Midpeninsula Regional
Open Space District

R- 20-71
Meeting 20-14
July 8, 2020

SPECIAL MEETING AGENDA ITEM 1

AGENDA ITEM

Midpeninsula Regional Open Space District Mountain Lion Conservation Efforts

GENERAL MANAGER'S RECOMMENDATION

Receive and discuss information about the status of mountain lion (also known as 'puma', 'cougar', 'lion', *Puma concolor*) in California and the Santa Cruz Mountains, and the conservation efforts and policies of the agency to protect mountain lion populations and reduce potential conflicts from human-mountain lion encounters. No Board action required.

SUMMARY

Mountain lions in the Santa Cruz Mountains are under threat from several factors, including habitat loss, habitat fragmentation, human caused mortality through vehicle strikes and depredation, poor genetic diversity, and impacts from rodenticide poisoning. Mountain lions are currently in a one-year review period for consideration of listing as a threatened species under the California Endangered Species Act. The Santa Cruz mountain population is one of six populations in the state that is considered at risk of localized extinction due to poor habitat connectivity and genetic depression.

The Midpeninsula Regional Open Space District (District) has protected nearly 65,000 acres of prime mountain lion habitat in the Santa Cruz Mountains and is committed to protecting regional mountain lion populations by preserving habitat, increasing habitat connectivity, minimizing human-wildlife conflicts, promoting bans and restrictions on rodenticide use, educating the public about mountain lions, and supporting research that improves our understanding of lion populations, ecology, and behavior throughout our region.

The District is committed in continuing to support healthy lion populations by furthering efforts to preserve habitat and provide habitat connectivity throughout the Santa Cruz Mountains and beyond. Additionally, the District is working towards amending the Grazing Management Policy to address potential conflicts between wildlife and livestock while protecting lion populations. The District is also exploring opportunities to further local understanding of mountain lion habitat use, behavior, and potential habituation to humans by developing a wildlife photo index project at Rancho San Antonio Open Space Preserve and partnering with the University of California Santa Cruz Puma Project to develop a Human/Mountain Lion Interaction Study and Management Plan.

BACKGROUND

The presence of mountain lions is a strong indicator of ecosystem health. As apex predators, lions play essential roles by regulating deer populations and supporting soil health, scavengers, and decomposers that rely on nutrients and sustenance from decomposing carcasses. Where healthy lion populations persist, deer behavior is influenced, resulting in reduced herbivory within forest-edge habitats. Additionally, lion suppression of deer numbers reduces the prevalence of Lyme disease by naturally managing the deer population that support large numbers of ticks.

While lions provide many ecological services that improve ecosystem function as well as directly benefit humans, they occasionally come into conflict with people. Continued loss of lion habitat and urban expansion has increased the potential for human-lion conflicts. The most common instances of human-lion conflict come in the form of mountain lions attacking unprotected livestock or pets. Sheep and goats make up the majority of these attacks and in some cases the livestock owner will request a depredation permit from the California Department of Fish and Wildlife (CDFW) for the legal lethal removal of a mountain lion. According to CDFW data, 75-85% of annual lion depredation permits are issued in response to sheep and goat losses. Instances of livestock loss may also increase illegal hunting (poaching) of mountain lions.

On very rare occasion, mountain lions have attacked people. Since 1986 there have been only seventeen confirmed mountain lion attacks on people in the state of California, most of which resulted in minor injuries. Unfortunately, three of these attacks were fatal. In instances of mountain lion attacks on humans, CDFW attempts to capture and humanely euthanize the offending lion in order to protect public safety. Two of the seventeen confirmed attacks took place on District preserves, highlighting the importance of District efforts to address human-lion conflict. These two attacks occurred in 2014 at Picchetti Ranch Open Space Preserve, and most recently, in February of 2020 at Rancho San Antonio Open Space Preserve. In both cases, the victims of the attacks recovered from their injuries.

Permanent signage is posted at all preserve entrances to inform visitors of the presence of mountain lions and provide instructions about what actions to take if a mountain lion is encountered. In both cases of mountain lion attacks on District lands, the District promptly requested CDFW response and coordinated with them throughout each incident. CDFW has the primary reasonability for wildlife management throughout the state. In addition to coordinating with CDFW, District staff implemented District wildlife response protocols, closed preserves, and heightened warnings in surrounding areas to inform and protect visitors. Human-lion conflict threatens mountain lion populations when mountain lions must be removed. There is limited current scientific understanding of factors that influence human-mountain lion conflict as well as appropriate management strategies to minimize these conflicts while protecting healthy mountain lion populations. As a result, the District relies heavily on CDFW expertise, and its role as an important partner who holds the responsibility for managing statewide mountain lion populations.

DISCUSSION

District Policy:

In 2014 the Board approved a set of Resource Management Policies (Attachment 1) that direct the District's resource preservation actions, which are summarized in the 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.

Housed within these Resource Management Policies is the Wildlife Management Policy, which has the following goal:

Maintain and promote healthy and diverse native wildlife populations.

This goal is supported by specific policies, which include the following:

- Policy WM-1: Understand and maintain the diversity of native wildlife.
- Policy WM-2: Protect, maintain and enhance habitat features that have particular value to native wildlife.
- Policy WM-3: Protect animal populations against the impact of human actions.
- Policy WM-4: Protect and enhance the habitats and populations of special status animal species

All of the above listed policies relate to the District's mountain lion conservation efforts, which include funding and support of ongoing lion research, preservation of lion habitat, increasing habitat connectivity, reducing conflicts between humans and lions, public outreach and education about lions, supporting legislation that regulates rodenticide use, and advocating for further legal protections for vulnerable mountain lion populations.

Threats to and Status of Mountain Lions:

Mountain lion populations face several serious threats that put their chances of long-term survival at risk. The largest of these threats come in the form of habitat loss and fragmentation. Urban development and the expansion of roads and highways have diminished and fractured suitable lion habitat, reducing the ability for mountain lions to survive, reproduce, disperse and spread genes between disjunct populations. This has led to a lack of genetic diversity in several mountain lion populations. A common representation of genetic diversity is 'effective population size', which is an estimate of the number of animals in a population with free genetic exchange with the same genetic diversity as the studied population. In fragmented habitats with limited genetic exchange with adjacent populations (breeding), the effective population size may be much lower than the actual population size. A recent study estimates the effective population size in the Santa Cruz Mountain at 17 individuals (for reference, the current adult population size is estimated to be between 33-66 individuals). Many conservation geneticists consider an effective population of 50 or more as necessary to avoid a short-term risk of inbreeding depression. Populations with poor genetic diversity are less resilient to disturbances like drought, fire, and disease, and are at a higher risk for extirpation (localized extinction).

Mountain lions also face threats from human-caused mortality events, including depredation (permitted lethal removal of a mountain lion in response to the loss of a domestic animal), poaching, and vehicle strikes. These issues reduce the number of individual lions, disrupt social hierarchies by removing established adults, and compound issues of poor genetic diversity by increasing the likelihood of inbreeding. In addition to direct mortalities, humans also impact lion populations through secondary poisonings caused by the use of rodenticides.

