

RESOURCE MANAGEMENT POLICIES

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT



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MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

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PREFACE

ABOUT THIS DOCUMENT

Document Purpose

This Resource Management Policies (RMPs) document defines the policies and practices used by the Midpeninsula Regional Open Space District (District) to protect and manage **resources** on District lands. The word resources as used in this document includes plants, animals, water, **soil**, terrain, geologic formations, **historic**, scenic, and cultural features. Recreational resources are described in other documents.¹

The purpose of the RMPs is to:

- ◆ Set the framework for the District's resource management program;
- ◆ Provide general guidance for issue-specific and site-specific planning;
- ◆ Provide staff and Board a tool for informed, consistent, and effective resource management decision making;
- ◆ Inform the public of the purpose and intent of the District's resource management program;
- ◆ Provide a basis for evaluating the District's progress in reaching its resource management objectives.

This document does not provide detailed plans for management of individual preserves or resources. Other more specific master plans, site plans, and resource management plans will supplement these policies to further refine and resolve the implementation strategies on a site-specific basis.

The suitability and scope of implementation of a specific RMP can only be effectively determined on a site-specific or issue-specific basis given the

¹ These documents include Use and Management Plans for individual preserves, Trail Use Guidelines and Mitigation Measures, Land Use Regulations and the Visitor's Guide to the Open Space Preserves.

circumstances and conditions to be addresses. The suitability or effectiveness of a RMP may depend on a number of factors. These may include evaluation of potential environmental impacts associated with the RMP, physical or other constraints, availability of funding, and feasibility of implementation. Therefore, the determination of whether and to what extent a RMP is implemented in whole or in part will be made on a site-or issue-specific basis. In some circumstances, deviations from an RMP will represent a more effective resource management approach given applicable factors.

In addition, carrying out and implementing RMPs will be achieved over time, and is subject to funding availability and competing District needs and overall feasibility. Competition for District funds requires balancing the expense of resource management with the cost of continued land acquisition, project planning, and the cost of access and facilities improvements.

Document Organization

The RMPs are organized into chapters by subject and resource category. The chapter format generally consists of a background section and a section containing goals, policies, and implementation measures. The background section provides rationale for the goal and policies that follow. The goal is phrased as a broad, general statement describing the desired state or condition to be achieved. The policies state what steps the District will take in order to attain that goal. Policies are numbered according to chapter with the first letter of each of the first two words of the Chapter title followed by a number (e.g. **VM-1** is **V**egetation **M**anagement Policy **1**).

Each policy includes one or more recommended implementation measures, highlighted by bullets (◆). Implementation measures specify action items the District will strive to carry out to apply the policies to the landscape where feasible. Implementation measures are referenced internally according to bullets. For instance, VM-1: Measure 2 refers to the second bulleted measure under VM-1. Informational sidebars identify current knowledge and practices regarding resource conservation. Key words are noted in **bold** and definitions for each can be found in the Glossary.

The District will apply the RMPs to every day District functions and operations from the planning of new trails and facilities to the evaluation of new

prospective land acquisitions, to routine Preserve maintenance. It will draw upon varied expertise to balance resource needs and public interests. The annual action plan will describe existing and proposed resource management plans and projects, and progress towards resource management goals.

Document Review and Amendment

The RMPs comprise a "living" document that will grow and change regularly, based on new experience and information. It will be reviewed and updated every five to ten years and chapters amended as needed to respond to ever-changing resource conditions (e.g. insect or disease outbreaks, large cataclysmic events, climate change etc.). The staff or Board may decide to amend the document for a significant single purpose at any time.

I. DISTRICT RESOURCE MANAGEMENT PROGRAM

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

Midpeninsula Regional Open Space District (District) is a public agency that owns and manages 26 **open space** preserves totaling over 59,000 acres of land (as of 2011). Created by a voter initiative in 1972, the District's mission statement is "To acquire and preserve a regional greenbelt of open space land in perpetuity; protect and **restore** the **natural** environment; and provide opportunities for ecologically sensitive public enjoyment and education."

District boundaries enclose an area of 227,900 acres in northern Santa Clara and southern San Mateo counties, and a small portion of Santa Cruz County. The District's Sphere of Influence, or the area within which the District is likely to expand, includes an additional 12,333 acres. Extending from Montara in the north to the Lexington Hills in the south, the District directly serves more than 25 communities having a combined population of over 700,000. Preserves vary in size from 59 acres (Stevens Creek Nature Study Area) to over 17,000 acres (Sierra Azul). Elevations range from sea level in the baylands preserves to 3,486 feet atop Mount Umunhum in the Sierra Azul Range.

The District manages land primarily to preserve a regional greenbelt of open space land. There are few improvements, other than parking areas, some rest rooms, and informational signs. Over 220 miles of public trails invite activities such as hiking, biking, jogging, horseback riding, dog walking, and picnicking limited only as required. The preserves are open to the public every day, free of charge. Because the preserves are "close to home," they serve as popular weekday and weekend recreational destinations.

District lands protect a variety of **habitats** rich in both numbers and variety of plants and animals. The District preserves tidal salt marshes in the east, home to the endangered clapper rail and salt marsh harvest mouse and

used by thousands of migratory birds. The heart of the District straddles the eastern and western flanks of the Santa Cruz Mountains. These lands are covered in a diverse mix of oak **woodland**, grassland, **chaparral**, coastal scrub, and both evergreen and **coniferous forests** that form an impressive scenic backdrop for the densely populated San Francisco Bay Area and Central California Coast. Creeks and streams that run through District lands provide refuge area for endangered coho salmon and threatened steelhead trout. The natural setting of District preserves provides a peaceful refuge for visitors seeking low intensity recreational opportunities away from the pressures of urban life.

PURPOSES OF OPEN SPACE

Open space consists of land and water areas that remain in a natural state and are minimally developed. Open space may include compatible agriculture uses. Open space preserves provide protection in the form of permanent sanctuaries for **native** wildlife and vegetation. These irreplaceable resources are rapidly disappearing as human presence and activity encroach into natural areas. Reasons to preserve open space that are discussed in the District's Master Plan include protecting scenic beauty, public health and safety, natural, cultural and agriculture resources; shaping urban growth; and providing low-intensity outdoor recreation opportunities and environmental education.

NEED FOR RESOURCE MANAGEMENT POLICIES

Resource management at the District includes management of both natural cultural and agricultural resources. Natural resource management generally consists of protecting, restoring, enhancing, and monitoring native vegetation and wildlife, and monitoring and protecting the quality of geo-

logical and hydrological conditions. Cultural resource management consists of identifying and evaluating and protecting archeological sites and **cultural landscapes**.

The District faces many issues, challenges, and choices in management of District land and sensitive resources. Land acquisition is politically, socially, and opportunistically driven, sometimes independent of resource needs. Defining, identifying and communicating resource needs and management objectives provides for more informed decision making, guides property acquisition, and results in better protection of land and sensitive natural and **cultural resources**.

The complex and constantly changing **ecosystems** of District preserves are comprised of a wide variety of interrelated components resources that sometimes have competing needs for preservation. Managers must be able to recognize, distinguish, and decide among competing priorities. Compounding these inherent challenges is the change in open space management needs over time: the amount of land managed by the District continues to grow; employees and board members who function as caretakers change; funding sources come and go; and the public's interests, values, and use patterns differ over both time and place; and visitation continues to increase which can place increased pressure upon natural systems. A well-defined set of policies is essential for the District to maintain consistent and effective resource management despite these changes.

The Basic Policy adopted March 10, 1999 directs the District to:

“follow management policies that ensure proper care of the land, that provide public access appropriate to the nature of the land, and that are consistent with ecological values and public safety.”

Although the Basic Policy implies a direction for managing the land, it does not offer specific guidance as to what constitutes “proper care.” These RMPs are intended to provide that guidance.

MISSION STATEMENT FOR RESOURCE MANAGEMENT

The resource management mission statement defines the purpose toward which the District directs its resource management efforts. The District's resource management program is one of stewardship not only intended to protect resources and to sustain them in perpetuity. The District calls its lands "preserves" rather than "parks," emphasizing the goal of resource preservation. The following overall mission statement reflects the District's commitment to resource management:

Resource Management Mission Statement

The District will protect and restore the diversity and integrity of its resources and ecological processes for their value to the environment and to people, and will provide for the use of the preserves consistent with resource protection.

Overall Resource Management Strategies

The following general strategies summarize how the District will achieve its resource management mission.

- | | |
|------------|---|
| Strategy 1 | Favor protection of resources when use significantly interferes with resource protection and preservation. |
| Strategy 2 | Provide an effective interdisciplinary program to protect and enhance natural and cultural resources. This program should include planning, interpretation , research, protection, maintenance, and monitoring practices. |
| Strategy 3 | Prevent or minimize human-caused and accelerated impacts, including erosion, invasion by non-native species, disruption of the natural flow of water, degradation of water quality , trampling of vegetation, and displacement of wildlife. |
| Strategy 4 | Protect and restore known rare, endangered, special status species and sensitive habitats , as well as seriously |

degraded or deteriorating areas. Give priority to sensitive habitats and consider the relative scarcity of the specific resources involved.

- Strategy 5 Manage open space as a composite resource, rather than as separate and isolated parts. Maintain ecological processes as well as individual species and features. Consider the regional context and cumulative impacts of resource management decisions. Favor long-term goals over short-term benefits.
- Strategy 6 Support low intensity recreational and agricultural use of District lands consistent with resource protection. Consider present and potential use.
- Strategy 7 Balance efforts to protect and restore resources with efforts to acquire and provide public access to lands.
- Strategy 8 Monitor changing conditions and the effectiveness of resource management practices.
- Strategy 9 Increase public knowledge, understanding, and appreciation of the natural and cultural resources of the preserves, and support for their conservation.

PLANNING AND IMPLEMENTATION

The RMPs are to be used to guide the overall planning, budgeting, and decision making processes for individual Preserves and for District-wide programs. Implementation of the policies will be through the Use and Management Plan and Master Plan for each Preserve. The District's Land Acquisition Policies shall reference the RMPs to help guide future land acquisitions. Successful implementation of the Policies will result in informed, consistent, and effective resource management.

II. VEGETATION MANAGEMENT

BACKGROUND

District Plant Communities

The District is located along the western edge of the North American continent on a geologically active peninsula between the Pacific Ocean and San Francisco Bay, which limits migration of plants and animals. This unique location is dominated by the Santa Cruz Mountains which are influenced by a Mediterranean climate comprised of mild wet winters and long hot and dry summers cooled by cyclical coastal fog. Because of this climate regime, the landscape is subject to periodic fire. The San Andreas Fault, one of the world's longest and most active faults, cuts through the eastern side of the Santa Cruz Mountains. Continuing movement along the fault and differing composition of the underlying rocks created many **soil** types and terrain features including steep, narrow canyons, rolling hills, and flat bay lands. The eastern edge of the District is heavily influenced by the urban areas of San Francisco, San Jose and other peninsula cities which result in **natural** lands that are often used as a large “urban backyard” rather than a pristine wilderness. These and other factors have shaped diverse and dynamic **native** plant communities that are precisely adapted to these complex and varied conditions.

A **plant community** is a group of plants growing in an interrelated manner on a particular site. Each community has characteristic dominant and associated species, spacing, and **habitat**.

Native plant communities in District preserves include the following general vegetation types:

- ◆ Salt marsh and brackish marsh
- ◆ Freshwater marsh
- ◆ Redwood **forest**
- ◆ Douglas fir forest
- ◆ Coastal scrub
- ◆ **Chaparral**
- ◆ Mixed evergreen forest
- ◆ **Riparian** forest

- ◆ Native grassland
- ◆ Oak **woodland**

The condition of vegetation affects other **resources** in the preserves. A mixture of natural plant communities gives scenic character to a landscape, and provides the diversity and stability needed to support native wildlife, clean water and reduce erosion. Loss or fragmentation of plant communities reduces their ability to provide the full range of ecological benefits, including maintenance of species diversity, soil and watershed protection, wildlife, and recreational and aesthetic values. It is the main reason why animal species have become endangered or threatened.

Alterations to Vegetation

Continuing effects of past and present land use practices, including **fire suppression**, grazing, logging, **non-native** plant invasion, feral animals, and uses which trample vegetation, threaten the District's native plant communities. Such activities have caused drastic and rapid changes in vegetation. In some areas the alteration is permanent.

Protection of Sensitive Species

A number of plants listed by either federal or State agencies or the California Native Plant Society as rare, threatened, endangered, and of limited distribution have been identified within or near District preserves. Site-specific information is needed for both existing and new properties to protect sensitive species.

Ecological Restoration

Ecological restoration is the process of returning land that has been degraded and disturbed into ecologically functioning habitat. The District often employs the principles of ecological restoration when performing **vegetation management**. Vegetation management is the maintenance, establishment, or **restoration** of target vegetation that meets a preserve's management objectives. The term **revegetation** is used to describe the process of replacing existing vegetation or bare ground on a site with ap-

Ecological restoration is an intentional activity initiated by the District that accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability. Frequently, ecosystems requiring restoration have been degraded, damaged, transformed, or destroyed by direct and indirect human actions.

appropriate plant species. Selecting effective vegetation management strategies requires understanding natural ecological processes at a specific site. It also may involve coordinating with neighbors, as part of the District's "good neighbor" policy. The District applies ecological restoration when it replaces landscaping with native vegetation, stabilizes slopes or restores degraded sites with natural drainage patterns.

Management measures may include actions such as eliminating or restricting activities that destroy vegetation, restoring grasslands and meadows that were formerly maintained by natural processes, conducting prescribed burns, managing **conservation grazing**, and either planting or removing vegetation.

Fire Suppression

Periodic fires were a part of natural ecological processes on lands which now make up the District preserves. As a result, many species evolved with fire adaptations and need periodic fire for renewal. Fire opens forests to new generations of younger trees, purges grassland of invasive shrubs, and stimulates seed germination and shoot growth in chaparral. Without fire, fire-adapted communities are eventually replaced by forest, and plant and animal species are lost. **Fuel** in unburned areas can build up to such a high level that when a wildfire occurs, it can have devastating effects.

Local Native Americans allowed natural fires to burn and also deliberately set fires to clear underbrush and create meadow areas attractive to deer and other animals. Open meadows improved visibility for hunting and encouraged the growth of acorn oaks and other edible plants. Subsequent implementation of fire suppression policies eliminated these benefits, reversing their positive environmental effects.

Impacts of **fire suppression** continue to reduce **biodiversity** in the preserves. Grasslands and oak woodlands are decreasing in area due to invading brush and forest species. **Stands** of coastal scrub and chaparral have aged and are not being renewed. Dense tangles of brush and young trees have largely replaced the park-like understory beneath redwood and Douglas fir forests and mature oak woodlands described by early European explorers.

High Use Areas

High use areas such as those around parking lots, visitor centers, restrooms, and specially surfaced or whole access trails, require more intensive vegetation management than natural areas that make up the bulk of District land.

VEGETATION MANAGEMENT GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal VM- Sustain and promote viable and diverse native plant communities characteristic of the region
--

Policy VM-1 Maintain the diversity of native plant communities. (See WR-7, ES-1, IS-2, and FM-6)

- ◆ Map and describe plant communities; analyze successional trends and formulate site-specific vegetation management goals as part of the Resource Management Plan for a preserve or geographic area.
- ◆ Identify appropriate areas for restoring lost or altered native plant communities and **restore** them to a natural condition. This is often best done by restoring natural processes and controlling invasive plants, rather than by planting.
- ◆ Manage native grassland sites to encourage reestablishment and perpetuation of California native grasses.
- ◆ Manage oak woodland to encourage reestablishment and perpetuation of California native oaks.
- ◆ Control invasive non-native plants. (See Section VI.)

Policy VM-2 Use native species occurring naturally on similar sites in ecological restoration projects.

- ◆ Use seed and cuttings collected from the same geographic area to revegetate or **enhance** degraded areas. One source of native seed is topsoil or mulch taken from adjacent intact habitat and applied thinly.

- ◆ Use fill, mulch, and seed mixtures that are as free as possible of non-native plants in ecological restoration projects. Know where such materials come from. (See GS-2 for possible exception.)
- ◆ Work with nurseries to grow native plants needed for ecological restoration projects.
- ◆ Avoid seeding with rye grass (unless sterile), "Zorro" fescue, Harding grass, or other non-native aggressive plants after fires to control erosion.
- ◆ Use plant material that is biologically and visually appropriate to the surrounding wild landscape and appropriate to the stage of plant community development at the site.
- ◆ Encourage District tenants to use native plants for landscaping to provide natural habitat.

Special status species are species that are state or federally listed as threatened, rare, endangered, species of special concern, candidate species, or those plant species listed by the California Native Plant Society's list 1B and 2.

Policy VM-3 Protect and enhance the habitats and **populations of special status** plant species.

- ◆ Identify the location and condition of special status plants and their habitats as part of the Resource Management Plan for a preserve or geographical area.
- ◆ Conduct surveys for special status plants during the appropriate season before significant site-specific development or any unusual anticipated increase in use. Modify the project or use to avoid impacting such plants.
- ◆ Protect areas with special status species from human activities and other negative impacts such as erosion. Examples of protective measures include trail rerouting, signs, and fencing. (See GS-2)

Policy VM-4 Manage forest diseases, when necessary, to protect native biological diversity and critical **ecosystem functions**.

- ◆ Develop a plan to detect, report, and monitor areas infested by high priority insects and diseases; utilize sanitation and **best management practices (BMPs)** to control the spread of infestations; train staff and educate the public; and support research to guide land management decisions.

- ◆ Prioritize research and management activities to slow the spread of Sudden Oak Death (SOD) and actively pursue partnerships with other public agencies to develop treatment alternatives.

*Sudden Oak Death (SOD) is a prevalent disease of particular concern within District forested lands. SOD has killed over one million native oak and tanoak trees and infests many other forest species in one Oregon and 14 coastal California counties. Hundreds of dead tanoak trees and other symptoms of the SOD pathogen, *Phytophthora ramorum*, are commonly seen on the District's preserves. There currently is no cure for SOD, and as with other extensive forest diseases, a strategy may take decades to develop. The District has adopted a ten-year plan to slow the spread of SOD, collaboratively study impacts on wildland ecology and recreation, and develop a restoration strategy for heavily infested forests.*

III. WILDLIFE MANAGEMENT

As pressures from the expanding human population increase, District preserves become more important as refuges for wildlife. The term **wildlife** as used here includes all animals, from the smallest invertebrates to the largest mammals. Without a sufficient amount of proper **habitat**, an animal cannot survive. As a result, most management of **native** wildlife involves management of habitat conditions and habitat impacts from visitor activities rather than hands-on management of the animals themselves. Protection of habitat is key to protection of wildlife.

BACKGROUND

Animal Habitat Characteristics

Habitat refers to the area where an organism occurs, its **natural** home or "neighborhood." An animal's habitat includes plant communities which provide the shelter, food, and water it needs to live and reproduce. Other aspects of the environment that affect an organism, such as geographic location, climate, and topography, are also part of its habitat.

Animals move from place to place and require a variety of land, both daily and seasonally. Some have precise habitat requirements; others are more flexible. Some species live their entire lives within one vegetation type. Others use several vegetation types in a single day or use different habitats at different stages of their lives. Some animals use one habitat for part of the year and migrate elsewhere for the rest. Ultimately it is important to preserve all these habitats to ensure continued wildlife diversity.

The habitats most important for wildlife are those which offer food, cover, topography, and other parameters essential to survival and reproduction. Examples include springs and seeps, nesting and breeding sites such as standing dead trees, movement and migration corridors, pathways to perennial streams, and foraging areas. Some of these habitats are considered **sensitive**, in that they are vulnerable to disturbance and do not recover easily once disturbed.

