



the SONOMA COUNTY AGRICULTURAL PRESERVATION and OPEN SPACE DISTRICT

Montini Open Space Preserve

NOVEMBER 2008

MANAGEMENT PLAN AND INITIAL STUDY



www.sonomaopenspace.org

Montini

Open Space Preserve

Draft

Management Plan and Initial Study

Vision Statement

“The Preserve will be an oak woodland and grassland that supports high quality habitat for a diversity of native Sonoma County wildlife and plants. The Preserve will support opportunities for research and will be a showcase for appropriate management of oaks and grasslands for the Sonoma Valley.

The gentle trails, rolling grasslands and oak woodlands, spring wildflowers, and spectacular views of the Sonoma Valley and San Pablo Bay will attract visitors who enjoy and appreciate the natural setting of Sonoma County. The public will have clear and easy access to the Preserve with minimal impacts to wildlife habitat. The Preserve will provide opportunities for persons with physical disabilities to enjoy the Preserve.

Partners will collaborate to provide a wide range of management, interpretive and environmental education programs. The Preserve will provide trail linkages, connecting the adjacent overlook trail with the regional bike trail and the Vallejo Home State Historic Park. The local community and visitors will enthusiastically identify and promote the Preserve as a regional and statewide tourist destination that contributes to economic development and enhances the quality of life in Sonoma.”

Sonoma County Agricultural Preservation and Open Space District
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November 2008

Table of Contents

Vision Statement.....	i
Table of Contents	I
Project Information/Management Plan.....	II
Summary Project Description	1
Introduction	1
Project Location	1
Project Purpose.....	1
Projected Park Visitors	1
Development Schedule	2
Public Access	2
Grassland Management.....	2
Erosion Control.....	3
Resource Protection	3
Oak Woodland Management.....	3
Wildlife Movement.....	3
Public Use	4
Access.....	4
Environmental Education	4
Interpretation.....	5
Benches	5
Chapter 1. Introduction	7
Preserve Overview	7
Setting.....	7
Land Ownership.....	8
Preserve Purpose	10
Purpose and Need for the Plan.....	10
General and Other Plans.....	10
Existing Partnerships	11
Related Projects and Studies in the Area	11
Easement.....	11
Sonoma State Historic Park	11
Sonoma Overlook Trail	11
Sonoma Aqueduct Cathodic Protection Upgrade Project	11
Chapter 2. Planning Process.....	13
Description of the Planning Process	13
The Montini Open Space Preserve.....	13
Issues Identified by the Public.....	14
Issues Identified Other Agencies.....	14

Internal Issues.....	14
Chapter 3. Preserve Resources	15
Geographic/Ecosystem Setting	15
Physical Environment	15
Topography.....	15
Hydrology.....	15
Soils/geology	16
Vegetation	16
Wildlife.....	20
Special Status Species	20
Natural Processes.....	20
Cultural Resources	20
Prehistoric Resources.....	21
Historic-era Resources	22
Land Use.....	22
Preserve	22
Surrounding Land Use.....	22
Improvements.....	22
Roads	22
Water Infrastructure	22
Fences	24
Public Use	24
Other Uses.....	24
Visual Resources	24
Current Management.....	24
Chapter 4 - Challenges and Opportunities	25
Problems	25
Weeds.....	25
Erosion.....	25
Oak Regeneration	25
Trespassing.....	25
Fences	26
Sudden Oak Death	26
Opportunities.....	26
Public Use	26
Historic Landscape.....	26
Partnerships.....	26
Restoration	26
Chapter 5. Management Direction – Vision Statement, Goals, Objectives.....	29
Vision Statement	29
Management Direction: Goals, Objectives, and Strategies	29

Chapter 6. Implementation and Monitoring	41
Funding and Personnel	41
Detailed Management Plans	41
Partnership Opportunities	41
Monitoring and Evaluation	41
Plan Amendment and Revision	42
References	43
Literature	43
Personal Communications.....	44
Endnotes.....	44

Figures

Figure 1. Regional Map	9
Figure 2. Soils	17
Figure 3. Vegetation.....	19
Figure 4. Existing Preserve Roads	23
Figure 5. Trails and Facilities.....	37

Tables

Table 1. Estimated visitors to the Montini Open Space Preserve	2
Table 2. Invasive Plant Species Targeted for Control on the Montini Preserve.....	25

Initial Study ChecklistSection 2

Appendices

Section 1
Project Information/Management Plan

Summary Project Description

Introduction

The District has provided this summary of the Montini Open Space Preserve Management Plan (plan) to describe District actions that are most likely to affect the environment.

The proposed project is a management plan for the Montini Open Space Preserve (Preserve), with the Sonoma County Agricultural Preservation and Open Space District (District) the California Environmental Quality Act (CEQA) lead agency for the proposed project. This document has been prepared by District staff. The document is intended to provide a description of the proposed project and of the potential environmental impacts associated with the construction, operation, and maintenance of the proposed project for decision-makers, responsible and trustee agencies under CEQA, and the public. For more information, please see the full management plan, of which this project summary and initial study are appendices.

This Initial Study has been prepared in compliance with CEQA, and the State CEQA Guidelines. The District retained three consultants to complete studies to assist in the completion of this management plan and Initial Study.

1. Botanical Study
2. Cultural Resources Study
3. Traffic Study

Project Location

The Montini Open Space Preserve consists of 98 acres, including a 9-acre portion of a parcel located within the city limits of Sonoma, a 26-acre site, also situated in the city limits, and a hillside area of about 63 acres located in the unincorporated county. The Preserve is bounded on the east by 1st St. West, to the west by 5th St. West, to the north by property retained by the Montini family and to the South by Sonoma State Historic Park and the Field of Dreams ballpark (figure 1).

Project Purpose

The purpose of the management plan is to provide a framework for how the District will manage the Preserve's natural and cultural resources and visitor services. The plan provides for opening the Preserve for public use beyond the periodic guided tours currently offered. In addition, the plan provides recreational access for disabled individuals.

Projected Park Visitors

The projections are considered by season and are based on observations of other similar facilities. Observations of the numbers of cars in the trailhead parking lot for the Sonoma Overlook Trail are multiplied by estimated turnover of vehicles and estimated number of visitors per vehicle to calculate the projections. The average annual number of Preserve visitors expected

during the next ten years is listed in Table 1, below.

Development Schedule

Improvements for the plan will be completed throughout the life of the plan and will be phased based on available funding. Maintenance and

resource enhancement activities will be ongoing. It is expected that the programs and special events described in this Initial Study will evolve and be modified through the plan implementation phase.

Table 1. Estimated visitors to the Montini Open Space Preserve

Daily number of visits	People per car	Cars per day	Total annual visitation
May – June 15, Sept – Oct 15, Sat – Sun			
55	2.2	25	1,430 (26 days total)
May, Sept Mon – Fri			
14.4	1.8	8	936 (65 days total)
April, June – Aug, Oct – Nov			
8.4	1.2	7	1,285 (153 days total)
Dec – Mar			
6	1.2	5	726(121 days total)
Annual total			4,377

Public Access

Public access will be focused on the Montini Open Space Preserve trailheads (Figure 2). The Preserve fronts only two streets, Norrbom Road/1st St West and 5th St. West. Access is concentrated on those two areas.

Grassland Management

The District will manage grasslands so that weeds are minimized and native plants are maximized to the

extent possible. The District will explore specific prescriptions for using cattle, goat, and other livestock grazing, as applicable, as a means of weed control, monitor the Preserve each spring for noxious weeds such as purple and yellow starthistle and Harding grass, and implement control efforts if necessary.

The District will conduct an experimental restoration of native grass species on the Preserve by developing site-specific native grassland restoration plans; locating onsite seed sources where possible and having the seeds grown; using herbicide (glyphosate, 2, 4-D, transline), mechanical (mowing, grazing, string trimming, and heating) and biological control, and hand removal for two seasons before establishing native grasses; and controlling broadleaf and other perennial invasive plants on newly restored areas if necessary.



Summary Project Description

Erosion Control

The District will address erosion problems on the ranch road leading from the water tanks east towards 5th St. West and the erosion on the ranch road leading north from the water tanks by rerouting or removing the roads to be less erodible, removing the fencing that concentrates cow movement to the area uphill of the eroding ranch road, restoring eroded areas by grading rilled areas, using biotechnical measures such as coir materials (coconut fiber erosion and sediment control products), if necessary, and planting only native plant materials.

Resource Protection

The District will protect natural resources from excessive impacts from the public such as litter, illegal camping, etc. while providing for public enjoyment. The District will work with local law enforcement officials to patrol the Preserve once per week, continue the volunteer patrol, maintain a District presence on the Preserve with regular visits to the Preserve, and prohibit smoking and all other nonvehicular sources of combustion. In addition, the District will educate the public on personal stewardship of the Preserve, emphasizing fire danger and the harm caused by littering, off-trail hiking, and smoking using visitor contacts, bulletin board materials, handouts, and interpretive programs. The District will sign the Preserve as a pack in/pack out area for trash, organize periodic volunteer trash pick up days, sign that the Preserve hours are sunrise to sunset, and enforce the nighttime closure by patrolling and ticketing violators. Allowable public uses at the Preserve will be hiking, nature observation and photography, interpretation, stewardship, and

environmental education. Other public uses could be evaluated using a compatibility determination.

Oak Woodland Management

The District will manage oak woodland habitats to promote the natural oak woodland habitat species composition and age structure. The District will remove unnecessary ranch roads and restore them to natural conditions, plant native woody vegetation on the 9-acre parcel on 5th St. West if appropriate conditions exist, work with a contractor to grow plant materials to be used on the Preserve using seeds and cuttings collected on-site, where possible. All plantings will be native to the site.

In addition, the District will continue to work with others to decrease the risk of sudden oak death (SOD) on the Montini Preserve and in Sonoma County. The District will monitor susceptible tree species for evidence of SOD on the Preserve annually. If potentially infected trees are found, leaf samples from adjacent bay trees will be sent to the County Agricultural Commissioner's office for testing. The District will also develop interpretive materials to help visitors recognize SOD and understand how SOD is spread, encourage visitors to stay on the trail as a means of preventing the spread of SOD, limit the number of trails through the Preserve, and meet with researchers to identify appropriate research projects on the Preserve. If infected trees are found, they will be treated with phosphonate and partial or complete removal of infected adjacent bay trees.

Wildlife Movement

Currently, wildlife movement through the Preserve is limited by barriers within the Preserve. The District will take the following steps

to ameliorate this condition:

- Inventory existing fencing and remove unnecessary fencing within the Preserve.
- Route trails so that there is a large portion of the Preserve that is undisturbed, particularly shaded grassy areas favored for fawn beds.
- Investigate exterior fencing and gates that would keep cattle in the Preserve while allowing wildlife to move out of the Preserve (wildlife friendly cattle fencing).
- Protect nesting sites of important birds such as pileated woodpeckers and great-horned owls by keeping nesting sites safe from disturbance by rerouting trails or implementing seasonal trail closures, if necessary.

Public Use

The Preserve's public use program will primarily consist of a trail system, trailheads, and signs.

- Construct and maintain trails (Figure 5) in accordance with the prescriptions in the trail log (Appendix E).
- Construct a parking lot for 2 disabled access vans off 5th St. West.
- Work with the city to establish a disabled accessible connection from the city's ballfield parking lot to the Montini Preserve trailhead.
- Install self-closing gates at trailheads (Agate 1983).
- Construct an information kiosk at the Norrbom Road and 5th St. West trailheads with a bulletin board for general preserve information. Kiosk designs should be compatible with

the Sonoma Overlook Trail kiosk and State Parks kiosks.

- Link the trail on the Preserve to the Sonoma Overlook Trail via the Rattlesnake Cutoff spur.
- Construct a fence bisecting the southwestern 9-acre parcel to separate livestock from hikers.
- Install directional trail signs.
- Install bike parking racks at the 5th St. West and Norrbom Road trailheads.
- Protect the narrow-anthered brodiaea and Franciscan onion with barriers.
- Monitor populations of the narrow-anthered brodiaea and Franciscan onion annually to monitor their reaction to the trail.

