TAYLOR MOUNTAIN

REGIONAL PARK AND OPEN SPACE PRESERVE

Master Plan

OCTOBER 9, 2012

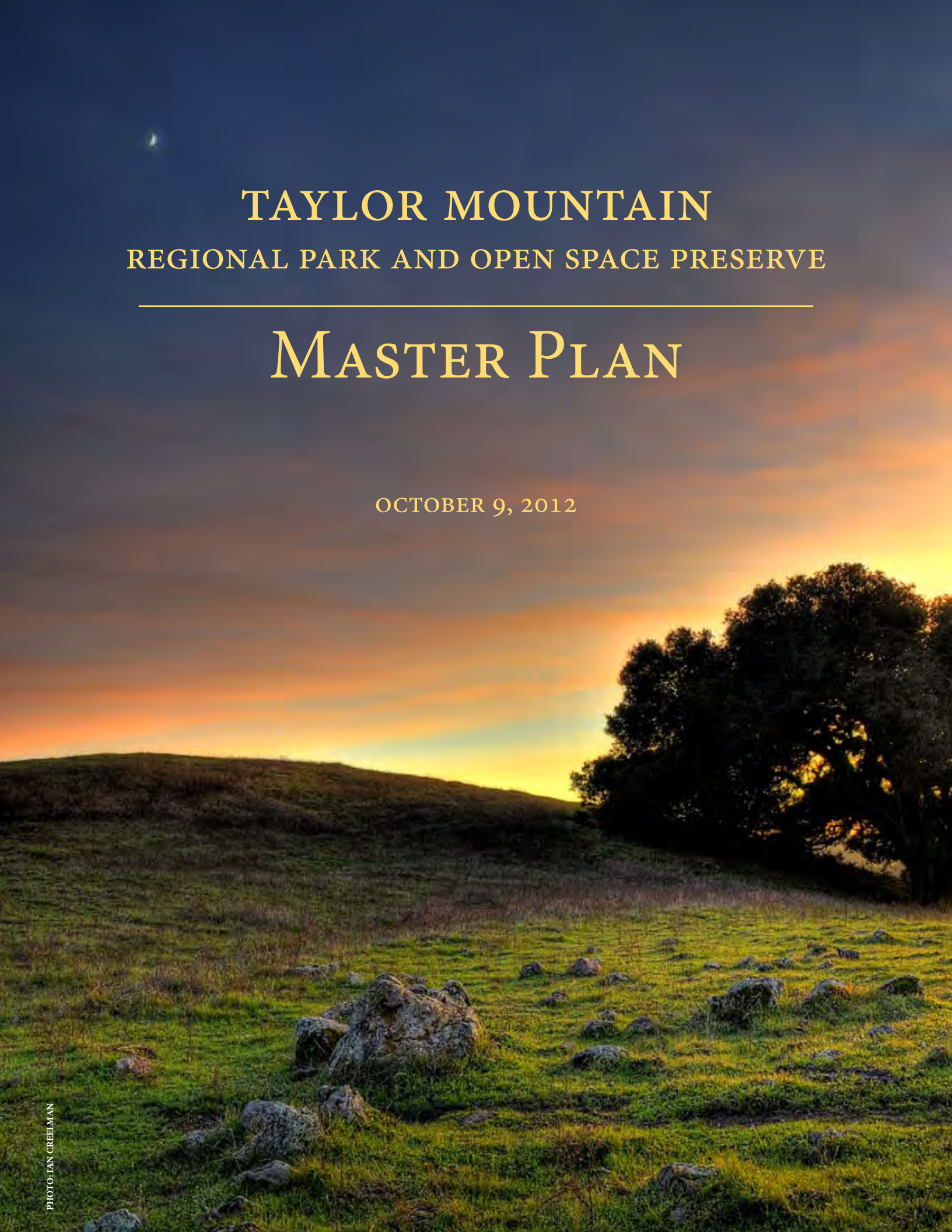

PHOTO: IAN CREELMAN

TAYLOR MOUNTAIN

REGIONAL PARK AND OPEN SPACE PRESERVE

MASTER PLAN

October 9, 2012

Prepared for

SONOMA COUNTY
AGRICULTURAL PRESERVATION
AND OPEN SPACE DISTRICT

Sonoma County Agricultural Preservation and Open Space District

&

Sonoma County Regional Parks

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1. Introduction

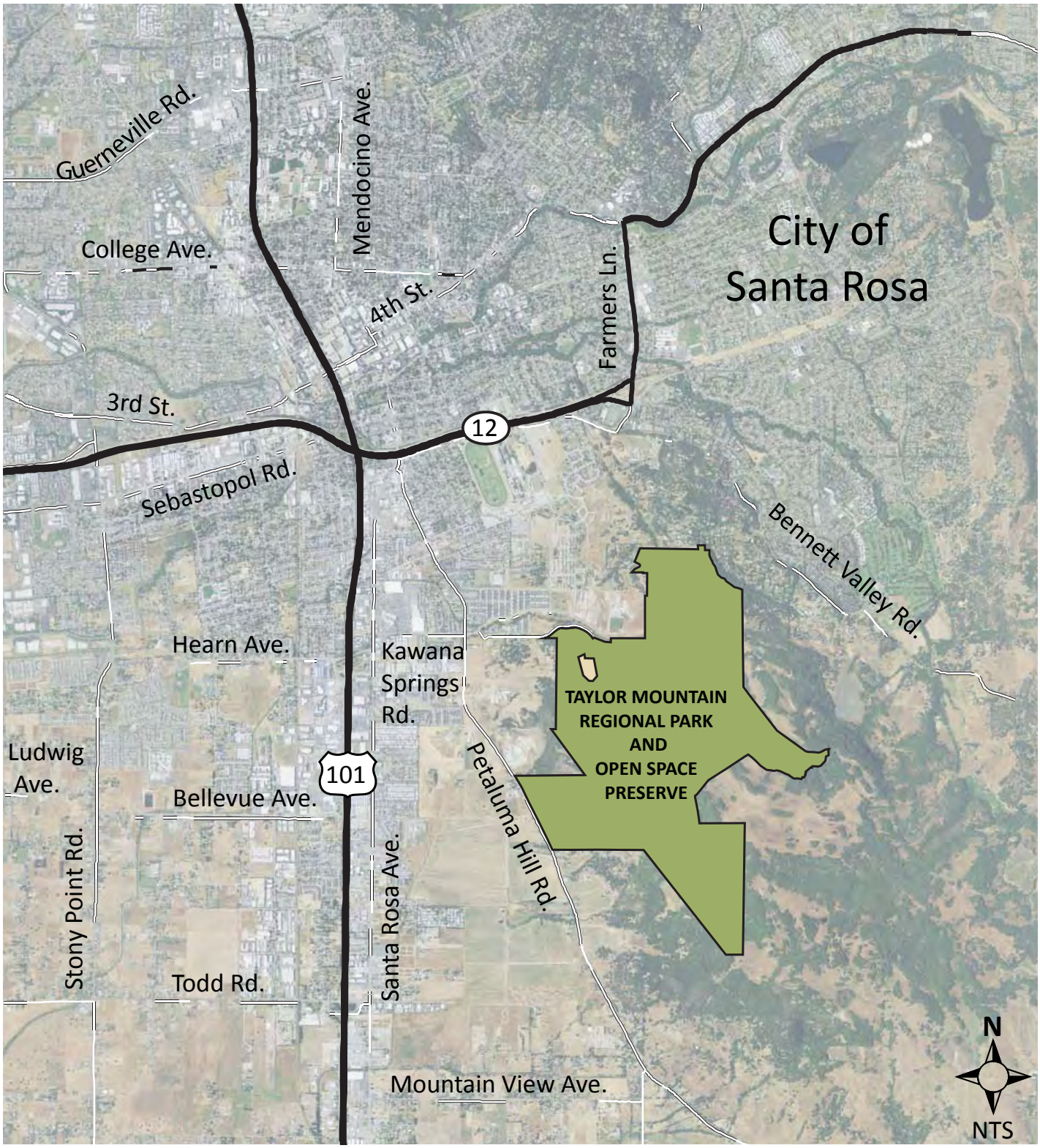

Figure 1. *Taylor Mountain Regional Context.*

1. INTRODUCTION

The land known as Taylor Mountain, or Mount Taylor, as it is called by some local residents, provides a scenic backdrop to the south-eastern boundary of the City of Santa Rosa. Over 1,100 acres of the oak- and grass-covered landmark was forever protected when it was purchased by the Sonoma County Agricultural Preservation and Open Space District (District) on behalf of the Sonoma County community. The purchases of the properties that comprise the Taylor Mountain site, along with completion of this Master Plan, are monumental steps in fulfilling the goals of preserving the scenic and agricultural landscape, and natural resources of Taylor Mountain and adding to an impressive regional greenbelt.

1.1 OVERVIEW AND PURPOSE OF THE MASTER PLAN

The purchase of the properties that comprise the approximately 1,100 acres subject to the Taylor Mountain Regional Park and Open Space Preserve Master Plan (Master Plan) was part of a long-range vision and strategy developed by the District for conservation. The Master Plan is intended to guide and direct the permanent conservation, resource management, recreational amenities, and operations of Taylor Mountain for the many benefits the project will provide to the residents and visitors of Sonoma County. The importance of balancing the protection of resources with the provision of public access is a consistent theme and a guiding principle of the Master Plan.