The Importance of Riparian, Pond, and Other Wetland Habitats

Certain habitats are intensively used by many kinds of wildlife. **Riparian** (streamside), pond, and other wetland habitat, with their wide variety of plants and readily available water, are perhaps the most important. These habitats provide a drinking source; dense, green foliage for cover and food; shade in which to rest and escape the heat; perennial or seasonal water bodies which are required for breeding by some amphibian and other wildlife species, and protected corridors through dry, open areas. Almost all species of wildlife depend on external sources of water and will often travel long distances to reach it. People are also attracted to water, especially ponds and riparian areas. Excessive human use can cause problems from trampling, **soil** compaction, destruction of vegetation, alteration of water quality and temperature, introduction of pathogens or foreign substances and species, and frequent disturbance of wildlife.

Predators Indicate Habitat Health

The presence of large predators is a strong indicator of a healthy habitat. Large predators are at the top of the food pyramid and depend on the availability of large numbers of smaller animals. The greenbelts of District and neighboring public lands in the Skyline and Sierra Azul areas are large and diverse enough to support such wide-ranging predators as black bear (although no resident black bears are present in the Santa Cruz Mountains presently), mountain lion, coyote, bobcat, fox, badgers, and numerous hawks and owls. The chance to see such animals is a big incentive for many people to visit the preserves.

Results of Habitat Fragmentation

In the last century, population growth, urban expansion, and construction of roads and highways have fragmented habitats and interrupted wildlife movement corridors. Fragmentation has four main consequences for wildlife:

- a. Isolated habitat **patches** may not be large enough to support wildlife that requires a certain size of habitat. Fragmentation may also destroy particular plant species that some animals require for food or cover.
- b. Wide-ranging animals such as the larger predators can be cut off from territories they need for feeding and breeding.
- c. **Non-native** species become more common, displacing natives and thereby also reducing **biodiversity**.
- d. Inbreeding increases when **populations** are cut off from neighboring **populations**. The resulting lack of diversity in the gene pool weakens the species through “inbreeding depression” and reduces the **population's** long-term chance of survival. A single environmental change or disease could then eliminate all members of the local **population**.

WILDLIFE MANAGEMENT GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal WM- Maintain and promote healthy and diverse native wildlife populations
--

Policy WM-1 Understand and maintain the diversity of native wildlife.
(See WR-6 and WR-7)

- ◆ Identify wildlife usage, movement patterns, and habitat features with high value to wildlife.
- ◆ Consider and avoid or minimize impacts on wildlife when planning trails and other facilities.
- ◆ Develop a wildlife data base to record wildlife sightings and guide management decisions.
- ◆ Non-native wildlife release on District lands shall adhere to the policies identified in the Integrated Pest Management chapter (See IPM).

- ◆ The District shall strive to control or remove non native wildlife using management actions identified in the Integrated Pest Management chapter (See IPM).
- ◆ Native wildlife shall not be released onto District land if it is adapted to urban conditions or interaction with human.
- ◆ Native wildlife can be released onto District preserves if the animal has been rehabilitated by an animal rescue center specializing in wildlife, it is disease-free, suitable unoccupied habitat is available, and there is a high likelihood for the animal to adapt and survive in its new surroundings without adversely affecting existing resources at the site. The rehabilitated animal should be marked or banded, if feasible, to allow monitoring of its adaptation.

*Examples of wildlife using human-made structures on District lands include the Red barn at La Honda Creek Open Space Preserve which is used by both the Townsend's big-eared bat (*Plecotus townsendii*) and Pallid bat (*Antrozous pallidus*).*

Policy WM-2 Protect, maintain and **enhance** habitat features that have particular value to native wildlife. (See HC-2: Measure 5, WR-6 and WR-7)

- ◆ Inventory critical and sensitive wildlife habitats and develop management strategies for their protection.
- ◆ Leave brush piles, **snags**, and fallen trees in areas where they do not pose a fire hazard or visual blight, to provide cover and nesting sites for animals, and nursery conditions for forest seedlings.
- ◆ Evaluate the wildlife habitat value associated with human-made structures before altering or removing them and avoid or mitigate any impacts.
- ◆ Repair, modify, and maintain stock ponds as wildlife watering sources and habitat for aquatic and semi aquatic organisms (See WR-3).

Wildlife movement and safe passage is affected at a regional level by large-scale transportation needs and development including housing, roadways, and commercial development. The District works with Preserve neighbors, municipalities, counties, and regional planning organizations to improve new development projects through the use of wildlife friendly fencing, clustering new development away from sensitive areas, and providing refuge areas for wildlife.

Policy WM-3 Protect animal **populations** against the impact of human actions. (See HC-2: Measure 5)

- ◆ Discourage human intrusion into sensitive wildlife habitats by appropriate placement of facilities and trails.
- ◆ Identify and eliminate **barriers** (e.g. remove unnecessary fences, old barbed wire, and other barriers) and provide safe crossings (e.g. protect established wildlife crossings and use wildlife friendly fencing) to

enhance wildlife movement on a regional basis. (See HC-3, HC-4, and GM-2: Measure 1)

- ◆ Consult with responsible wildlife agencies to conserve special status species or to control problem wildlife when human life, property, or other significant natural resources are threatened.
- ◆ Reduce conflicts between wildlife and humans through notification and education, control of human access and, as a last resort, control of wildlife presence or movement.
- ◆ Prohibit hunting or trapping in District preserves except as a management tool or for scientific or educational purposes.
- ◆ Fishing is allowed only in areas declared by the District to be permitted fishing areas, where state laws regulate the taking of game fish.
- ◆ Review and update criteria for designating temporary (e.g., day-use) access areas for domestic animals into District preserves. Incorporate the criteria into District regulations.

Policy WM-4 Protect and enhance the habitats and **populations of special status** animal species.

- ◆ Conduct surveys of special status animals in affected areas before initiating significant development or any substantial increase in use. Give priority to protection of special status species.

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IV. INTEGRATED PEST MANAGEMENT

BACKGROUND

Integrated Pest Management

Pesticide is a broad term that includes any material (natural, organic, or synthetic) used to control or prevent pests including herbicides (weed or plant killers), insecticides (insect killers), and rodenticides (rodent killers) as a few examples.

Integrated pest management (IPM) is a process for efficiently managing **pests** while protecting human health and environmental quality. IPM is a long-term, science-based, decision-making system that uses a specific methodology to manage damage from **target pests**. IPM requires monitoring site conditions before, during, and after treatment to determine if objectives are being met and if methods need to be revised. IPM requires that non-chemical methods be considered in addition to chemical methods (i.e., **pesticides**, herbicides, insecticides). If chemical methods are necessary to meet a pest control objective, the potential for harm to the public and workers are carefully considered, as are effects on the environment and **non-target organisms**, and then the least toxic and most effective, efficient, and target-specific method is chosen.

The Problem with Invasive Species

Invasive species can alter ecosystem processes by changing biotic ecosystem characteristics (such as plant community composition, structure, and interactions; trophic relationships; and genetic integrity) and abiotic characteristics and processes (such as fire regimes, erosion, sedimentation, hydrological regimes, nutrient and mineral conditions, and light availability).

Invasive species are animal or plant species that invade and dominate sufficiently large areas causing a reduction in **biodiversity**. They proliferate in the absence of natural control and interfere with the natural processes that would otherwise occur on **wildlands**. Once established, invasive species can become difficult to manage and they can eliminate native species or otherwise alter the **ecosystem**. This chapter addresses the management of invasive species in order to protect the native species and natural processes of the preserves.

Invasive Plants

Invasive plants have greatly altered many of California's natural plant communities. Because they originated elsewhere, many invasive plants are not susceptible to **predation** or diseases of this region. They are extremely adaptable and can thrive in a wide range of conditions. They can grow quickly, reproduce early, produce many long-lasting seeds, and tolerate disturbance. They reduce native biodiversity by gradually crowding out or competing with native plants for water and sun, and by reducing or modifying wildlife **habitat**.

Invasive Animals

Ranking second to loss of habitat resulting from human intrusion, invasive animals pose another threat to native wildlife. Escaped domestic animals and other non-native wildlife species can thrive in the favorable climate of the San Francisco peninsula. Once established in a preserve, they compete for valuable **resources** and disturb the sensitive balance of natural **food webs**. Bullfrogs and wild pigs are examples of invasive introduced animals found in District preserves that physically displace or predate upon native plants and wildlife.

Programs to manage pests require long-term commitment. With many invasive plant and animal species, short-term lapses in management activity may negate years of expensive control programs.

Wild (feral) pigs are an example of an invasive wildlife species with obvious impact on District lands. They have been widespread in the central coast of California since about 1970, reproduce rapidly, dig up meadows and wetlands, and carry diseases that can affect people and livestock. They eat acorns, bulbs, and soil animals, and are difficult to control. Feral pigs were abundant in the South Skyline region in the 1990s. The District has been trapping feral pigs since 2000 and has substantially reduced their population and damage from their rooting.

INTEGRATED PEST MANAGEMENT GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal IPM- Control pests by consistent implementation of IPM principles to protect and restore the natural environment and provide for human safety and enjoyment while visiting and working on District lands.

Best management practices for preventing the introduction of invasive species include cleaning equipment before leaving a weedy site, and using seed, plant, forage, fill, erosion-control and other materials that are free of weed seeds.

The California Invasive Plant Council maintains an Invasive Plant Inventory that rates the threat of non-native plant species by evaluating their ecological impacts, invasive potential and ecological distribution. Along with local knowledge, the District uses this list to evaluate the invasive risk of existing and new non-native plants found on District preserves.

Policy IPM-1 Develop specific pest management strategies and priorities that address each of the five work categories.

- ◆ Manage pests in buildings to support existing uses, while also protecting human health and surrounding natural resources.
- ◆ Manage pests and potential human interactions in recreational facilities to minimize conflict, ensure visitor safety and enjoyment, and protect the surrounding natural resources.
- ◆ Manage pests in fuel management areas to reduce risk to human life and property, while also protecting natural resources.
- ◆ Manage pests in rangelands and on agricultural properties to support existing uses, while also protecting human health and surrounding natural resources.
- ◆ Manage invasive species in natural areas and set priorities for their control based on the potential risk to sensitive native species and loss of native biodiversity.

Policy IPM-2 Take appropriate actions to prevent the introduction of new pest species to District preserves, especially new invasive plants in natural areas, rangelands, and agricultural properties.

Policy IPM-3 Manage pests using the procedures outlined in the following eight implementation measures.

- ◆ Develop and implement tolerance levels for pests within each of the Work Categories to determine when to undertake pest control.
- ◆ Identify the pest, determine its life cycle and disruptive potential, and identify relevant site conditions prior to implementing a pest control activity. Review pest control objectives for consistency with other site goals and establish tolerance levels that must be exceeded before pest control is undertaken.
- ◆ Choose site-specific strategies and times of treatment that provide the best combination of protecting preserve resources, human health, and non-target organisms and that are efficient and cost effective in controlling the target pest. Whenever feasible, direct the control method narrowly at vulnerable points in the target organism's life cycle to avoid broad impacts.
- ◆ Monitor results and modify control methods over time as site conditions and treatment techniques change and as needed to obtain an effective level of control.
- ◆ Use the least harmful method(s) to control identified pests. Where the use of pesticides is necessary, apply according to the label using all safety precautions and take all measures needed to protect the environment, the health and safety of visitors, employees, neighbors, and the surrounding natural areas including water and soil resources.
- ◆ Plan for repeat treatments as indicated by the pest's regenerative capabilities.
- ◆ Coordinate and cooperate with adjacent landowners, neighbors, and other responsible agencies to control pests and limit secondary effects.
- ◆ If eradication of a pest from a distinct location is not feasible, apply measures to achieve containment, sustained control, slow down a pest's rate of spread, or minimize pest damage.

Prior to the approval of the use of any new biological control agent, the US and California Departments of Agriculture conduct years of laboratory and field studies to assess the candidate's host specificity and its potential impact on target and nontarget species and environmental safety.

The District coordinates with the San Mateo County and Santa Clara County Weed Management Areas, the California Invasive Plant Council, the California Department of Fish and Game, the California Department of Food and Agriculture, County Agricultural Departments, and the Cooperative Extension Service to stay informed on invasive plants and animals, IPM techniques, and pesticide regulations.

Policy IPM-4 Monitor pest occurrences and results of control actions and use adaptive management to improve results.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
INTEGRATED PEST MANAGEMENT

Policy IPM-5 Develop and implement an IPM Guidance Manual to standardize pest management and IPM procedures across all District Lands.

V. WATER RESOURCES

BACKGROUND

Water is essential to life on earth and is also one of the most important forces shaping **habitats** and **biodiversity**. District **open space** lands contain a variety of water **resources** that include such diverse habitats as freshwater **wetlands** (including ponds and seasonal wetlands) and **watercourses**, salt water tidal wetlands within San Francisco Bay, and groundwater resources such as springs, seeps, and underground aquifers. These water resources have **natural**, scenic, recreational, scientific, and educational values. In general, this policy will discuss **waters** (sag ponds, artificial impoundments, lakes, and aquifers), watercourses (such as streams and creeks), and wetlands. These terms are discussed further below.

“Waters” is a term that is broadly used to describe all aquatic systems. This policy defines “waters” as areas of standing water, both seasonal and permanent, such as lakes and ponds, as well as underground aquifers. “Watercourse” is a generic term used to define any land feature that conveys concentrated water flow, regardless of whether the water flow is ephemeral, intermittent, or perennial. “Wetlands” are distinguished by the presence of water, either at the surface or within the root zone. Wetlands have unique **soil** conditions that differ from adjacent uplands and support vegetation adapted to wet conditions. Wetlands provide critical ecological functions and habitat for a variety of fish, wildlife, and plant species

Wetlands are lands that are transitional between terrestrial and aquatic systems. The water table is usually at or near the surface, or land is covered by shallow water. Some functions of wetlands include the following: provide habitat for fish and aquatic wildlife, offer foraging habitat or water for terrestrial wildlife and birds, absorb flood waters, reduce erosion, recharge aquifers, cleanse pollutants, provide aesthetic values, support unique plant associations, and provide habitat for many rare species of plants and wildlife. In California, wetlands of all types have been greatly reduced in area from their historic extent and are being rapidly lost or adversely impacted.

Watersheds Within the District

District Preserves are located within 22 major **watersheds** extending from the Pacific Ocean in San Mateo County to the baylands in San Mateo and Santa Clara Counties. Watersheds are land or “basins” within which all precipitation within a given watershed drains to a single body of water, often a creek or stream. Many of the District’s lands are located within the headwaters or uppermost sections of these watersheds.

Most preserve watersheds contain steep ridges and deep canyons typical of the Santa Cruz Mountains. Rainfall occurs mostly between November and April with seasonal rainfall totals varying greatly within the District. The greatest rainfall quantities occur along the west facing slopes near the summit of the mountain range where totals can reach 40 to 50 inches per year, however, averages around 20 to 30 inches per year are more typical. In the Santa Cruz Mountains, fog accounts for approximately 10-20 inches of this precipitation, much of which is delivered in the dry summer months. Many smaller creeks and streams are intermittent, reflecting this seasonal distribution of rainfall. Winter flows are higher, especially during and immediately following storms.

The Influence of Water Movement

Water flows in predictable patterns on the surface, through rocks beneath the soil, and in underground water tables. Plants and animals are adapted to specific movement patterns of water, sediment, and nutrients occurring in their area. A significant change in any of these factors may reduce or eliminate original species in favor of those better able to survive in the new conditions. Maintaining and restoring hydrologic patterns is important in maintaining healthy **ecosystems**.

The condition of soil and vegetation influences the rate at which water moves as well as its quality and quantity. Leaf litter acts as mulch that helps absorb and conserve rainwater. Maintaining a continuous cover of live and decomposing vegetation residue is the most successful long-term approach to controlling erosion and maintaining **water quality** and quantity.

Water Management Within The District

As rain falls on District Preserves, it is captured and transported through the ecosystem. These processes create high-quality water for the environment and people. District Preserves also support groundwater recharge that helps sustain summer and fall water availability and mitigate the impact of drought.

The District is also dependent on water to fulfill its mission. District field offices require water for employees, equipment maintenance, dust control, and fire suppression. The District manages residential properties that are often located in areas without municipal supplies, thus relying on locally, naturally occurring water sources. **Conservation grazing** operations that manage grass-lands for multiple benefits require water in remote areas. Irrigation supports farming that provides local food.

The District manages ponds that support aquatic and terrestrial wildlife. In the semi-arid region of the Santa Cruz Mountains, restoration of stream and **aquatic ecosystems** is a priority for managing ecosystems.

The District relies on a variety of water sources. **Springs** are captured and developed to provide water to people and **livestock** with the goal of allowing wildlife access to the spring water. Wells capture deeper groundwater sources and require energy to pump the water to the surface. Streamflow can be captured by small impoundments or pumps and diverted to the place it is needed. These waters are often stored to provide water during the dry seasons in tanks or ponds

Water Resource Issues

Wetlands and watercourses on the District's open space lands provide valuable and increasingly scarce habitat for a variety of **native** plant and animal species as well as many **special status** species. Where aquatic habitat is not directly present on District lands, runoff from District lands supports habitats downstream, a connection that should be recognized and preserved. Issues associated with the management of water resources and water quality include erosion and sedimentation, excessive diversion of water for consumptive use, severe erosion following **wildland** fires, agricultural runoff, **pesticides** and fertilizers, septic system

Groundwater is water that is held underground in soil or pores and crevices in bedrock

Surface water is found in streams, rivers, ponds, and lakes.

Springs are a type of groundwater that surfaces at a point on the land.

Consumptive use is the amount of water that is used by people, livestock, or crops that is unavailable to the environment after use.

wastewater disposal, stormwater runoff, flooding, drought, climate change, associated sea level rise, and chemical **contamination** from neighboring areas or from former use of preserve lands.

WATER RESOURCES GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal WR- Protect and restore natural water courses, wetlands and hydrologic processes
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Policy WR-1 Protect surface and ground water from contamination.

Contamination is man-made waste that has polluted the environment making it unfit or unsafe. Examples on District lands include deteriorated septic systems, underground storage tanks, leaking transformers, and trash and debris.

- ◆ Inventory existing facilities and uses that affect watercourses, **riparian** areas, and wetlands, and prepare plans for protection or **restoration**, as appropriate.
- ◆ Research and pursue cleanup of likely sources of pollution, such as buried fuel tanks, improperly dumped or stored material, and faulty waste or drainage systems.
- ◆ Utilize self-contained sanitary facilities or place rest rooms where they cannot contaminate water sources.
- ◆ Control activities having a high potential for pollution.
- ◆ Properly decommission abandoned septic systems and avoid water quality impacts when constructing new septic systems. Manage active and abandoned wells to avoid groundwater contamination
- ◆ Regulate the type and intensity of human activity on District lands to protect water quality.
- ◆ Review and comment on offsite land use and water management projects and policies that affect District water resources. Recommend and support measures to maintain natural water quality, channel flow, and sedimentation rates on District lands.

Policy WR-2 Restore, maintain or **enhance** water quality on District lands.

- ◆ Manage vegetation to improve watershed productivity and water quality.
- ◆ Manage agricultural leases and easements to maximize the protection and **enhancement** of riparian areas and water quality.
- ◆ Monitor sediment delivery and transport on District preserves located within watersheds identified as impaired by sediment or supportive of special status animals requiring aquatic habitat.
- ◆ Coordinate with agencies and organizations to establish volunteer-based monitoring programs. Participate in regional watershed management activities.