Access

The District will facilitate two safe trail crossings across Norrbom Road by implementing the recommendations from the W-Trans report on crossing Norrbom Road and will consider installation of a vehicular speed measuring device on Norrbom Road. In addition, the District will construct a trailhead at the Field of Dreams/Police Station and using existing parking for the Field of Dreams/Police Station. The District will also construct a trailhead at 5th St. West (Western Spur) an access road would be located at the 3-way stop sign at the corner of 5th St. West and Verano Blvd. The road would lead to a parking lot for 2 disabled vehicles.

Environmental Education

The District plans to have 7 classes of schoolchildren using the Montini Preserve for environmental education annually.

Summary Project Description

Interpretation

The District's public education program will include a kiosk at the Norrbom Road trailhead and at the 5th St. West Trailhead, an interpretive trail, plant identification labels, and guided tours.

Benches

The District will allow donations of three benches at several viewpoints, at the entrance kiosk and at the quarry site. Interpretive panels will be placed near the benches.

Chapter 1. Introduction

Preserve Overview

The Montini Open Space Preserve (Preserve) was established in December 2005. The District protected the Preserve because of its scenic prominence, its historic role in the history of California, its proximity to the Vallejo Home State Historic Park, and its ability to provide a pleasant and strikingly scenic hike within a short distance of Sonoma's historic Plaza.

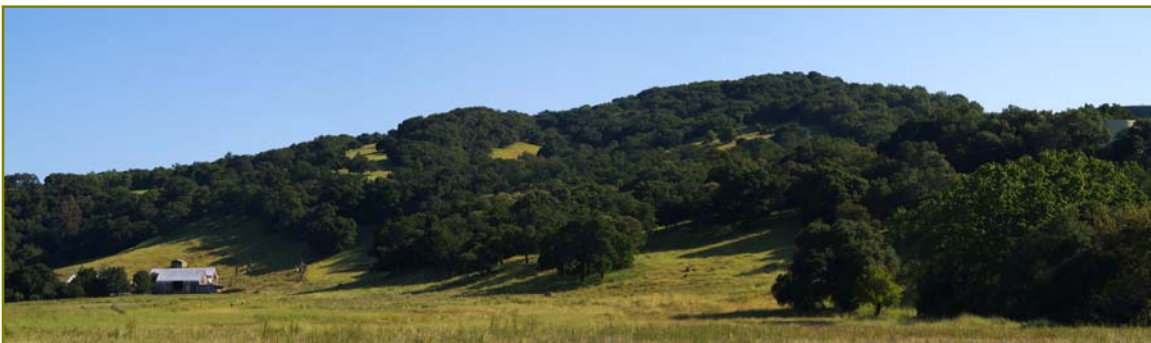
The Preserve was purchased by General Vallejo and was used for grazing and rock (basalt) extraction until 1934. In 1934, the Montini family acquired the property from General Vallejo's heirs and the property was used from that time until the Preserve was established for grazing.

Setting

The Preserve is located on one of the hills just north of the historic Sonoma Plaza in the city of Sonoma. The Preserve consists of rolling grasslands and open oak woodland with large rock outcroppings scattered throughout.

The city of Sonoma is located at the southern end of the scenic Sonoma Valley. The valley is roughly bisected by Sonoma Creek, which eventually flows into the San Pablo Bay. The valley contains a variety of plant communities with primarily coastal affinities as well as valuable wildlife, including salmon, steelhead, and a variety of birds. The varied plant communities in the Sonoma Valley include redwood forests, chaparral, grasslands, oak woodlands, and mixed evergreen forest. Slopes of wildflowers abound in spring. Birds, including a wide variety of raptors, waterfowl, shorebirds, and migrating birds can also be found in great abundance in the valley, especially in the estuary.

The Montini Open Space Preserve is the most significant greenbelt property bordering the city of Sonoma, and has been identified as a priority for conservation since the District's inception in 1990. Protection of the Preserve's oak covered hillsides and pasturelands will ensure that the scenic vista remains much as it was in General Vallejo's day. The Preserve is located



Montini Open Space Preserve



Hikers enjoying the first District Montini Open Space Preserve Hike.

adjacent to a community that is a major tourist destination in part because of its pastoral character and scenic beauty. According to the Sonoma Valley Visitors Bureau, 100,000 visitors signed the log at its welcome center in the Sonoma Plaza in 2004. The Bureau estimates that the actual number of visitors is 3 to 4 times that number.

Visitors to the Preserve can see sweeping views of San Francisco and San Pablo Bays from various locations on the Preserve hillside.

Land Ownership

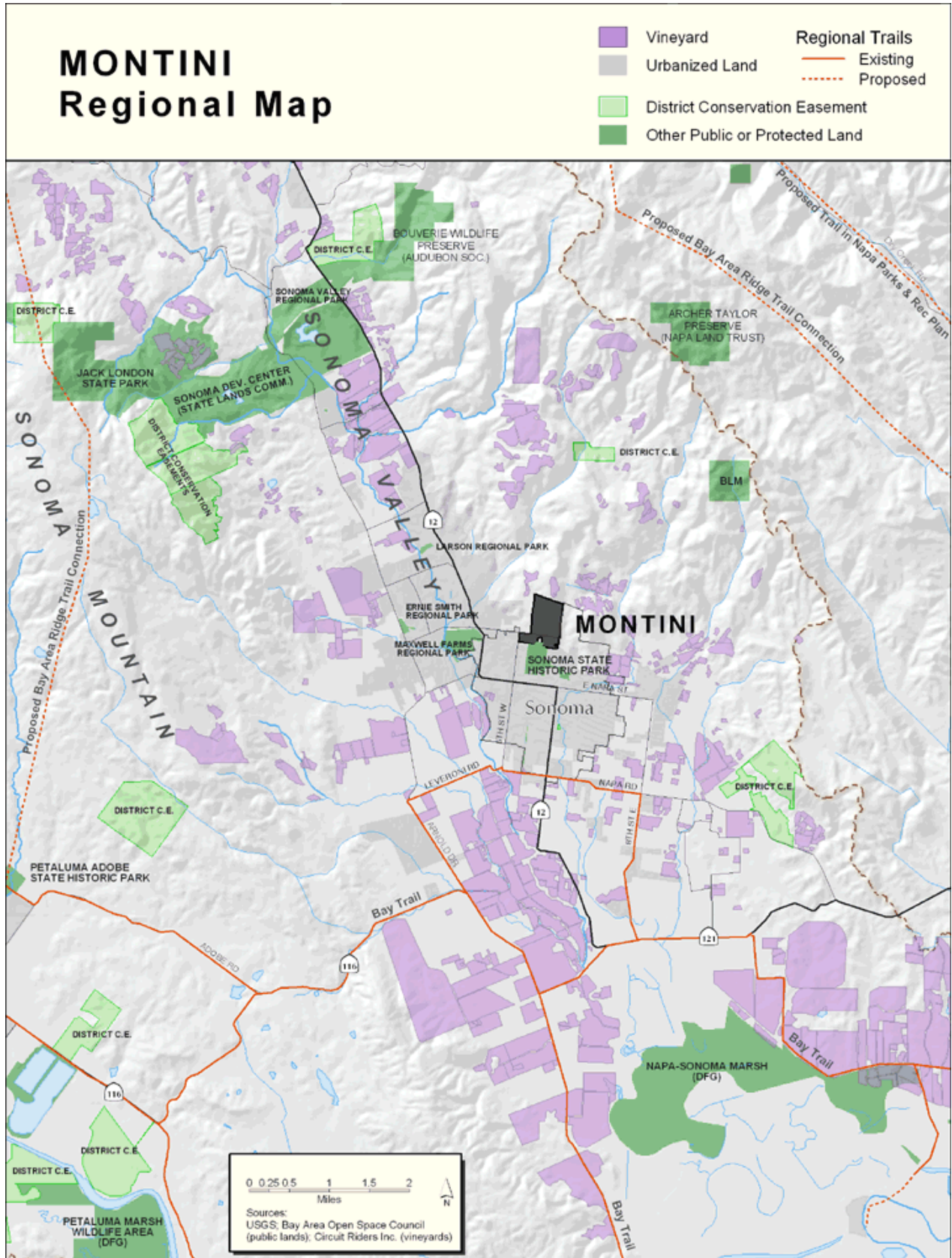
The Montini Open Space Preserve consists of 98 acres, including a 9-acre portion of a parcel located in the city of Sonoma, a 26-acre site, also situated in the City, and a hillside area of about 63 acres located in the unincorporated county. The District concurrently acquired a conservation easement over 53 hillside acres on an adjacent parcel of land from the Montini family (Figure 1. Regional Map). This management plan does not apply to the conservation easement.

The 9-acre portion of the urban residential parcel was acquired in fee and will eventually be transferred to the city of Sonoma for passive recreational use. The 26-acre site adjacent to the Sonoma State Historic Park and 63 acres within the unincorporated County, directly to the north of the 26-acre site were acquired in fee for eventual transfer to State Parks. Bill Montini retains a five-year grazing lease on all of the Property that was acquired in fee by the District.

A number of other entities hold easements over the Preserve including:

- An easement for a pipeline, waterline facilities, fixtures, and all appurtenances in favor of the city of Sonoma over a portion of the eastern portion of the Preserve.
- An easement for a road and public utility granted to Sonoma County along a strip along the easterly boundary.
- A 20-foot-wide easement for a pole line and appurtenances for conveyance of electricity and telecommunications along the northerly portion of the Preserve granted to a private party.
- An easement for underground water pipelines and all facilities, fixtures, and appurtenances to the Sonoma County flood Control and Water Conservation District on the portion of the Preserve adjacent to the State Historic Park and the Montini Ranch residential development.

Figure 1. Regional Context



- An easement for construction, grading, operation, and maintenance of storm drainage and flood control facilities on the southerly 50 feet of the parcel to the city of Sonoma.
- An easement granted to a private party in the southeast corner of the Preserve.

Preserve Purpose

The purpose of the acquisition is to preserve and protect the open space, natural, and scenic values of the Preserve, and to prevent any uses of the Preserve that will significantly impair or interfere with those values. The Preserve is visible from much of the city of Sonoma and serves as an important backdrop contributing to the community identity Sonoma.

The Preserve also has a significant amount of oak woodland that serves as habitat for important plant and animal species integral to preserving the natural heritage of Sonoma County. Accordingly, the Preserve protects the City's scenic values including the pastoral view of the Preserve from surrounding and nearby public lands, and the Preserve's existing natural resources including the oak woodland, grasslands, and other important habitats.

In addition, the Preserve will expand public recreational access, ranging from viewpoints high on the Preserve to meadows along Fifth Street West. The recreational opportunities created by this project will benefit the many residents and visitors who will be able to walk a few city blocks to the Preserve from the Sonoma Plaza.

Maintaining the scenic vista that forms the backdrop for Sonoma is critical for the city of Sonoma and

contributes to the quality of life for city residents and citizens of Sonoma County. Conservation of the Preserve will enhance the experience of the Sonoma State Historic Park for the more than 65,000 visitors annually by maintaining the historic feel of the hillside backdrop, and further by providing for expansion of existing State Park and city trails. To the east is the Sonoma Overlook trail, which could eventually extend onto the fee portion of the Preserve. This city trail linkage and trail connections from the State Park to the Preserve could eventually enable a pedestrian starting in the downtown Sonoma Plaza to walk up through the State Park, or around to the trail on the east side, to meadows and through oak woodlands on the Preserve.

Purpose and Need for the Plan

The District prepared this management plan to guide natural resource management, including public use, on the Preserve for the next 10 years. The plan is flexible; it will be revised periodically to ensure that its goals, objectives, implementation strategies, and timetables are still appropriate. Major revisions, if needed, will require public involvement and CEQA review.

