listed in the three subtypes below.

Mixed Chaparral subtype – Chamise (*Adenostoma fasciculatum*), Manzanita species (*Arctostaphylos glandulosa*, *A. pungens*, *A. glauca*), Wild Lilac species (*Ceanothus greggii* var. *perplexans*, *C. leucodermis*, *C. palmeri*, *C. oliganthus* var. *oliganthus*), Birch-leaf Mountain Mahogany (*Cercocarpus betuloides* var. *betuloides*), California Buckwheat (*Eriogonum fasciculatum* vars.), Coffeeberry species (*Rhamnus californica* ssp. *californica* and *Rhamnus tomentella* ssp. *tomentella*), scrub oaks (*Quercus Xacutidens*, *Q. berberidifolia*), White Sage (*Salvia apiana*) and chaparral candle (*Hesperoyucca whipplei*, formerly *Yucca w.*).

Chaparral Complex subtype - Mixed Chaparral species with partial overstory of Coulter Pine (*Pinus coulteri*), Jeffrey pine (*Pinus jeffreyi*), Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Q. chrysolepis*) and California Black Oak (*Q. kelloggii*).

Montane Chaparral subtype – Pink-bract Manzanita/Cuyamaca Manzanita (*Arctostaphylos pringlei* ssp. *drupacea*), Point-leaf / Mexican Manzanita (*A. pungens*), White-back Ceanothus (*Ceanothus leucodermis*), Mountain Lilac (*Ceanothus oliganthus* var. *oliganthus*), Western Chokecherry (*Prunus virginiana* var. *demissa*), Coffeeberry species (*Rhamnus californica* ssp. *californica*, *R. tomentella* ssp. *tomentella*).

- **Montane Meadow/Grassland** – These two vegetation types have been combined in this plan because no management actions, other than exotic plant control and removal, have been proposed. They commonly intergrade in species composition and are roughly segregated by small differences in elevation and relative moisture availability. The Montane Meadow subunit tends to be relatively flat and is commonly adjacent to watercourses and the vernal

wet margins of Lake Cuyamaca. The Grassland subunit is usually found in the drier areas above meadows. This vegetation type has the highest occurrence of sensitive plant species.

Montane Meadow subunit – Sedges (*Carex* species), Rushes (*Juncus* species), Deergrass (*Muhlenbergia rigens*), Junegrass (*Koeleria macrantha*), Kentucky Bluegrass (*Poa pratensis*), Yarrow (*Achillea millefolium*), Goldfields (*Lasthenia gracilis*), Cream Cups (*Platystemon californicus*), Tidy-tips (*Layia platyglossa*), Miniature Lupine (*Lupinus bicolor*), Common Mullein (*Verbascum thapsus*), Tumble Mustard (*Sisymbrium altissimum*), non-native annual grasses such as Slender Wild Oat (*Avena barbata*), Ripgut Grass (*Bromus diandrus*) and Foxtail Chess (*Bromus rubens*), Cheat Grass/Downy Brome (*Bromus tectorum*) and Red-stem Filaree/Storkbill (*Erodium cicutarium*).

Grassland subunit – Foothill Buckwheat (*Eriogonum wrightii* var. *membranaceum*), Junegrass (*Koeleria macrantha*), Squirreltail Grass (*Elymus elymoides* ssp. *brevifolius*, *Elymus multisetus*), Beardless Wild-rye (*Leymus triticoides*), Blue Wildrye (*Elymus glaucus* ssp. *glaucus*), Foothill Needlegrass (*Nassella lepida*), Purple Needlegrass (*Nassella pulchra*), Tumble Mustard (*Sisymbrium altissimum*), non-native annual grasses such as Cheat Grass/Downy Brome (*Bromus tectorum*), Foxtail Fescue (*Vulpia myuros* vars.) and Red-stem Filaree/Storkbill (*Erodium cicutarium*).