Policy WR-3 Restore Hydrologic Processes.

- ◆ Incorporate **best management practices (BMPs)** and develop storm-water pollution prevention plans (SWPPP) when required at staging areas.
- ◆ Inventory and assess roads and trails on District lands to identify significant erosion and sediment sources. Prioritize maintenance and road/trail management based on most severe erosion and sediment delivery sites.
- ◆ Manage human activities to control erosion--for example, abandon and where feasible **restore** to a natural condition poorly designed or sited roads to a natural condition, close certain trails to bicycle and equestrian use during the wet season, re-route existing trails to minimize erosion and sediment delivery.
- ◆ Restore hydrologic processes altered by past land uses by 'slowing water, spreading it, and sinking it' through installing erosion control materials and structures, removing culverts and drainage diversions where appropriate, and using improved drainage structures that minimize alteration of hydrology.
- ◆ Minimize soil disturbance during all construction projects.
- ◆ Locate new trails to minimize potential water pollution and stream bank erosion and sediment delivery.

Restoration and enhancement are terms that are sometimes used interchangeably when discussing habitat improvement projects. Restoration refers to the process of returning land that has been degraded and disturbed into functional habitat. Enhancement refers to the process of altering a habitat to provide specific ecosystem functions that may be missing; typically to provide habitat for endangered species.

Many of the District's properties contain legacy logging and ranching roads that were not designed or constructed for year-round use. These road systems can greatly alter the flow of water across the land, causing erosion and sediment problems due to concentrated runoff from winter rains.

- ◆ Construct trails, roads, staging areas, and buildings so that streams are not permanently diverted nor interrupted, and runoff is not concentrated. Minimize creation of impermeable surfaces.
- ◆ Identify and mitigate significant impacts of altered water flow on plants and animals, including aquatic organisms.

Policy WR-4 Manage Water Consumption to Balance Operational and Environmental Needs.

Two types of surface water use are recognized under California law: appropriative rights and riparian rights.

Appropriative rights require a permit from the State Water Resources Control Board, which grants the right to use water on parcels not adjacent to the watercourse or to store water.

Riparian rights are the rights of any owner of a parcel immediately adjacent to a watercourse to use water.

- ◆ Phase in installation of water meters or other measures to monitor annual consumptive water use.
- ◆ Develop and regularly update BMPs for efficient water use in offices, field operations, residences, **conservation grazing**, and farming.
- ◆ Evaluate and consider the environmental and operational benefits and tradeoffs of each water source for new projects.
- ◆ Evaluate and consider the construction and operational costs of each water source.
- ◆ Balance operational and consumptive use needs with the goal of maintaining healthy ecological functions.
- ◆ Provide technical assistance to lessees of District lands and owners of lands on which the District has an agricultural easement to secure water rights for the continuation or establishment of viable agriculture consistent with the protection of sensitive habitats (see Coastal Service Plan PA.2).

Policy WR-5 Determine and maintain District water rights and utilization.

- ◆ Identify existing uses of surface water on newly acquired open space lands, as part of the purchase process. Protect appropriative and riparian water rights for appropriate and beneficial existing or possible future uses.
- ◆ Secure water rights for the continuation or establishment of viable agriculture and **conservation grazing** on District land consistent with protection of sensitive habitats.

Policy WR-6 Preserve and enhance fisheries habitats. (See WM policies).

- ◆ Inventory and assess stream reaches accessible to **anadromous** fish to identify impediments to fish passage and opportunities for habitat enhancement.
- ◆ Remove artificial **barriers** to fish passage where removal will enhance spawning and rearing habitats.
- ◆ Enhance spawning and rearing habitats for native fisheries through restoration. Prioritize restoration and enhancement of areas providing habitat to sensitive species.
- ◆ Monitor sensitive fish species **populations** in District waters.
- ◆ Monitor water quality and condition of high priority aquatic habitats associated with District projects containing spawning, breeding, rearing habitat for special status fish, reptile, amphibian, or other aquatic species.
- ◆ Evaluate and consider the environmental benefits and construction/operational costs of off-stream storage facilities to minimize stream diversion and/or allow for the release of water into natural waterways during low flow seasons and implement accordingly.
- ◆ Avoid new direct stream diversion for consumptive uses where economically feasible alternative water sources exist, or the diversion captures the majority of flows, or the aquatic habitat would be substantially impaired. Explore alternate sources for existing in stream diversions.

Policy WR-7 Preserve and enhance ponds and other wetland habitats. (See VM-1 and WM policies).

- ◆ Maintain ponds or other water bodies as wildlife watering sources as appropriate (See WM-2).
- ◆ Inventory and assess ponds and wetlands to identify opportunities for habitat maintenance and enhancement.
- ◆ Monitor sensitive reptile, amphibian, and aquatic organism **populations** dependent on District wetlands.

Few of the ponds in the Santa Cruz Mountains are naturally occurring features. The majority of ponds were created as artificial impoundments that require ongoing management to maintain. Regardless of their origin, ponds provide wildlife access to a scarce resource (water) and greatly increase the diversity of species inhabiting the District's lands.

- ◆ Preserve ponds through maintenance of artificial impoundment structures where ponds provide habitat for sensitive and other wildlife species.

Policy WR-8 Develop seasonal and multi-year drought management strategies for District lands.

- ◆ Evaluate and develop where appropriate wells and springs to create resilient water supplies.
- ◆ Identify and curtail diversions that strain naturally limited water sources, especially those that significantly impact special status species.
- ◆ Evaluate and implement where appropriate additional water storage infrastructure to store water when it is naturally abundant for later use during dry seasons.
- ◆ Evaluate and alter as appropriate water-intensive land management practices during drought conditions to reduce overall District-wide water consumption.

VI. GEOLOGY AND SOILS

BACKGROUND

District lands include a diverse set of dynamic geological **resources characterized by steep slopes**, earthquake faults, landslides, unstable and erosive **soils**, and attractive but fragile rock formations. **Open space** is an appropriate designation for such areas.

Soil – A Valuable and Fragile Resource

Soil is the essential surface layer that predominates in the District Preserves. Soil provides the rooting medium for plants and supplies most of the nutrients they require, whether native or cultivated. As plant communities mature, plant roots, surface debris, and animal remains break down and are incorporated into the soil. Over time, this organic material builds up soil structure and fertility. If depleted or lost, soil takes a long time to regenerate- often longer than a single human generation. This surface layer of the land is readily accessible and easy to disturb and therefore requires the most protection by land managers.

Factors Contributing to Soil Loss

In some areas, District soil erosion has been accelerated by loss of plant cover, disruption of **natural** drainage patterns, landslide activity and/or some types of recreational uses. Some of these are naturally occurring causes, some are natural causes accelerated by human activity. By far the largest amount of soil erosion on District lands is human-caused. Poor placement of roads or trails, shortcutting of trails, poor design, construction or placement of drainage systems, excessive grazing pressure or past cultivation practices, and development of facilities can accelerate natural erosion. These activities can destroy protective plant and mulch cover, exposing soil to wind and water or diverting water from natural drainages. Recovery of soils from such disturbances is slow. Monitoring, preventing, and, where necessary, remedying human-caused erosion are all important parts of the District's **resource management** responsibilities.

GEOLOGY AND SOILS GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal GS- Avoid or minimize soil loss and prevent or remediate contamination related to human land use, and protect unique or exceptional geologic features

Policy GS-1 Locate and construct facilities to avoid high-risk areas subject to landslides, liquefaction, faulting, flooding and erosion.

- ◆ Minimize construction of major improvements (examples: buildings, roads, pipelines, and septic tanks) in landslide-prone areas, active fault zones, flood zones, and highly erodible areas.
- ◆ Design trails with respect to natural topography to maintain or **restore** natural drainage patterns as much as possible. Design roads, trails and facilities to minimize disturbance to vegetation and soil.
- ◆ Review available geohazard data for proposed facilities and infrastructure, where **geologic hazards** may be present.

Policy GS-2 Minimize unnatural soil erosion and sedimentation. (See VM-3: Measure 3)

- ◆ Monitor soil erosion and slope failure and identify areas where these processes are accelerated and causing resource damage. Utilize existing information (soil maps, geologic reports etc.) to avoid construction in problem areas and to identify areas with conditions that may impact existing infrastructure.
- ◆ Reduce human-caused erosion by identifying, limiting or eliminating the causative activity, properly locating or relocating facilities, installing drainage or erosion control measures, or revegetating the area. Construct roads and trails to maintain natural drainage patterns.
- ◆ Reconstruct or stabilize and abandon roads and trails that display or have the potential for ongoing erosion problems.
- ◆ Limit agricultural activities, facility development, and trail construction in riparian and other wetland areas to protect them from disturbance.

- ◆ Minimize soil disturbance associated with construction and maintenance operations.
- ◆ Seed to rehabilitate disturbed ground and lessen erosion. Time seeding projects to ensure adequate soil moisture for seed germination. Utilize mulch or other appropriate groundcover to reduce erosion where sediment can be delivered to a **watercourse** or wetland.
- ◆ Utilize **native** plants when possible for projects requiring **revegetation** for long-term erosion control. **Non-native** sterile grass seed may be used to quickly establish ground cover and reduce erosion. In areas of active **livestock conservation grazing**, incorporation of non-invasive pasture grasses may be utilized.
- ◆ Prevent, to the extent possible, the physical removal of naturally occurring soil.

Policy GS-3 Protect unique or exceptional geologic features from human damage.

- ◆ Identify locations and document the condition of unique or exceptional geologic features (example: tafoni sandstone formations, serpentine outcrops, sag ponds).
- ◆ Monitor such features to determine if action is needed to prevent or stop damage.
- ◆ Control access to features requiring protection by informing visitors, placing signs and **barriers**, and enforcing restrictions.
- ◆ Develop security protocols to limit availability and distribution of geographic information for geology and soil resources to protect sites from accidental destruction, looting, and vandalism.

Policy GS-4 Prevent or remediate contaminated soils

- ◆ Prevent the release of hazardous materials into the environment associated with District operations by implementing and following Best Management Practices (BMPs) for spill prevention.
- ◆ Investigate areas where soil contamination may have occurred due to previous land use including: disposal sites, mining areas, or leaks from storage tanks.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
GEOLOGY AND SOILS

- ◆ Remediate areas where contaminants pose a threat to human and ecological health through implementation of recommended treatment options including biodegradation, safe removal of contaminated soils, capping of soils, or other methods as recommended by a remediation professional.
- ◆ Adhere to requirements outlined in soil management plans approved for the preserves.

VII. SCENIC AND AESTHETIC RESOURCES

BACKGROUND

The District recognizes the protection of scenic values as one of the primary benefits of **open space**. The scenic and aesthetic **resources** of District lands provide physical and psychological relief from the stresses and uniformity of urban life. They also contribute to our "sense of place" - our appreciation of the qualities that set this area apart from others and make it feel like home.

District preserves include a variety of **natural** settings and landscapes that form magnificent scenic backdrops to the urbanized peninsula. Local residents and visitors particularly appreciate the interplay of color, pattern, form, and light on the coastal mountains, where rugged topography, hot sun, wind, and fog combine to create dramatic and appealing contrasts in vegetation.

In some cases, preserving a significant scenic or **historic** landscape may involve managing it to actually *prevent* natural succession, for example, without intervention; a shallow pond may gradually fill in and become a meadow or open grassland. Active management through vegetation maintenance or pond deepening not only promotes the scenic and aesthetic value of a wetland setting, but may also be more beneficial to wildlife. However in most instances, restoring or mimicking natural processes can help maintain the appealing visual and biological diversity of **native** communities.

SCENIC AND AESTHETIC RESOURCES GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal SA- Preserve lands with natural appearance, diversity, and minimal evidence of human impacts
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District development consists of facilities such as trails, restrooms, parking lots, fencing, offices, and residences. District facilities are designed to blend into the natural surroundings and are located within or adjacent to previously disturbed areas such as placing parking lots along existing roadways, or improving, remodeling, or placing new structures in previously developed areas.

Policy SA-1 Minimize evidence of human impacts within preserves.

- ◆ Clarify and document appropriate standards for designing and locating trails, parking areas, and buildings.
- ◆ Locate trails to minimize their visibility from a distance.
- ◆ Where feasible, locate telecommunication towers, power lines, water towers, firebreaks, and other infrastructure along margins of roads, next to existing structures or where vegetation and terrain help ease undesirable visual and environmental impacts. Install utility lines underground, if practical.
- ◆ Cluster new facilities near existing development, where possible.
- ◆ Design facilities such as structures, bridges, fencing, benches, and barriers to harmonize with natural landscape features, colors, and materials.
- ◆ Cluster, reduce, and place signs to lessen their visual impact.
- ◆ Rehabilitate areas degraded by human use by restricting access or type(s) of use, rerouting trails and roads, removing unsightly human-made features and **non-native** plants, restoring natural contours, and revegetating with native plants.

Policy SA-2 Maintain significant landscapes or features that were formerly maintained by natural processes.

- ◆ Control encroaching vegetation where it adversely affects significant scenic, historic or **habitat** resources (See **Vegetation Management**, **Cultural Resources**, and **Integrated Pest Management** policies).

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
SCENIC AND AESTHETIC RESOURCES

- ◆ Control vegetation to create or maintain important scenic viewpoints and vistas (See Vegetation Management and Integrated Pest Management policies).
- ◆ Require District tenants to maintain landscapes and improvements to acceptable visual standards that do not detract from a visitor's experience or adversely impact wildlife.

Policy SA-3 Minimize unnatural noise within preserves

- ◆ Prevent or reduce unnatural sounds that adversely impact preserves resources or a visitors' enjoyment of them.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANGEMENT POLICY DOCUMENT
SCENIC AND AESTHETIC RESOURCES

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VIII. CULTURAL RESOURCE MANAGEMENT

BACKGROUND

Cultural Resources at the District

The San Francisco Peninsula has had a rich and diverse history, including settlement by **Native** American groups; the Spanish (1776-1821) and Mexican Republican (1821-1848) colonization of the region; the annexation of California by the United States in 1848; and subsequent industrial, agricultural, and residential development. There are remains from each of these periods on District lands, including Native American village sites and bedrock mortars, barns and other ranching features, orchards, wineries, **historic** homes, sawmills, mines, historic roads and trails, and outdoor recreational sites. As time passes, more recent periods of California's history become **historically significant**. As such, some 20th century sites such as World War II and Cold War military sites are now considered historically significant **resources** throughout California. Collectively, these sites, structures, features, and **artifacts** comprise the **cultural resources** of the District.

The District was founded to preserve a regional greenbelt of **open space** land on the San Francisco Peninsula from the rapid suburban development that accelerated in the post-World War II boom in the Bay Area. Although the District's mission is to protect the greenbelt for open space values, **natural** resource protection, and ecologically sensitive recreation, this mission compliments cultural resource preservation goals. The development pressures from which the District protects open space land also threaten its associated **historic** and **prehistoric** structures, cultural landscapes, and **archaeological sites**. The preservation of open space land in the peninsula's greenbelt provides the opportunity for the District to protect and interpret the rural history of the Santa Cruz Mountains and San Francisco Bay for the benefit of present visitors and future generations.

Native American groups, such as the Ohlone, have lived on the San Francisco Peninsula for thousands of years. Bedrock mortars and other artifacts from their habitation and use of the landscape can be seen on District lands today.

During the Spanish Colonial and Mexican Republican periods, the San Francisco peninsula was divided into large ranching tracts. District preserves, including Rancho San Antonio, the Rancho de Guadalupe area of Sierra Azul, and La Honda Creek (formerly Rancho San Gregorio), were part of these large land grants.

In the second half of the 19th century, District forests were used for timber harvesting, residences, and outdoor recreation. Grasslands were developed for ranching and agriculture, including vineyards and orchards. Historic roads, such as Old Page Mill Road, connected communities and industries in the growing region.

Examples of completed historic preservation projects on District lands include the Woodhills Home at Fremont Older, Picchetti Winery, Grant Cabin at Deer Hollow Farm, and the Red Barn at La Honda Creek.

CEQA defines a historical resource as potentially significant if it is at least 50 years old and is determined to be eligible for listing on the California Register of Historic Resources. A unique archaeological site is defined as a site that is at least 100 years old and has the potential to provide useful information about the past. Therefore, as time passes,

Cultural resources are irreplaceable resources that face substantial threats such as disturbance from construction and maintenance activities, theft, vandalism, and deterioration over time. When the District acquires land with historic structures, the structures often have suffered years of neglect and are at risk of collapse. In these cases, it can be very expensive to **rehabilitate** and maintain these structures, many of which have already lost significant **resource integrity**. It is sometimes necessary to remove dilapidated historic structures due to public safety concerns and the prohibitive expense of **historical rehabilitation**. The District has adopted "Policies Regarding Improvements on District Lands" to provide a public process used to assess and determine whether District structures and improvements are cultural resources, and how they can most appropriately be managed. The District has successfully completed a number of important historic preservation projects, often with assistance from granting agencies and/or public/private partnerships. Cultivating relationships with historic preservation groups, research organizations, and knowledgeable local residents, including Native American groups, will allow the District to pursue new opportunities to preserve cultural resources and protect remnants of the peninsula's heritage for present and future Bay Area residents. The District serves communities of diverse ethnic heritage, who seek a wide variety of experiences in District preserves. To the extent that these practices can be accommodated with minimal impact to the natural and cultural resources, they should be encouraged and accommodated wherever feasible.

Regulatory Context

There are a number of state and federal laws pertaining to cultural resources to which the District must adhere in its operations. The California Environmental Quality Act (CEQA) (Guideline 15064.5, Public Resources Code 21038.2) states that a substantial adverse change to the significance of a historical resource or a unique archaeological resource must be treated as a significant effect on the environment in a project's environmental review. Public Resources Code 5097.9-5097.994 mandates protocols for protecting Native American graves and human remains, and prohibits unauthorized excavation, destruction, or vandalism to Native American archaeological sites on public land.

Section 106 of the National Historic Preservation Act of 1966 requires consideration of impacts to historic resources on federal lands or projects requiring federal permits. Likewise, any project that requires review under the National Environmental Policy Act of 1969 must consider impacts to cultural resources. The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) mandates the protection of Native American burial sites on federal lands and the repatriation of human remains and funerary objects to descendent Native American groups. Under NAGPRA, institutions with collections of Native American remains and funerary items must create an inventory and notify lineal descendants as part of the repatriation process.

In compliance with the statutes listed above, the District has included protocols for unexpected discoveries of archaeological sites and human remains as mitigation measures in District projects. An example of a District project specifically identifying protocols for cultural resource protection is the Service Plan and accompanying Environmental Impact Report for expansion of the District's boundaries to include coastal San Mateo County completed in 2003. The Service Plan recognized the unique value of cultural resources in the San Mateo County coastal area and established Cultural Resource Policies to preserve cultural resources in the Coastal Annexation Area. The Policies and Implementation Measures established in this Cultural RMPs are consistent with the Cultural Resource Policies in the Service Plan.

The Cultural RMPs is intended to be consistent with and to supplement the District's "Policies Regarding Improvements on District Lands." The purpose of this policy is to formalize and enhance the District's cultural resource management practices for the long-term stewardship of the District's significant historical and archaeological sites.

Cultural resources are not restricted to historic structures. Many of the landscapes on District preserves are artifacts of historic and prehistoric human activity. These include agricultural landscapes, such as the orchards at Stevens Canyon Ranch; the remnants of logging in the District's redwood forests; ranching landscapes; and the formal estates of August Schilling in Thornewood and, Harry Tevis in Bear Creek Redwoods and Fremont and Cora Older at Fremont Older.