General and Other Plans

The Preserve was identified in the District's Acquisition Plan 2000 under the Greenbelt category of the plan. The Preserve also falls within the priority oak woodland of the Natural Resource category.

The Preserve meets several goals of the 1989 Sonoma County General Plan. The District's protection will maintain the rural character of the hillside, and will ensure that the scenic woodlands and meadows are protected in perpetuity. The low-intensity public outdoor recreational

use is consistent with protection of the Preserve's open space values within the scenic viewshed. The Preserve was identified by the draft Sonoma County General Plan as being in Sonoma Valley Planning Area (Planning Area 9). A portion of the hillside was designated as part of a scenic landscape unit (Sonoma County 2006). In the city of Sonoma General Plan as the Preserve is identified as Sonoma residential on the 26-acre parcel north of Montini Ranch and Hillside (1 DU per/10 acres maximum), Hillside Backdrop, and Open Space on the remainder of the Preserve within the Sonoma city limit (City of Sonoma 1995).

Existing Partnerships

The District's partners for the acquisition of the Preserve included the California Coastal Commission and the city of Sonoma. California State Parks will also play a key role in the Preserve's future as the eventual owner of most of the property.

In addition to the agency partners, two nongovernmental partners were very supportive of the protection of the Montini Preserve, the Sonoma Overlook Trail Committee and the Sonoma Ecology Center.

Related Projects and Studies in the Area

Easement

The District purchased a conservation easement over 53 acres of the Montini family's property in 2005 to protect the rural and scenic character of the hillside. The conservation easement allows for continued grazing of Montini family's lands, and construction of one single-family residence within a designated building envelope. This easement will protect the oak woodland and other important

resources on the property, adjacent to the Preserve.

Sonoma State Historic Park

Sonoma State Historic Park is a series of historic attractions within the Sonoma community. The Vallejo home site of Sonoma SHP is located south of the Montini Preserve. Visitor activities include tours of the historic sites, displays and exhibits, picnicking, bike trails, and a visitor center.

Sonoma Overlook Trail

A group of citizens worked to protect the city of Sonoma's Mountain Cemetery. Through the grassroots efforts of this group the Sonoma Overlook Trail was constructed, largely using volunteers. The trail and Mountain Cemetery is located east of the Preserve across Norrbom Road. Volunteer docents occasionally lead tours on the trail. The trailhead to the gentle but hilly, two mile trail is within walking distance from the plaza in Sonoma. The trail makes its way through meadows, soap-root, buckeye, and manzanita and across a babbling brook to a breathtaking view of Sonoma. This well-maintained trail is open all year round from dawn to dusk.

Sonoma Aqueduct Cathodic Protection Upgrade Project

The Water Agency will replace an anode within an underground drinking water pipeline. The anode extends the life of a pipeline by controlling erosion. The anode station would consist of an anode placed in a 150-foot to 250-foot deep well, a rectifier to power the anode, and connecting power lines. The anode itself would be housed in a concrete box, flush with ground level and the rectifier would be housed in a steel box, placed next to an existing steel box near the

intersection of Verano Rd. and 5th St. West. The Water Agency would also construct a gate on the Preserve near the intersection which would then be used by the District to access the proposed gravel parking lot.

Chapter 2. Planning Process

Description of the Planning Process

Key steps in the planning process include:

- Gathering information;
- Initiating public involvement;
- Analyzing resource relationships;
- Identifying issues and developing vision and goals;
- Developing the plan and assessing environmental effects;
- Publishing the draft management plan and CEQA document;
- Documenting public comments on the draft plan;
- Revising the draft plan and preparing the final plan;
- Implementing the plan.

The plan may be amended at any time, as necessary, under an adaptive management strategy (the process of implementing policy decisions using scientifically driven experiments that test predictions and assumptions about management plans, and using the resulting information to improve management strategies). Public involvement and CEQA (Section 2) review will be required if major revisions are needed. For more about plan revision, please see Chapter 6.

The Montini Open Space Preserve

The District purchased the Montini Preserve in December 2005. The

District held a Dedication for the Preserve in February 2006. The invitation to the Dedication was distributed to about 3,000 residents of the city of Sonoma and included information about a public workshop. Several press releases to Sonoma Valley publications were sent out describing the workshop.



District General Manager, Andrea Mackenzie at the Preserve Dedication

In June 2007, the District held another public workshop to present the preliminary draft management plan. The invitation to the workshop was distributed to about 350 residents of Sonoma County, adjacent landowners, and others who had expressed interest in the Preserve. The District sent a press release to Sonoma Valley publications describing this second workshop.

This draft plan and Initial Study/Negative Declaration is being distributed to District partners, adjacent landowners, government agencies, local jurisdictions, community groups, and private citizens. The public has 30 days from its release to provide comments. The draft plan and CEQA documentation can also be viewed at the following Internet site:

<http://www.sonomaopenspace.org>

Issues Identified by the Public

Issues, concerns, and opportunities were identified through the first public workshop, and discussions with other District staff and other key contacts. Comments were received orally (Appendix A).

The District held a public workshop on March 8, 2006 in Sonoma at the Sonoma Fire House Training room. About 30 people attended. Issues identified by the public pertained primarily to access and recreation. Several individuals said that they would like to have the trail constructed quickly without delays and that the construction should be kept simple and inexpensive. An adjacent landowner expressed a concern about the proximity of hikers to his private residence. One individual expressed that it would be nice for residents and visitors to be able to walk the trails. The District received one comment by mail. The sender expressed a desire to hike on a trail that is accessible from downtown Sonoma.

The District held an additional public workshop on June 27, 2007 in Burlingame Hall of the First Congregational Church in Sonoma. About 30 people attended. Issues identified by the public pertained primarily to trails and parking. Some individuals of the adjacent subdivision did not want hikers so close to their residences. Other individual felt that the proposed trail spur to 5th St. West provided good access to the west side of town. Several individuals said that the 9-acre parcel adjacent to the Montini Ranch subdivision should not have a trail, public use, or anything, that the parcel should be visual only. Others expressed that crossing Norrbom Road is unsafe. The District also received similar comments by mail and email.

Subsequent to the June 2007 workshop, District staff met numerous times with various members of the community. Subsequent comments included that a disabled trail should not be constructed in the 9-acre parcel because it would displace the cows. Others noted that cows and wheelchairs are safely accommodated on other trails in the San Francisco Bay Area and that the District was planning to maintain the cows in the area currently under a grazing regime.

A mediator was retained by the District to assist in developing a consensus agreement on the disabled trail alignment through the District's 9-acre parcel.

Issues Identified Other Agencies

Initially the trail was designed to pass south of the Water Agency's and City's water tanks and onto State Parks' property for a distance of 500 feet. After further consideration, State Parks rejected that portion of the trail alignment. The trail was subsequently rerouted north of the water tanks onto District-owned property.

Internal Issues

Internally, the District identified the desire to design and construct trails to be as sustainable as possible. The District also has an interest in resource management, including oak regeneration, preventing the spread of sudden oak death, and in discouraging nonnative invasive weeds, while encouraging native plant species. Lastly, discouraging illegal camping, protecting historic resources, and protecting wildlife populations were also identified as priorities.

Chapter 3. Preserve Resources

Geographic/Ecosystem Setting

There are various systems of identifying ecosystems in California. The US Environmental Protection Agency (USEPA) system classifies the Preserve as being within the southern and central California chaparral and oak woodlands ecoregion (USEPA no date). The primary distinguishing characteristic of this ecoregion is its Mediterranean climate of hot dry summers and cool moist winters, and associated vegetative cover comprising mainly chaparral and oak woodlands; grasslands occur in some lower elevations and patches of pine are found at higher elevations. Most of the region consists of open low mountains or foothills, but there are areas of irregular plains in the south and near the border of the adjacent Central California Valley Ecoregion. Domestic livestock grazes much of this region; very little land has been cultivated.

Partners in Flight, a consortium of agencies and nongovernmental organizations, classifies the Montini Preserve as being within the Central and Southern California Coast and Valleys (US Bureau of Reclamation no date). Designed to be a tool for environmental resource management, ecoregions denote areas within which ecosystems (and

the type, quality, and quantity of environmental resources) are generally similar. The approach uses the premise that ecoregions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level.

For a description of the Preserve's local setting, please see Chapter 1.

Physical Environment

Topography

The Preserve is on a hillside and consists of a series of small forested ridges alternating with sloping grasslands. Elevations range from about 120 feet to about 500 feet above sea level.

Hydrology

Two small ephemeral drainages flow southeast between ridges on the Preserve. Both drainages typically flow for a short period of time



Montini Open Space Preserve Hillside

following heavy rainfall and were found flowing in March and April 2006. In addition, two drainage ditches can be found on the Preserve, one along Norrbom Road and another along the North side of the Water Agency's paved access road. The remnants of a small earthen dam were found on the eastern part of the Preserve. It does not currently retain water.

Soils/geology

Figure 2 shows soils on the Preserve as mapped by the Natural Resource Conservation Service. Most of the Preserve is mapped as Goulding-Toomes complex, 9 – 50 percent slopes. These soils are quite rocky with shallow soils, where water does not accumulate on the surface, nor is it well retained by the soil during the dry season. Active erosion areas are limited to small areas in and on the banks of the easternmost drainage, north of the Water Agency tanks where cattle converge to eat green wetland vegetation and along the ranch roads leading west and north from the water tanks.

The southeastern portion of the Preserve, consisting of most of the open field south of the Water Agency's paved road is Red Hill clay loam, 2 – 15 percent slopes, RhD. These soils are moderately well-drained and have a predominately

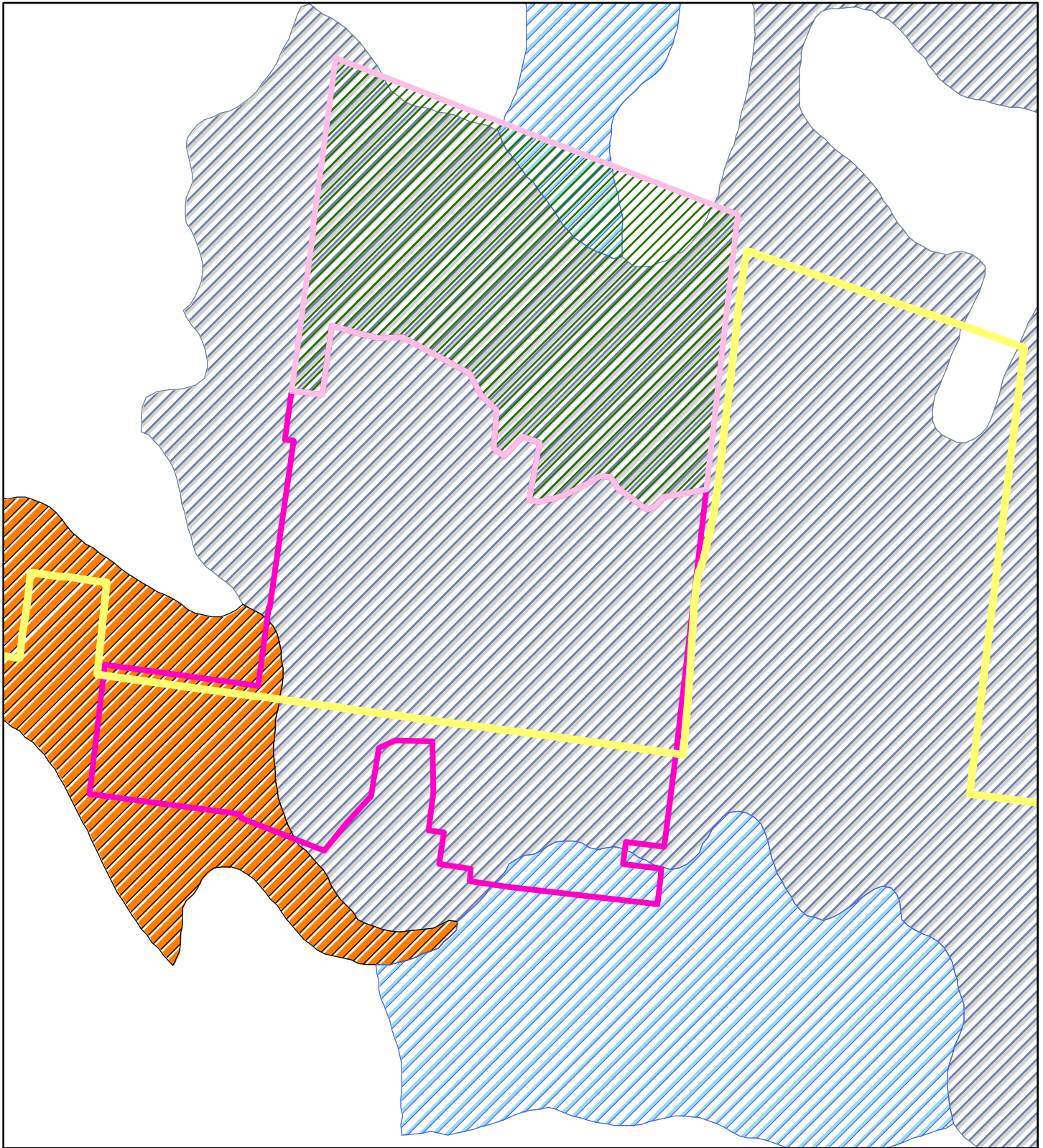
clay subsoil, are moderately prone to erosion and have moderate permeability and medium to rapid runoff. The RhD area in the Preserve is virtually flat and no erosion has been seen on these soils. In most places vegetation on RhD soil is madrone, oaks, and Douglas fir. Red Hill soils are used mainly for producing timber with some areas (including the lands on the Preserve), being used for limited grazing by sheep and cattle.