On April 15, 2020, the California Fish and Game Commission (CFGC) voted unanimously to evaluate mountain lions as threatened under the California Endangered Species Act (CESA). The commission designated six Evolutionarily Significant Units (ESU) that include a region spanning from the Santa Cruz Mountains to the southern Coast Ranges and into southern California. These regions are home to at risk populations representing six of the ten known distinct populations of mountain lions in the state. This decision triggers a one-year review period during which mountain lions will be protected under CESA and will need to be considered during any California Environmental Quality Act (CEQA) review process for applicable projects. The District wrote a letter to the CFGC in support of the evaluation for listing (Attachment II) and joined as signatories on letters from the Center for Biological Diversity and the Western Wildlife Corridor Working Group. The District's letter promotes robust research, expansion of wildlife crossings and habitat conservation work, and assistance from CDFW to facilitate effective human-mountain lion conflict management actions throughout the state. Recent mountain lion population research suggests that the Santa Cruz Mountains differ from areas in southern California in sustaining higher numbers of individual mountain lions but with low genetic diversity.

Habitat preservation:

The District has protected nearly 65,000 acres of prime mountain lion habitat throughout the Santa Cruz Mountains to date. With the exception of Ravenswood Open Space Preserve and the Stevens Creek Nature Shoreline Study Area, all District preserves include viable mountain lion habitat. Coupled with work of similar preservation agencies, District preserves make up a regional greenbelt of connected habitat extensive enough to support the needs of wide-ranging mountain lions that can require territories of up to ninety square miles. According to a recent study by CDFW, continued protection of high-quality mountain lion habitat, along with improved connectivity between these habitats, are the most essential factors in preserving the species.

Habitat connectivity:

Highway 17 Wildlife and Regional Trail Crossing Project

The District is currently developing wildlife and regional trail crossings across Highway 17 to connect over 30,000 acres of protected public lands. Well-placed and appropriately designed wildlife crossings enable wide-ranging animals like mountain lions to roam while helping to reduce wildlife-vehicle collisions and wildlife mortalities. The Highway 17 wildlife crossing project is one of several local efforts to create connections between the Santa Cruz Mountains, and the Gabilan and Hamilton mountain ranges.

A recent study by CDFW suggests that the Santa Cruz Mountains need 196,1170 acres of protected mountain lion habitat to sustain a healthy lion population in perpetuity. Unfortunately,

the Santa Cruz mountains do not contain that many acres of suitable lion habitat. This makes connectivity a key factor for sustaining mountain lion populations in the region. When completed, the Highway 17 Wildlife and Regional Trail Crossings Project will improve connectivity between the northern and southern portions of the Santa Cruz Mountains and facilitate dispersal into adjoining suitable habitat in the Gabilan and Hamilton ranges.

Human-Mountain Lion Conflict:

Grazing Management Policy Amendment

In the late 1990s, coastal residents expressed their support for extending the District's boundaries to include the San Mateo County Coast, where development was beginning to threaten the area's rural character and agricultural heritage. When District boundaries expanded in 2004, a commitment to preserve agricultural land and rural character, and encourage viable agricultural use of land resources, was made to the Coastside community and embedded in the District's Coastside mission statement:

To acquire and preserve in perpetuity open space land and agricultural land of regional significance, protect and restore the natural environment, preserve rural character, encourage viable agricultural use of land resources, and provide opportunities for ecologically sensitive public enjoyment and education.

To date, the District has protected more than 11,000 acres of open space and agricultural land on the San Mateo County Coast, including more than 40 percent of San Mateo County's ranchlands. The District has invested more than $16 million in land preservation, environmental restoration, and ecologically-sensitive public recreation on these preserved coastal properties.

Coastal grasslands are one of the most biodiverse and threatened ecosystems in North America, and in many cases depend on regular disturbances like grazing or fire to prevent encroachment by introduced species, shrubs, and forest. These disturbances were historically provided by wildlife herds and Native American burning practices.

Conservation grazing is distinguished from basic livestock production in that the primary purpose for the use of livestock is to further the conservation goals of protecting and increasing grassland habitat biodiversity, including populations of important pollinators. To accomplish these goals, a Rangeland Management Plan is specifically customized for each grazing site that sets specific management parameters, such as stocking rates, class of livestock, seasonality, and duration of grazing activity. The District uses conservation grazing as a critical tool for managing approximately 8,000 acres of coastal grasslands for ecological health, biodiversity, and wildland fire safety. The District's Conservation Grazing Program is a mutually beneficial partnership with small-scale local ranchers on the San Mateo County Coast to accomplish multiple goals aligned with the District's mission.

The District began its conservation grazing program in 2007 to maintain and enhance the diversity of native plant and animal communities by preserving grassland habitat, manage fuel loads for fire protection, sustain the local agricultural community, and preserve the region's rural agricultural heritage. As the District continues to acquire new lands that may be included in the conservation grazing program, there is a growing need to define the roles of the District and its tenants in addressing wildlife and livestock conflicts when they arise. The District does not allow

and will not consider allowing the take of mountain lions in response to predation of livestock, even if allowed under state law. Amendments to the Grazing Management Policy are currently under review that will provide greater guidance for the District's conservation grazing program to reduce and/or mitigate wildlife conflicts, further clarify the District's role and strategy in managing these conflicts, and set a clear understanding for grazing tenants of District provisions for addressing these issues. The proposed amendments are specifically are focused on the following:

- **Further scientific research:** Supporting science that informs wildlife and livestock protection regionally. Researching the best tools to consider for proactively reducing interactions between wildlife and livestock.
- **Explore economic tools:** These include adjusting reimbursements for confirmed losses and adjusting rent to compensate for expected livestock loss.

Public Safety

The District follows up on all reported mountain lion observations submitted by staff, consultants, and members of the public on District lands. These data, to the extent available, play an important role in allowing staff biologists to evaluate trends in lion activity and determine the appropriate response to potentially concerning mountain lion behavior. When a lion observation takes place, Natural Resources staff contacts the reporting party and conducts an interview to determine the specifics of the observation. Mountain lion observations are evaluated under the District's wildlife response protocols (Attachment III) and the District takes appropriate actions to reduce risks to public safety, which include consultation with CDFW.

Working closely with biologists from CDFW, the District determines the appropriate response to lion activities. The majority of mountain lion observations on District lands do not involve concerning mountain lion behavior. However, there are occasions when mountain lions exhibit threatening or unusual behavior, and in very rare and unfortunate instances, mountain lions have attacked humans. As previously mentioned, two attacks on humans have occurred in District preserves. One attack took place in 2014 at Picchetti Ranch Open Space Preserve, and another occurred on February 16, 2020 at Rancho San Antonio Open Space Preserve. Both attacks involved children and were non-fatal.

Rancho San Antonio Open Space Preserve (RSA) is by far the most popular District preserve with over 700,000 visitors per year. The preserve is bordered by highly urbanized environments to the north and east, Lehigh Permanente Quarry to the south, and acts as a peninsula of suitable mountain lion habitat within this highly developed landscape. In addition, mountain lion prey species, including their preferred prey of deer, attract mountain lions to the area. The combination of highly suitable mountain lion habitat, surrounded by less suitable mountain lion habitat in adjacent areas, and large influxes of human activity likely play a significant role in the number of mountain lion observations the District receives from RSA. Since 2015, the District has taken various actions in consultation with CDFW, including increased signage, public educational tabling, and nine (9) separate preserve closures due to concerning mountain lion behavior at RSA. The District continues to actively monitors mountain lion behavior and coordinate with CDFW as needed.