Archaeological sites include prehistoric sites, such as Native American villages and other remnants, and historic sites dating from after European settlement. These can include Spanish Colonial /Mexican sites, and sites dating from after the annexation of California by the United States.

To protect vulnerable archaeological resources, the State Legislature has exempted sensitive archaeological site information from disclosure requirements in the California Public Records Act.

CULTURAL RESOURCE GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal CR- Identify, protect, preserve, and interpret cultural resources for the benefit of present and future generations.

Policy CR-1 Maintain an inventory of cultural resources on District preserves.

- ◆ Inventory and assess cultural resources throughout the District, including **prehistoric** and historic archaeological sites, structures, and **cultural landscape** features. The **Cultural Resource Inventory** should include a Geographic Information Systems database; however, access to this inventory must be restricted to District staff and qualified professionals, to the extent allowed by law to protect sites from looting and vandalism.
- ◆ Record cultural resources in the District's Cultural Resource Inventory when purchasing new property and perform research on previous uses of the property. Examples of research activities include performing a records search with the **Northwest Information Center** and consulting historic preservation organizations, previous residents, and descendants to gather local historical information.
- ◆ Complete archaeological site records for known unrecorded sites on District land and file reports with the Northwest Information Center.

Policy CR-2 Address cultural resources in the development of preserve use and management plans.

- ◆ Consult the Cultural Resource Inventory when planning projects that may have an impact on cultural resources in the project area.
- ◆ Conduct appropriate reconnaissance measures, such as research or archaeological survey, early in the planning process for trail construc-

tion, maintenance activities, or other projects that entail ground disturbance in an area of known archaeological sensitivity. Monitor construction activities when appropriate.

- ◆ Locate facilities, such as trails, staging areas, and new structures, to avoid loss or degradation of historically or archaeologically significant resources wherever possible. If not possible to avoid, minimize impacts, for example by: capping site, recording important features and/or artifacts, relocating structures, or **data recovery** excavation.
- ◆ Include stakeholder groups when developing plans for the management of historically or **archaeologically significant** resources. Consult with descendent communities such as Native American and other ethnic groups when developing plans for the management of historically or archaeologically significant resources related to their heritage.
- ◆ Assess the significance, integrity, and feasibility of preservation of historic structures when developing Preserve Use and Management Plans or Master Plans. If a structure is determined to be eligible for the California Register of Historic Resources, assess feasibility of preserving the resource.

Policy CR-3 Protect cultural resources from disturbance to the maximum extent feasible.

- ◆ Wherever possible and appropriate, preserve historical resources and archaeological sites **in situ**.
- ◆ Prohibit looting, vandalism, and unauthorized removal of cultural resources and associated artifacts from District preserves.
- ◆ Implement security measures such as protective fencing and patrolling to reduce vulnerability of the resources due to vandalism and looting.
- ◆ Develop security protocols to limit availability and distribution of geographic information for cultural resources to protect sites from looting and vandalism.
- ◆ Prohibit District sale, purchase, or commercial trade of individual archaeological artifacts.

Looting of archaeological sites for commercial gain poses a threat to sites around the world. Codes of archaeological ethics therefore discourage any activity that commodifies artifacts and encourages their commercial trade.

There are a number of potential sources of grant funding for historic preservation projects. In the past, the District has received grants from the Santa Clara County Historical Heritage Commission and the California Heritage Fund. Listing resources on local, state, or national registers can increase opportunities for grant funding.

Provenience, or the contextual information associated with an artifact or collection, is important for retaining its research potential and relevance for interested communities. A cataloging system is a crucial tool for preserving this information and keeping it linked to objects.

- ◆ Develop and follow guidelines for reporting, protecting and recording archaeological sites and features in the event of unexpected discovery.
- ◆ Provide District staff with basic training to identify and protect cultural resources.
- ◆ Assess existing operations within areas of known archaeological sensitivity to protect and preserve cultural resources.
- ◆ Require that all archaeological investigations or research activities that have the potential to physically significantly impact archaeological resources are carried out by qualified archaeologists, and that a technical report for each project is provided to the District following excavation.

Policy CR-4 Preserve and maintain cultural resources wherever feasible.

- ◆ Actively pursue grant assistance from local, state, federal, and other programs to supplement District funds to implement historic preservation projects for historically and archaeologically significant resources.
- ◆ Seek partnerships with private or non-profit groups to aid in the **restoration**, management, and use of historic structures.
- ◆ Assess the condition, identify needed repairs, and prepare maintenance plans for significant high priority historic structures as funds allow.
- ◆ Assess the eligibility of cultural resources for nomination on local registers, the California Register of Historic Resources, and the National Register of Historic Places. Consider nomination to registers for which a resource is determined eligible.
- ◆ Catalog artifacts associated with sites on District lands to prevent deterioration and to document the site and location where the artifacts were recovered. Consider curating artifacts in danger of deterioration. Maintain a cataloging system to preserve artifacts' contextual information and storage locations. Where appropriate, coordinate with other agencies and organizations to assist in long-term curation of District collections.
- ◆ Develop and follow guidelines and procedures governing loans of artifacts to other agencies and organizations.

Policy CR-5 Provide public access and educational programs to interpret historical and archaeological resources. (See PI-1)

- ◆ Provide controlled public access to historical and archaeological sites where appropriate, considering other public access resource constraints and resource protection.
- ◆ Allow appropriate uses of cultural resources by descendent communities.
- ◆ Seek input from descendent communities, such as Native American and other ethnic groups, when planning public access and educational programs that interpret cultural resources related to their heritage.
- ◆ When developing partnerships for the use and management of historic structures, plan for public access to the structures where appropriate while minimizing impact to the structures and respecting the needs of building occupants.
- ◆ Provide interpretive materials such as signage or brochures for self-guided hikes to inform visitors about the history of District lands and the San Francisco Bay Area. Develop locations to display artifacts for public benefit.
- ◆ Encourage, utilize, and support historical research by docents and volunteers.
- ◆ Provide training opportunities for docents to aid them in the development of docent-led tours of **historic** and archaeological sites and landscapes.
- ◆ Facilitate school field trips of historic and **archaeological sites** and cultivate other opportunities to work with educational groups to interpret cultural resources on District preserves.
- ◆ Support historical and archaeological research conducted by District-approved, qualified cultural resource professionals on District lands.

Public interpretation and access to non-sensitive information about cultural resources on District land is an important part of their preservation, conveying their importance to the general public. The District's cultural resources are a valuable public asset.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
CULTURAL RESOURCE MANAGEMENT

Policy CR-6 Preserve District institutional history.

- ◆ Preserve documents and artifacts important to the history of the District.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
CULTURAL RESOURCE MANAGEMENT

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IX. RESEARCH AND COLLECTION OF INFORMATION

BACKGROUND

Achieving the District's **resource management** objectives requires support in the form of basic academic research and applied field studies. This level of research is usually conducted by colleges and universities, by consultants as part of environmental analysis for project proposals, or by environmental and wildlife organizations such as the California Native Plant Society, the Nature Conservancy, or the Audubon Society. Although the District may conduct or sponsor research directly, it will continue to depend on and support outside research to expand its knowledge about the **natural** resources under its care, and to provide the basis for sound planning and management decisions.

RESEARCH AND INFORMATION GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal RC- Use and document scientific knowledge of preserve resources and resource management techniques as a basis for management decisions
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Policy RC-1 Maintain resource information files for each preserve and resource subject.

- ◆ Systematically gather information and data from appropriate agencies, universities, non-profit organizations, studies, and reports. Integrate spatial data into the District's **GIS database**.
- ◆ Maintain an electronic filing system to facilitate access of spatial data and information by location and resource type.
- ◆ Facilitate the reporting of resource related observational data by field staff and the public and its access by District staff.

- ◆ Respond to public information requests and promote release of non sensitive resource information to better distribute and share District scientific knowledge.
- ◆ Recruit interns and volunteers to help organize and maintain resource information files, in cooperation with the District's volunteer program.

Policy RC-2 Coordinate and cooperate with institutions, agencies, organizations, and individuals conducting resource management or research.

- ◆ Maintain a list of District related potential resource research projects. Encourage research directed to specific sites, District-related issues, or resource management practices.
- ◆ Administer the District's Resource Management Grant Program to fund projects that contribute to resource management projects. Incorporate the District's list of potential projects into the Grant Program.
- ◆ Explore partnerships and foster relationships with educational institutions, scientists, and other land management professionals in order to share information and resources and to develop Memorandums of Understanding or Memorandums of Agreement between the District and other agencies.
- ◆ Sponsor or participate in events and activities such as symposiums, workshops, and conferences that support scientific research and sound resource management practices.
- ◆ Encourage and facilitate currency on resource management techniques, such as **restoration, integrated pest management**, and erosion control.
- ◆ Provide internship support for appropriate research.

Policy RC-3 Undertake original research necessary for planning or management decisions.

- ◆ Carefully research existing information and explore opportunities for cooperative studies to collect additional information.

- ◆ Retain qualified consultants or researchers to conduct studies or collect additional information in a standardized format that can be integrated with the District's GIS database.
- ◆ Encourage and facilitate training of District staff to obtain environmental permits (such as scientific collection or sensitive species handling permits) in order to participate in or conduct needed research and monitoring and to maintain relationships with agency staff.
- ◆ Share significant new information through resource agency contacts and local and regional databases, such as the California Natural Diversity Data Base and Natural Resources Database.

Policy RC-4 Allow collecting, trapping, or other field research activities only in conjunction with legitimate research consistent with the District's management goals.

- ◆ Continue to administer the District's Special Use Permit Program for collection, trapping, archaeological research, or field studies on District lands.
- ◆ Require the researcher to share the information resulting from the studies with the District and other appropriate parties. If appropriate, integrate data into electronic filing system or GIS database.

Policy RC-5 Develop performance measures when designing District projects and collect monitoring data to evaluate project success.

- ◆ Research and utilize existing performance measures from comparable prior projects and partner agencies.
- ◆ Collect and evaluate monitoring data to measure project success and for use in adaptive management.
- ◆ Engage in benchmarking opportunities with public, partners, and research institutions through collaborations and the sharing of project data.

X. PUBLIC INTERPRETATION AND ENVIRONMENTAL EDUCATION

BACKGROUND

Communication and **outreach** are key to developing broad public support for acquiring and protecting **open space**. Increasing public knowledge and appreciation of the preserves' **natural** and **cultural resources** will improve support for their conservation. The District needs to inform the public about District treasures, so it will care about protecting them.

The **resource management** program will play a vital role in this effort by providing a greatly improved information base for the public. Studying the current condition of preserve resources and discovering how best to maintain and **restore** them will reveal information that stimulates public interest, makes the preserves more enjoyable places to visit, and inspires respect and a sense of stewardship.

The District's Public Affairs department is charged with communicating this information to the public. For example, staff works closely with local schools, districts, agencies, and other special groups to provide **environmental education** and interpretive programming to students, organizations, and the general public. The Public Affairs department also gets the word out through publications, presentations, and working with the media. The volunteer and docent programs greatly increase public outreach opportunities. The volunteer program provides a means for the public to learn firsthand about stewardship, by participating in District projects. The docent program trains docents to conduct activities on the preserves and interpret District resources. Docents also staff the Daniels Nature Center and lead environmental science-based field trips for students.

Environmental education is typically a curriculum-based approach targeted toward students to attain an ultimate goal (such as environmental stewardship). The District's environmental science-based programming was established in 1996 and serves elementary school students in a field trip experience at the District's Daniel's Nature Center and surrounding Skyline Ridge Preserve. During the program students engage in hands on discovery and learning.

Interpretation is a communication method that reveals meanings, connections, and relationships by firsthand experience, and by illustrative media, such as web pages or signs. The District's interpretive program includes communication and outreach by District staff and docents, as well as through brochures, publications, signage, signboards, exhibits, and other means. Interpretive programs are often the most effective means of stimulating understanding and appreciation of open space, providing information, promoting stewardship of resources, and helping ensure visitor safety.

INTERPRETATION AND EDUCATION GOALS, POLICIES, AND IMPLEMENTATION MEASURES

An Interpretive Service Plan (ISP) serves to identify and prioritize the valuable natural and cultural resource "stories" and connections that can be brought forward through enhanced or new interpretive programs or facilities at each location being evaluated.

Goal PI-	Increase public knowledge, understanding, and appreciation of the natural and cultural resources of the preserves, and support for their conservation.
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Policy PI-1 Provide interpretive **programming**, facilities, and materials. (See CR-5, GM-6 and GM-7)

- ◆ Develop appropriate and timely projects and plans to support natural and cultural resource interpretive opportunities that are guided by recommendations and priorities in the District's **Interpretive Systems Plan (ISP)**,
- ◆ Provide interpretive materials via a wide range of media (web and print based).
- ◆ Continue to operate an interpretive program at the David Daniels Nature Center at Skyline Ridge Open Space Preserve with docents and staff to support its use by the general public and local schools and organizations.

- ◆ Provide information about the District's mission, resources, management practices, and goals in District signboards, facilities, and publications. Encourage publication of this information in the general media.
- ◆ Provide training for new docents and additional "refresher courses" to continue to help them provide interpretive services.
- ◆ Provide opportunities for the public to learn about natural resources and support resource management activities through the docent and volunteer programs.

Policy PI-2 Provide environmental education programming and outreach.

- ◆ Coordinate and cooperate with local agencies and organizations, particularly schools that would like to use District lands and facilities for **environmental education**, whenever appropriate.
- ◆ Involve school children in District-sponsored environmental projects and educational activities.
- ◆ Provide environmental education programs and materials to schools, groups, and organizations.

Policy PI-3 Provide other public **outreach**.

- ◆ Support and/or participate in special events and programs that foster public knowledge and appreciation of **open space** resources.
- ◆ Participate in multi-agency forums to share information and resources and explore partnership opportunities.
- ◆ Develop and use outreach opportunities to gain public support for resource management goals and policies.
- ◆ Work with the Public Affairs Department to increase public awareness of resource values.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
PUBLIC INTERPRETATION AND ENVIRONMENTAL EDUCATION

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XI. CONSERVATION GRAZING MANAGEMENT

BACKGROUND

The vegetation of the Santa Cruz Mountains is comprised of a rich and diverse assemblage of plant species. This wealth of diversity was most evident within the grassland **ecosystems** that evolved under a variety of disturbance pressures including fire and grazing by large herds of **ungulate animals**, which are now mostly extinct or locally extirpated. The **flora** that emerged has been described as one of the most diverse and species rich ecosystems in the United States

The arrival of early Spanish and Anglo settlers initiated a particularly dramatic change in species composition of California grasslands, primarily as a result of tilling the grasslands for agricultural crop production, reduction of **native** grazing animals and introduction of cattle herds brought over from Europe and let loose on the new rangeland. This introduction of **non-native** plants and animals, coupled with the concurrent suppression of fire on the landscape as the western United States was settled, resulted in the substantial replacement of the native grassland vegetation with a predominately **exotic**, annual flora. The exotic vegetation is often more competitive, productive, and prolific than the **native** plants within which it coexists, and tends to dominate and replace existing native grasses and wildflowers. Over the last 150 years, coastal grassland areas have also experienced large-scale conversion to agriculture or urban development. The remaining undeveloped grasslands face continued development pressure and are severely impacted by exotic, invasive organisms.

The District's **open space** preserves contain large acreages of grasslands that in many areas have been degraded due to the pressures described above. Management of these grassland habitats is desirable to reduce the risk of wildfire and to maintain viable **native** plant communities. **Vegetation management** using **livestock conservation grazing** or other **resource management** tools can be a substitute for **native** grazing animals and recurring fire to achieve the District's objective of preserving, protecting and restoring the **natural** environment.

The greatest diversity within California's coastal grasslands can be seen in the forbs or wildflowers that emerge in the spring following winter rains. Sites with adequate management of non-native vegetation will reward these efforts with bountiful displays of colorful spring wildflowers.

By some estimates, nearly 80 percent of the vegetation cover within California grasslands is exotic vegetation.

District lands currently contain approximately 5300 acres of grassland habitat. The largest contiguous grassland areas are within District lands in western San Mateo County.

Livestock ranching is a small but vital part of the Bay Area's agricultural economy. As with any business that depends on local infrastructure and services, livestock ranching is increasingly threatened with each ranch that goes out of business. Every livestock rancher depends on services and supplies including veterinary care, feed sales and delivery, farm and ranch infrastructure supplies, and livestock transportation services. As land is taken out of ranching, all of these services and supplies are incrementally affected and may cease to operate, increasing the burden for families and businesses that choose to keep ranching.

Typical fencing used to control livestock movement that the District inherits as part of property acquisitions is five-strand barbed wire fencing. The District standard for new/replacement cattle fence construction is wildlife-friendly 5-strand fencing with a smooth bottom wire approximately 16" above the ground unless conditions warrant an alternative fence type. Other fencing types that may be used include four-strand barbed wire for interior fencing, wood rail fencing and temporary electric fencing that can be installed to seasonally restrict livestock to target areas or exclude livestock from sensitive areas. Wildlife-friendly fences enable virtually all wild animals to move through an area without harm and with minimal impediment.

In 2003, the District completed the Service Plan and accompanying Environmental Impact Report for the San Mateo Coastal Annexation Area expansion of the District's boundaries to include coastal San Mateo County. The Service Plan recognized the unique value of the San Mateo County coastal area and established Agricultural Policies to preserve and encourage viable agricultural use of land. The Policies and Implementation Measures established in this **Conservation Grazing** Management Policy are intended to supplement and complement the Agricultural Policies in the Service Plan. Furthermore, these **Conservation Grazing** Management Policies will be implemented in a manner that is consistent with the Service Plan.

CONSERVATION GRAZING MANAGEMENT GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal CGM- Where appropriate manage District land with livestock conservation grazing that is protective of natural resources and that is compatible with public access; to maintain and enhance the diversity of native plant and animal communities, manage vegetation fuel for fire protection, help sustain the local agricultural economy, and preserve and foster appreciation for the region's rural agricultural heritage.

Policy CGM-1 Ensure that **conservation grazing** is compatible with and supports wildlife and wildlife habitats.

- ◆ Inventory and assess sensitive habitats to identify areas requiring special management practices. The conservation of these areas will take precedence over other uses and management practices that are determined to have an adverse effect on these **resources**.

- ◆ Prepare site-specific grazing management plans by a certified range-land manager including **best management practices (BMPs)** for preserves where **conservation grazing** will be utilized as a resource management tool. The site-specific grazing management plan will be a component of the agricultural production plan developed through the Use and Management Planning process. The Use and Management Planning process provides for public input and Board approval of site-specific grazing management plans.
- ◆ Manage agricultural leases and easements to protect and enhance **riparian** areas and to maximize the protection or **enhancement of water quality**. (See WR-4)
- ◆ Per the District's long-standing policy of protecting **native** predators, continue to prohibit the lethal take of predators in response to **livestock** depredation.

The goals of conservation grazing are to maintain and enhance biodiversity by moderating the impacts of exotic grasses, manage fuel loads to reduce risk of catastrophic wildfire, and to help sustain local agricultural heritage

Policy CGM-2 Provide necessary infrastructure to support and improve **conservation grazing** management where appropriate.

- ◆ Utilize fencing that allows wildlife movement and fosters habitat connectivity. (See WM-3: Measure 3)
- ◆ Manage access to existing water features and where needed supply supplemental drinking water through stock ponds and water troughs to preserve clean water for **livestock**, protect water quality, and enhance habitat for wildlife. Provide wildlife escape ramps where necessary.
- ◆ Encourage and assist **conservation grazing** tenants on District land to provide range improvements to **restore** or conserve **wildland** resources and to enhance range condition.
- ◆ Inventory and assess roads and trails on District lands to identify significant erosion and sediment sources – abandon and where feasible restore to a natural condition poorly designed or sited roads. (See WR-4)

Policy CGM-3 Monitor environmental response to **conservation grazing** on lands.