- **Riparian Woodland** – OVERSTORY: California Sycamore (*Plantanus racemosa*), White Alder (*Alnus rhombifolia*), Western Cottonwood (*Populus fremontii* ssp. *fremontii*), Arroyo Willow (*Salix lasiolepis*), Velvet Ash (*Fraxinus velutina*). UNDERSTORY: California Rose (*Rosa californica*), Creek Dogwood (*Cornus sericea* ssp. *occidentalis*), San Diego Burning Bush (*Euonymus occidentalis* var. *parishii*), Poison Oak (*Toxicodendron diversilobum*), Stinging Nettle (*Urtica dioica* ssp. *holosericea*), California Blackberry (*Rubus ursinus*), San Bernardino Raspberry (*Rubus leucodermis*), Basketbush/Skunkbrush (*Rhus trilobata*), Common Mullein (*Verbascum thapsus*) and White Sweetclover (*Melilotus albus*).

Source: Modified from the fuel types as defined by Gaidula and Biswell (1983, DPR 1982) in Draft Prescribed Fire Management Plan for Cuyamaca Rancho State Park (Goforth and Boyce 2003).

Note: Although Deerbrush (*Ceanothus integerrimus*) is cited in the vegetation types in the Draft Prescribed Fire Plan for CRSP (Goforth and Boyce 2003), the species does not occur within San Diego County and was likely a misidentification of *C. palmeri* or *C. spinosus*. Also, specimens of Snowberry (*Symphoricarpos mollis*) that have been collected in the Park and housed at the San Diego Natural History Museum herbarium, have been re-identified as *Symphoricarpos albus* var. *laevigatus* (Dr. Jon Rebman, Curator of Botany, San Diego Natural History Museum, pers. com.).

## APPENDIX B – SENSITIVE PLANTS

Scientific Name	Common Name	Status	Vegetation Type
<i>Aspidotis densa</i>	Indian's Dream	LLD	Mixed Conifer Forest (gabbro soil)
<i>Astragalus oocarpus</i>	San Diego Milkvetch	1B, FSC	Pine-Oak Woodland
<i>Boschniakia strobilacea</i>	California Groundcone	LLD	Mixed Conifer Forest
<i>Callitropsis stephensonii</i> [Cupressus stephensonii, C. arizonica ssp. stephensonii]	Cuyamaca Cypress	1B, FSC	Chaparral (drainages, gabbro soil)
<i>Calochortus dunnii</i>	Dunn's Mariposa Lily	1B, CR/FSC	Chaparral (gabbro soil)
<i>Calochortus invenustus</i>	Shy Mariposa Lily	LLD	Montane Meadow/ Grassland
<i>Caulanthus simulans</i>	Payson's Caulanthus	4	Mixed Conifer Forest, Pine-Oak Woodland
<i>Ceanothus foliosus</i> var. <i>foliosus</i>	Wavy-leaf Lilac	LLD	Mixed Conifer Forest, Chaparral (gabbro soil)
<i>Celtis reticulata</i>	Net-leaf Hackberry	LLD	Montane Meadow/ Grassland (rock outcrops)
<i>Chaenactis parishii</i>	Parish's Pincushion	1B	Pine-Oak Woodland
<i>Chorizanthe polygonoides</i> var. <i>longispina</i>	Knotweed Spineflower	1B, FSC	Montane Meadow/ Grassland
<i>Chrysothamnus nauseosus</i> ssp. <i>bernardinus</i>	San Bernardino Rabbitbrush	LLD	Mixed Conifer Forest (gabbro soils)
<i>Clarkia purpurea</i> ssp. <i>viminea</i>	Large Clarkia	LLD	Pine Woodland
<i>Danthonia unispicata</i>	One-spike Oatgrass	LLD	Montane Meadow (pebble plain)
<i>Delphinium hesperium</i> ssp. <i>cuyamaca</i>	Cuyamaca Larkspur	1B, CR/FSC	Montane Meadow/ Grassland
<i>Downingia concolor</i> var. <i>brevior</i>	Cuyamaca Lake Downingia	1B, CE/FSC	Montane Meadow/ Grassland
<i>Epilobium minutum</i>	Small-flower Willow Herb	LLD	Mixed Conifer Forest (gabbro soil)
<i>Ericameria cuneata</i> var. <i>macrocephala</i>	Laguna Mountain Goldenbush	1B	Pine-Oak Woodland (rock outcrops)
<i>Gayophytum humile</i>	Dwarf Groundsmoke	LLD	Montane Meadow/ Grassland, Chaparral (gabbro soil)
<i>Gilia clivorum</i>	Purple-spot Gilia	LLD	Montane Meadow/ Grassland
<i>Grindelia hirsutula</i> var. <i>hallii</i>	San Diego Gumplant	1B	Montane Meadow/ Grassland
<i>Holodiscus discolor</i>	Oceanspray	LLD	Mixed Conifer Forest (rock outcrops)
<i>Horkelia clevelandii</i>	Cleveland's Horkelia	LLD	Montane Meadow (host plant for Federally-listed, endangered Laguna Mountains Skipper Butterfly)
<i>Hulsea californica</i>	San Diego Hulsea	1B	Chaparral, Pine-Oak