District response to aggressive mountain lion behavior is science-based and multifaceted. Aggressive behavior from a mountain lion is not always abnormal. If a lion has a stashed prey carcass, or young nearby, they may not immediately retreat from the presence of humans.

Because of this, the District often responds to concerning lion behavior by closing portions of preserves for a one-week period. This gives lions a chance to consume any carcass they may be guarding or relocate young to another den site. In instances when there are multiple reports of aggressive lion behavior from different locations within one region within a short time-period, the District may close an entire preserve. This may indicate that lion aggression is not related to normal hunting/feeding or parenting behavior. In the tragic event of a mountain lion attack on a human, District protocols require immediately closing the Preserve and contacting CDFW. CDFW has jurisdiction over all wildlife in the state and acts on the behalf of public safety to humanely euthanize any mountain lion that has attacked a human.

In addition to the actions stated above, the District has undertaken further proactive measures to reduce the potential for human-lion conflict by 1) educating the public on mountain lion safety, 2) holding public education events to inform the public about lion activity, and 3) modifying access to the preserves when warranted.

First, permanent preserve signage includes information about what to do if visitors see a mountain lion and, in the event, that the District has received reports of a recent sightings, increased temporary signage or warnings are posted in accordance with District protocols. Second, with regard to public education, since 2017, the District has held annual "Mountain Lion Awareness Week" tabling events where staff and volunteers provide onsite lion safety information to preserve users at RSA. On May 28, 2020, the District also held a virtual live event titled "Coexisting with Cougars", which informed 380 participants on the District's work to conserve mountain lions and how to stay safe in lion habitat. Third, the District has modified its management of the RSA preserve in order to reduce the chances of visitors encountering mountain lions. Specifically, in response to an encounter in 2016 where joggers running at RSA before sunrise were approached by a mountain lion, the District changed preserve operation hours to discourage public access during non-daylight hours when lions are more active.

Rodenticides:

Research by the Department of Pesticide Regulation discovered that 92% of mountain lions throughout California had been exposed to anticoagulant rodenticides. Rodenticide poisoning is often linked to notoedric mange. This disease is caused by mites infesting the skin of animals with compromised immune systems, making them weak and emaciated, impacting their ability to survive.

In 2014, twelve bobcats at Rancho San Antonio Open Space Preserve died from notoedric mange and dozens were reported sick. District research discovered that commonly available rat poisons within a category of pesticides known as second-generation anticoagulant rodenticides (SGAR) were linked to the bobcats' illnesses. In response, District staff educated preserve neighbors about the effects of rodenticides on wildlife and joined the ongoing effort to lobby the California State Legislature in prohibiting the use of SGARs. In 2014, the legislature passed AB 2657 limiting access to SGARs to individuals with pest control licenses. The District also implemented a new plant and animal pest management program in the preserves that focuses on non-chemical controls and furthers its ongoing prohibition of SGARs on District land to protect human and environmental health.

SGARs are still used to this day by pest control companies and continue to impact local predators. In 2019, legislation to ban the use of SGARs in California (AB 1788) was pulled from consideration and will be taken back up in 2020.

Mountain Lion Research:

To facilitate scientific understanding of lion behavior, ecology, movement, and population dynamics, the District has worked with and supported research efforts by the University of Santa Cruz California (UCSC) Puma Project (for over a decade), CDFW, Pathways for Wildlife, and the Bay Area Puma Project. The District has granted access to preserves for research activities, provided grant funding, and coordinated with research organizations to facilitate groundbreaking research that has improved scientific knowledge of lions in the Santa Cruz Mountains and throughout the state. These efforts have helped identify suitable wildlife crossing locations, lead to greater understanding of the genetic structure of mountain lion populations throughout California, and informed the collective understanding of human impacts on lion populations and behavior.

Future opportunities:

Rancho San Antonio Wildlife Photo Index:

Natural Resources staff are currently developing a Wildlife Photo Index project to deploy at RSA. This project will rely on a system of wildlife cameras strategically placed to collect standardized data on wildlife diversity, habitat use, and abundance relative to other species. This study can inform the District on how lions are using habitat at RSA and what factors might influence their movement patterns, including human activities and recreation. This project will provide opportunities for community science and volunteer engagement in the form of outreach and data management. This project is scheduled to begin in Fiscal Year 2020-21.

Human-Mountain Lion Interaction Study and Management Plan

The District has made exploratory steps in developing a lion collaring study at RSA and surrounding preserves in partnership with the UCSC Puma Project. This project seeks to understand the factors that influence interactions between humans and mountain lions, and develop site-specific management actions for reducing the potential for human-lion conflict in areas with high levels of human-lion encounters. The proposed five-year study will rely on GPS accelerometer collar data to determine lion habitat use in relationship to numerous factors, including human activity, habitat type, and trail characteristics. This study will also estimate the local lion population at RSA and surrounding preserves to the extent possible.

FISCAL IMPACT

None.

BOARD COMMITTEE REVIEW

This item is being brought to the full Board given full Board interest.

PUBLIC NOTICE

Public notice was provided as required by the Brown Act.

CEQA COMPLIANCE

Review and discussion of mountain lion status in California and the Santa Cruz mountains, current and future District conservation efforts and policies relating to mountain lions, and work to reduce potential human-lion conflicts is not a project subject to the California Environmental Quality Act. Approval of future studies and projects related to the work discussed in this report will be accompanied by appropriate CEQA review.

NEXT STEPS

The projects mentioned in this report are included in the District's Fiscal Year 2020-21 Budget and Action Plan. Below is a summary of the schedules for these projects:

Highway 17 Wildlife and Trail Crossing Project

- 2020-2022: Environmental review and Caltrans Project Report
- 2022-2024: Design (plans and specifications)
- 2025-2029: Construction (funding dependent)

Grazing Management Policy Amendment

- September 1, 2020: Planning and Natural Resources Committee Meeting
- October 28, 2020: Board Adoption of Policy
- 2021-2026: 5-Year Wildlife and Livestock Protection Efficacy Research

Wildlife Photo Index Project

- July 2020: Deploy camera array
- 2020-2022: Data collection and processing

Human-Lion Interaction Study and Management Plan

- July 22, 2020: Board approval of contract
- 2020-2025: Public outreach
- 2020-2025: Implementation of study with annual updates to Board
- 2025: Receive management plan

Attachments:

1. Resource Management Policies
2. District letter of support for evaluation of listing mountain lions
3. Wildlife Response Protocols

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ATTACHMENT 1

RESOURCE MANAGEMENT POLICIES

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

JULY 2018

ATTACHMENT 1

ATTACHMENT 1

RESOURCE MANAGEMENT POLICIES

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 fist 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 cites 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.

propriate 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 barb 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.

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.

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-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.

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

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-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. Grazing operations that manage grasslands for multiple benefits require water in remote areas. Irrigation supports farming that provides local food.

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.

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

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

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

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

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

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

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.

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.

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.