- ◆ Monitor forage utilization and distribution by **conservation grazing** animals to assure appropriate amounts of **residual dry matter (RDM)** remain on the

Residual Dry Matter (RDM) is a measure of the amount of vegetation left on the ground, typically measured at the end of the summer or fall. Appropriate levels of RDM strive to minimize thatch, which can inhibit new plant growth, while maintaining adequate levels of vegetation to prohibit soil erosion.

Fire reduction is a great concern for some landowners. However, cattle are not able to graze all land areas effectively for fire protection purposes, such as steep slopes or slopes partially vegetated with brush. In these instances, goats may be an effective alternative. Goat herds can be rented for a short period of time and can be moved with a goat herder and dog(s) along with portable fence enclosures. Goats and other small livestock must be penned in enclosures at night to protect them from predators.

ground to achieve desired resource management objectives. In the course of RDM monitoring, evaluate and report on wildland fire **fuel** levels that may result in an increased risk of wildland fire (See WF policies).

- ◆ Monitor **livestock** use levels and **agricultural infrastructure** condition to ensure conformity with lease provisions to contribute to improved management.
- ◆ Monitor wildland conditions with an emphasis on documenting the location, distribution and abundance of native grasses, wildflowers, and other native flora and fauna
- ◆ Monitor water quality in ponds, **wetlands**, and **watercourses** with unrestricted **livestock** access.
- ◆ Monitor non-native vegetation response to **conservation grazing** with an emphasis on documenting the location, distribution and abundance of **target, invasive species**.
- ◆ Use information collected from monitoring to annually review range-land conditions and response to **livestock conservation grazing**. Use **adaptive resource management decision making framework** within grazing management plans.

Policy CGM-4 Utilize different **livestock** species to accomplish vegetation management objectives.

- ◆ Research the effective use of cattle, goats, sheep, and horses to manage vegetation on District lands.
- ◆ Utilize appropriate species depending on management needs.

Policy CGM-5 Preserve and foster existing and potential **conservation grazing** operations to help sustain the local agricultural economy.

- ◆ Establish longer term grazing leases to promote financial viability for the operators and efficient land stewardship for the District.
- ◆ Seek grants or other economic support for agricultural infrastructure maintenance and improvements.
- ◆ Ensure site-specific grazing management plans are economically feasible and practical for **conservation grazing** operators.

Policy CGM-6 Provide information to the public about the region's rural agricultural heritage. (See PI-1)

- ◆ Install display boards and give presentations highlighting historical and educational facts about ranching families and industry at appropriate sites.

Policy CGM-7 Provide public access in a manner that minimizes impacts on the **conservation grazing** operation. (See PI-1)

- ◆ **Conservation grazing** operators on District lands or lands under easement to the District shall be consulted when public access is being planned and considered for the property to minimize conflicts between the public and the **conservation grazing** operation.
- ◆ Prepare and distribute a brochure to educate visitors about etiquette for use of open space property with **livestock** animals.
- ◆ Prepare and distribute a brochure to educate visitors about etiquette for use of open space property with **livestock** animals.
- ◆ Install signage where appropriate to educate the public about the resource benefits of **conservation grazing** and to educate visitors about approaching animals, closing gates, and other etiquette appropriate for moving through lands with **livestock** animals.

Policy CGM-8 **Conservation grazing** operations on District lands in San Mateo County will be managed in accordance with the policies established in the Service Plan for the San Mateo Coastal Annexation Area.

- ◆ Consult with appropriate agencies and interest groups, including the San Mateo County Farm Bureau and San Mateo County Agricultural Advisory Committee in the development of site-specific Use and Management plans and agricultural production plan components in the Coastside Protection Area.

Policy CGM-9 Safeguard native plants and wildlife while promoting the economic sustainability of conservation cattle grazing as a **resource management** tool and reducing **predation** of **livestock**.

- ◆ Consider the economic impact of predation in setting lease rates for **conservation grazing** tenants.
- ◆ Provide economic relief for **conservation grazing** tenants who, as required per conditions of a Board of Directors approved lease, are performing **resource management** services and are in good standing with the District, in response to confirmed cattle losses from **predation** to sustain **conservation grazing** as a viable tool for natural **resource management**. Require cattle grazing tenants to document annual **livestock** losses due to both **predation** and non-predation-related causes.
- ◆ Support and promote scientific research on the effectiveness of wildlife and **livestock protection methods**, and their influence on wildlife behavior, grazing productivity, and **livestock** health. Periodically review research results and consider findings in future policy development.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
CONSERVATION GRAZING MANAGEMENT

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XII. FOREST MANAGEMENT

BACKGROUND

The term forest applies to habitats dominated by tree species with a continuous or nearly continuous canopy covering substantial portions of the landscape. Woodlands consist of scattered trees across the landscape intermixed with a significant habitat component of other vegetation types such as grassland.

As of 2007, District lands encompass approximately 30,000 acres of **forest** and **woodland habitat**. Approximately 11,500 acres consist of redwood and Douglas-fir associated **coniferous forest**, located primarily in the northern Skyline area of the District. These forests are often intermixed with a lesser component of **hardwood**, primarily tanoak, madrone, California bay, black oak, and various live oaks.

The remaining 18,500 acres consist of a variety of hardwood forest and woodlands. These consist of numerous oak species (coast live, canyon live, and Shreve oak, black oak, blue oak, valley oak), madrone, tanoak, California bay, California buckeye, and **riparian** species such as red and white alder, big-leaf maple, various willow species, California sycamore, and box elder.

Forest and woodlands within the District have been subject to significant historic modifications. Portions of the oak forests and woodlands have had a history of **livestock** grazing and **fuel wood** procurement. The effects of these uses are not well documented, but young dense **stands** (primarily live oak species) occur within the preserves in areas of prior disturbance. These young dense stands often occur along forest margins or have regenerated within areas that had been previously cleared. At the other end of the spectrum are beautiful stands of large old majestic oaks. Concerns about the reduction of oak forest and woodland within California often center on their conversion to urbanized uses or commercial agriculture. The primary role for the District is the preservation and protection of these forests and woodlands, particularly considering the heavy urban growth pressures within the San Francisco Bay Area.

Riparian hardwood forests have also been modified in areas by past land use practices. These practices have typically whittled away at the width of the corridors, in places narrowing the corridors to thin strips along the **edges** of creeks. When riparian forests are modified in this manner, it is common for the species composition to change to those species that prefer to be near the water (typically willow and alder), while reducing species that typically occupy elevated floodplains such as sycamore.

The proximity of the redwood and Douglas-fir forests in the Santa Cruz Mountains to the urban San Francisco Bay Area and associated ports of trade fostered the development of an early and intense commercial logging industry. Commercial timber harvest and milling activities were well underway beginning in the 1850's within the La Honda Creek, Purisima Creek Redwoods, and El Corte de Madera Creek Open Space Preserve areas. Timber harvest activities have generally altered the forest stands by reducing the size and age of the stands and increasing the density of the young growth. This is clearly evident when viewing the distribution of **old growth** redwood stumps within the forests. A second round of logging that focused on residual (left over) old growth and the second growth that re-sprouted from the late 1800's clear cuts began in the 1950's-1960's. Tractor logging continued within El Corte de Madera Creek and Purisima Creek **watersheds** throughout the 1970's and 1980's, resulting in third and fourth timber harvest entries into much of the areas that are now protected by the open space preserves.

Numerous roads were constructed to facilitate access to early timber (and grazing) operations on the properties now owned by the District. These roads were often constructed in locations, and utilizing methods that were insufficiently protective of **water quality** and aquatic resources. The elimination or conversion of non-essential roads and the judicious maintenance of essential roads will be necessary to protect water quality and aquatic resources.

Pathogens are a significant threat to the District forests. The most notable pathogen at present is *Phytophthora ramorum* which is responsible for Sudden Oak Death syndrome, commonly known as SOD. A number of oak species are susceptible to death and slow decline from SOD, particularly tanoak, and additional **host** species include many other forest trees and shrubs. SOD has the potential to seriously impact forests within the preserves and the region, presenting a number of social and ecological concerns.

All of the forest **ecosystems** within the District preserves evolved in association with periodic fire. **Fire suppression** activities within the Santa Cruz Mountains, as well as throughout the Western United States, have

also had an effect on District forests. The effects of fire suppression typically include an increase in forest density, a build up of forest floor **fuel loads**, and a decrease in herbaceous forest floor plant communities. **Forest management** actions can be undertaken to reduce the severity of fires within the forest ecosystem and watersheds when these fires occur. Prescriptive forest management can achieve conditions suitable for the reintroduction of fire into forest ecosystems, an ecological function that has been largely absent, except under typically severe conditions, for the past sixty years.

The District has preserved large blocks of forest and woodland. The overall extent of District land holdings within the greater Santa Cruz Mountain Bioregion is exceptionally important to regional **biodiversity** and well suited to regional ecosystem management. State, county and local parks, non profit and conservation organization owned properties and numerous conservation easements over both public and private properties, together with the District preserves, provide tremendous opportunities for regional forest preservation and **restoration**.

Active **conifer** forest management on public lands is typically limited to relatively small fuel management projects and controlled burns in old growth stands within some state parks. This limits the majority of these forests to more hands off management, requiring long periods of time where trees compete for food, water, and sunlight. During this time period, which can take hundreds of years, the dominant trees will persist, while the less dominant trees will be crowded out and die. During much of this transitional period, habitat complexity and biodiversity can remain relatively stagnant and simplified. Maintaining most of these protected forests under the same management paradigm has the potential to suppress regional biodiversity.

Late-seral and old growth forest characteristics typically include: large widely spaced trees, thick bark, large complex branches, large standing snags in various stages of decay, large downed logs on the forest floor, and a closed canopy. This complex structure results in a very wide variety of habitat conditions and results in tremendous biodiversity.

From a regional perspective, old growth and **late-seral** conifer forests are very limited in distribution. Late-seral forests, or **late-successional** forests, are older forests that begin to develop some characteristics similar to old growth forests. The initial development of late-seral redwood and Douglas-fir forests is generally considered to take place between 80 to 300 years, and continue to persist for centuries, with the oldest redwoods reaching an age of 1,000 to 2,000 years old. The District preserves have retained a significant **“biological legacy”** of residual (uncut) single old

growth trees and small stands of old growth, as well as a substantial older Douglas fir component. These biological legacies are known to harbor significant remaining habitat components that are used by wildlife, from the canopy species such as marbled murrelets down to soil microbes.

The District's conifer dominated Preserves offer the opportunity to manage **forest conditions** to accelerate late-seral habitat conditions to promote biologically diverse, dynamic forest habitat, increase the extent of this limited habitat, and accelerate the development of forest structure for the benefit of protected species and for improved fire resistance.

FOREST MANAGEMENT GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal FM-	Manage District land to retain and promote biologically diverse, dynamic forest conditions; maintain and enhance high quality forest and aquatic habitat; encourage and enhance the development of late-seral conifer forest; provide for visitor experiences within diverse forest habitat; and promote District and regional fire management objectives.
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Policy FM-1 Inventory and assess District forest and woodland.

- ◆ Inventory and assess existing District forest conditions. Inventories within hardwood stands should include forest age, structure, health, and an evaluation of regeneration (growth of seedlings and young trees). Inventories within conifer stands should have a particular emphasis on forest age and structural characteristics, identification of biological legacies, and the reconnection and restoration of late-seral habitat. Inventories should also include the identification and assessment of any effects of urbanization on the forests.
- ◆ Identify unique habitat features such as meadows, ponds, or other non-forested communities. Evaluate the need for management to

maintain landscape heterogeneity and specialized habitat for non-forest wildlife and vegetation.

- ◆ Inventory District forest wildlife with a particular emphasis on **special status** species, such as the marbled murrelet, spotted owl, Vaux's swift, numerous raptor species, and indicator species such as the pileated woodpecker.
- ◆ Inventory District forest to assess fuel loads and forest structure related to fire. Identify access issues and District and community/regional fire concerns.

Policy FM-2 Ensure that forest management activities are compatible with the protection of special status plant and animal species.

- ◆ Conduct time appropriate surveys for special status species to establish the presence or absence thereof, and identify essential habitat features (nest trees, roosts, sheltering trees, springs, and ponds).
- ◆ Manage forests to expand critical habitat for sensitive species by restoring forest structure and habitat elements utilized by sensitive species to develop and connect suitable habitat.
- ◆ Continue regular consultation with regulatory agencies and experts to develop plans to protect and **enhance** habitat for sensitive species.

Policy FM-3 Ensure that forest management activities are compatible with riparian ecosystem and water resources protection and policies.

- ◆ Protect riparian ecosystems and habitat to maintain **natural** hydrologic process, water quality, and wildlife benefits. Maintain essential riparian functions, and if necessary enhance and restore riparian habitats.
- ◆ Inventory and assess roads and trails on District forestlands to identify significant erosion and sediment sources. Maintain essential roads to high standards, and eliminate or reduce to trail width all non-essential roads. (See Policies WR-3 and WR-4).

Riparian ecosystems are streamside ecosystems that are extremely important to numerous forest plant and wildlife species. In addition to benefits to wildlife such as fish and amphibians, these ecosystems also play critical roles regarding forest hydrology and water quality. The protection and restoration of Riparian ecosystems is a primary component of Forest Management.

- ◆ Discourage forest management activities within riparian areas unless justified and implemented for the specific purpose of restoring degraded riparian habitat.

Policy FM-4 Manage District conifer forests to sustain and encourage the development of late-seral habitat conditions.

- ◆ Prepare Forest Management Plans for **high priority District forests** to establish habitat goals and appropriate management treatments. Utilize restoration ecologists, forest ecologists, Registered Professional Foresters, or other **resource management** professionals to prepare plans, as appropriate.
- ◆ Restore degraded forest habitats to promote the development of late-seral habitat, forest habitat complexity, and to enhance biodiversity, where existing stand conditions and access permit. Utilize state of the art silvicultural (forestry) practices to restore degraded forests.
- ◆ Protect existing residual old growth trees and stands, mature oaks, and most large, older Douglas fir trees. The conservation of these areas will take precedence over other uses and management practices that are determined to have an adverse effect on these resources.
- ◆ Maintain and/or create large **snags** and downed wood for wildlife habitat where not a safety hazard.
- ◆ Foster relationships with educational institutions, forest scientists and forest professionals to inform District forest management decisions based upon sound, current science, and to contribute opportunities for continuing research of late-seral focused management. Seek grant opportunities and partnerships for forest research and monitoring.

Policy FM-5 Provide necessary fire and fuel management practices to protect forest resources and public health and safety. (See WF policies)

- ◆ Maintain essential roads for emergency fire access, and forest management activities undertaken to reduce fire hazard.
- ◆ Maintain adequate fire clearance around District structures and facilities. (See WF-3 and WF-1: Measure 5)

Late-seral redwood and Douglas-fir forests are generally considered to be some of the most fire resistant and resilient type of forest.

Restoration forestry practices may result in timber that would be available for commercial sale. Revenue derived from commercial timber sales conducted in conjunction with restoration activities will be used for resource management activities (such as road upgrade projects, weed abatement projects, and long-term monitoring).

Snags are dead standing trees that are important to a variety of species. As trees age and die, holes created by woodpeckers cavity decay, and broken branches create new habitat niches for a host of bird, bat, small mammal, amphibian, and insect species. Snags and large downed wood are critical components of high quality late-seral forest communities.

Fire hazard reduction is a great concern for some landowners, particularly residential landowners. Fire can also be a significant threat to the environment, particularly water and aquatic resources.

Shaded fuel breaks are an example of a fuel reduction project that the District can undertake. They consist of areas where vegetation is thinned to break up horizontal connectivity, and lower growing “ladder fuels” that can connect ground fire to tree canopy are removed. Enough tall tree canopy is retained to maintain shade to discourage the re-growth of ladder fuels. These often require follow-up maintenance.

- ◆ Encourage neighboring property owners to maintain adequate fire clearance around existing development. Consult with regulatory agencies to encourage that construction of new development maintains fire agency recommended setbacks for fire clearance between new development and District forest and woodland.
- ◆ Evaluate the potential to reduce forest fuel loading through the removal of smaller trees to reduce forest floor fuel buildup and **ladder fuels**.
- ◆ Coordinate with **fire agencies** and local communities to define locations where fire protection infrastructure is desirable and practical.
- ◆ Reintroduce fire as a resource management tool to reduce forest floor fuels and reestablish fire for ecosystem health where stand conditions, access, and public safety permit. Coordinate with other agencies for planning and implementation.
- ◆ Seek grant opportunities and partnerships for fuel management projects and monitoring.

Policy FM-6 Protect forest health from intense wildfire, **pests**, and pathogens with high potential to cause damage.

- ◆ Evaluate potential for forest loss to intense wildfire, pests and pathogens where effective methods are available and justified.
- ◆ Limit the scale of clearings and light-gaps in forests to reduce potential for weed establishment. Where activities occur within the forest edges, weed treatments and monitoring will be a component of the treatment plan.
- ◆ Manage forest diseases when necessary to protect natural biological diversity and critical **ecosystem functions**. Regarding Sudden Oak Death (SOD): detect, report and monitor infested areas; utilize sanitation and **best management practices (BMPs)** to control the spread of the SOD pathogen; train staff and educate the public; and support SOD research to guide land management decisions (See VM-1 and WF policies).

Policy FM-7 Monitor wildlife, water quality, and vegetation response to forest management activities.

- ◆ Conduct pre and post project wildlife and vegetation surveys with emphasis on special status species.
- ◆ Monitor water quality upstream and downstream of forest management activities that have the potential to negatively affect water quality or aquatic resources.
- ◆ Periodically re-inventory forest conditions with a frequency adequate to monitor forest response to management.

Policy FM-8 Provide educational opportunities for the general public and recreational users regarding **forest** ecosystems and management.

- ◆ Place interpretive displays in accessible locations to inform and educate the public about forest ecosystems, and management techniques employed on District lands.
- ◆ Conduct public outreach to inform and gain support for District activities within the local community.
- ◆ Conduct interviews with individuals related to past land use and history of forested Preserves to compile historical details and perspectives on District forest land. Include history into **interpretation** and educational opportunities within the Preserves.

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
RESOURCE MANAGEMENT POLICIES
FOREST MANAGEMENT

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XIII. ECOLOGICAL SUCCESSION

BACKGROUND

Ecological succession is the sequential development of plant and animal communities following disturbance. In a land management context, this natural process can be both positive and negative. For example, the natural recruitment of coyote brush in grassland areas on District lands is reducing the extent of this already-limited **habitat** type and has serious impacts on **native** plants and wildlife. Regrowth of mixed evergreen forest in previously-logged areas is threatening to shade out rare species. Ponds and seasonal **wetlands, which** are slowly filling in with sediment and converting to grassland and areas dominated by broadleaf tree species can become shaded out by coniferous forests. This policy addresses such undesirable habitat type conversions that result from the process of ecological succession.

The directional nature of succession was once thought to result in a stable, stationary species composition (known as the “climax community”) over time. In reality, however, all natural systems are subject to disturbance and limited by seed availability and the process of succession may never reach completion. Early-succession species have specific life history strategies which allow them to take advantage of disturbance. Furthermore, some species, such as knobcone pine, King’s Mountain manzanita, and many grassland plants, are **disturbance-dependent**: they require disturbance to maintain habitat conditions suitable for reproduction and establishment. Both natural and human disturbance drive species composition in **natural** habitats. Past disturbance regimes (either natural or historic and pre-historic land management) can be artificially re-created to maintain desired habitat types. More intensive management may also be necessary as climate change causes large-scale shifts in **plant community** composition and distribution.