The level field on the southwestern portion of the Preserve is Clough gravelly loam 2 to 9 percent slopes. Clough gravelly loam is generally used for hay, grapes, and grazing. The soils are moderately well drained with gravelly clay subsoil underlain by a hardpan. Permeability is very slow with runoff slow to medium and a slight to moderate hazard of erosion.

Biological Environment

Vegetation

The Preserve's vegetation (Appendix C) is on a spectrum from open grassland to oak savannah to oak woodland with some wetland vegetation as well (Figure 3). Annual, nonnative grasses and weedy forbs, reflecting the Preserve's long



Montini Open Space Preserve

Figure 2. Soils



0 0.05 0.1 0.2 Miles

City Limits

Soils



CLOUGH GRAVELLY LOAM, 2 TO 9 PERCENT SLOPES



GOULDING-TOOMES COMPLEX, 9 TO 50 PERCENT SLOPES



RED HILL CLAY LOAM, 2 TO 15 PERCENT SLOPES

District Holdings

Symbol



10 - Fee



11 - Easement over Private Land



12 - Easement over Public Land



16 - Easement over Private Conservation Organization

17 - Easement over District

history of woodcutting, grazing, and quarrying, dominate the grassland. The densest vegetation is on the west-facing slope west of the Water Agency tanks and along Norrbom Road. Wooded areas support many coast live oak, blue oak, California buckeye, California bay, healthy madrone, manzanita, sticky monkeyflower, black oak, toyon, and poison oak. No conifers were seen (District 2005).



Pileated Woodpecker. Ohio Department of Public Resources

Oak Savannah/Woodland. The oak woodlands and savannah (scattered trees) are characterized by coast live oak, black oak, and blue oak, along with scattered bays and California buckeye. Poison oak and coyote brush were also noted in the understory.

Grassland Vegetation. Herbaceous plants identified in winter (Bush 2005) and spring (Lew 2006) include soft chess (*Bromus hordeaceus*), wild oats (*Avena* spp.), purple false brome (*Brachypodium distachyon*), hedgehog dogtail (*Cynosaurus echinatus*), Hardinggrass (*Phalaris aquatica*), purple needlegrass (*Nassella pulchra*) (Ruygt 2006), rattlesnake grass (*Briza maxima* and *Briza minor*). Dove weed (*Eremocarpus setigerus*) was common in areas with little herbaceous cover, especially in the heavily grazed areas at the southwestern end of the Preserve and along the mown temporary path. Grasslands likely include many other species of grasses and grass-like plants such as rushes and sedges, and forbs that would be evident during a spring site visit (Bush 2005). Spring vegetation includes rushes, and other herbaceous species including forbs such as popcorn flower, at least two species of buttercups, blue dicks, and mouse-eared chickweed. Nonnative forbs such as filaree and field marigold were also observed.



Allium peninsualre ssp. franciscanum. Broussard.



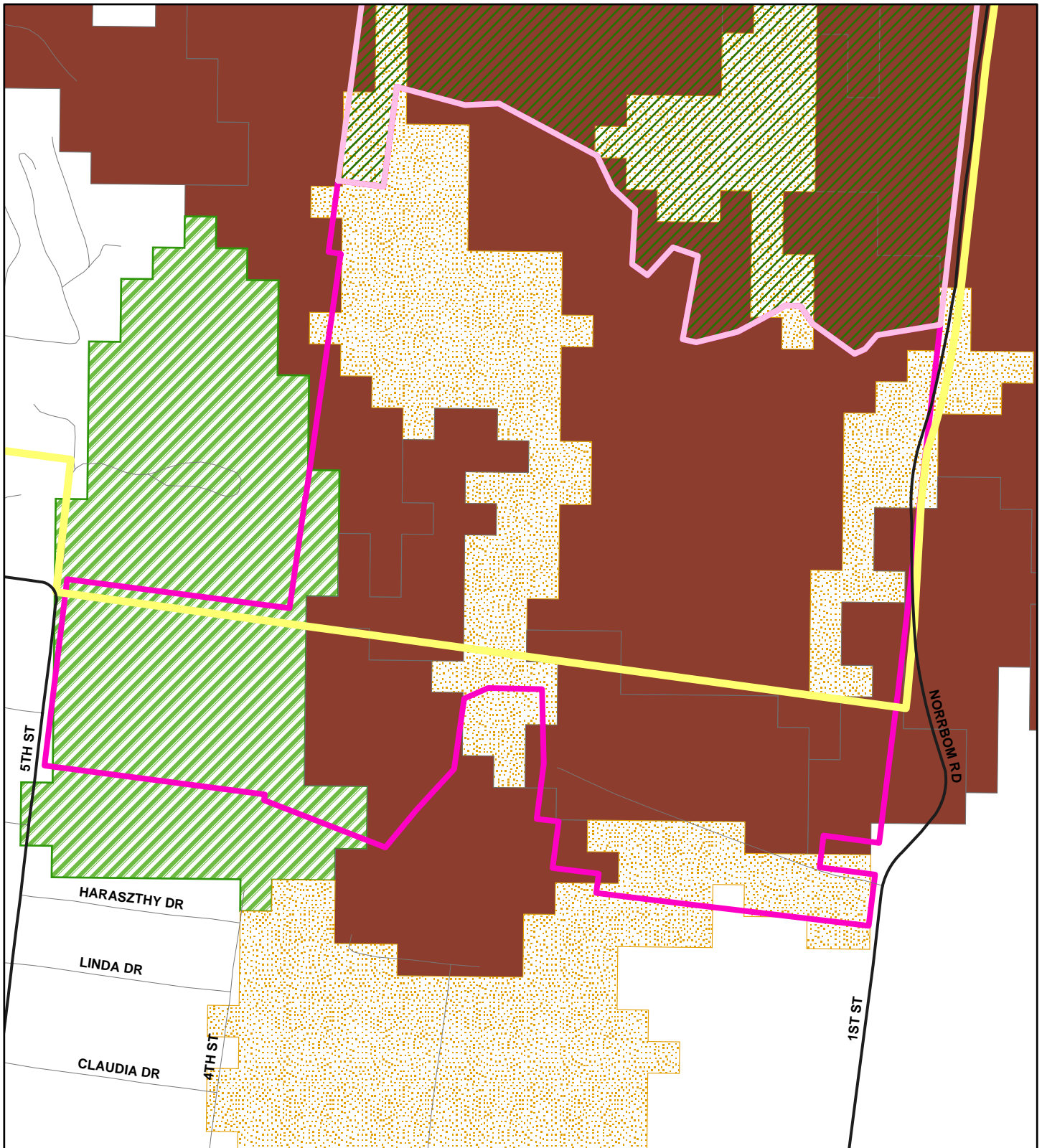
Brodiaea californica var. leptandra Robert E. Preston, PhD

Wetlands. Scattered small wetlands can be found in the Preserve, especially on the flat parcel along 5th St. West and in some of the lower grassy fields. Most of these could be characterized as marginal seasonal wetlands, since they are wet during the rainy season, remaining moist into spring. plants found within these areas include sedges and rushes.

Weeds. Weedy species that merit attention include purple and yellow starthistle (*Centaurea calcitrapa* and *C. solstichialis*). A few very small patches of Hardinggrass were seen on the hill slopes. The few patches seen by Bush (2005) are on dry hill slopes where their ability to spread is likely constrained by available moisture (Bush 2006).

Purple starthistle should be the highest priority for management because it occurs in a localized area where control efforts can be concentrated. Yellow starthistle is more wide spread and would therefore be more difficult to manage (Bush 2006).

Several invasive species are found in the grassland and woodland understory. Yellow starthistle can be found in small areas at the southeast and northeast corners and just below (south) of the Water Agency's paved road. Hedge parsley (*Torilis arvensis*) is abundant throughout the Preserve. Turkey mullein (*Eremocarpus setigerus*) appears in historically over-grazed grassland areas and in mown or otherwise disturbed areas. New invasions are probable in the future; from traffic from adjoining properties or weed seed in livestock feed (District 2005).








Montini Open Space Preserve

Figure 3. Vegetation
*from CalVeg, US Forest Service

District Holdings

Symbol

-  10 - Fee
-  11 - Easement over Private Land
-  12 - Easement over Public Land
-  16 - Easement over Private Conservation Organization
-  17 - Easement over District

-  A1, A2
-  C1, C2
-  F1
-  H1
-  I1
-  City Limits

Montini Vegetation CalVeg

Type

-  AGRICULTURE-CROPS
-  ANNUAL GRASS
-  BLUE OAK FOOTHILL PINE
-  BLUE OAK WOODLAND
-  MONTANE HARDWOOD
-  WET MEADOW



0 0.05 0.1 0.2
Miles

Wildlife

The wildlife value of the Preserve is bolstered by its adjacency to the undeveloped Mountain Cemetery (owned by the city of Sonoma) to the east. The following species have been observed using the Preserve: great horned owl, acorn woodpecker, Nuttall's woodpecker, pileated woodpecker, black phoebe, various other songbirds, pileated woodpecker, red-shouldered hawk, red-tailed hawk, moles, and gray squirrel. Abundant deer and turkey have also been seen (District 2005). An Audubon count in the area surrounding and including the Montini Preserve combined with observations on the Preserve yielded 60 species of birds (Appendix c. Bird List) (Audubon 2006). Loggerhead shrike, burrowing owl, marsh hawk, and white-tailed kite have also been seen in the area (Wetlands Mitigation Plan for Montini Subdivision).

Special Status Species

A botanical survey conducted in May and June 200 discovered two special status plants within 50 feet of the preliminary trail alignment (Ruygt 2006). The trail was realigned to avoid affecting the plants and the plants themselves were protected with a low rock ring. The plants are *Allium peninsulare* ssp. *franciscanum*, Franciscan onion, on the California Native Plant Society (CNPS) list of rare and endangered plants of California and elsewhere, and *Brodiaea californica* var. *leptandra* (narrow-anthered California Brodiaea, also on the CNPS list of rare and endangered plants of California. The onion was found under a stand of buckeye and bay. The Brodiaea was found along a grassy segment in a small draw. The habitat and distribution of both of these plants is very limited within the Preserve.