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, 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 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 of 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** 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.

- 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

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.

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-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).

- 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.

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VIII. CULTURAL RESOURCE MANAGEMENT

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.

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.

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.

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.

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.

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.

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,

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 descendents 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.

CULTURAL RESOURCE GOALS, POLICIES, AND IMPLEMENTATION MEASURES

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.

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 descendents 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.

- 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.

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.

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.

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.

- 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.

Policy CR-6 Preserve District institutional history.

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

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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**

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.**

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.

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XI. GRAZING MANAGEMENT

BACKGROUND

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.

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. The **flora** that emerged has been described as one of the most diverse and species rich ecosystems in the United States.

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

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.

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

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** 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.

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 is **five-strand barbwire fencing**. Other fencing types that may be used include four-strand barbwire 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 Grazing Management Policy are intended to supplement and complement the Agricultural Policies in the Service Plan. Furthermore, these Grazing Management Policies will be implemented in a manner that is consistent with the Service Plan.

GRAZING MANAGEMENT GOALS, POLICIES, AND IMPLEMENTATION MEASURES

Goal GM-	**Manage District land with livestock 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 GM-1 Ensure that 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 rangeland manager including **best management practices (BMPs)** for preserves where 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)

Policy GM-2 Provide necessary infrastructure to support and improve 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.
- Encourage and assist 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 GM-3 Monitor environmental response to grazing on District lands.

- Monitor forage utilization and distribution by grazing animals to assure appropriate amounts of **residual dry matter (RDM)** remain on the 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 insure conformity with lease provisions to contribute to improved management.

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.

- 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 grazing with an emphasis on documenting the location, distribution and abundance of **target**, **invasive species**.
- Use information collected from monitoring to annually review rangeland conditions and response to livestock grazing. Use **adaptive resource management decision making framework** within grazing management plans.

Policy GM-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 GM-5 Preserve and foster existing and potential 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 grazing operators.

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

- 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 grazing operation.
- 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 grazing and to educate visitors about approaching animals, closing gates, and other etiquette appropriate for moving through lands with livestock animals.

Policy GM-8 Grazing operations on District lands in the Coastside Protection Area 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.

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.**

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.

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.

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).

- 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.

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

- 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.

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).

- 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.

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.

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)

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.

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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.

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.

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 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

Habitats are the conditions and locations in which plants and animals live and reproduce, and are a critical component of a naturally functioning **ecosystem**. 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.

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.

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.

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.

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

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.

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.

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

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 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.

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

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.

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.

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.

- 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. (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, 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)

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, 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, Grazing Management, ecological Succession, Habitat Connectivity)

Enhance – To increase or improve a habitat in value or quality. (Vegetation Management, Wildlife Management, Water Resources, 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. (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 Barbwire Fencing – Fencing typically used in ranching operations to confine livestock to established areas, constructed of five evenly spaced rows of barbwire stretched between posts comprised of wood or metal. (Grazing Management)

Flora – The plants of a particular region or period. (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. (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, 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, 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, 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, Grazing Management, Forest Management, Ecological Succession, Wildland Fire)

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, 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, 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, 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 Resources 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, 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)

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. (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, 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, 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, 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, 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. (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, 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, 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, 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, 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, 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

California Department of Fish and Game
California Natural Diversity Database (CNDDB)
http://www.dfg.ca.gov/wildlife/nongame/t_e_spp/index.html

Dramstad, W.E., Olson, J.D, and Forman, R.T.T. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*. Harvard University Graduate School of Design, Island Press, and the American Society of Landscape Architects, 1996 (Habitat Connectivity)

Gonzalez, P. *Climate Change in the National Parks of the San Francisco Bay Area, California, USA.* National Park Service and University of California, Berkeley, 2016 (Climate Change)

Jensen, D.B., Torn, M.S., and Harte, J. *In Our Own Hands: A Strategy for Conserving California's Biodiversity*. University of California Press, 1993 (Habitat Connectivity)

Natural Resources Database (NRDB)
http://www.nrdb.org/about.asp

Peck, S. *Planning For Biodiversity: Issues and Examples*. Island Press, 1998 (Habitat Connectivity)

Townsend, C.R., Harper, J.L., and Begon, M. *Essentials of Ecology*. Blackwell Science, 2000 (Habitat Connectivity)

UNESCO, Tbilisi Declaration, 1978 (Cultural Resources)

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.

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April 1, 2020

Mr. Eric Sklar, President
California Fish and Game Commission
1416 Ninth Street, Suite1320
Sacramento, CA 95814

RE: Letter of Support for Evaluating the Listing of the Mountain Lion Under the California Endangered Species Act

Dear President Sklar and Commissioners:

The Midpeninsula Regional Open Space District (Midpen) would like to take this opportunity to offer the following comments in reference to the proposed listing of mountain lions (*Puma concolor*) as Threatened under the California Endangered Species Act (CBD & MLF, 2019). Midpen manages roughly 65,000 acres of prime mountain lion habitat in the Santa Cruz Mountains and is committed to protecting regional mountain lion populations by preserving habitat, increasing habitat connectivity, minimizing human-wildlife conflicts, promoting bans and restrictions on rodenticide use and supporting research that improves our understanding of lion populations, ecology, and behavior throughout our region of influence.

As detailed in the petition to list, the Santa Cruz Mountain (SCM) lion population shares many of the same issues as the Santa Ana Mountains (SAM), San Gabriel/San Bernardino Mountains (SGSB) and Santa Monica (SMM) populations. All of these populations suffer from reduced habitat connectivity, poor genetic diversity and small effective population sizes (Gustafson et al. 2018). For these reasons Midpen supports the decision to evaluate the SCM population for inclusion in the proposed Evolutionarily Significant Unit (ESU). Conversely, there are significant differences between these populations that should be considered when evaluating the SCM population for listing. Unlike the SAM, SGSB, and SMM, the SCM have high quality habitat with a surplus lion population that act as a source for neighboring populations (Dellinger et al. 2019). Seven dispersal aged males from the SCM found their way into urban areas between 2014 and 2017 and required relocation by CDFW (CDFW data) indicating that available lion habitat is already occupied by dominant males. The Florida Panther Recovery plan suggests minimum densities of 2-5 lions per 100 square miles (USFWS, 2008). There are 1,387 square miles in the Santa Cruz Mountains bioregion. Based on the conservative estimate of 33-66 adult mountain lions (Gustafson et al. 2018) the SCM reaches the recommended minimum density with 2.38-4.76 lions per square mile. Considering that sub-adults, juveniles, and cubs are not included in this estimate it is likely that lion densities are considerably higher in the SCM. This indicates that the SCM population is not suffering from low population numbers relative to available habitat, but rather a lack of genetic diversity within the population, limited habitat connectivity between neighboring populations, and

increasing human use within available habitat. If lions in the SCM are listed, the recovery criteria should be designed to reflect this distinction by including a threshold of minimum genetic diversity and improved connectivity for recovery. Furthermore, robust, multi-year population studies will be required to determine the effectiveness of additional protections for mountain lions.