Ecological disturbance is the disruption of an ecosystem's structure and function, generally with effects that last for time periods longer than a single growing season for vegetation.

Physical disturbances in our region include fire, windstorm, drought, flood, and earthquake.

Biogenic disturbances include the impacts of herbivorous insects, mammals, disease, and pathogens.

Anthropogenic disturbances include logging, development, agricultural land use conversion, and non-native invasive species introductions.

ECOLOGICAL SUCCESSION GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal ES- Use sustainable land management techniques to maintain, restore, or simulate natural disturbance in priority habitats.

As Alpine Pond, Horseshoe Lake, and other District ponds fill with sediment, open water habitat is rapidly transitioning to cattail marsh with little open water. Certain rare amphibians as well as many common wildlife species require open water for key portions of their life cycles.

Unique stands of knobcone pine, a fire-adapted species, in southern Sierra Azul Open Space Preserve will hold seeds in pine cones for up to 30 years waiting for a fire to release them. With the absence of fire, knobcone stands are not being replaced as older mature trees die off and their seeds are not released resulting in an overall decline of the species.

Policy ES-1 Manage historic grassland areas that are threatened by shrub encroachment. (See VM-1)

- ◆ Identify priority grasslands for management, focusing on those with cultural significance and/or a substantial component of native species.
- ◆ Identify the most cost-effective, safe, and least environmentally damaging management technique for shrub removal, including **livestock grazing**, mechanical removal, and **prescribed fire**.
- ◆ Prepare long-term plans for managed grassland areas to ensure that desired conditions are maintained.
- ◆ Monitor and manage grasslands for **invasive species** and biodiversity to promote use of grasslands by native and special status species

Policy ES-2 Preserve and **enhance** pond habitats and other wetlands.

- ◆ Inventory and assess ponds to identify opportunities for habitat maintenance and/or aesthetic enhancement.
- ◆ Monitor sensitive reptile and amphibian **populations** on District lands.
- ◆ Preserve pond habitats through maintenance of infrastructure such as: pond contours, depth, earthen berms, spillways and inlet and outlet features
- ◆ Remove sediment or invasive vegetation to provide improved habitat for sensitive species.

Policy ES-3 Facilitate regeneration of disturbance-dependent special status, rare, or unique plants.

- ◆ Research, document, and implement site specific fire prescriptions to improve regeneration of fire adapted and special status vegetation in fire-dependent ecosystems where feasible.
- ◆ Develop and implement an alternative management protocol to encourage seedling establishment of special status and disturbance adapted species in aging stands when regeneration by fire is not feasible.

Nearly all stands of the rare Kings Mountain manzanita on District lands are in danger of being shaded out by Douglas fir and other trees. No regeneration has been observed in these stands.

XIV. HABITAT CONNECTIVITY

BACKGROUND

Although the Santa Cruz Mountains are geographically separate from the nearby mountain ranges, they share many of the same species, and are interconnected through routes of migration and dispersal. These connections often referred to as “wildlife corridors,” commonly follow watercourses into and out of the foothills and valleys. In the San Francisco Bay region and elsewhere, wildlife corridors are frequently intersected by roads and highways.

Habitats are the conditions and locations in which plants and animals live and reproduce, and are a critical component of a naturally functioning **eco-system**. Habitats come in many forms, but are traditionally thought of as the particular communities of plants and animals that together comprise the ideal conditions for one focal species or for a broad assembly of particular plants and animals. District **open space** lands are made up of a wide variety of habitats, including freshwater streams, redwood **forests**, oak **woodlands**, coastal grasslands, **chaparral**, and many others. In areas surrounding District Preserves, one finds many of these same communities. Connections that link otherwise isolated habitats are known as corridors, and effectively extend the range of a species from one location to many locations in accessible areas. **Wildlife corridors** may be extensive contiguous **natural** areas suitable for a wide-ranging organism, a stream with a continuous wide buffer of **riparian** vegetation, or even a tunnel or culvert beneath a highway that allows passage of animals.

The District’s Geographic Setting

The District’s sphere of influence, spanning the San Francisco Peninsula from the Pacific Ocean in San Mateo County to the baylands in San Mateo and Santa Clara Counties, is drawn along both natural and political boundaries. The District encompasses much of the northern portion of the Santa Cruz Mountains, numerous foothills and ridges of that mountain system, and more than 50 miles of coastline, both on the Pacific Ocean and the San Francisco Bay. The Santa Cruz Mountains are a local spur of the Coast Range, and are physically separated from the larger system by the Golden Gate to the north, the Santa Clara Valley to the east and south, and the Pajaro Valley to the south. The closest adjacent mountains and foothills with a similar suite of resident species are the Gabilan Range and the Diablo Range, and it is with these regions that biological exchange is both most likely and most critical.

Habitats in the Santa Cruz Mountains are both connected to and isolated from comparable habitats in nearby areas. This means that interaction between local and neighboring plant and animal **populations** is governed by their need and ability to move across areas that are inhospitable or even hazardous to survival of the **population**. These **barriers** can take many forms, and have differing effects on various species. Furthermore, as humans modify the natural environment, pre-existing boundaries to plant and animal movement can change dramatically. Modified habitat connectivity may result from new roads or houses, changing vegetation, or even from the effects of climatic changes on habitat distribution. Habitat features are just one aspect of a functioning interdependent ecosystem; thus, the permeability of geographic barriers is a complex and ever-changing relationship. It is a function not only of the species' capacity for crossing barriers, but also of the obstacles themselves.

Basic Habitat Ecology

An ecosystem's many habitats form a complex mosaic on the landscape. They may gradually transform from one to another, or change suddenly at a natural or a man made **boundary**. Two or more habitats may coexist or form a relationship, as when a stream, a linear habitat for fish, insects, and riparian plants, flows through an oak woodland, which is found only where specific kinds of soil type, water availability, and weather conditions occur. Habitats may also be partially or completely interrupted, as when a broad river bisects a grassy plain, a highway passes through the redwoods, or a meadow forms in the woods.

Both the relative size and extent of a habitat's connectivity to other habitats are key factors in its ability to support the plants and animals that depend on it, and in the variety of species, or **biodiversity**, it can support. Typically, the most resilient and diverse habitats are large areas connected by corridors along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, **populations** can move in response to environmental changes and natural disasters, and species at risk can be replenished from other areas. For habitats in the District, migratory and genetic linkage with neighboring mountain ranges, where many of the same plant and animals live and reproduce, is important for overall **population** health. Species living in small, isolated **patches** of habitat are more vulnerable to disease, population pressures, predation, and other

Preserving contiguous natural habitats is key to preserving biodiversity in a changing world. When a species is reduced to a few isolated populations due to fragmentation of its habitat, a natural stressor such as a fire or drought can wipe out a significant portion of the remnant population, bringing it closer to extinction. Connected habitats help species respond to changes in their environment.

stresses. Such isolation can also lead to inbreeding, which compromises genetic diversity and contributes to instability of species **populations**. This need for habitat connectivity is particularly true of wide-ranging animals such as mountain lions, eagles, or salmon, but is also applicable at smaller scales. For example, movement across a small road can be critical for the newt that must locate a valuable food source or find a mate.

To support a viable **population** over the long term, a given species needs an uninterrupted patch of suitable habitat of a particular size. The needed size varies, but always greatly exceeds the range of one individual. This **core** habitat is bordered by **edges** that can fill some of an organism's needs, but do not support stable **populations**. The largest patches have a high proportion of core habitats, but also provide edge zones. Barriers to movement such as roads, homes, or walls cause **habitat fragmentation**, in which multiple smaller edge habitats are formed. Habitat fragmentation can greatly diminish the viability of the ecosystem. As habitats become fragmented, the amount of core habitat decreases while edge habitat increases. This can greatly reduce habitat viability for species with unique requirements such as nesting owls or murrelets, or increase predation by edge-adapted predators such as cats or raccoons.

The District's boundaries encompass many of the remaining undeveloped habitats within the San Francisco Peninsula. The main connection for the plants and animals inhabiting District habitats is through relatively narrow corridors at the southern end of the Santa Cruz Mountain Range and across the Santa Clara Valley. Smaller thoroughfares, residential construction, and some natural features are hindrances to the movement of smaller animals and distribution of plants.

Types of Movement and Barriers to Movement

Movement of plant and animal species occurs at every scale, from the small matter of crossing a trail to the significant task of climbing a mountain. Furthermore, movement of species can be described not only as locomotion, or movement of individuals, but also as dispersal of eggs, seeds, or larvae. Although the challenges to a single individual can be seen as an effective model for their whole species, habitat networks are more specifically relevant to **populations** than to individuals. Various species use these corridors frequently, seasonally, or only on rare occasions. Again, the large and wide-ranging animals utilize regional scale habitat networks most heavily, while smaller scale networks may occur between one stream and a woodland for frogs or among interconnected grasslands for a **population** of deer.

HABITAT CONNECTIVITY GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal HC- Protect ecosystem integrity by maximizing habitat connectivity.

Policy HC-1 Identify and include habitat connectivity from a local and regional scale in strategic land acquisition planning.

- ◆ Maximize habitat connectivity for priority plant and wildlife species in new property purchases.
- ◆ Actively participate and coordinate with regional and local land preservation groups and resource agencies to develop strategic goals for protecting or purchasing critical habitat areas and/or movement corridors.
- ◆ Emphasize protection of extensive and interconnected open space habitats.

Policy HC-2 Identify and protect existing habitat networks to prevent further compromise to ecosystem integrity. (See WM-2: Measure3)

- ◆ Evaluate existing facilities and land uses that impact habitat connectivity and riparian corridors and prepare plans for protection or restoration, as appropriate.
- ◆ Identify wildlife movement patterns and high value habitat features and formulate site-specific habitat management goals.
- ◆ Encourage field research activities including collecting, trapping, and tracking in support of studies that can inform District management of natural **resources** and ecosystems.
- ◆ Incorporate construction practices that avoid the creation of unnecessary barriers to habitat connectivity. Where feasible, utilize removable

Wildlife corridors, or the paths of movement between patches of an animal's distribution, are only one component of an effectively connected habitat. As the science of biogeography and population dynamics develops, wildlife corridors have come to mean structures or narrow reserves set aside for crossing highways at pinch points or along established migration routes. Habitat networks are a more resilient and extensive linkage of suitable environments that support dynamic and mobile populations of plants and animals.

fencing, wildlife friendly silt trapping devices, and other design features that allow passage of plants and animals during and after project implementation

- ◆ Evaluate the existing habitat values of human-made structures prior to removal.
- ◆ Strive to connect isolated natural areas through movement corridors to facilitate connection across barrier(s).
- ◆ Identify unique or locally rare habitat types and **target** for protection. Strive to maximize habitat connectivity for locally rare habitats such as serpentine grassland, valley oak woodlands, coastal terrace prairie, etc.

Early results from the Bay Area Puma Project indicate that Highway 17 may act as barrier to movement within the Santa Cruz Mountains. If mountain lions are not able to actively cross this barrier, it can result in a loss of connectivity leading to an isolated population of lions on the San Francisco Peninsula. Over time this isolated population may lose genetic diversity and become vulnerable to disease, predation, and other stressors. Multiple agency and landowner cooperation are needed to effectively address this issue.

Policy HC-3 Collaborate with neighboring land holders and surrounding agencies to support regional efforts to establish and maintain habitat networks. (See WM-2: Measure 3 and WM-3: Measure 3)

- ◆ Advocate for land use plans and policies that preserve the District's biogeographic connectivity with the greater Santa Cruz Mountains and with the neighboring Gabilan and Diablo Ranges.
- ◆ Review and comment on land use decisions that impact habitat connectivity within the District's jurisdiction and bioregion, including construction or modification of roads and proposals for large scale developments.

Policy HC-4 Restore, maintain or enhance local habitat networks formed within or incorporating Preserves and other protected lands. (See WM-2: Measure 3 and WM-3: Measure 3)

- ◆ Review and comment on land use decisions that impact habitats contiguous to those located on District Preserves. Recommend and support measures to maintain connected and undegraded habitats where possible.
- ◆ Protect and restore known habitats of rare, endangered, or special status species, taking into consideration the legal protection, distribution and abundance, and risk to specific resources involved.

- ◆ Designate sensitive habitat areas and, if necessary, limit or exclude public access to these areas for resource protection.
- ◆ Evaluate impacts on wildlife movement and habitat connectivity when planning trails and other facilities.
- ◆ Identify and protect established wildlife crossings to allow movement across existing roads. Where appropriate, modify established crossings to improve habitat features.
- ◆ Collaborate with resource agencies to restore and enhance the habitats of protected and **special status** species known to utilize preserve areas.

Policy HC-5 Preserve and enhance riparian, stream, and other wetland habitat locally and at a **watershed** level to provide important habitat connections. (See WM-2: Measure 3)

- ◆ Inventory and assess stream reaches accessible to **anadromous** fisheries to identify impediments to fish passage and opportunities for habitat **enhancement**. Remove artificial barriers to fish passage where removal would enhance spawning and rearing habitats.
- ◆ Enhance spawning and rearing habitats for **native** fisheries through restoration. Prioritize restoration and enhancement of areas providing habitat to sensitive species.
- ◆ Restore hydrologic processes altered by human activity by installing erosion control materials and structures, and minimizing culverts and drainage diversions where appropriate, and using improved drainage structures that minimize alteration of hydrology.
- ◆ Participate in regional watershed management planning and restoration activities.
- ◆ Identify and remove invasive species in riparian, stream and wetland habitats that act as a barrier to wildlife use

Streams can be thought of as linear habitat corridors, particularly for fish that migrate from land to sea. Anadromous fish, such as steelhead trout, return from the open ocean as adults to freshwater streams to breed. Human activities have greatly altered and degraded many of the streams in the Bay Area primarily through barriers to fish passage, such as road culverts and dams and through degradation of spawning habitats by excessive sedimentation of spawning gravels.

XV. WILDLAND FIRE MANAGEMENT

BACKGROUND

The Mediterranean climate of California's San Francisco Bay Area affords District lands an unparalleled diversity of plants and **habitats**; from redwood forests on the coast and northern portions of the District to dry **chaparral** habitats and **hardwood** (oak, madrone) dominated forests in the southern end of the District. Given the diversity of rainfall, climate, vegetation, soil and geology, one constant emerges throughout the District (and in fact throughout California); all landscapes have been subject to periodic fires through time. The present and future will be no different.

To understand the role of **wildland** fire on District lands, it is important to understand the past. Native Americans within the area utilized fire as a tool for improving wildlife habitat for grazing animals (deer, elk, rabbits), maintaining productive vegetation communities for food procurement (grasslands, oak **woodlands**), to maintain travel routes, and to manage **pests**. Burning by Native Americans took place for thousands of years, a practice that significantly increased the frequency of fire locally. These practices, in addition to the benefits listed above, greatly reduced much of the **fuel load** on the ground and significantly reduced the severity of fires within these fire managed landscapes.

Many of the vegetation communities on District lands evolved with the occurrence of periodic fire and have acquired unique adaptations to withstand and regenerate after a fire. Without periodic fire, these plant communities build abnormally high and dangerous fuel levels and are susceptible to large scale destructive fire events. Fire is a **natural** occurrence on the landscape; our challenge is to find ways to live safely with fire.

From 1860 through the early 1920's unprecedented alterations took place within the forests of the Santa Cruz Mountains. The ancient "**old growth**" forests were mostly clear-cut and burned. This removed the largest, most fire-resistant trees from the forested landscape. The forest that has grown back typically consists of a much higher density of trees that are more susceptible to fire. This period of time also corresponded to the first wave

of development within the San Francisco Bay Region and ushered in a new paradigm for wildland fire response: immediate suppression.

This has increased the time interval between fires on most land to time periods substantially longer than Native American burning and natural lightning-caused fire. The result is a vegetated landscape that has largely been prevented from burning, and that has accumulated fuel loads and structural characteristics that have not occurred on the landscape for thousands of years, if ever.

The District was formed in response to the observed population growth and development pressure within the San Francisco Bay Region of the late 1900's. This has substantially reduced residential development in some areas, and significantly decreased the level of fire risk by precluding development that would have likely otherwise resulted in additional high risk communities. Nonetheless, there is some residential development (including some on District property) intermixed with District Preserves that deserve consideration.

The **wildland-urban interface (WUI)** refers to areas where residential development, from a few scattered houses to larger subdivisions or communities, exist immediately adjacent to or nearby parks, open space preserves, or other relatively undeveloped "wildlands". Important issues within this interface include **defensible space** around residential structures, emergency vehicle access, and residential fire improvements such as water tanks, fire hydrants, sprinklers, and fire resistant construction techniques.

The District is an active participant in coordinating with various **fire agencies** and community fire planning efforts. District participation in these planning efforts will continue. These include the development of regional fire plans, **Fire Safe Council** meetings, and the preparation of **Community Wildfire Protection Plans (CWPPs)**. The District also coordinates with local fire agencies and other park agencies conducting and participating in **prescribed fire** for **resource management** purposes.

The District, for many years, has undertaken various wildland fire management practices to effectively manage fuel loads and decrease wildland fire risk. Among these, the District annually maintains a series of disc lines (where vegetation is mechanically disked with a tractor to reduce dry fuel along ignition sources such as roads); vegetation is mowed or brushed back from roads and trails; roads, parking areas, and Preserve entrances

The WUI is an area where urban ignition sources such as vehicles, equipment, burn piles, barbeques, chimneys, smoking, fireworks, etc. from adjacent residential properties and public streets pose a threat to Open Space lands. Residential structures can also supply fuel for fire that can cross into open space lands.

are maintained to provide access for District patrol vehicles and other emergency vehicles; and vegetation is cleared from around District structures and residences. Preserve access points are closed when appropriate during periods of high fire risk. The District possesses a number of firefighting apparatus including a water tank truck, and smaller water tanks with hoses outfitted on Ranger vehicles, as well as portable water-pack/spray outfits for individual personnel. Fire training is also provided to District personnel who may be involved in combating wildland fire.

The District has an active **vegetation management** program that has been **targeting** invasive plant species that can be fire hazards, such as eucalyptus and French broom. Active **livestock** grazing is being maintained and has been re-introduced on some Preserves to reduce the fuel loads in the mostly **non-native** grasslands. **Conservation grazing** is being used to encourage the vigor of native grasses and **forbs** that typically produce less fuel (thatch). Given their year-round growth cycle, perennial native grasses maintain moisture later into the dry season, reducing fire hazard. The vegetation management program at the District also utilizes prescribed fire for managing invasive species in addition to fuel load reduction benefits.

The substantial **historic** alterations of the landscape, the history of **fire suppression**, and the numerous jurisdictions involved in wildland fire management and suppression, present challenges in managing wildland fire, but also present many opportunities. Effective wildland fire management actions can be undertaken to reduce the severity of fires within the WUI and within the District's **ecosystems** and **watersheds**, when fires inevitably occur. Additionally, active management can achieve conditions suitable for the reintroduction of fire into many ecosystems, an ecological function that has been absent, except under atypically severe conditions, for most of the past century. Prescribed fire is a powerful tool that not only has ecological benefit, but also significant wildland fire management benefit.

WILDLAND FIRE MANAGEMENT GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal WF- Manage District land to reduce the severity of wildland fire and to reduce the impact of fire suppression activities within District Preserves and adjacent residential areas; manage habitats to support fire as a natural occurrence on the landscape; and promote District and regional fire management objectives.

Policy WF-1 Implement necessary fire and fuel management practices to protect public health and safety, protect natural resources, and to reduce the impacts of wildland fire.