The Master Plan was prepared by the District and the Sonoma County Regional Parks Department (Regional Parks). It was created concurrently with an environmental review and information document required by the California Environmental Quality Act (CEQA). The Initial Study and Mitigated Negative Declaration (MND) analyzes potential environmental impacts that may be caused by the proposals contained in the Master Plan, and provides measures to mitigate such impacts. Preparing the Master Plan and MND concurrently and incorporating mitigation measures into the Master Plan is a proactive, best management practice approach referred to as a self-mitigating Master Plan.

The proposed projects illustrated in the Master Plan will be implemented using a series of guidelines and standards that ensure potential impacts are avoided and/or reduced by complying with the measures.

1.2 COMPONENTS AND ORGANIZATION OF THE MASTER PLAN

The Master Plan is organized around two major components: natural resource management, and the conceptual design plan for facilities and improvements. Chapter 1, the introduction to the document, outlines the goals and objectives, which evolved with input and feedback from the public, and became the foundation for the master plan. Next, the background chapter, Chapter 2,

Image 1. *Aerial view of Taylor Mountain.*
PHOTO: STEPHEN JOSEPH

describes the historical context as well as the property acquisition actions that led to the current park and preserve boundaries. The preamble of the Master Plan is completed in Chapter 3 by a summary of the public outreach process, which describes the important interaction with the community that occurred at key milestones of the planning process.