As a public land management agency Midpen strives to minimize potential human-wildlife conflicts to the greatest extent possible. Many of our preserves offer high quality lion habitat that directly abut densely populated urban areas with considerable potential for interactions between humans and mountain lions. Midpen has a strong focus on public outreach and education through interpretive signage, on site tabling, interviews with persons reporting lion activity, and adaptive management of trail access in response to potential human safety issues. Unfortunately, two of the seventeen verified mountain lion-human attacks in California since 1986 have occurred on Midpen preserves. The most recent attack took place on February 16th, 2020 at Rancho San Antonio Open Space Preserve (Rancho). At this preserve, lion sightings are reported roughly once per month and lions have been seen at all times of the day throughout all months of the year. As both lion and human populations in the area increase, and human-lion interactions become more common, lions occupying habitat along the urban interface may become more likely to exhibit bold behavior around people. Mountain lion attacks, though rare, are a risk to human safety that cannot be ignored. Furthermore, when attacks do occur, lions are killed in response to protect human safety. Midpen believes that non-lethal behavioral modification research to keep lions wary of human activity would be a benefit to mountain lions and to public safety. Midpen is also interested in studying human recreational use and/or habitat modification to reduce conflict.

In addition to research needs for non-lethal behavioral modifications of mountain lions to increase public safety where there is high human/mountain lion interactions, there is also a need for research on non-lethal deterrence methods to reduce livestock predation by mountain lions. In the last 10 years, 42 mountain lions have been lethally removed using depredation permits in Santa Cruz, Santa Clara, and Santa Cruz counties (CDFW depredation permit data). These three counties encompass the Santa Cruz Mountains and are all within Midpen's jurisdiction. This is significant considering the best available estimate of the number of lions in the Santa Cruz Mountains is 33-66 adult lions (Gustafson et al. 2018). In addition to legal depredation of lions, instances of poaching are known to occur along the San Mateo County Coast. In supporting additional protections for mountain lions, non-lethal tools will become increasingly important as livestock operators look for viable alternatives to reduce conflicts.
In support of ongoing wildlife and livestock protection policy work, Midpen hired Wildlife Conflict Specialist Dr. Veronica Yovovich to complete a comprehensive literature review detailing all available wildlife livestock conflict mitigation measures that have been evaluated through scientific research. This has been attached to this letter as a reference that may prove useful in determining appropriate non-lethal alternatives for livestock operators dealing with predation issues.

Midpen has worked closely with regional CDFW biologists and wardens in responding to both public safety issues and depredation caused by mountain lions. In this capacity we have learned that a key issue facing CDFW is their capacity to respond with existing staffing levels. If the recent decision to extend the "three-strikes" depredation permit process to cover the entire proposed ESU is to be successful, Midpen recommends that additional staff be hired to ensure that CDFW has capacity to issue and monitor these non-lethal permits, as well as to educate ranchers and the public on how to best protect their domestic animals. In addition, there needs to be more enforcement of existing protections for mountain lions to ensure that poaching is discouraged to the greatest extent possible. This may require coordinating with

local District Attorney's Offices to advocate that lion poaching cases be prosecuted to the fullest extent of the law.

Midpen is looking forward to continuing to work with CDFW to preserve mountain lions in the Santa Cruz Mountains and beyond. We believe that additional protections paired with robust research, support for habitat connectivity, further habitat preservation, and appropriate staffing for CDFW biologists and wardens, can ensure that mountain lion populations persist throughout the state

Sincerely,

Kirk Lenington
Natural Resources Manager

Sources Cited

Gustafson, K.D., et al. 2018 Genetic source-sink dynamics among naturally structured and anthropogenically fragmented puma populations. *Conserve. Genetics* **20**, 1-13.

Dellinger, J. (2019). Relationship between habitat and genetics in a wide-ranging large carnivore. Temecula, CA.

US Fish and Wildlife Service, 2008. Florida panther recovery plan (Puma concolor coryi), third revision. US Fish and Wildlife Service, Atlanta, 217.

Center for Biological Diversity and the Mountain Lion Foundation, 2019. A Petition to List the Southern California/Central Coast Evolutionarily Significant Unit (ESU) of Mountain Lions as Threatened under the California Endangered Species Act (CESA)

Resource Management	Policy 12.006
	Page 1 of 11
Title: Wildlife Response Protocols	6/30/2020

I. Purpose

To ensure appropriate response to wildlife interactions on District lands that might impact the safety of visitors, staff, pets or the operations of a District preserve. This protocol shall be followed when wildlife such as mountain lions, coyotes, bobcats, raccoons, wild pigs, turkeys, venomous snakes or others display nuisance or aggressive behavior that could endanger the safety of the public or staff.

II. Policy

Multiple agencies have shared roles and responsibilities in addressing wildlife-human interactions and response on District lands. Staff is responsible to know their responsibilities as well as those of other agencies. Cooperation is essential to fully meet these responsibilities. See Resource Management Roles and Responsibilities Section for additional details.

III. Procedure

A. Visitor and Field Services staff shall work with Natural Resources staff to determine acceptable and unacceptable wildlife behavior to initiate an appropriate response.

Wildlife behavior relevant to humans or their pets can be categorized as acceptable or unacceptable. Acceptable behavior can be defined as any wildlife-human interaction where there is no unprovoked aggression from the animal toward the human or their pet. Unacceptable behavior is where an animal displays unprovoked aggression, repetitive nuisance acts, or unacceptable levels of injuries to humans or damage to other resources.

1. Examples of **acceptable** wildlife behavior include:
    a) The animal does not appear to notice human(s) or pet(s)
    b) The animal retreats at the sight of human(s) or pet(s)
    c) The animal postures in response to human and/or pet activity followed by retreating or no further aggression
    d) The animal remains in place, while humans show no aggression. Animal may be engaged in other acceptable activity such as hunting, feeding, etc.
    e) The animal shows signs of curiosity while humans and/or their pet show no aggression
2. Examples of **unacceptable** wildlife behavior include:
    a) The animal displays unprovoked aggression
    b) The animal remains in high use area for extended period and fails to retreat when humans are present
    c) The animal exhibits predatory behavior towards humans or pets
    d) The animal continues to disturb, raid, or investigate humans, pets or high use areas
    e) The animal displays a lack of fear of humans and/or pets by aggressively approaching, or failing to retreat, when humans take aggressive actions
    f) The animal attacks a human or pet
    g) Invasive animals impacting native wildlife or sensitive habitat

Not every wildlife interaction will easily fit into one of the two behavior patterns listed above and will have to be judged on the circumstances of that interaction. Investigating staff should look at each wildlife-human and/or pet interaction for signs that an animal was present and

posed a threat or displayed little fear of, or an unusual interest in, humans and/or their pets. Cumulative interactions or context will also be considered. For example: several acceptable interactions may occur, however their frequency or amount may cause interactions with that animal or interactions in a particular area to become unacceptable.