- ◆ Prepare wildland fire management plans for District lands that address, at a minimum, public safety, District staff and firefighter safety, District infrastructure including residences and roads, natural resource protection (particularly **special status** species), **cultural resources**, and vegetation management for fire protection and **fire behavior** and hazardous fuels modification.
- ◆ Identify, with input from responsible fire agencies and neighboring public agencies, essential roads for wildland fire access. Maintain designated roads for fire access and patrol purposes, and improve with surfacing, additional turnouts and safety zones when necessary.
- ◆ Coordinate with fire agencies and local communities to identify locations where additional fire infrastructure is desirable and practical (e.g. hydrants, water tanks, helicopter zones, safety zones, **fuel breaks**, consistent with the **incident command system (ICS)**). Work cooperatively with these groups to install needed infrastructure.
- ◆ Work with Cal Fire and other appropriate fire management and regulatory agencies to develop and carry out plans that use prescribed burns to maintain and restore natural systems.
- ◆ Maintain adequate fire clearance around District structures and facilities. (See FM-5 and WF-4:Measure 5)
- ◆ Require lessees of District land or structures to maintain fire hazard reduction measures as directed.

- ◆ Prohibit activities that have a high risk of sparking fires during periods of **extreme fire hazard**.
- ◆ Close Preserve areas of particular concern during **extreme fire weather**, as appropriate, and increase patrol levels where appropriate.
- ◆ Seek grant opportunities and partnerships for fuel management and monitoring projects.

Policy WF-2 Aggressively support the immediate suppression of all unplanned fires that threaten human life, private property or public safety.

- ◆ Respond to wildland and structure fires on District lands in coordination with responding fire agencies.
- ◆ Prioritize and prepare Preserve specific wildland fire response plans that identify appropriate fire suppression activities for District lands in the event of a wildland fire. Plans should include detailed maps of infrastructure such as roads, fuel breaks, structures, water sources (hydrants, water tanks, ponds), as well as sensitive natural and cultural resources to be avoided during fire suppression activities.
- ◆ Direct bulldozer actions to areas identified in wildland fire response plans to minimize and reduce ground disturbance, erosion, and rehabilitation efforts wherever possible.
- ◆ Develop guidelines for appropriate rehabilitation measures to address erosion, **revegetation**, invasive species, trail and road stability, security, public safety, and natural and cultural resources following fires.

Defensible space is the area adjacent to a structure where basic wildfire protection practices are implemented, providing a key point of defense for an approaching wildland fire or area to escape from a structure fire. Cal Fire publishes guidelines for fuel (vegetation) treatments to create a perimeter around buildings and structures in order to maintain minimum conditions for firefighters to defend a property.

Policy WF-3 Work with adjacent landowners and fire agencies to maintain adequate fire clearance around qualifying structures. (See FM-5 and WF-1: Measure 5)

- ◆ Maintain a permit system that enables adjacent landowners to maintain defensible space clearance surrounding homes and other qualifying structures across property boundaries and onto District land as long as the activity is recommended by the local fire agency and is consistent with the District's resource management policies, including protection of environmentally sensitive habitat.
- ◆ Work with fire agencies and local governments to develop requirements for new development to maintain required fire clearance distance from District land wherever possible.

- ◆ Focus fuel management activities in areas adjacent to development, essential facilities and improvements, major egress and emergency routes, essential fuel breaks, and sensitive natural and cultural areas.
- ◆ Investigate alternative funding sources in conjunction with fire agencies and residential communities within the WUI adjacent to District Preserves to fund and implement fire hazard reduction projects.
- ◆ Work with fire agencies and residential communities to ensure that adequate evacuation routes and vegetation clearance around structures are maintained on adjacent non-District lands.
- ◆ Coordinate with fire agencies and local communities to define locations where community and regional fire protection infrastructure is desirable and practical.

Policy WF-4 Manage District vegetation communities to reduce the risk of catastrophic fire and to maintain biological diversity. (See VM-1 and FM-6)

- ◆ Promote the **restoration** and development of late-seral forest communities.
- ◆ Evaluate the potential to reduce forest fuel loading through the removal of smaller trees to reduce forest floor fuel buildup and **ladder fuels**.
- ◆ Continue to utilize and expand the District's **conservation grazing** program to reduce grassland fuels, brush encroachment, and encourage the vigor of native grass and forb species.
- ◆ Manage forest diseases such as Sudden Oak Death (SOD).
- ◆ Manage scrub, shrub, and chaparral communities to maintain a mosaic of ages and species within strategic management corridors on roads, ridgetops, and near residential development or other critical infrastructure to **compartmentalize** preserves and reduce fuel loads.

Policy WF-5 Conduct prescribed burns to re-introduce fire into native ecosystems and maintain natural ecological processes on District lands.

- ◆ Continue to utilize fire as a resource management tool to reduce fuels and reestablish fire for **resource benefit** where vegetation conditions, access, and public safety permit. Coordinate with other agencies for planning and implementation.

Sudden Oak Death mortality is also a potential concern within the wildland- urban interface area, as well as within other areas of District Preserves. This concern is currently being studied by researchers in conjunction with District staff. These studies should provide additional insight into the potential fire hazard associated with SOD mortality and propose effective management options.

- ◆ Continue to utilize prescribed fire to reduce and prevent unwanted fire damage resulting from excessive fuel load and altered **plant community** structure and to control invasive species.
- ◆ Conduct prescribed burns in an ecologically sound manner which mimic natural **fire regimes**, and to promote **biodiversity**.
- ◆ Conduct public **outreach** to recreational users, adjacent landowners and the general public through mailings, web site postings and press releases related to the benefits of prescribed fire and other fire management activities.

Policy WF-6 Foster and maintain interagency fire management partnerships.

- ◆ Annually coordinate with fire management and other resource agencies to discuss pre-fire planning conditions and needs in advance of the fire season.
- ◆ Participate in county **Fire Safe Councils** and Community Wildfire Protection Plan (CWPP) efforts.
- ◆ Train with fire agencies and participate in training burns when possible.
- ◆ Complete and distribute to fire agencies up-to-date maps of Preserve infrastructure including existing road network available for wildland fire management, helicopter landing zones, safety zones, evacuation routes, and other pertinent information.

Policy WF-7 Conduct research and monitoring to refine fire management practices.

- ◆ Monitor pre-project vegetation, soil, erosion, and **water quality** to establish baseline conditions for post project analysis.
- ◆ Monitor post fire and vegetation management projects to assess the achievement of project objectives and to identify potential impacts to vegetation, soil, erosion, and water quality.
- ◆ Conduct monitoring in a manner consistent with other land management agencies to obtain comparable data.
- ◆ Foster relationships with educational institutions, scientists and other land management professionals to inform District land management decisions based upon sound, current science, and to create opportunities for continuing research. Seek grants and pursue partnerships for research and monitoring.

- ◆ Integrate wildland fire management into District **interpretation** and education programs.

Policy WF-8 Wildland Fire management actions on District lands in the Coastside Protection Area will be in accordance with the policies established in the Service Plan for the San Mateo Coastal Annexation Area.

- ◆ In consultation with the County of San Mateo Environmental Services Department and fire agencies, determine whether the construction of dry hydrants on specific lands acquired is feasible in order to provide additional remote area water supplies for fire suppression activities
- ◆ Select native plant materials and/or seed mixes utilized at staging areas or along trails for their low maintenance and drought and fire resistant characteristics to minimize additional fuel available to wildland fires to the extent feasible.
- ◆ Where compatible with other trail characteristics, planners shall locate trail alignments and access points to allow trails to also serve as emergency access routes for patrol or emergency medical transport. Where feasible for more remote areas, emergency helicopter landing sites shall be provided.
- ◆ Coordinate with appropriate agencies, such as the County and Cal Fire to formalize mutual aid agreements.
- ◆ Consult with fire agencies in developing site-specific **fuel modification** and management programs for specific lands acquired as part of its Use and Management planning process, in addition to continuing the current District fuel management practices.
- ◆ Prohibit smoking, firearms, fireworks and off-road vehicle use and limit trail use, picnicking, and camping to designated activities.
- ◆ Develop and maintain staging areas and trail heads in accordance with the wildland fire **hazard mitigation** measures established in the Service Plan for the Coastside Protection Area.

XVI. CLIMATE CHANGE

BACKGROUND

Greenhouse gases, such as carbon dioxide, methane, and nitrous oxide, contribute to the atmospheric warming “greenhouse effect” by absorbing infrared radiation.

Climate change is directly affecting temperatures, precipitation, weather patterns, species ranges, wildfire risk, and sea levels, impacting the District’s ability to meet its resource management goals. Human activities that put excess **greenhouse gases** into the atmosphere, such as burning fossil fuels for transportation and energy generation, are the leading cause of climate change.

Impacts on Natural Systems

According to the National Park Service, the wide range of climate change impacts in the Bay Area include the following:

- ◆ Increase in average annual temperatures of 1.2 degrees Celsius (2.2 degrees Fahrenheit) between 1960 and 2010
- ◆ Northern shifts in winter bird ranges of 0.5 kilometers (0.3 miles) per year between 1975 and 2004
- ◆ Upward shifts in elevation for 12 percent of endemic species and 27 percent of non-native species between the periods of 1895-1970 and 1971-2009
- ◆ Sea level rise of 22 centimeters (9 inches) between 1854 and 2016
- ◆ Decrease in coastal fog by 33 percent between the periods of 1901-1925 and 1951-2008
- ◆ Increase in heavy storms by 25 percent between the periods of 1901-1960 and 1991-2000
- ◆ Human-caused climate change accounted for 10-20% of the 2012-2014 drought
- ◆ Climate was the dominant factor controlling the extent of wildfire burn areas between 1916 and 2003, even during periods of active fire suppression

The Carbon Cycle

The carbon cycle is a natural process by which carbon moves between different stores or reservoirs, such as the atmosphere, oceans, sedimentary rocks, soils, and plant biomass. When burning fossil fuels, humans move a massive amount of carbon from the ground to the atmosphere, putting the carbon cycle out of balance and causing climate change. The two key approaches to solving climate change are 1) to avoid adding any more carbon to the atmospheric store and 2) to move carbon from the atmospheric store to safer stores, such as plant biomass and soils. Humans can avoid adding more carbon to the atmospheric store by reducing greenhouse gas emissions from fossil fuels and preventing the release of carbon in plants and soils. Humans can facilitate the movement of carbon from the atmosphere into plant biomass and soils, also known as **carbon sequestration**, through land conservation and management. The District stewards over 63,000 acres of open space lands, including redwood forests, which store large amounts of carbon in trees, other vegetation, and soils.

Carbon sequestration is the process by which carbon is removed from the atmosphere and stored elsewhere, such as in plants and soils.

CLIMATE CHANGE GOAL, POLICIES, AND IMPLEMENTATION MEASURES

Goal CC- Reduce agency-generated greenhouse gas emissions, increase carbon sequestration, and promote resilience to climate change impacts

Policy CC-1 Reduce administrative greenhouse gas (GHG) emissions 20% below 2016 baseline by 2022, 40% below 2016 baseline by 2030, and 80% below 2016 baseline by 2050, in line with the State of California's GHG reduction goals.

- ◆ Implement Climate Action Plan strategies to reduce or offset administrative GHG emissions from vehicles, equipment, facilities, employee commuting, and tenant residences.
- ◆ Periodically update GHG Inventory and track GHG reduction.
- ◆ Improve GHG Inventory data quality and tracking systems.
- ◆ Consider GHG emissions related to all policies, plans, decisions, and management practices, in addition to other factors.

The State of California set a goal to reduce GHG emissions 40% below 1990 baseline levels by 2030 and 80% by 2050 (AB 32). The District first inventoried GHG emissions in 2016 so that is the baseline for the District's reduction goals.

District GHG emissions are divided into administrative emissions, which come directly from District operations such as vehicles and facilities, and non-administrative emissions, which are related to District activities but the District has less control over. A numerical GHG reduction goal is set only for administrative emissions.

- ◆ Evaluate the full life-cycle footprint of equipment, services, and supplies, and choose lower impact/responsible services and supplies.
- ◆ Develop sustainability guidelines for facilities, operations, projects, and events.

Policy CC-2 Reduce non-administrative GHG emissions related to District activities, such as visitor transportation and **livestock**.

- ◆ Implement Climate Action Plan strategies to reduce or offset GHG emissions from visitor transportation to preserves.
- ◆ Implement Climate Action Plan strategies to reduce or offset GHG emissions from **livestock**, and research additional techniques or technologies.
- ◆ Where agricultural sustainability is not a leading factor, select appropriate **livestock** species to accomplish vegetation management objectives (See GM-4).

Policy CC-3 Increase **carbon sequestration** in vegetation and soils and minimize carbon release from wildfire.

- ◆ Manage conifer forests to sustain and encourage the development of late-seral habitat conditions (FM-4). Evaluate the potential to reduce forest fuel loading through the removal of smaller trees to reduce fuel buildup and ladder fuels (See FM-5).
- ◆ Manage vegetation communities to reduce the risk of catastrophic fire and to maintain biological diversity (WF-4). Conduct prescribed burns to re-introduce fire into native ecosystems and maintain natural ecological processes on District lands (See WF-5).
- ◆ Evaluate, study, and implement additional land management strategies to increase carbon sequestration in vegetation and soils.
- ◆ Improve data on carbon sequestration in District lands.
- ◆ Evaluate opportunities to create and sell carbon offsets on the California Cap and Trade market or other voluntary offset markets.

Resilience is the capacity of natural and human communities to withstand and bounce back from climate stress and hazardous events.

Policy CC-4 Prepare for climate change impacts and promote **resilience** for both natural and built environments.

- ◆ Prioritize ecosystem function, resilience, and ecological diversity focused on multiple species benefits, rather than aiming to prevent ecological change or return to past conditions.

- ◆ Incorporate climate change impacts on natural resources such as species range and phenology changes into restoration and monitoring activities. Utilize an adaptive management framework to adjust resource management methods and priorities as impacts start to occur and climate change knowledge and response options continue to increase (See GM-3).
- ◆ Support ecological functions and ecosystem services that protect the built environment from climate change impacts, such as flooding and increased wildland fire frequency and intensity.
- ◆ Incorporate climate change impacts to infrastructure, such as flooding, drought, and sea level rise, into planning, project design, and other relevant activities.
- ◆ Evaluate, study, and implement additional land management strategies to promote ecosystem resilience.

Policy CC-5 Lead by example and support state, regional, and community-scale action on reducing climate change impacts to ecosystem health and biodiversity, and increasing ecosystem resilience.

- ◆ Support and participate in regional climate change initiatives and burgeoning community of practice. Foster partnerships to respond to climate change collaboratively, and seek opportunities to share information with other agencies.
- ◆ Support and influence local and state climate change policies that are protective of ecosystem health and biodiversity. Seek grant opportunities to fund implementation of GHG reduction, carbon sequestration, and natural resource resilience efforts.
- ◆ Increase public awareness of climate change impacts and solutions the District is pursuing through education and outreach. Incorporate climate change into interpretive programming, facilities, and materials (See PI-1).
- ◆ Coordinate and cooperate with institutions, agencies, organizations, and individuals conducting research on climate change and resource management (See RC-2).

XVII. GLOSSARY

Agricultural Infrastructure – Improvements made to a property to support an agricultural operation such as fencing, roads, water supply systems and structures. (Conservation Grazing Management)

Anadromous – Fish, such as steelhead trout, that return from the open ocean as adults to freshwater streams to breed. (Water Resources, Habitat Connectivity)

Archaeological site – A site in which physical evidence of past prehistoric or historic human activity has been preserved. (Cultural Resources)

Artifacts – Objects created by humans or modified by human activity. (Cultural Resources)

Barrier – An impediment to migration, genetic exchange, dispersal, or other essential movement of an organism. Barriers may be of natural or human-made origin. (Habitat Connectivity)

Best Management Practices (BMPs) – District developed standard practices that identify the preferred manner in which an activity is to be performed in order to be protective of both human health and the environment. (Vegetation Management, Integrated Pest Management, Water Resources, Conservation Grazing Management, Forest Management)

Biodiversity – Describes the natural variety and abundance of plants and animals and the environments in which they live. U.S. Congressional Biodiversity Act, 1990 HR1268, defines biodiversity as “The full range of variety and variability within and among living organisms, and the ecological complexes in which they occur, and encompass ecosystem or community diversity, species diversity and genetic diversity.” (Vegetation Management, Integrated Pest Management, Water Resources, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Biological Legacies – The retention of forest components that were originally present within the forest, prior to large scale disturbance such as fire, or timber harvesting. Notable “legacy” components include: large live

trees (especially old growth) with mosses and lichen growth within the canopy, hollow cavities, and complex large branch structure; large pieces of wood on the forest floor; intact forest soil and associated fungi and microbes. These forest components have a profound influence on recovering forest ecosystems and are important considerations for habitat reconnection and restoration. (Forest Management)

Boundary – The area of border between habitat patches or vegetation types; a zone comprised of edges of adjacent ecosystems or land types. (Habitat Connectivity)

Carbon Sequestration – The process by which carbon is removed from the atmosphere and stored elsewhere, such as in plants and soils. (Climate Change)

Chaparral – Shrub and small tree dominated landscapes composed of species with small, thick, evergreen, leathery leaves that often grow dense and tangled. (Vegetation Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Community Wildfire Protection Plan (CWPP) – The Healthy Forests Restoration Act (HFRA), passed in 2003 by the federal government, established statutory incentives for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects. In order for a community to take full advantage of this federal assistance, a community must first prepare a CWPP. CWPPs may address issues such as wildfire response, hazard mitigation, community preparedness, or structure protection—or all of the above. (Wildland Fire)

Compartmentalize – Using fire management techniques such as installation of shaded fuel breaks, or defensible space surrounding homes to separate a potentially large scale wildland fire into distinct smaller management areas separated by vegetation type, fuel loading, access, or terrain into pre-designated fire management units. (Wildland Fire)

Conifer, Coniferous – Cone bearing trees with needles or scale-like leaves, stay green throughout the year in California. Examples include:

coast redwood, Douglas fir, pine trees, and cypresses. Conifers are also referred to as softwood. (Forest Management, Ecological Succession)

Conservation Grazing – Conservation Grazing is the intentional use of grazing management to meet resource management objectives including protecting and enhancing habitat for native plants and animals that occur in grassland habitat and moderating the negative effects of invasive exotic plants on these species. (Wildland Fire, Conservation Grazing Management, Vegetation Management)

Contamination – Human-made waste that has polluted the environment making it unfit or unsafe. (Water Resources, Geology and Soils)

Core – The portion of an ecosystem or habitat where effects of the surrounding area are limited. (Habitat Connectivity)

Cultural Landscape – A landscape modified by past human activity or otherwise holding historical or prehistoric cultural importance. (Cultural Resources, Public Interpretation, Wildland Fire)

Cultural Resource – A structure, landscape feature, archaeological site, or other artifact of human activity in the past during prehistoric or historic periods. (Cultural Resources)

Cultural Resource Inventory – The District's inventory of cultural resources on District preserves. Information in this inventory may include site locations, descriptions, and photographs, as well as historical information on individual sites and preserves. (Cultural Resources)

Data Recovery – Research and recording techniques such as the excavation of archaeological sites or recording of architectural features prior to site disturbance. Data recovery is a common mitigation measure for projects that may have a substantial adverse impact on a significant cultural resource. (Cultural Resources)

Defensible Space – Defensible space is the area adjacent to a structure where basic wildfire protection practices are implemented, providing a key point of defense for an approaching wildland fire or area to escape from a structure fire. The California Department of Forestry and Fire Protection