The first of the two major focus areas of the Master Plan, natural resources management, comprises four chapters of the document. The environmental setting, Chapter 4, is a summary of existing conditions on Taylor Mountain, as identified in the Ecological Resources Report (ERR) that is contained in Appendix B. The ERR was completed at the outset of the master planning process to provide baseline information about the property. Chapter 5 describes how the natural resources will be protected, managed, and enhanced, with objectives, guidelines and standards for each of the habitat communities found on Taylor Mountain. Chapter 6 addresses the ongoing agricultural practices and infrastructure needs in order to continue cattle grazing on Taylor Mountain. Understanding the cultural importance of the land is addressed in Chapter 7. This chapter summarizes the importance of the property to the indigenous tribes of the area, and identifies recommendations for preserving historic or pre-historic sites and artifacts on the property.

The second of the two major focus areas in the Master Plan, the conceptual design plan, is contained completely within Chapter 8. This chapter describes the allowable recreational and educational uses, illustrates design concepts for staging areas, shows conceptual routes for trails, and outlines guidelines and standards for how improvements will be constructed over the course of time.

The balance of the Master Plan document includes Chapters 9 through 11, which provide guidelines for operations and maintenance of facilities (Chapter 9), and ideas for community stewardship and involvement on the property (Chapter 10). Also included is an implementation strategy (Chapter 11) that prioritizes and organizes projects into categories for future phasing of implementation.