3. In some instances, humans may unintentionally provoke unacceptable behavior on the part of the animal by:

    a) Immediately running away on sighting (especially children), triggering the chase instinct

    b) Remaining in a location that does not allow the animal an escape route

    c) Approaching an animal that is hunting, feeding, or is with their young

    d) By bringing pets such as leashed dogs into proximity with wildlife

    e) Not looking where they are placing their hands and feet in areas where snakes or other wildlife may occur

    Aggressive actions on the part of humans that would tend to cause an animal to retreat would include:

    f) Grouping together

    g) Making loud noises, yelling, blowing a whistle, or playing loud music

    h) Throwing objects like stones

    i) Moving toward the animal with a walking stick, bicycle or other large object

B. For wildlife interactions with invasive animals, see also Integrated Pest Management section XX.005. For sick, injured, diseased, dying or dead wildlife (such as deer carcasses, downed bats or animals that may require euthanasia), please see section XX.007. If wildlife has an interaction with domestic animals (pets), see also the domestic animal control section XX.008. For wildlife livestock interactions, please see the grazing management section XX.010.

C. Management Actions in response to wildlife interactions:

The District's management actions focus on: 1) maintaining and enhancing natural communities in which wildlife populations live; 2) providing public information and education about wildlife behavior and habitats; 3) providing medical response to Preserve users when a wildlife-human interaction results in injury; and 4) investigating and reporting wildlife-human (including pet) interactions that occur

Standard approaches for public safety, information dissemination, and response to wildlife-human and/or pet interactions are described below and the appropriate color-coded mountain response signage is noted as well. See Section XX.009.

Wildlife interactions fall into five categories escalating from least concern to most concern: 1) Sighting, 2) Recurrent sightings, 3) Encounter, 4) Incident, 5) Attack.

1. **Sighting:** A visual observation of an animal (Yellow Signage)

    Since many preserves contain good quality wildlife habitat, a sighting is not normally a cause for management action. Exceptions to this would be instances where the animal appears to be sick or injured, is invasive, is sighted frequently in close proximity to high use area or displays some abnormal behavior or condition.

    a) Staff investigates to assess the accuracy of the report

    b) Staff completes an Electronic Wildlife Observation Form as soon as possible

    c) If there is a public safety concern, staff notifies the Visitor Services Manager

and Natural Resources Manager or their assigned designee

d) Confirmed mountain lion and coyote predation events (animal carcass present or observed predation) shall always be reported using the Electronic Wildlife Observation Form

e) If a carcass or portions of a carcass need to be relocated, see the Sick, Injured, Diseased, Dying or Dead section XX.007 prior to moving the carcass

f) Staff investigates and reports invasive wildlife (pests) and considers control options using the District's Integrated Pest Management Program (see Section XX.005). Invasive animals not covered by the District's California Department of Fish and Wildlife Program shall be handled on a case-by-case basis as determined by Natural Resources staff in consultation with applicable agencies

2. **Recurring sighting:** Repeated sightings of an animal in an area. (Yellow Signage)

a) Staff investigates report. If possible, obtain animal description detailed enough to ascertain the identity of specific animals (size, markings, split ear, limp, etc.)

b) Staff documents sightings on Electronic Wildlife Observation Form. Form shall be completed as soon as possible after report is received

c) Natural Resources staff reviews other reports in order to determine any use patterns, unusual circumstances or repeated sightings that may not have been known or documented from independent sightings alone

d) Staff considers temporary trail closures if a den, kill site or another ongoing attractant is suspected or confirmed

e) Confirmed mountain lion and coyote predation events (animal carcass present or observed predation) shall always be reported using the Electronic Wildlife Observation Form

f) If a carcass or portions of a carcass need to be relocated, see the Sick, Injured, Diseased, Dying or Dead section XX.007 prior to moving the carcass

g) Recurrent sightings that are problematic or potentially dangerous will be reported to California Department of Fish and Wildlife

h) Natural Resources staff informs California Department of Fish and Wildlife of recurrent sightings that may pose a public safety concern. Notification to California Department of Fish and Wildlife is species dependent, for example recurrent mountain lion sightings would be notified, but recurrent rattlesnake sightings would not.

i) Comprehensive data for all mountain lion observations is sent to California Department of Fish and Wildlife on a quarterly to annual basis by Natural Resources based on staff availability

j) Staff may consider if marking the animal is possible, especially to determine if a recurrent sighting is more than one animal and/or to attempt to deter unacceptable behavior (such as repeated presence in a high use area)

k) To the level of their training and allowable permit conditions, Visitor Services and Natural Resources staff may mark the animal using the appropriate personal protective equipment, tools, and following safety protocols

l) Staff researches the possibility of making structural changes such as removal

of brush, changing a trail location, or modifying/removing potential attractants

m) As warranted Visitor and Field Services staff will provide educational material about recurrent wildlife to the public. Visitor Services staff may post signage, distribute materials or staff outreach events

n) Natural Resources staff works with Visitor Services and Public Affairs staff to develop appropriate content and messaging

o) If warranted, Public Affairs staff will provide outreach using the District website, newsletter or other articles, social media, or by scheduling or attending outreach events

p) Mountain lion or other recurrent wildlife sightings with unacceptable wildlife behavior at Rancho San Antonio Open Space Preserve require notification by Visitor Services to Santa Clara County Parks, Hidden Villa, and neighborhood associations

q) For all other Preserves, Visitor Services in conjunction with Public Affairs shall notify applicable neighbors, tenants, local jurisdictions, and agencies as deemed necessary

3. **Encounter:** An unexpected direct meeting between a human and wildlife without incident. The animal may display acceptable or unacceptable behavior. (Orange signage)

a) Staff investigates report. If possible, obtain animal description detailed enough to ascertain the identity of specific animals (size, markings, split ear, limp, etc.)

b) Staff completes an Electronic Wildlife Observation Form

c) Staff may call Natural Resources wildlife staff if more immediate review is requested

d) Natural Resources staff will determine if animal behavior is acceptable or unacceptable from witness statements and investigation of the scene, with attention to if the animal demonstrated a lack of fear towards humans or pets. Special attention should be paid to the description of the animal and its behavior toward people or pets especially the following:

(1) Who initiated the encounter, wildlife, humans or pets?
(2) Was the animal feeding, with young, or appear to be cornered?
(3) What attempts were made to scare off the animal?
(4) What attempts were made to lure or feed the animal?
(5) Did the animal follow, chase, stalk, growl or hiss at the person or their pet?
(6) What was the appearance of the animal (aggressive posture, ears pinned, crouching, sniffing ground)?

e) Typical acceptable and unacceptable behaviors are described in Section A. above

f) Natural Resources staff reviews other reports in order to determine any noticeable patterns or increasing wildlife behavior indicating public safety concerns

g) As warranted notification up the Visitor Services chain of command should happen next followed by notification of any staff that may work in the affected

area including all field staff

h) Area Superintendents or the Visitor Services Manager will notify necessary department managers and the general manager's office as necessary

i) Visitor Services and Natural Resources staff consider temporary trail closures if a den, kill site or another ongoing attractant is suspected or confirmed

j) Confirmed mountain lion and coyote predation events (animal carcass present or observed predation) shall always be reported using the Electronic Wildlife Observation Form

k) If a carcass or portions of a carcass need to be relocated, see the Sick, Injured, Diseased, Dying or Dead section XX.007 prior to moving the carcass

l) To the level of their training and allowable permit conditions, Visitor Services and Natural Resources staff may consider marking the animal if possible, to determine if more than one animal is present and/or to attempt to deter unacceptable behavior