			Woodland, Mixed Conifer Forest (post-fire)
<i>Hymenothrix wrightii</i>	Wright's Hymenothrix	4	Mixed Conifer Forest, Pine-Oak Woodland
<i>Iris missouriensis</i>	Western Blue Flag	LLD	Montane Meadow/Grassland
<i>Lewisia brachycalyx</i>	Southwestern Bitter-root	2	Montane Meadow (pebble plain)
<i>Lewisia nevadensis</i>	Nevada Lewisia	LLD	Mixed Conifer Forest (seeps in clearings)
<i>Lilium humboldtii</i> ssp. <i>ocellatum</i>	Ocellated Lily	4, FSC	Mixed Conifer Forest, Chaparral (gabbro soil)
<i>Lilium pardalinum</i> ssp. <i>pardalinum</i>	Leopard Lily	LLD	Mixed Conifer Forest (banks of perennial streams)
<i>Limnanthes alba</i> ssp. <i>parishii</i> [ <i>L. gracilis</i> ssp. <i>parishii</i> ]	Parish's Slender Meadowfoam	1B, CE/FSC	Montane Meadow (vernally wet swales, depressions)
<i>Linanthus orcuttii</i>	Laguna/Orcutt's Linanthus	1B, FSC	Pine-Oak Woodland, Montane Meadow/Grassland
<i>Lithophragma glabrum</i>	Bulbous Woodland Star	LLD	Pine-Oak Woodland, Riparian (vernally wet areas)
<i>Madia elegans</i> ssp. <i>elegans</i>	Elegant Madia	LLD	Montane Meadow/Grassland
<i>Maianthemum stellatum</i>	False Solomon's Seal	LLD	Montane Meadow/Grassland, Mixed Conifer Forest (vernally wet areas)
<i>Mimulus clevelandii</i>	Cleveland's bush monkey flower	4	Mixed Conifer Forest, Montane Chaparral (clearings)
<i>Mimulus congdonii</i>	Congdon's Monkey Flower	LLD	Pine-Oak Woodland, Chaparral (drainages)
<i>Mimulus palmeri</i> [ <i>Mimulus diffusus</i> ]	Palomar Monkey Flower	4	Chaparral (drainages)
<i>Minuartia pusilla</i>	Annual Sandwort	LLD	Mixed Conifer Forest (gabbro soil)
<i>Monardella macrantha</i> ssp. <i>hallii</i>	Hall's Monardella	1B	Mixed Conifer Forest (gabbro soil)
<i>Navarretia peninsularis</i>	Peninsular Navarretia	1B	Montane Meadow/Grassland
<i>Navarretia tagetina</i>	Marigold Navarretia	LLD	Montane Meadow/Grassland
<i>Pentachaeta aurea</i>	Golden-ray Pentachaeta	4	Montane Meadow/Grassland, Pine-Oak Woodland
<i>Piperia leptopetala</i>	Narrow-petal Rein Orchid	4	Mixed Conifer Forest, Chaparral
<i>Polygonum parryi</i>	Parry's Knotweed	LLD	Montane Meadow/Grassland, Mixed Conifer Forest
<i>Rosa woodsii</i> var. <i>ultramontana</i>	Interior Rose	2, CE	Mixed Conifer Forest