(Cal Fire) publishes guidelines for fuel (vegetation) treatments to create a perimeter around buildings and structures in order to maintain minimum conditions for firefighters to defend a property. (Wildland Fire)

Disturbance (Ecological Disturbance) – The disruption of an ecosystem's structure and function, generally with effects that last for time periods longer than a single seasonal growing cycle for vegetation. (Wildlife Management, Integrated Pest Management, Water Resources, Geology and Soils, Ecological Succession)

Disturbance-dependent – Species that require disturbance to maintain habitat conditions suitable for reproduction and establishment. (Ecological Succession)

Ecological Succession – The sequential development of plant and animal communities following disturbance. (Ecological Succession)

Ecosystem – An area within the natural environment in which physical (abiotic) factors of the environment, such as rocks and soil, function together along with interdependent (biotic) organisms, such as plants and animals, within the same habitat. (Vegetation Management, Integrated Pest Management, Water Resources, Conservation Grazing Management, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Ecosystem Function – The interaction(s) or ecological processes that exists between organisms with one another and the physical environment, such as nutrient cycling, disturbance, soil development, water budgeting, and flammability. (Vegetation Management, Water Resources, Forest Management, Wildland Fire)

Edge – The portion of an ecosystem or habitat near its perimeter, where influences of the surroundings prevent development of interior/core-area environmental conditions. (Habitat Connectivity)

Enhancement – The process of altering a habitat to provide specific ecosystem functions. (Water Resources, Conservation Grazing Management, Ecological Succession, Habitat Connectivity)

Enhance – To increase or improve a habitat in value or quality. (Vegetation Management, Wildlife Management, Water Resources, Conservation Grazing Management, Forest Management, Ecological Succession, Habitat Connectivity)

Environmental Education – A learning process that increases people’s knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action. (Public Interpretation)

Exotic – Species that were not present in the Santa Cruz Mountains region of California prior to the large scale development of the American continent by European humans prior to 1769. (Conservation Grazing Management)

Extreme Fire Hazard/Weather – The National Weather Service, operating through cooperative agreement with the State of California, issues Red Flag Warnings during conditions of extreme fire weather. This alert is used by fire agencies to plan staffing levels and preparedness and set public use restrictions (such as campfires or the use of spark producing equipment). (Wildland Fire)

Five-Strand Barbed Wire Fencing – Fencing typically used in ranching operations to confine **livestock** to established areas, constructed of five evenly spaced rows of barbed wire stretched between posts comprised of wood or metal. (Conservation Grazing Management)

Flora – The plants of a particular region or period. (Conservation Grazing Management)

Fire Agencies – Agencies with jurisdiction to respond to wildland and structure fires on District lands and that may work in cooperation with the District in planning site-specific fuel and wildland fire management practices and in conducting training in fire and fuel management. They can include Cal Fire as well as local, regional, city, county and special district fire agencies. (Wildland Fire, Forest Management)

Fire Behavior – The manner in which a fire reacts to fuel, weather, topography, or fire suppression efforts. (Wildland Fire)

Fire Regime – The characteristic frequency, extent, intensity, severity, and seasonality of fires within an ecosystem. (Wildland Fire)

Fire Safe Councils – The Fire Safe Council is a coalition of public and private organizations with a common, shared interest in reducing losses from wildfires. (Wildland Fire)

Fire Suppression – Human efforts connected with fire-extinguishing operations, such as use of tools, engines, water or aircraft, or installation of fuel breaks, or removal of fuels surrounding homes or other structures. (Vegetation Management, Forest Management, Wildland Fire)

Food Web – The relationships between interconnected plants and animals in an ecosystem pertaining to how each organism gets their food and meets energy requirements. (Integrated Pest Management)

Forbs – A broad-leaved herb other than a grass, especially one growing in a field, prairie, or meadow. (Conservation Grazing Management, Wildland Fire)

Forest – Habitats dominated by tree species with a continuous or nearly continuous canopy covering substantial portions of the landscape. (Vegetation Management, Wildlife Management, Forest Management, Ecological Succession, Wildland Fire)

Forest Conditions – A characterization of forest age, structural complexity (height, spacing, multiple canopy levels), species composition, habitat suitability, biological legacies, fuel loads, diseases or pathogens, regeneration, and level of disturbance. (Forest Management)

Forest Management – The active stewardship of a forest or stand to achieve a desired future condition. (Forest Management)

Fuel – Combustible vegetation including live or dead forbs, shrubs, branches, trees, vines etc. (Vegetation Management, Conservation Grazing Management, Forest Management, Wildland Fire)

Fuel Break – A strip of land on which vegetation has been removed, reduced, thinned, or otherwise modified so that a fire burning into or up to it can be more readily controlled (Wildland Fire)

Fuel Load – The oven-dry weight of fuel per unit area. (Wildland Fire)

Fuel Modification – Breaking up, thinning, reducing, or otherwise modifying continuous fuels to prevent or reduce the spread of a wildfire. (Wildland Fire)

Fuel Wood – Woody vegetation or wood products, primarily used as fuel for heating, cooking, or industry. (Forest Management)

GIS (Geographic Information System) – A combined database and mapping system used for the storage, retrieval, and analysis of geographic data. (Integrated Pest Management, Research and Collection)

GIS Database – A database that contains information about the location of real-world features and the characteristics of those features. (Integrated Pest Management, Research and Collection)

Geologic Hazards – Hazards created by fault zones, landslide prone areas, and flood zones. (Geology and Soils)

Greenhouse Gases – Gases such as carbon dioxide, methane, and nitrous oxide that contribute to the atmospheric warming “greenhouse effect” by absorbing infrared radiation. (Climate Change)

Habitat – the combination of living and non-living factors that surround and potentially influence an organism; or species’ typical environment. (Vegetation Management, Wildlife Management, Integrated Pest Management, Water Resources, Scenic and Aesthetic, Conservation Grazing Management, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Habitat Fragmentation – the breaking up of a previously continuous habitat (or ecosystem) into spatially separated and smaller pieces. (Wildlife Management, Forest Management)

Hardwood – Broadleaf trees that usually produce flowers that ripen into fruits containing seeds. Local examples include: numerous oak species, madrone, tanoak, willows, and western sycamore. (Forest Management, Wildland Fire)

Hazard Mitigation – action taken to reduce or eliminate long-term risk to people and their property from hazards such as proximity of flammable vegetation, dead or dying tree limbs, or pollution or contamination in close proximity to homes or public facilities. (Wildland Fire)

High Priority District Forests – Forests that have been identified through inventories or other analysis as priority areas for forest management. Priority can be based on different management objectives such as: restoring degraded habitat, reconnecting late-seral habitat, and/or wildland-urban interface fire concerns. (Forest Management)

Historic – Dating from periods post-dating the use of written historical documents. In the American West, the historic period is generally considered to refer to all periods after European exploration and colonization of the region. (Water Resources, Scenic and Aesthetic, Cultural Resources, Forest Management, Ecological Succession, Wildland Fire)

Historical Rehabilitation – “The act or process of making possible a compatible use for a property through repair, alterations and additions while preserving those portions or features which convey its historical, cultural, or architectural values.” (Definition from *Secretary of the Interior’s Standards for Treatment of Historic Properties*) (Cultural Resources)

Host – A plant or animal that provides sustenance for another organism. (Integrated Pest Management)

Inbreeding Depression – The decrease in growth, survival and fertility of an individual often observed following mating among relatives or self-fertilization (in plants). (Wildlife Management)

Incident Command System (ICS) – a standardized, on-scene, all-hazard incident management concept. ICS allows its users to adopt an integrated organizational structure to match the complexities and demands of single

or multiple incidents without being hindered by jurisdictional boundaries. (Wildland Fire)

In Situ – “In place;” at the site of original deposition or discovery. (Cultural Resources)

Integrated Pest Management (IPM) – A long-term strategy that specifically reviews alternatives and monitors conditions to effectively control a target pest with minimum impact to human health, the environment, and non-target organisms. (Integrated Pest Management)

Interpretation – A communication method that aims to reveal meanings, connections, and relationships by firsthand experience, and by illustrative media. (Cultural Resources, Public Interpretation, Forest Management, Wildland Fire)

Interpretive Systems Plan (ISP) – An overarching analysis of the interpretive opportunities that exist throughout an agency’s parks or preserves. (Public Interpretation)

Invasive Species – animal or plant species that take over sufficiently large areas to reduce biodiversity. (Integrated Pest Management, Conservation Grazing Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Ladder Fuels – Live or dead vegetation that allows a fire to ascend from low lying vegetation such as forbs and grasses, into the upper or uppermost vegetation such as taller shrubs and trees. Common fuel ladders include tall grasses, shrubs, and tree branches, both living and dead. (Forest Management, Wildland Fire)

Late-Seral – Stage of forest development dominated by large mature trees. Initial age development of this stage for redwood and Douglas-fir forests is generally considered to occur between 80- and 300 years. Trees and forest begin to develop some characteristics associated with old growth including large decadent trees, snags and large down logs. (Forest Management, Wildland Fire)

Late-Successional – Same as late-seral. (Forest Management)

Livestock – The horses, cattle, sheep, and other useful animals kept or raised on a farm or ranch. (Integrated Pest Management, Geology and Soils, Conservation Grazing Management, Forest Management, Ecological Succession, Wildland Fire)

Livestock Protection Methods – Wildlife and **livestock** conflict mitigation tools that promote the protection and continued conservation of wildlife while safeguarding **conservation grazing** as a management tool (Conservation Grazing Management).

Native – Those elements of the natural world occurring within an ecosystem prior to disturbance from an outside event. (Vegetation Management, Wildlife Management, Integrated Pest Management, Water Resources, Geology and Soils, Scenic and Aesthetic, Cultural Resources, Research and Collection, Conservation Grazing Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Natural – Plant, animal, and microorganism life, native materials, and ecosystem processes that make up the physical world. (Vegetation Management, Wildlife Management, Integrated Pest Management, Water Resources, Geology and Soils, Scenic and Aesthetic, Cultural Resources, Research and Collection, Public Interpretation, Conservation Grazing Management, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Non-Native – Species which moved into, or were introduced into, preserve environments as a direct or indirect result of human activities. (Vegetation Management, Wildlife Management, Integrated Pest Management, Geology and Soils, Scenic and Aesthetic, Conservation Grazing Management, Ecological Succession, Wildland Fire)

Non-Target Organisms – those plants and animals that are not intentionally targeted by a pest management strategy in order to spare benign and often beneficial species. (Integrated Pest Management)

Northwest Information Center – A clearing house for historical and archaeological information associated with the California Historical Re-

sources Information System, which houses historical documents, site reports and other research pertaining to cultural resources in Northwest California. (Cultural Resources)

Old Growth – Stand or residual (uncut) trees in excess of 200 years old, often characterized by very large trees, large plated bark, broken, dead or forked tops, with a prevalence of mosses and lichens on large branches within the canopy. Old growth stands also typically include large snags and large downed logs. (Forest Management, Wildland Fire)

Open Space – Land and water areas that remain in a natural state and are minimally developed, and may include compatible agriculture uses. (Wildlife Management, Water Resources, Geology and Soils, Scenic and Aesthetic, Cultural Resources, Public Interpretation, Conservation Grazing Management, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Outreach – The communication of the District's mission and goals to a wide variety of audiences usually conducted away from the office or preserves. (Integrated Pest Management, Public Interpretation, Forest Management, Wildland Fire)

Patch – A relatively homogenous type of habitat that is spatially separated from other similar habitat and differs from its surroundings. (Habitat Connectivity)

Pathogen – A disease causing organism. (Vegetation Management, Forest Management)

Performance Measure(s) – Parameter(s) used to measure project success tied to project goals and objectives.

Pesticides – A broad term used to describe any material (natural, organic, or synthetic) used to control or prevent pests including herbicides (weed or plant killers), insecticides (insect killers), and rodenticides (rodent killers). (Integrated Pest Management)

Pests – Animals or plants that proliferate beyond natural control and interfere with the natural processes which would otherwise occur on open

space lands. (Integrated Pest Management, Forest Management, Wildland Fire)

Plant Community – A group of plants growing in an interrelated manner on a particular site. (Vegetation Management, Integrated Pest Management, Ecological Succession, Wildland Fire)

Population – the number of organisms in a particular species that occupy the same geographic region at the same time and are capable of interbreeding (Vegetation Management, Wildlife Management, Water Resources, Habitat Connectivity, Wildland Fire).

Predation – a biological interaction where a predator (an organism that is hunting or browsing) feeds on its prey (the organism that is hunted or consumed). (Integrated Pest Management, Wildlife Management, Habitat Connectivity)

Prehistoric – Dating from periods of human activity prior to the use of written history. In the American West, prehistory generally refers to all periods before European colonization of the region. (Cultural Resources)

Prescribed Fire – Fire applied to wildland ecosystems under specified fuel and weather conditions to accomplish predetermined resource management objective such as regeneration of sensitive species in a fire-adapted plant community. (Wildland Fire)

Programming – The regularly scheduled organized, topic-specific presentations or other delivery of information, including community outreach, education, interpretation, and docent led activities, or other special events. (Public Interpretation)

Residual Dry Matter (RDM) – A measure of the amount of vegetation left on the ground, typically measured at the end of the summer or fall. Appropriate levels of RDM strive to minimize thatch, which can inhibit new plant growth, while maintaining adequate levels of vegetation to prohibit soil erosion. (Conservation Grazing Management)

Resilience – The capacity of natural and human communities to withstand and bounce back from climate stress and hazardous events. (Climate Change)

Resource Integrity – The extent to which character-defining features of a resource or its research potential remain intact. (Cultural Resources)

Resource Management – Management of both natural and cultural resources. Natural resource management generally consists of protecting, restoring, enhancing and monitoring native vegetation and wildlife, and monitoring and protecting the quality of geological and hydrological conditions. Cultural resource management consists of identifying and evaluating archeological sites and cultural landscapes. (Vegetation Management, Geology and Soils, Research and Collection, Public Interpretation, Conservation Grazing Management, Forest Management, Wildland Fire)

Resources – Plants, animals, water, soil, terrain, geologic formations, historic, scenic, and cultural features. (Vegetation Management, Wildlife Management, Integrated Pest Management, Water Resources, Geology and Soils, Scenic and Aesthetic, Cultural Resources, Research and Collection, Public Interpretation, Conservation Grazing Management, Forest Management, Habitat Connectivity, Wildland Fire)

Restoration – The process of returning land that has been degraded and disturbed into functional habitat. (Vegetation Management, Integrated Pest Management, Water Resources, Research and Collection, Forest Management, Wildland Fire)

Restore – To bring back to or put back into a former or original state. (Vegetation Management, Geology and Soils, Public Interpretation, Conservation Grazing Management, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Revegetation – The process of replacing existing vegetation on a site with desired vegetation. (Vegetation Management, Geology and Soils, Wildland Fire)

Riparian – Terrestrial environments adjacent to lakes, streams, springs and estuaries where transported surface and subsurface fresh water provides soil moisture for vegetation. (Wildlife Management, Water Resources, Geology and Soils, Forest Management, Habitat Connectivity)

Significance – A measure of the importance of an archaeological or historical resource. The threshold of significance determines eligibility for state and national registers and whether a cultural resource must be considered in NEPA and CEQA documents related to a project. The criteria detailed in CEQA by which significance (See Appendix A) is determined differ for historic and archaeological resources but include the resource's age, integrity, association with important individuals or trends in local history, and potential to provide important information about the past. (Cultural Resources)

Snag – A standing dead or partially dead tree, important wildlife habitat for woodpeckers and other cavity nesting birds, and small mammals. (Wildlife Management, Forest Management)

Soil – Natural material that covers much of the earth's surface; consisting of rock and mineral particles often mixed with organic matter. (Vegetation Management, Wildlife Management, Integrated Pest Management, Water Resources, Conservation Grazing Management, Forest Management, Habitat Connectivity, Wildland Fire)

Special Status – Species that are state or federally listed as threatened, rare, endangered, species of special concern, candidate species or those plant species listed by the California Native Plant Society. (Vegetation Management, Wildlife Management, Water Resources, Forest Management, Ecological Succession, Habitat Connectivity, Wildland Fire)

Stand – An aggregation of trees occupying a specific area, similar in age, size, arrangement and composition, that is distinguishable from the forest in adjoining areas. (Forest Management)

Target Pests – Plant or animal species that have a negative impact on other organisms or the surrounding environment and are targeted for treatment. (Integrated Pest Management)

Ungulate Animals – Hoofed mammals, including ruminants, such as cattle, goats, and sheep, as well as horses, and donkeys. (Conservation Grazing Management)

Vector – An organism, such as a tick or mosquito, that is able to transport and transmit a pathogen to a host. (Integrated Pest Management)

Vegetation Management – The maintenance, establishment, or restoration of target vegetation that meets a preserve's management objectives. (Vegetation Management, Conservation Grazing Management, Wildland Fire)

Watercourse – A natural or artificial channel through which water flows. (Water Resources, Geology and Soils, Habitat Connectivity)

Waters – Areas of standing water, seasonal and permanent, such as lakes and ponds, as well as underground aquifers. (Water Resources)

Water Quality – The chemical, physical, and biological characteristics of water. Important issues related to forest management include water temperature, nutrients, and sediment inputs. (Wildlife Management, Water Resources, Conservation Grazing Management, Forest Management, Wildland Fire)

Watershed – A bounded hydrologic system, where all of the precipitation that falls drains into a single water feature, often a creek or stream. (Vegetation Management, Water Resources, Habitat Connectivity)

Wetlands – Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions (hydrophytes). (Wildlife Management, Integrated Pest Management, Geology and Soils, Conservation Grazing Management, Ecological Succession, Habitat Connectivity)

Wildland – Land in a natural uncultivated state that forms habitat for plants and wildlife. (Vegetation Management, Integrated Pest Management, Water Resources, Conservation Grazing Management, Wildland Fire)

Wildland-Urban Interface – The area where structures and other human development meet or intermingle with undeveloped wildland. (Wildland Fire)

Wildlife – A broad term that includes all living animals that have not been domesticated. (Vegetation Management, Integrated Pest Management, Water Resources, Scenic and Aesthetic, Research and Collection, Conservation Grazing Management, Forest Management, Habitat Connectivity, Wildland Fire)

Wildlife Corridors – Avenues along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, **populations** can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas. (Habitat Connectivity)

Woodland – A scattering of trees across a landscape intermixed with a significant component of another vegetation community, such as grass or shrub land. (Vegetation Management, Forest Management, Habitat Connectivity, Wildland Fire)

XVIII. REFERENCES

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APPENDIX A. CEQA CRITERIA

This appendix outlines the CEQA Criteria of Significance for Historic Resources and Archaeological Resources:

HISTORICAL RESOURCES

A historical resource may be considered significant under CEQA if it is listed on the National Register of Historic Places (NRHP), California Register for Historical Resources (CRHR), or a local register (e.g., a town or county register), if it is determined to be eligible for the CRHR by a qualified expert, or if a Lead Agency finds it to be historically significant based on substantial evidence.

A resource is considered eligible for listing on the CRHR if it meets one of the following criteria:

- ◆ Criterion 1: Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
- ◆ Criterion 2: Associated with the lives of persons important to local, California, or national history.
- ◆ Criterion 3: Embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic value.
- ◆ Criterion 4: Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

ARCHAEOLOGICAL RESOURCES

In addition to the definition of historical resources above (which can include archaeological sites), the following criteria for unique archaeological resources (California Public Resources Code 21083.2) determine significance under CEQA:

A resource is considered a unique archaeological resource if it meets one of the following criteria:

- ◆ Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- ◆ Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- ◆ Is directly associated with a scientifically recognized important prehistoric or historic event or person.