m) Visitor and field services staff research the possibility of making structural changes such as removal of brush and or food sources, changing a trail location, or modifying/removing other potential attractant(s)

n) Natural Resources Department staff will notify California Department of Fish and Wildlife of mountain lion or other aggressive animal encounters. Visitor Services supervisory staff may notify California Department of Fish and Wildlife if Natural Resources staff are unavailable and notification is immediately warranted

o) Visitor Services Staff posts "Area Closed" signs for a confirmed encounter with animal displaying unacceptable behavior that poses a potential future public safety risk

p) Caution signs will be posted following an Area Closure for a length of time to be determined by the Area Superintendent and the Natural Resources Manager or assigned designee

q) Signs shall be posted at all designated exterior access points to any preserve within a reasonable distance of the encounter or at designated trail locations when a portion of the preserve is closed. This may result in posting signs at multiple Preserves and/or contacting adjacent landowners for additional posting considerations

r) The Area Closed Signs will be replaced by "Caution" signs for a period of two (2) weeks from the date the area was closed or as deemed safe by California Department of Fish and Wildlife (if applicable) and/or Natural Resources staff

s) If a portion of the preserve is closed, Caution signs should be posted at all the designated entrances to that preserve which are not posted closed.

t) For more guidance on placement of signage, see Mountain Lion Posting Guidelines Section.

u) Mountain lion or other wildlife-human encounters with unacceptable wildlife behavior at Rancho San Antonio Open Space Preserve require notification by Visitor Services to Santa Clara County Parks, Hidden Villa, and neighborhood associations.

v) For all other Preserves, Visitor Services in conjunction with Public Affairs shall notify applicable neighbors, tenants, local jurisdictions, and agencies as

deemed necessary.

w) Area superintendent in conjunction with Natural Resources to determine if an after-action review shall be conducted with all District departments involved in response to the encounter (case-by-case).

4. **Incident:** An incident is defined as an event which meets one or more of the following criteria:

   a) A conflict between human or their domestic animal (pets) and a wild animal that resulted in an unsafe situation;

   b) The animal displayed unacceptable/abnormal behavior; and the person involved felt threatened

   c) It is also considered an incident whenever domestic animals (pets) are attacked

   Staff response to an incident:

   d) Staff determines, from witness statements and investigation of the scene, if the wildlife involved in the incident demonstrated a lack of fear towards humans, special attention should be paid to the description of the animal and its behavior toward people, especially the following:

      (1) Who initiated the encounter, wildlife, humans, or domestic animals?
      (2) Was the wildlife involved in the incident feeding, with young, or appear to be cornered?
      (3) What attempts were made to scare off the animal?
      (4) What attempts were made to lure the animal or feed?
      (5) Did the animal follow, chase, stalk, growl, hiss, strike or lunge at the person?
      (6) What was the appearance of the animal (aggressive posture, ears pinned, crouching, sniffing ground)?

   e) Staff notifies Area Superintendent and the Natural Resources Manager or assigned designee as soon as possible. Visitor Services staff may close the entire preserve or a portion of the preserve where the incident occurred to protect public safety. Follow the closure protocols in section D

   f) Other factors to be considered at an incident:

      (1) It may be necessary to close and secure the area of the incident and treat it as a crime scene. This may be necessary to enhance the chances for tracking and trapping personnel to locate the offending animal (see closure protocol)
      (2) Visitor and Field Services staff may need to notify and work with California Department of Fish and Wildlife to implement protocol for incidents and attacks and to strategize for specific response. Pre-planning is critical since successful tracking (if warranted) is dependent on a timely response
      (3) If the animal has exhibited unprovoked aggression towards a human and is a threat to public safety, California Department of Fish and Wildlife may consider removing the animal. If the animal is destroyed, the California Department of Fish and Wildlife lab will require that the animal be tested and treated in the same manner as evidence
      (4) Time is critical. The best chance of successfully tracking the animal comes when qualified wildlife tracking personnel can be on scene

within a couple hours of the incident

(5) Wildlife incidents at Rancho San Antonio Open Space Preserve require notification by Visitor Services to Santa Clara County Parks, Hidden Villa, and neighborhood associations

(6) For all other Preserves, Visitor Services in conjunction with Public Affairs shall notify applicable neighbors, tenants, local jurisdictions, and agencies

(7) Determine public education and media needs. Public Affairs staff will update the District website and Visitor Services staff will distribute materials developed in conjunction with Natural Resources staff

(8) Complete an Electronic Wildlife Observation Form as soon as possible after the incident and no later than 24 hours

g) A press release may be prepared by the District Public Information Officer. Press releases will be determined on a case by case basis at the discretion of management staff and the Natural Resources Manager or assigned designee

h) Visitor Services staff posts a Caution Sign on all designated exterior access points to the preserve where the incident occurred for a period of two (2) weeks from the date the incident occurred

i) Area superintendent to conduct an after-action review with all District departments involved in response to the incident.

5. Attack**:** An “Attack” is defined as an Incident where a human is injured or killed by a wild animal

Procedures to follow when notified of an Attack:

a) Attend to the medical needs of the victim(s)

b) It is imperative that the victim(s) be evaluated and treated by medical personnel

c) The bite area must be preserved to collect any animal fluid samples

d) For mountain lion or coyote attack, a Visitor Services Supervisor shall contact a California Department of Fish and Wildlife Warden through Mountain View Communications or their 24-hr. dispatch immediately (916) 358-1300. California Department of Fish and Wildlife will assist in determining, from the above information, how to deal with the animal. If necessary, California Department of Fish and Wildlife will contact personnel for tracking or direct District staff to do so

e) For mountain lion and coyote attacks, immediately close and secure the areas of the attack and treat it as a crime scene. Consider if this is warranted for any other wildlife attacks on a case by case basis (for example may not be warranted for a snake bite but may be needed for other attacks). This is necessary to enhance the chances for tracking and trapping personnel to locate the offending animal (see Section D: Closure Protocol)

(1) Informational signs indicating Closed Areas should be posted at all designated exterior access points and parking lots at the Preserve in which the attack occurred

(2) If the attack occurred near a preserve boundary, a Visitor Services Supervisor in conjunction with Natural Resources staff will consider closing or posting caution signs in neighboring preserves

(3) Signs should be posted on barricades, existing signposts, and gates.

Signs must be visible to users and should act as a barrier to Closed Areas of the Preserve. Caution tape may be used in addition to posted signs to close off trail entrances and gate ways

(4) "Area Closed" signs will be posted until Area Superintendent and/or the Natural Resources Manager or assigned designee deems the areas safe to the public. Caution signs will be posted following an Area Closure for a length of time to be determined by the Area Superintendent and the Natural Resources Manager or assigned designee

f) For mountain lion, coyote, and other applicable attacks: make sure the enforcement agency on scene is aware that an effective search for the wildlife will most likely be conducted by CDFW and authorized trappers. Treat the area as a crime scene even if the offending wildlife is destroyed

g) Time is critical. The best chance of successfully tracking an animal comes when qualified personnel can be on scene within a couple hours of the attack

h) Document the circumstances of the attack by completing the Electronic Wildlife Observation Form and Ranger Incident Report, paying special attention to the exact location, description, and direction of travel of the animal. Staff should also note the following:

(1) What was the victim's interaction with the animal prior to the attack?