<i>Rubus glaucifolius</i> ssp. <i>ganderi</i>	Cuyamaca/Gander's Raspberry	1B	Mixed Conifer Forest
<i>Rupertia rigida</i> [ <i>Psoralea r.</i> ]	Parish's Psoralea	4	Pine-Oak Woodland, Montane Meadow/ Grassland
<i>Saltugilia caruifolia</i>	Caraway-leaf Gilia	4	Mixed Conifer Forest/ Pine-Oak Woodland, Chaparral
<i>Salvia sonomensis</i>	Creeping Sage	LLD	Mixed Conifer Forest, Chaparral (clearings, gabbro soil).
<i>Sanguisorba occidentalis</i>	Western Burnet	LLD	Montane Meadow/ Grassland
<i>Scutellaria bolanderi</i> ssp. <i>austromontana</i>	Southern Skullcap	1B	Riparian
<i>Streptanthus bernardinus</i>	Laguna Mountain Jewelflower	4	Mixed Conifer Forest (gabbro soil)
<i>Symphotrichum defoliatum</i> [ <i>Aster bernardinus</i> ]	San Bernardino Aster	1B	Montane Meadow/ Grassland, Mixed Conifer Forest
<i>Thermopsis californica</i> var. <i>semota</i>	Velvety False-lupine	1B, FSC	Pine-Oak Woodland, Montane Meadow/ Grassland

**CE** = State-listed Endangered

**CR** = State-listed Rare

**CT** = State-listed Threatened

**FSC** = Federal Species of Concern

**1B** = rare, threatened, or endangered in California and elsewhere (CNPS)

**2** = rare, threatened, or endangered in California, but more common elsewhere (CNPS)

**3** = plants that lack the necessary information to assign them to other lists (CNPS)

**4** = plants of limited distribution (CNPS)

**LLD** = Locally Limited Distribution species (Colorado Desert District)

**CNPS** = California Native Plant Society's Inventory of Rare and Endangered Plants. (7<sup>th</sup> Ed.) The online edition is published quarterly.

Note: Cuyamaca Raspberry (*Rubus glaucifolius*), [*R. g.* ssp. *ganderi* (Bailey) Beauchamp] is listed in Beauchamp, 1986. *R. g.* var. *ganderi* (L. Bailey) Munz, is mentioned, but not listed, in The Jepson Manual (1993), but it is listed in the CNPS Inventory 2001 as 1B 3-1-3, and in National Diversity Database as a Federal Species of Concern (FSC). If the variety *ganderi* is recognized in future taxonomic treatments, it will become an endemic species in San Diego County (Rebman and Simpson 2006).