Natural Processes

Natural processes are generally disturbance factors to which an ecosystem has evolved. These natural processes are typically major disruptions to the current order of the ecosystem such as flooding or fire and shift the natural process of succession. Flooding is probably not a major factor in Montini Preserve vegetation types. Fire, however was likely a part of this landscape.

Role of Fire. Fire is a natural part of California's oak woodlands. It was also used by Native Americans as a management tool to improve access for hunting and gathering acorns and to prevent encroachment of other, less useful tree species. The use of fire as a management tool continued with the European settlers and cattle ranchers to increase forage production and keep stands open for cattle.

Higher fire frequencies have been correlated with better oak regeneration (UC Cooperative Extension no date). Oak recruitment was associated with fire events, although the mechanism by which this occurs is unknown. It is thought that postfire oak sprout growth may play a role.

No significant wildland fire has occurred on the Preserve since at least 1939 (Sonoma County Permit Resource and Management Department 2004).

Grazing. It is likely that the Montini Preserve was subject to native grazers such as elk, pronghorn, and deer before the presence of European settlers.

Cultural Resources

The Preserve is on the hill directly north of General Mariano

Guadalupe Vallejo's historic ranch. This area played a major role in the history of Sonoma Valley, Sonoma County, and California. Before Mexican missionaries established the mission in Sonoma in 1823, just southeast of the Preserve, the site of the current city of Sonoma was a California Indian village.

Good soils, temperate climate, and abundant food and water attracted indigenous peoples to the Sonoma Valley for at least 12,000 years before Spanish missionaries settled in the early 19th century. As many as 5,000 Native Americans lived in what is now Sonoma County at any one time. Local tribes included the Pomo-Kashaya, Wapo, and Patwin. At the time of European settlement, the Preserve was included in the territory controlled by the southern Miwok (Steen and Origer 2006). The Southern Miwok were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures. They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied continually throughout the year and other sites were visited in order to gather resources that were abundant or available during certain seasons. Sites were often near fresh water sources and where plants and animals were diverse and abundant.

Historically, the Preserve is situated within the 6,094 acres of the Pueblo Lands of Sonoma Landgrant.

Father Jose Altamira established the Mission San Francisco Solano in Sonoma in 1823, soon after the Russians settled Fort Ross in 1812. The Mission is the northernmost Franciscan mission in California and was the last established mission in California. It is the only California

mission established under Mexican rule after Mexican independence from Spain. The town plaza was the site of the Bear Flag Revolt in 1846 which established California as an independent Republic separate from Mexican rule. Extensive and repeated cycles of grazing began immediately upon European settlement. Basalt quarrying began early and continued to the 1900's. (District 2005) Four quarries are listed in the literature as being in the vicinity of the Preserve, Aguillon, Melani, and Weyl quarries and Sonoma City Rock Crusher. In 1916, Sonoma county was the number top producer of paving blocks in California, However, because of labor union conflict and a desire for smoother streets for cars, most quarries reduced their output or closed in later years (Steen and Origer 2006). There are numerous sites of quarry activity on the Preserve with a large quarry pit in the northeast portion. A foundation can be found near the northern boundary. It is thought that it supported quarrying equipment (Montini pers. comm. 2006).

A cultural resources survey was conducted of the entire Preserve in 2006 (Steen, E. and T. M. Origer. 2006). Three cultural sites were found, a prehistoric midden, a rock wall and the remains of a basalt quarry.

Prehistoric Resources

The midden, previously recorded, contains obsidian, chert and basalt lithics (stone tools or projectiles), fire-affected rock, and historic era ceramics. This site was also located during the 2006 survey. This site will be retained *in situ* (will not be moved from its original place of deposition).

Historic-era Resources

A dry-laid stone fence was also found on the Preserve. The fence extends about 900 feet with a 300-foot break. The stone fence will remain in its current condition. A buffer between the wall and public use will be in effect and there are no plans whose execution would alter its integrity.

A historic basalt quarry was found that extended over much of the Preserve. These are believed to be the remains of the Aguillon Quarry. Remains of activity include pits, trenches, roads, ramps, a powder house, and other remains. The quarry is a good example of quarrying activity in Sonoma County. Although the trail is proposed through the quarry, no ill effects are anticipated. In fact, the quarry's juxtaposition with the trail provides a rich interpretive opportunity to tell the story of basalt quarrying and its importance to the early economy of Sonoma County. Any movable surface artifacts will be recovered prior to trail opening, possibly for display purposes (Steen and Origer 2006).

Land Use

Preserve

The Preserve has been grazed for many decades, and this use continues. The paved road at the southeast corner of the Preserve from Norrbom Road is used under an easement to access the Water Agency's tanks (District 2005). The District has sponsored periodic public access and volunteer stewardship workdays.

Surrounding Land Use

The 5-acre parcel to the southwest of the Preserve is currently being developed as a subdivision for 26 single-family lots. The property to the east of the Preserve is owned by

the city of Sonoma and is used for hiking (Sonoma Overlook Trail). Lands to the north are used for livestock and vineyards. The property to the south is a recreational property owned by State Parks (Sonoma State Historic Park) and ball fields and a dog park owned by the city of Sonoma. West of the Preserve is a mixture of grazed lands and houses.

Improvements

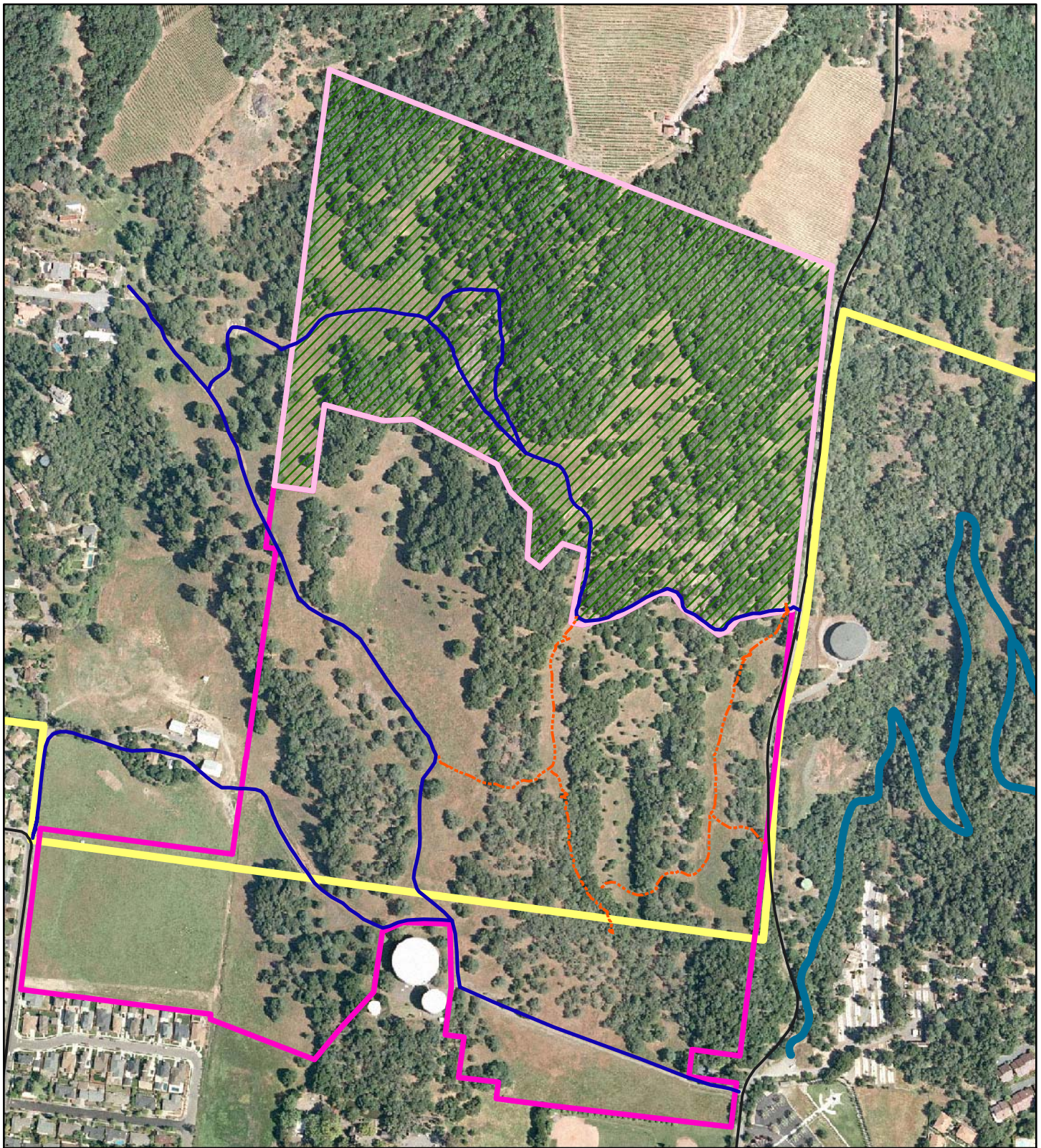
Roads

The Preserve is accessed from Norrbom Road through a locked gate at the southeast Preserve corner. A paved road extends from this gate to the water towers. An additional gate can be found further along Norrbom Road. However, the road into the Preserve from that gate no longer appears passable. Several other ranch roads head north/south up to the northern Preserve line (Figure 4. Existing Roads).

Water Infrastructure

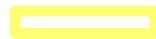




A well located on the southern boundary of the Preserve, just east of the water tanks and north of the Vallejo Home State Historic Park is not currently supplying water, but has the potential to irrigate the pasture adjacent to it.

In addition, a ditch extends from the Water Agency tanks along the paved road toward Norrbom Road. The purpose of the ditch is to provide drainage from the site and prevent it from sheet flooding the City's Ernest Holman Park below. A 12-inch corrugated galvanized pipe extends along the ditch. Its function was to channel water through the ditch in an effort to prevent flooding the Field of Dreams ballpark at Ernest Holman Park. However, it is no longer connected on the intake end. A black pipe taped shut on the intake




Montini Open Space Preserve

Figure 4. Existing Preserve Roads

-  City Limits
-  Major Highways
-  Sonoma Overlook Trail
-  Internal Roads
-  Minor Roads/Trails

District Holdings

Symbol

-  10 - Fee
-  11 - Easement over Private Land
-  12 - Easement over Public Land
-  16 - Easement over Private Conservation Organization
-  17 - Easement over District

0 0.05 0.1 0.2 Miles

end extends from the water tanks along the south side of the Water Agency's paved road. Its function is also unknown. A pipe extends from the Water Agency's tanks west towards 5th St West. The purpose of this pipe is to supply water to irrigate the 9-acre pasture along 5th St. West, although it has not been used for many years (Montini 2006).

Fences

Existing fencing, consisting of older barbed wire and/or mesh, runs along the west boundary north of the ranch road leading to the Preserve to the west, and all of the north, east, and south boundaries. Some interior fencing can be found north of the paved road and north of the ranch road leading from the water tanks to the Montini homestead. A boundary fence was constructed along the northern boundary in 2006.

Public Use

Currently, there is no formal recreational use occurring on the Preserve. However, there is a State Historic Park south of the Preserve and the Sonoma Overlook Trail across from Norrbom road to the east.

Some informal use has occurred historically on the Preserve, mostly partying and hiking.

Other Uses

Homeless encampments have been observed on the Preserve.

Visual Resources

The Montini Preserve meets several goals of the 1989 Sonoma County General Plan. The acquisition will maintain the rural character of the hillside, and will ensure that the scenic woodlands and meadows are protected in perpetuity. The low-intensity public outdoor recreational use is consistent with preservation of

the Preserve's open space values within the scenic viewshed.

Current Management

Other than being grazed, resources on the Preserve are not currently being actively managed. The District has offered several open access hiking days and a volunteer stewardship day. The District has contracted with the Sonoma Ecology Center to implement a Volunteer Patrol program. Volunteers are trained and then commit to hiking the Preserve at regular intervals to report on Preserve conditions and provide a District presence on the Preserve.