(2) Did the victim run prior to the attack?

(3) Did the victim or others injure the animal in fending off the attack?

i) A follow-up supplemental form can be sent when the animal is located or further tracking discontinued

j) Attempt to determine from the information if the animal's behavior was defensive in nature, or an attempt to prey on a person

k) Mountain lion, coyote or other applicable wildlife attacks at Rancho San Antonio Open Space Preserve require notification by Visitor Services to Santa Clara County Parks, Hidden Villa, and neighborhood associations

l) For all other Preserves, Visitor Services in conjunction with Public Affairs shall notify applicable neighbors, tenants, local jurisdictions, and agencies

m) Provide visitor information in area of attack. Public Affairs staff will update the District website and Visitor Services staff will distribute materials developed in conjunction with Natural Resources staff

n) All questions regarding the attack should be referred to the District's Visitor Services Manager or their designee and California Department of Fish and Wildlife until a public statement is made

o) Public Information Officer designated by the Visitor Services Manager or Area Superintendent will handle questions regarding the preserve closure

p) A press release prepared by either the District Public Information Officer or California Department of Fish and Wildlife is required if an attack by a mountain lion, coyote, or other applicable animal occurs

q) Area superintendent to conduct an after-action review with all District departments involved in response to the attack.

D. Electronic Wildlife Observation Form:

1. Authentic mountain lion encounters, incidents, attacks or other wildlife-human interactions shall be reported to the on-duty supervisor, Area Superintendent, and the

Natural Resources Manager or assigned designee. All observations shall also be recorded on the Electronic Wildlife Observation Form and Ranger Incident Report which shall be completed (when needed) by end of shift. Only confirmed mountain lion sightings and applicable wildlife incidents or attacks should be reported to California Department of Fish and Wildlife. All Electronic Wildlife Observation Forms should be completed within 24 hours of sighting, recurrent sighting, encounter, incident, or attack

E. Closure Protocol:

1. A preserve, or a portion thereof, should be closed whenever necessary for public safety, for investigation purposes, or for tracking offending animal(s). Visitor Services staff may immediately close an area for public safety purposes. As soon as possible, the Area Superintendent should approve a closure and indicate the scope of the closure.
2. When any trail, portion of or an entire preserve(s) is closed, the Supervising Ranger shall immediately contact the Area Superintendent and the Natural Resources Manager or assigned designee and inform them of the circumstances. The Area Superintendent shall notify the Visitor Services Manager who will notify the Visitor and Field Services Assistant General Manager and General Manager of the situation.
    a) Area Superintendent or Supervising Ranger may put the Visitor Services Manager in direct contact with the ranger(s) on scene to relay clear, precise information
    b) If an Area Superintendent cannot be reached, the Supervising Ranger shall contact the Visitor Services Manager to inform of the closure
    c) If the Visitor Services Manager cannot be reached, the Area Superintendent will contact the Assistant General Manager and General Manager to update them on the closure
    d) For any closure the Visitor Services Manager, Natural Resources Manager, and General Manager will be notified of the incident as soon as possible
    e) See also Emergency Notification Section 5.028 of the Ranger Operations Manual
3. The duration and scope of the closure will depend on the circumstances of each situation. Consultations should be made with knowledgeable professionals such as wildlife biologists, California Department of Fish and Wildlife staff, authorized trackers, etc. The closure may need to be adjusted as more information becomes available. Consideration should also be given to the following specific factors:
    a) The proximity of other use areas to the site of the wildlife-human interaction and whether these areas consist of suitable habitat (i.e. vegetation that provides cover) or wildlife corridors linking habitat blocks
    b) The probability of an incident or attack. Natural Resources staff shall review the circumstances of the wildlife-human interaction and the history of animal activity in the area
    c) Whether there are indications of a sick, injured, or diseased animal being involved
    d) Whether the animal's behavior was predatory, defensive, or curious in nature
    e) The animal's direction of travel and elapsed time since the interaction. Whether the circumstances of the wildlife-human interaction have any similarity with other interactions that would indicate the presence of an

animal that is prone to aggressive behavior or does not fear humans

f) Visitor Services in conjunction with Public Affairs shall notify applicable neighbors, tenants, local jurisdictions, and agencies as deemed necessary. If a portion of a preserve is to be closed to the public for an extended period, a press release should be issued to local news sources.

g) Visitor Services staff shall notify the law enforcement agency with jurisdiction over the area of the closure

4. Preserve closures should remain in effect until the area is deemed safe by Natural Resources staff or California Department of Fish and Wildlife (as applicable) and Visitor Services Supervisory staff. Upon re-opening a closed area, Caution signs should be posted for two weeks. If additional wildlife-human interaction(s) with unacceptable behavior occur, or if the offending animal is still in the area, Caution signs will remain posted for two weeks from the most recent.

F. Duration of Closures Following an Attack:

1. Areas should normally be reopened when California Department of Fish and Wildlife, trappers, or others as applicable have completed (successfully or unsuccessfully) their operations, and there is no indication that the offending animal is still in the area. Closures for longer periods of time may be appropriate if there are indications that the offending animal is still in the area (i.e., fresh sign) or is likely to return soon (i.e., cached food). Before reopening an area, consult with Natural Resources or California Department of Fish and Wildlife (as applicable) and the Visitor Services Manager. Be sure visitor information (signs and brochures) are in place when facility is reopened.

2. If a portion of the preserve is to be closed to the public for an extended period, the Public Affairs department will work with the Natural Resources Manager or assigned designee and/or California Department of Fish and Wildlife (as applicable) to issue a press release to local news sources.

3. Closures shall be enforced with citations if necessary, to ensure compliance.

G. Public Education during Preserve Closures:

1. When a closure has been necessary due to a wildlife interaction, District staff should make every effort to inform the public about the value and fragile nature of wildlife and their habitat within the preserves. What people can do to avoid a potentially dangerous interaction with wildlife should be given special attention. General information (such as signs and pamphlets) on the specific animals should be made available in affected areas.

2. If a Preserve or trail was closed and reopened without locating the offending animal, visitors should be informed of the situation and of what to do if they encounter wildlife. Use any closure as an additional opportunity to expand the District's efforts to educate the public about living with wild animals.

H. Media Relations about Wildlife Interactions:

1. All media inquiries regarding responses to specific wildlife interactions shall generally be referred to the Public Affairs Manager, or the designated Public Information Officer. Since California Department of Fish and Wildlife has statutory responsibility for wildlife in the state, media inquiries regarding the specific wildlife interaction may be referred to California Department of Fish and Wildlife staff (if applicable). For "incidents" or "attack," California Department of Fish and Wildlife may assist the District in disseminating appropriate information.

2. District staff may respond to inquiries regarding frequency and locations of sightings,

District protocols for wildlife interactions, public warnings, preserve closures and other types of general information related to District operations.

3. The media is an important partner to be utilized in the on-going education of the community regarding the possible presence of dangerous wild animals, and threatening wildlife behavior.
4. Incident information will be posted on the District website if a preserve is closed due to wildlife activity. Incident information may be posted on the District website when caution signs are posted based on the discretion of the Area Superintendent and Natural Resources Manager or assigned designee.