1.3 GOALS

A. District and Regional Parks Mission Statements

The District's and Regional Parks' mission statements set the tone for the Taylor Mountain Regional Park and Open Space Preserve and reinforce the outcomes and directions described in the Master Plan.

- The Sonoma County Agricultural Preservation and Open Space District permanently protects the diverse agricultural, natural resource, and scenic open space lands of Sonoma County for future generations.
- Sonoma County Regional Parks Department leads in the preservation, conservation, restoration and promotion of natural, scenic, historical, and cultural resources in Sonoma County. We provide recreational, educational, social, and cultural opportunities for the public.

B. Master Plan Goals

The following goals guide the use, development and management of the park and preserve. They were developed with public input and are consistent with the original intent for protecting the property and with County policies.

Conservation Goals

- Preserve, protect, and enhance the scenic vistas and natural resources of Taylor Mountain.
- Protect ecological processes and conserve native biodiversity.

Recreation Goals

- Provide recreational and educational opportunities and access for people of all ages and abilities from multiple points of access for multiple modes of transportation.
- Provide facilities and improvements in appropriate locations related to passive and low- to medium-intensity recreational opportunities.

1.4 DESIGN PHILOSOPHY

The design intent for the Master Plan is one that takes its cues from the land. The areas of the property already impacted by human use, found on the edges of the property, are considered less sensitive and therefore are designated as areas appropriate for development. These "development envelopes" are where improvements and facilities such as parking lots, structures and camping shall be located. To protect the core habitat areas and agricultural function, the vast majority of land on Taylor Mountain will remain outside of the designated development envelopes and will only be developed with trails, occasional benches, and signage. Cattle grazing will continue outside the development envelopes.

All of the improvements and projects planned for the regional park and preserve will be Low Impact Development (LID) if feasible. An LID project is one that minimizes impacts to natural hydrology, fits well into the local environment and has a relatively small footprint. Other important characteristics of an LID project include using construction practices and materials that are sustainable and renewable or recycled. The Master Plan includes guidelines and standards to promote the use of LID principles.

1.5 INTRODUCTION TO GUIDELINES AND STANDARDS

The Master Plan contains a comprehensive list of guidelines and standards that provide clear direction on how to meet the project goals. They are distributed amongst several chapters, depending on the specific topic they address. In other words, guidelines and standards related to natural resources can be found within Chapter 5, grazing in Chapter 6, and so forth.

The distinctions between guidelines and standards are:

- Guidelines are often general in nature, while standards are typically more specific. For example: a guideline may state that frequent trail breaks should be incorporated into trail design to slow cyclists, keep the route interesting and allow users to catch their breath, whereas a standard would mandate that the clear tread width shall be 3' minimum, and 5' maximum.
- Guidelines are recommendations that are discretionary, but should be adhered to as much as possible. These are intended to provide a certain degree of flexibility to Regional Parks in implementing the Plan. However, if a guideline can reasonably be adhered to or implemented it should be carried out.
- Standards are measurable, non-discretionary directives that must be followed. Many of the standards are directly linked to mitigation measures in the Mitigated Negative Declaration (MND).

Several factors were considered in making the determination of whether a recommendation should be a guideline or a standard, including:

- Mitigation measures contained in the MND.

- Realistic ability of agencies to comply with requirements, from both an operational and a financial perspective.
- State and federal law.
- Existing local ordinances and policies.
- Mission statements of Regional Parks and SCAPOSD.
- The purpose for which the property was purchased.
- Professional judgement and design principles.

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PHOTO: SCAPOSD

2. Background

2. BACKGROUND

2.1 HISTORY OF THE PROPERTY

Lying between the land-grants of Cotate, Llano de Santa Rosa, Cabeza de Santa Rosa, and Los Guilicos, the area occupied by the Taylor Mountain property was designated as "public lands" by the federal government[1] (Origer, 2001). Since that time, various parts of the property were owned by numerous private individuals. The most recent landowners prior to the District's acquisition of the five adjoining parcels that comprise the Taylor Mountain property are named Matteri, Russell, Nunes, Bath, Watt, and Van Steyn. Over the years the property has been used primarily for grazing, an activity that continues today. In addition, there was a hot springs resort and a dairy operation.