## APPENDIX C – SENSITIVE AND RARE ANIMAL SPECIES WITHIN CUYAMACA RANCHO STATE PARK

Species	Listing Status	Habitat	Life History Notes
<b>Amphibians</b>			
Arroyo Toad, <i>Bufo microscaphus ssp californicus</i>	FE	Riparian woodland	Surface active, first rain-Jul (Nocturnal)
Large-blotched salamander, <i>Ensatina eschscholtzii ssp. Klauberi</i>	CSC	Woodland and forest; oaks logs and woody debris	Surface active Nov-Apr
<b>Fishes</b>			
Threespine stickleback, <i>Gasterosteus aculeatus willim soni</i>	FE	Aquatic	Introduced into Sweetwater River
<b>Reptiles</b>			
California legless lizard, <i>Anniella pulchra</i>	CSC	Chaparral, riparian woodland, oak woodland, pine-oak	Surface active nearly year-round
Red Diamond rattlesnake, <i>Crotalus ruber ssp. Rubber</i>	CSC	Chaparral, oak woodland	Surface active all year
Coronado skink, <i>Eumeces skittonianus ssp interparietalis</i>	CSC	Chaparral, oak woodland, pine-oak woodland	Surface active springs-early fall
San Diego Mountain King Snake, <i>Lampropeltis zonata ssp. Pulchra</i>	CSC	Pine-oak woodland, mixed conifer forest	Near-surface active mar-Nov
San Diego horned lizard, <i>Phrynosoma coronatum ssp blainvillei</i>	CSC	Chaparral, pine-oak woodland	Surface active Apr-Jul
Coast patch-nosed snake, <i>Salvadora hexalepsis ssp. Virgultea</i>	CSC	Chaparral	Surface active Mar-Oct
Two-striped garter snake, <i>Thamnophis hammondii</i>	CT	Riparian woodland	Surface active spring-early winter
<b>Birds</b>			
Bald eagle, <i>haliaeetus leucocephalus</i>	FE	Roosts	Winter visitor
Golden Eagle, <i>Aquila chrysaetos ssp. Canadensis</i>	CSC	Entire park, nests possible on cliffs and trees on steep slopes	Resident, no nests documented
Yellow-rumped warbler, <i>Dendroica coronata ssp. Auduboni</i>	Locally uncommon	Cuyamaca Peak	Summer resident, winter visitor
Dusky flycatcher, <i>Empidonax oberholseri</i>	Locally uncommon	Cuyamaca Peak	Rare summer resident & fall migrant
Southwestern willow flycatcher, <i>Empidonax traillii ssp Extimus</i>	FE, CE	Oak-woodland & Riparian, nests possible in thickets of <i>Salix sp.</i>	No recent records
Prairie Falcon, <i>Falco mexicanus</i>	CSC	Entire Park, nests possible on rocky cliffs and ledges	Resident
Green-tailed Towhee, <i>Pipilo</i>	Locally	Cuyamaca Peak	Summer resident

<i>chlorurus</i>	uncommon		
Purple Martin, <i>Progne subis</i> ssp. <i>Subis</i>	CSC	Mixed conifer forest, cavity nests in large diameter snags	Summer resident
Spotted Owl, <i>Strix occidentalis</i>	CSC	Mixed conifer forest	Resident, Status unknown after 2003 fire destroyed 95% of habitat
Fox Sparrow, <i>Zonotrichia iliaca</i>	Locally uncommon	Cuyamaca peak	Summer resident, winter visitor
<b>Mammals</b>			
Western Mastiff Bat, <i>Eumops perotis</i>	CSC	Mixed conifer forest, pine-oak woodland	Resident, nocturnal
<b>Insect</b>			
Laguna Mountain Skipper, <i>Pyrgus ruralis</i> ssp. <i>lagunae</i>	FE	Montane meadow, Hosts: <i>Horkelia clevelandii</i> and <i>Potentilla</i> sp	No records but host plant occurs in Park.

Data source: California Department of Fish and Game Natural Diversity Database.

#### APPENDIX D – STRUCTURE PROTECTION FIRE CODE

See PRC 4291 and Government Code 51182 for laws pertaining to fire protection around dwellings or structures. DPR adheres to these codes regarding park facilities at Cuyamaca.

#### APPENDIX E – DEVELOPED AREAS AND FACILITIES (SOUTH TO NORTH)

Residence # 1 (south)

Merigan Trailhead

Mack property (no facilities)

Res. # 1

Res. # 2

Green Valley (Res. # 3 & 4, campgrounds, restrooms, picnic area, amphitheater, ranger office, etc.)

Granite Springs Primitive Camp

Arroyo Seco Primitive Camp

Dyar House and area (House burned in 2003): new office/interpretive trailer, mounted assistance unit camp, corrals, nursery)

School Camp

La Cima Conservation Camp

Cuyamaca Peak (various facilities) and Peak Road

Paso Picacho (campgrounds, restrooms, picnic area, amphitheater, offices, maintenance shop, residence trailers, gas station)

Azalea Spring reservoir

Los Vaqueros Horse Camp

Res. # 9

Los Caballos Horse Camp (currently closed)

Camp Hual-Cu-Cuish (numerous buildings burned in 2003)

Milk Ranch Parking

Stonewall (restroom, reservoir, parking, interp. bldg., shop, mounted assistance unit  
group camp, foundation of burned residence)