Chapter 4 - Challenges and Opportunities

Problems

Weeds

Weeds, or nonnative invasive pest plants, are an epidemic problem in California, nearly replacing California native grasses over the entire state. The Preserve is no exception. Purple and yellow starthistles, well-known weeds are present on the Preserve. Other nonnative plants on the site include three species of *Erodium* or filaree and field marigold, both native to Europe.

The current grazing lessee and previous owner of the Preserve has taken measures to control a large patch of purple star. If his efforts prove successful his techniques should be incorporated elsewhere on the Preserve.

Nonnative animal species now reside on the Reserve including wild turkeys. No control of these species is currently planned.



Yellow Starthistle

Table 2. Invasive Plant Species Targeted for Control on the Montini Preserve.

Common Name	Scientific Name	State *	Distribution
Purple starthistle	<i>Centaurea calcitrapa</i>	yes	Grasslands
Yellow starthistle	<i>Centaurea solstitialis</i>	yes	Grasslands, roadsides
Hardinggrass	<i>Phalaris aquatica</i>	no	Grasslands

* Received a rating as a noxious weed by the State of California Department of Food and Agriculture Division of Plant Health & Pest Prevention Services

Erosion

Moderate to severe erosion can be found on some of the ranch road areas. Much of the area contains highly erodible soils, and soils subject to slumping. Erosion control is important to protect and regenerate native plant communities and wildlife habitat, prevent sediment runoff, and retain aesthetic values.

California. Black oak has also been observed to have regeneration problems in some regions. Although lack of oak regeneration has commonly been associated with fire suppression, cattle grazing, weedy grasses and herbivore of oak shoots by cattle and native mammals, the exact reason for the lack of regeneration is not known.



Purple Starthistle

Oak Regeneration

Oak regeneration, particularly blue and coast live oak regeneration, has been documented widely in

Trespassing

The site has a long history of trespassing by people partying (Montini 2007), hiking, and using the Preserve as a homeless

encampment. Trespassing is a habitat management problem in that trespassers have left garbage such as plastic cups, bicycle equipment, and tents and other camping gear and may pose a fire danger.

Fences

There are interior fences that may hamper the free movement of wildlife throughout the Preserve. None of the fences is essential for the continuing operation of the Preserve, or for the ranching lessee (Montini 2006). However, there may be management reasons for retaining some interior fencing, such as to control cattle grazing more easily.

Sudden Oak Death

Although there are no documented cases of SOD on the Preserve, the presence of *P. ramorum* in Sonoma County is well documented. Although it is possible that the Preserve being so dry, lacking even seasonal streams, and being south-facing, may be fairly resistant to SOD (Hunter 2006), the site may still present some susceptibility to SOD due to the abundance of bay trees that touch the susceptible coast live oak.

Opportunities

Public Use

The Preserve's proximity to Sonoma's historic town square provides an opportunity for visitors and residents to enjoy a moderate hike within walking distance of restaurants and markets. In addition, a regular presence on the Preserve is likely to discourage undesirable behaviors such as camping and littering.

The fact that a trail exists on a similar adjacent Preserve owned and managed by two of the Preserve's partners creates an opportunity to

link to the existing Sonoma Overlook Trail to create a more extensive network of trails. Since it is anticipated that the Preserve will eventually be added to the California State Park System, State Parks provided trail planning expertise for the Preserve trails.

Historic Landscape

In addition to providing public use, protection of the Preserve assures that the historic landscape of the original Vallejo Homestead is preserved in much the same state as it was during Vallejo's occupation. Its historic origins provide the Preserve with opportunities for maintaining and enhancing the historic landscape and providing interpretation of historic events.

Partnerships

There are several other entities involved in the Montini Open Space Preserve including the city of Sonoma (one of the District's partners for the acquisition of the Preserve), the Sonoma Overlook Trail Task Force and docents, and the most likely potential eventual recipient of much of the Preserve, California State Parks. Along with the District, each of these partners brings different and valuable resources to the Preserve.

Restoration

The Preserve has been grazed over its entirety, which has been beneficial in keeping the grasses short, but may have prevented some wetland and woody vegetation from growing, especially in areas that are seasonally wet. Restoration opportunities include plantings and fencing, some of which could be conducted by volunteers, schools, and citizens' groups. Planting native vegetation could be especially effective if it immediately follows weed removal because bare soil would provide less

Chapter 4

competition for the native plants and the native plants would prevent many weeds from reestablishing.

Chapter 5. Management Direction - Vision Statement, Goals, Objectives

Vision Statement

The Preserve will be an oak woodland and grassland that supports high quality habitat for a diversity of native Sonoma County wildlife and plants. The Preserve will support opportunities for research and will be a showcase for appropriate management of oaks and grasslands for the Sonoma Valley.

The gentle trails, rolling grasslands and oak woodlands, spring wildflowers, and spectacular views of the Sonoma Valley and San Pablo Bay will attract visitors who enjoy and appreciate the natural setting of Sonoma County. The public will have clear and easy access to the Preserve with minimal impacts to wildlife habitat. The Preserve will provide opportunities for persons with physical disabilities to enjoy the Preserve.

Partners will collaborate to provide a wide range of management, interpretive and environmental education programs. The Preserve will provide trail linkages, connecting the adjacent overlook trail with the regional bike trail and the Vallejo Home State Historic Park. The local community and visitor will enthusiastically identify and promote the Preserve as a regional and statewide tourist destination that contributes to economic development and enhances the quality of life in Sonoma.

Management Direction: Goals, Objectives, and Strategies

Goal 1. Manage Preserve grassland habitats to support native vegetation.

Objective 1. By the year 2010, reduce the percent cover of weeds by 5%.

Narrative:

Nonnative invasive pest plants or weeds displace native plants, reduce biological diversity, and alter ecosystem processes. Many of them, including the yellow starthistle found on the preserve, are on the state weed list, making them illegal to sell or plant. The Brooklyn Botanical Gardens estimates that there are 300 dangerously invasive weeds growing in the continental U.S. and Canada, half of which were introduced as ornamentals. They were brought to this country intentionally and allowed to gain a foothold before their harmful effects were known.

When they arrived in this country, none of the mechanisms that keep plants in check, such as insects, disease and competition came with them. So when they are unmanaged in native areas, they take over and disrupt the ecosystem, affecting bird, insect, fish and mammal populations that depend upon native plants for food, shelter and protection from predators.

Strategies:

- Use integrated pest

management techniques including grazing and mechanical (hand removal, mowing, string trimming, and heating), biological, and chemical control, where appropriate to reduce noxious weeds such as yellow and purple starthistles.

- Spot spray transline or glyphosate in spring (Hastings, pers. Comm. 2006).
- Monitor the grazing lessee's efforts on purple starthistle and incorporate results into weed management.
- Treat Harding grass by stimulating new growth with mowing, irrigation, or grazing, then treating with glyphosate. Allow at least ten to twelve inches (25-30 cm) of regrowth prior to herbicide application (Harrington and Lanini 2006).
- Conduct outreach to universities, including UC Davis' Department of Vegetable Crops and Weed Science program to present research opportunities on the Preserve.
- Partner with volunteer groups and groups such as the California Conservation Corps and community service groups to assist with weed control.
- Explore developing specific prescriptions for using livestock grazing as a means of weed control.
- Train volunteers to identify and monitor weed response to various treatments.
- Monitor the Preserve each spring for noxious weeds such as purple and yellow starthistle and Harding grass, and implement

control efforts if necessary.

Objective 2: By 2012, conduct an experimental restoration of native grass species on the Preserve.

Narrative:

Native grasses once covered nearly 22 million acres of California, including much of the Sonoma Valley (Heady 1977). Today, over 95 percent of these grasslands have been lost to invasive plant species or land uses including agriculture and development. Although little is known of the original composition of native grasses, it is believed that *Stipa pulchra* dominated the valley grassland with a mix of other perennial grasses including *Nasella pulchra* (purple needlegrass), *Danthonia californica* (California oatgrass), and *Deschampsia caespitosa var holciformis* (tufted hairgrass), *Poa spp.*, *Leymus spp.*, *Elymus spp.*, and *Mellica spp.*, annual grasses such as *Festuca spp.* and a mix of broad-leaved forbs (Heady 1977, Hatch, et al 1999, Stebbins 1965). European plants arrived in California during the 1770's and have since spread widely, largely replacing native annuals and perennials with introduced species (Hatch et al. 1999). These plants were either intentionally introduced as cereal or forage crops, or inadvertently introduced through impurities in crop seed and in packing material (Carlsen et al. 2000). Currently introduced Mediterranean annuals, such as *Erodium*, *Bromus*, *Hordeum*, *Hypochaeris*, and *Avena California* dominate grasslands (Stromberg and Griffin 1996). The success of introduced species in California grasslands has been attributed to a variety of mechanisms, including: 1) being superior competitors for water and light (Carlsen et al. 2000), 2) being superior colonizers of both

artificial and natural disturbances (Parker et al. 1993), 3) effectively reducing the fecundity and seedling establishment of competing native species (Carlsen et al. 2000, Stromberg and Griffin 1996), 4) responding better to overgrazing by livestock than native species (Hatch et al 1999), and 5) responding more vigorously to nutrient inputs (Maron and Connors 1996). Because little is known specifically about the original composition of the grasses of the Preserve, local experts are the best source of information when planning native grassland restorations.

Strategies:

- Identify what species were likely to have grown on the Preserve.
- Develop site-specific native grassland restoration plans using local experts as appropriate.
- Locate seed sources locally, if possible and have them contract grown.
- If local seed is not available, identify a proximal source of plant material.
- Remove nonnative seed sources using chemical, mechanical, and biological control, and grazing for two seasons before establishing native grasses, and control invasive broadleaf and other invasive plants on newly restored areas for three years or more.
- Maintain grasslands by periodic disturbance such as mowing, grazing, disking, or burning.
- Establish small (<0.25 acre) experimental native grass plots before large-scale restoration activities are conducted. Focus plots on the hilly areas which are less

compacted.

- Develop a monitoring plan to assess success of native grass restoration projects.
- Ensure a three-year post-planting replacement period for contractors implementing restoration projects.

Objective 3: By 2007, address erosion problems on the ranch road leading from the water tanks east towards 5th St. West and the erosion on the ranch road leading north from the water tanks.

Strategies:

- Reroute the roads to be less erodible.
- Remove the fencing that concentrates cow movement to the area uphill of the eroding ranch road.
- Inventory existing ranch roads and determine which roads are unnecessary and can be restored.
- Restore eroded areas by grading rilled areas, using biotechnical measures such as coir materials (coconut fiber erosion and sediment control products), if necessary, and planting only native plant materials.

Objective 4: Resources on the Preserve will be protected from human-caused damage.

Narrative:

Natural resources on the Preserve need to be protected while providing for public enjoyment. Visitors hiking off-trail can disturb new fawns and other wildlife. Litter is unsightly and can harm wildlife. Uncontrolled wildfire can be dangerous and could have environmental consequences.

Strategies:

- Work with local law enforcement officials, such as the Sonoma County Sheriff's Department, Sonoma Police Department, and private security companies to patrol the Preserve once per week.
- Retain a private security company to patrol the Preserve and other District Preserves.
- Continue the volunteer patrol.
- Maintain a District presence on the Preserve with regular visits to the Preserve.
- Prohibit smoking and all other nonvehicular sources of combustion on the Preserve.
- Emphasize potential wildland fire danger in visitor contacts, bulletin board materials, handouts, and interpretive programs. Increase visitor and neighbor awareness of fire safety.
- Conduct outreach with the Mission Highlands Homeowners' Association to alert the District, Sheriff, and Police if they notice cars parked on Norrbom Road.
- Work with the Sheriff and Police to post no overnight parking on Norrbom Road.
- Hiking, nature observation and photography, interpretation, stewardship, and environmental education are the only allowable public uses of the Preserve. Other public uses could be considered using a compatibility determination (Appendix D).
- Educate the public about the potential harm that can come to the Preserve by the human actions of hiking off-trail, littering, and smoking using printed materials, displays, and interpretive hikes.
- Clearly sign the Preserve is a pack in/pack out area.
- Continue to organize periodic volunteer trash pick up days.
- Clearly sign that the Preserve hours are sunrise to sunset and enforce the nighttime closure, by patrolling and ticketing.



Volunteer Clean-up Day

Goal 2. Manage oak woodland habitats to promote the natural oak woodland habitat species composition and structure.

Narrative:

Objectives under this goal use the acorn woodpecker and the red-shouldered hawk as target species. In choosing these birds as conservation targets, the District will manage the Preserve, not only for the target species, but other species that occupy a similar niche, such as the pileated woodpecker and red-tailed hawk.

Objective 1. By 2010, implement at least two strategies to facilitate oak regeneration and restoration and monitor the results of the action.

Narrative:

In addition to needing oak regeneration to replace old and

senescent oak trees, a diverse age structure and species composition is likely a life requirement for our target species, the acorn woodpecker (California Partners in Flight 2002).

Strategies:

- Remove unnecessary fences and ranch roads and restore these areas to natural conditions¹.
- If appropriate conditions exist, plant native woody vegetation on the 9-acre parcel on 5th St. West.
- Work with a contractor to grow plant materials used on the Preserve using on-site seeds and cuttings, where possible. All planting species used on the Preserve will be native to the site (see Appendix B).
- Implement oak restoration plantings that are protected from seedling depredation. Fence individual seedlings.
- Ensure that contractors implementing oak restoration include a three-year replacement period.
- Monitor restoration projects.

Objective 2. Work with other agencies, nongovernmental organizations, and universities to decrease the risk of sudden oak death (SOD) on the Montini Preserve.

Narrative:

Sudden oak death (SOD) is a disease caused by the plant pathogen *Phytophthora ramorum*. This pathogen has caused widespread dieback of tanoak and several oak species (coast live oak, California black oak, Shreve's oak, canyon live oak, and sometimes madrone) in California's central and northern coastal counties, including Sonoma County. It has also been found to

infect the leaves and twigs of numerous other plants species. While many of these hosts, such as California bay and rhododendron species, do not die from the disease, they play a key role in the spread of SOD, acting as breeding ground for inoculum, which may then be spread through wind-driven rain, water, plant material, or human activity.

Cankers on the trunk of oak and tanoak trees are the most damaging, and often lead to death.

Additionally, other organisms often attack diseased oak and tanoak trees once they are weakened by SOD. These secondary invaders can also kill the tree, and include such organisms as *Hypoxylon thourasianum* (a fungus that decays sapwood) and bark beetles. In foliar and twig hosts, symptoms can range from leaf spots to twig dieback, but these hosts rarely die from the infection (California Oak Mortality Task Force 2006).

The pathogen that causes sudden oak death is transported by weather (e.g. wind-driven rain) and by human activities (e.g. vehicles, bikes, hiking). Landscape-scale resource management affects the susceptibility of landscapes to infection by sudden oak death (University of California Cooperative Extension Marin County 2006.). Currently, SOD is not a major concern at the Preserve. Its occurrence has not been noted and it is thought that the area is too dry to promote its spread. Nevertheless, SOD is prevalent in the county and spreading public education and awareness is an important factor in controlling SOD.

Strategies:

- Monitor susceptible tree species for evidence of SOD on the Preserve annually. If

potentially infected trees are found, send leaf samples from adjacent bay trees to the County Agricultural Commissioner's office for confirmation.

- Develop interpretive materials to help visitors recognize SOD and understand how SOD is spread (Appendix E).
- Encourage visitors to stay on the trail as a means of preventing the spread of SOD.
- Limit the number of trails through the Preserve.
- If infected trees are found, treat them with phosphonate and partial or complete removal of individual affected bay trees.

Objective 3: Create and foster partnerships, wherever possible, that are mutually beneficial and further the goals of the Preserve, with private individuals, agencies, organizations, businesses, and universities.

Strategies:

- Encourage universities to research topics that would facilitate management and fill data gaps.
- Continue the exiting partnerships with California State Parks, the city of Sonoma, and the Sonoma Overlook Trail Task Force.
- Seek partnerships with California State University Sonoma, UC Davis, UC Berkeley, East Bay Regional Parks, and others.
- Work with other groups or agencies to manage Preserve resources more effectively.

Objective 4: Solidify communications between agencies,

neighbors, and other groups to manage the Preserve.

Strategies:

- Establish management responsibilities among the various partners involved in the Preserve.
- Establish an annual or other meeting with the city, State Parks, the SOT, and others, as appropriate to discuss Preserve management.
- Develop a protocol for notifying agencies and the public of actions that may be of interest to them.
- Conduct outreach with schools, scout groups, and other organizations for volunteer work.

Goal 3. Restore the natural diversity of wetland areas.

Objective 1: Within 2 years, restore 0.25 acres of wetland.

Strategies:

- Plant willow and oak using seedlings, cuttings, or acorns, as appropriate.
- Plant appropriate wetland species using on-site seed source when possible.
- Use volunteers, where possible, to conduct the plantings.
- Fence the restored area from disturbance by cows.

Goal 4. Remove obstacles to natural wildlife movement within the Preserve.

Objective 1: Within 8 years, adopt at least two strategies to facilitate wildlife movement.

Strategies:

- Inventory existing fencing and remove unnecessary

- fencing within the Preserve.
- Pets will not be allowed on the Preserve.
- Route trails so that there is a large portion of the Preserve that is undisturbed, particularly shaded grassy areas favored for fawn beds.
- Investigate exterior fencing and gates that would keep cattle in the Preserve while allowing wildlife to move out of the Preserve (wildlife friendly fencing).
- Protect nesting sites of important birds such as pileated woodpeckers and great-horned owls by keeping nesting sites safe from disturbance by rerouting trails or closing sections of trail, if necessary.

Goal 5. The public will enjoy and appreciate the natural landscape of the Sonoma Valley.

Objective 1. By summer 2007, construct about 1.8 miles of pedestrian trail on and connecting to the Preserve.

Narrative:

Trail planning expertise was provided by California State Parks, one of the Preserve partners. Trails were aligned on site over 6+ days of fieldwork. The trail was designed not to exceed sustainable maximum grade so that the trail would be less susceptible to erosion. A botanist and an archeologist then checked the preliminary trail alignment to ensure that no natural or cultural resources were disturbed. Once the trail alignment was inventoried, adjustments were made where necessary and the final alignment was identified. The alignment takes advantage of the most scenic portions of the Preserve while leaving large parts of the Preserve unaffected.



State Parks Staff, Sonoma Overlook Trail Task Force Volunteers and District Staff developing the preliminary trail alignment.

In addition, the site was assessed for its ability to provide trail access for the disabled. Using the 2007 Architectural Barriers Act (ABA) Accessibility Guidelines for Outdoor Developed Areas; Proposed Rule, a section of disabled-accessible trail was designed (Architectural and Transportation Barriers Compliance Board 2007).

Strategies:

- Working with the Sonoma Overlook Trail Task Force, the city of Sonoma, California State Parks, the Sonoma Ecology Center and other partners, construct and maintain trail (Figure 5) in accordance with the prescriptions in the trail log (Appendix F).
- The trail will be constructed to State Parks draft guidelines, where possible, to obtain maximum durability and sustainability.
- Construction will occur in spring to obtain maximum soil compaction.
- Construct the trail to conform to the guidelines described in the final report



Hikers in the oak woodlands

of the Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas where feasible.

- Contract with a trail specialist for technical aspects of trail construction and volunteer oversight.
- Construct a gravel parking lot for 2 cars off 5th St. West with disabled access, where feasible, as described by the Final Report of the Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas.
- Work with the city to establish a disabled accessible connection from the city's ballfield parking lot to the Montini Preserve trailhead.
- Install self-closing and/or kissing gates at trail heads (Appendix G)(Agate. 1983).
- Construct an information kiosk at the Norrbom Rd and 5th St. West trailheads with a bulletin board for information (see also Goal 4, Objective 4).
- Information displayed on the bulletin board would include maps, hours of

operation, safety tips, conservation messages (stay on trails, pack in/pack out), rules, emergency contacts, information about the District, and interpretive information. Kiosk designs should be compatible with the Sonoma Overlook Trail kiosk and State Parks kiosks.

- Link the trail on the Preserve to the Sonoma Overlook Trail via the Rattlesnake Cutoff spur.
- Install a pedestrian gate from the city's ballfield lot to the Preserve that will not allow cows to escape. Install a pedestrian gate along Norrbom Road across the road from the Sonoma Overlook Trail.
- Construct a fence bisecting the southwestern 9-acre parcel to separate livestock from hikers.
- Install directional trail signs.
- Install bike parking racks at the 5th St. West and 1st St. West trailheads.
- Working with others, construct a bridge across the ditch that separates the Sonoma Overlook Trailhead from the Sonoma Veterans' Memorial parking lot to allow Overlook hikers to cross Norrbom Road.
- Protect the narrow-anthered brodiaea and Franciscan onion with barriers.
- Monitor populations of the narrow-anthered brodiaea and Franciscan onion annually to monitor their reaction to the trail.

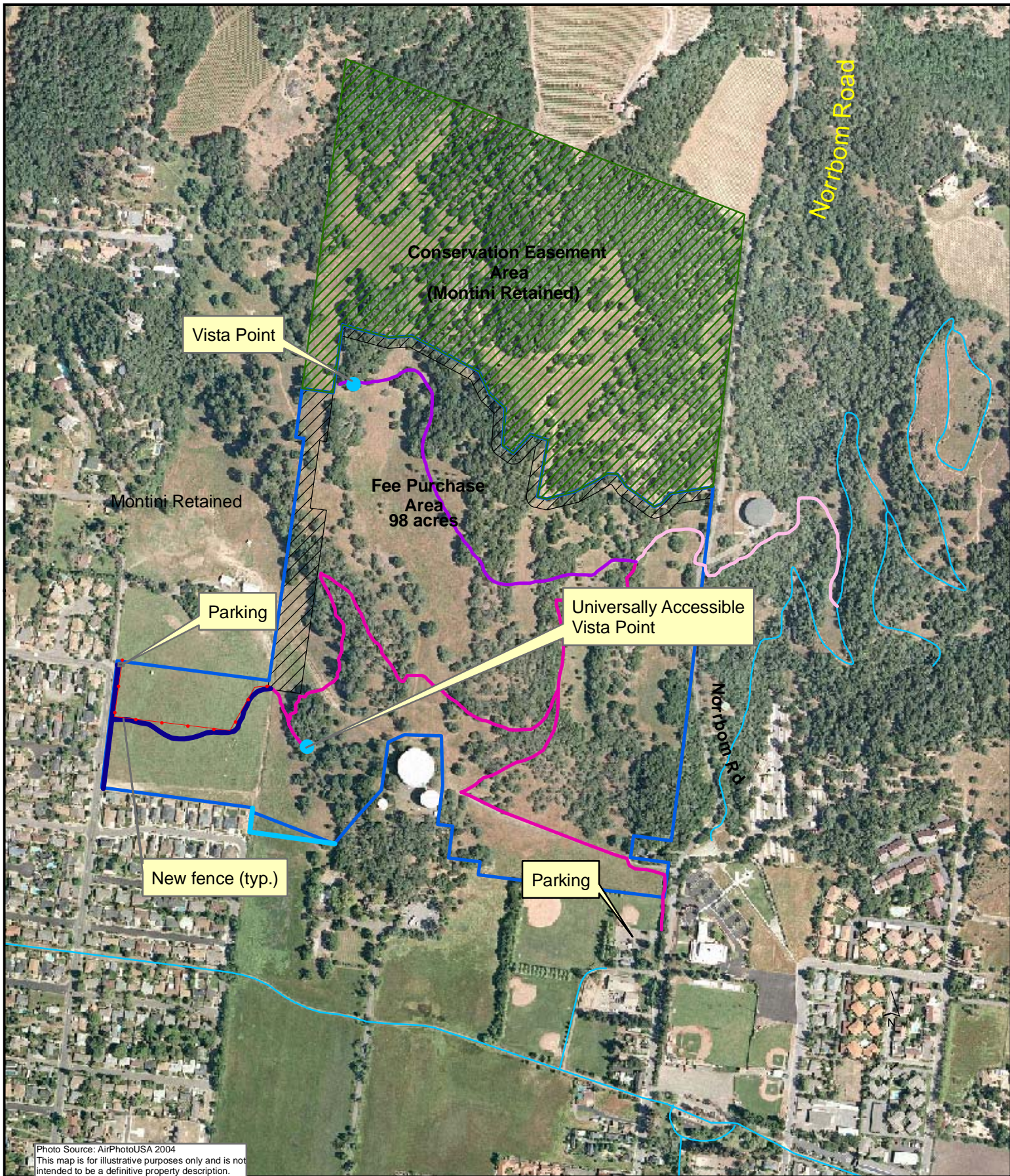


Photo Source: AirPhotoUSA 2004
 This map is for illustrative purposes only and is not intended to be a definitive property description.

Montini Open Space Preserve Draft Management Plan

Legend

- Upper Trail
- Lower Trail
- Fenced Trail
- Rattlesnake Cutoff
- Overlook Trail and other Regional Trails
- Boundary Buffers
- District Holdings**
- Symbol**
- Montini Open Space Preserve
- Conservation Easement
- Corrected boundary

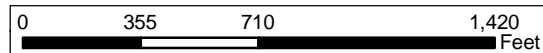


Figure 5. Trails and Facilities

Objective 2. By summer 2007, install signs, striping, and symbols along the trail and along Norrbom Road to facilitate safe trail crossing across Norrbom Road.

Strategies:

- Implement the recommendations from the W-Trans report on crossing Norrbom Road (Appendix J).
- Consider installation of a vehicular speed measuring device on Norrbom Road.

Objective 3. By 2008, at least two classes of schoolchildren will use the Montini Preserve for environmental education curriculum. By 2010, seven classes will use the Preserve.

Strategies:

- Conduct outreach with schools.
- Continue exploring a partnership with environmental education organizations like Acorn Soupe and the Sonoma Ecology Center.
- Encourage educational activities that benefit Preserve management such as wildlife and botanical surveys, and vegetation management and restoration projects.

Objective 4. By 2008 implement at least 2 interpretive programs on the Preserve.

Strategies:

- Construct a kiosk at one of the Norrbom Road trailheads and at the 5th Street West Trailhead.
- Construct and interpretive trail.
- Identify plants with a label,

where appropriate.

- Develop a self-guided brochure.
- Work in partnership with the Sonoma Overlook Trail Task Force to provide guided tours.

Objective 5. Within 3 years, visitors will have an opportunity to relax at 3 benches on the Preserve.

Strategies:

- Facilitate the donations of benches at several viewpoints, at the entrance kiosk and at the quarry site.
- Place interpretive panels near benches.

Objective 6: Conduct Preserve outreach, targeting the local community and nontraditional users, by expanding partnerships for the volunteer patrol. Participate in a minimum of 3 appropriate off-Preserve events per year to increase awareness of the Preserve's role in conserving Sonoma County viewsheds, grasslands, and oak woodlands.

Strategies:

- Continue and expand partnerships for events such as the annual Open Spaces & Public Places celebration.
- Participate in appropriate local off-Preserve events each year such as the Pacific Flyway Festival and classroom activities.
- Construct neighborhood walk-in and disabled access along 5th St. West.
- Collaborate with and assist local resource-oriented agencies and city departments on outreach programs involving the Preserve.
- Expand number of

presentations given to schools, conservation groups, and public service organizations.

- Continue working with the Sonoma Overlook Trail Task Force.

Goal 5. Cultural resources on the site will be protected and interpreted to promote the appreciation and stewardship of Sonoma's historic importance.

Objective 1. Develop a minimum of one interpretive exhibit or program to educate the public regarding the cultural resources of the Preserve by 2010.

Narrative:

Developing interpretive and educational materials to increase public understanding about local and State history is valuable given the importance of the Sonoma area and General Vallejo in California history.

Strategies:

- Develop exhibits to illustrate the role of the Preserve rock quarries in California history and the use of the quarried rocks in Sonoma and San Francisco streets.
- Develop exhibits to illustrate the role that General Vallejo played in California history.
- Solicit input and advice from local historians and others familiar with the history of the Preserve in planning, information gathering, and review of educational, interpretive, and outreach programs and publications.
- Include a cultural resource element when holding Preserve special events.

Chapter 6. Implementation and Monitoring

Funding and Personnel

The District intends that Preserve objectives be attained over the next 10 years. Management activities would be phased in over time and implementation is contingent upon and subject to the results of monitoring and evaluation, funding, and staffing.

Funding includes initial capital outlay for equipment, facilities, labor, and other expenditures, as well as annual, ongoing costs for staff, contracts, supplies, management, maintenance, and other recurring expenses.

Initial capital expenditures for implementation of this management plan would include a trail, parking lot, signs, and boundary signs. In addition, significant capital expenditures (Appendix H) would be needed for weed control. These capital expenditures would not all accrue during the first year of implementation. For example, weed control and habitat restoration would be implemented over several years, and some equipment and vehicles would be shared with other Preserves.

At full staffing, staff time dedicated to the Preserve would include the equivalent of about 0.9 full-time staff members. Annual contracts or cooperative agreements would be issued for litter removal, additional law enforcement, weed control, and other activities. The total cost of recurring tasks is expected to total about \$12,000 per year (Appendix H).

Detailed Management Plans

Some of the potential resource management objectives were not within the ten-year scope of this plan. These objectives include grassland management and wetland restoration. These objectives should be considered in the next planning effort for the Preserve.

Partnership Opportunities

As described in Chapter 1, a number of partners play an important role in helping the District achieve its goals and objectives for the Preserve. This management plan identifies many projects that provide new opportunities for existing or new partners. In addition to the District's existing partnerships with the Sonoma Overlook Trail (SOT) Task Force, Sonoma Ecology Center, city of Sonoma, State Parks, and the California Coastal Commission, there is an opportunity to build partnerships with Acorn Soupe, the National Park Service National Trails Assistance program and local universities and other research entities.

Monitoring and Evaluation

Adaptive management is the process of implementing policy decisions using scientifically driven experiments that test predictions and assumptions about management plans, and using the resulting information to improve management strategies. Management direction is periodically evaluated by a system of applying several options, monitoring the achievement of objectives, and adapting original strategies to reach

desired objectives. These periodic evaluations would be used over time to adapt both the management objectives and strategies to better achieve management goals. Such a system embraces uncertainty, enhances management options, and provides new information for future decision-making.

Because monitoring is an essential component of this plan, specific monitoring strategies have been integrated into the goals and objectives. Habitat management activities would be monitored to assess whether the desired effect on habitat components has been achieved. At a minimum, susceptible oak trees would be monitored for SOD and changes in the weed population would be monitored. Baseline surveys would be established for plants and animals for which existing or historical numbers are currently not well known. It would also be important to monitor the effects of public use and disturbance on the resources of the Preserve.

Plan Amendment and Revision

This plan has a ten-year life. At the end of ten, years, the plan should be evaluated to determine if plan objectives were met. If objectives were not met, the District would evaluate why they were not met. A new plan would address any unmet objectives and formulate new objectives for the management of this important open space preserve.

In addition, the plan will be evaluated annually to evaluate if objectives are being met and if strategies or objectives need to be modified. It may also be reviewed during routine inspections. Results of any of these reviews may indicate a need to modify the plan. The goals in the management plan will not change until they are reevaluated as

part of the formal 10-year revision. The objectives and strategies, however, may be revised to address changing circumstances or take advantage of new scientific understanding or increased knowledge of the resources on the Preserve. If changes are required, the level of public involvement and CEQA documentation will be determined by the General Manager.

References

Literature

- Agate, Elizabeth. 1983. *Footpaths*. ISBN 0 946752 31 1. Published by the British Trust for Conservation Workers. <http://handbooks.btcv.org.uk/handbooks/content/section/2373>
- Architectural and Transportation Barriers Compliance Board. 2007. *Architectural Barriers Act (ABA) Accessibility Guidelines for Outdoor Developed Areas; Proposed Rule*. Federal Register / Vol. 72, No. 118 / Wednesday, June 20, 2007 / Proposed Rules
- Bush, Lisa. *Montini Property Grazing Evaluation*. Unpublished office report. 2006.
- California Oak Mortality Task Force website. 2006. <<http://nature.berkeley.edu/comtf/index.html>>
- California Partners in Flight. 2002. *Oak Woodland Bird Conservation Plan*. <<http://www.prbo.org/calpif/pdfs/oak.v-2.0.pdf>>
- City of Sonoma. 1995. *1995 – 2005 General Plan*. City of Sonoma.
- District. 2005. *Montini Property Baseline Documentation*. Unpublished report. November 21, 2005
- Harrington, Kerry and T. Lanini. *Phalaris aquatica*. University of California Agriculture and Natural Resources. 2006. 17 July 2008. <<http://ucce.ucdavis.edu/datastore/detailreport.cfm?usernumber=67&surveynumber=182>>.
- Hatch, Daphne A., J.W. Bartolome, J.S. Fehm, and D.S. Hillyard. 1999, *Effects of burning and grazing on a coastal California grassland*. *Restoration Ecology*, 7, 376-381. December 1999.
- Heady, H.F. 1977. *Valley grassland*. In M.G. Barbour and J. Major, eds., *Terrestrial vegetation of California*, Special publication number 9. Sacramento: California Native Plant Society, pp.491-514.
- Maron and Connors 1996 from Avery, E. 2001. *Nutrient input effects from fire retardant on exotic species, species richness, and species diversity in a coastal California grassland*. Unpublished thesis.
- Nardo-Morgan, Angela M. 1997. *Environmental History of Sonoma Creek Watershed*. M.A. thesis, Sonoma State University. 110 pp. Notes: Addresses ecological management by Indians in the Sonoma Creek Valley. J226
- Partners in Flight. *Oak Woodland Bird Conservation Plan* - <<http://www.prbo.org/calpif/htmldocs/oaks.html>>
- Ruygt, Jake. 2006. *Rare Plant Survey of Montini Open Space Preserve and Ernest Homan Park, Sonoma, CA*.
- Sonoma County. 2006. *Draft General Plan*.
- Sonoma County Permit Resource and Management Department. 2004. *Draft Hazard Mitigation Plan*. <http://www.sonoma-county.org/prmd/docs/hmp/fig_2-09.pdf>
- Steen, E. and T. M. Origer. 2006. *A Cultural Resources Survey of the Montini Open Space Preserve, near Sonoma, Sonoma County, California*. August 31, 2006.

US. Bureau of Land Management. No date. Central and Southern California Coast and Valleys.
<http://www.blm.gov/wildlife/pl_90sum.htm >

UC Cooperative Extension Calaveras County. No date. The Role of Fire in Oak Woodlands.
<<http://cecalaveras.ucdavis.edu/fire.htm>>

University of California Cooperative Extension Marin County. 2006. Sudden Oak Death website
<http://cemarin.ucdavis.edu/index2.html>

USEPA. <http://www.epa.gov/wed/pages/ecoregions.htm>

Personal Communications

Montini, Bill.

---- 2006

---- February 2006

---- September 2006

---- April 2007

Hunter, R. Circuit Rider Productions. 2006.

Endnotes

ⁱ Conditions thought to exist just prior to the advent of the industrial era (app. 950AD to 1800AD), based upon scientific study and sound professional judgment.