There are three in-holding parcels on the property. One is the site of two large water tanks owned by the Sonoma County Water Agency, located immediately adjacent to the existing interim staging area. The second contains a radio transmitter tower, and is located on a ridge near the northeastern property line on the former Bath-Watt parcel. The third is owned by the City of Santa Rosa for the future Farmers Lane extension project, which will connect the existing Farmers Lane north of the site with Yolanda Avenue southwest of the site, through the existing interim staging area.

A. Prehistoric

At the time of European settlement, the Taylor Mountain property area was part of a larger territory inhabited by the Southern Pomo Native American tribe. The Southern Pomo settled in large, permanent villages that were often surrounded by seasonal camps and task-specific sites. There is no evidence of Southern Pomo village sites on the Taylor Mountain property itself, but there are several reported sites a few miles to the north (Origer, 2006). However, there are four documented prehistoric task-specific sites on the property that were used by the Southern Pomo. See Chapter 7 for more information.

B. John Taylor

John Shackelford Taylor, the property's namesake, was one of the Santa Rosa area's most notable early residents. He settled in the area in 1853 and became a prominent livestock rancher. The entrepreneurial Taylor established a resort on the north end of his property in the early 1860s to take advantage of the site's naturally occurring mineral hot springs. After the original resort building burned down, Taylor expanded his business and developed a two-story hotel with landscaped grounds that also included a

1 The "public land" designation refers to any land that was not part of large private land holdings at the time a territory became a state.

bathhouse, a gazebo, and a garage. Of this collection of buildings, only the hotel does not still exist on the site. The resort was known by several names, including most recently as Kawana Springs, and thrived until the 1906 earthquake caused the mineral springs to cease flowing.

John Taylor leased the property to other operators after 1906, and died at the age of 99 in 1927. Taylor's daughter Zana Weaver inherited the property and lived there, presumably in the converted bathhouse, until the time of her death in 1970.

The resort area was still relatively well-maintained as late as the 1980s, and the bathhouse was still used as a residence until 2006. See Chapter 7 for more information.

2.2 PUBLIC ACQUISITION OF PROPERTY

A. Purpose and Vision

The Taylor Mountain property rises to a height of approximately 1,300 feet, and is one of the most prominent landmarks in Sonoma County. The mountain's highest point of 1,400 feet is on privately owned land just beyond the eastern property line. The mountain provides a spectacular backdrop to the City of Santa Rosa, and it is highly visible from every major road in Santa Rosa and from most places on the Santa Rosa Plain. Expansive views of the Santa Rosa Plain and the coastal range to the west, and Mt. Saint Helena and the Mayacamas Mountains to the north can be enjoyed from numerous locations on the site. It also boasts a rich, healthy ecosystem of plants and wildlife.

Because of these reasons, Taylor Mountain was identified as one of the District's highest priorities for acquisition at the time the agency was created. The property met the criteria set forth in the District's Acquisition Plan 2000 for both the Recreation and Natural Resources categories, but was brought forward for consideration as a Greenbelt project. Greenbelt projects seek to preserve sites with dominant viewsheds and geographic features bordering the County's urban areas.

The successful acquisition of the Taylor Mountain properties ensures that the natural and scenic wonders of Taylor Mountain will be preserved in perpetuity for the enjoyment of current and future generations.

B. Phased Acquisition

The Taylor Mountain property today represents the combined aggregate of five separate holdings, shown in Table 1 and Figure 2. After the adoption of the Master Plan, the District will merge all the parcels into one and subsequently transfer the fee title to Regional Parks, at which time Regional Parks can begin implementation of the Plan. The District will continue to hold a conservation easement over the property in perpetuity.

2.3 REGULATORY AND POLICY FRAMEWORK

In addition to objectives and policies in the Sonoma County 2020 General Plan, there are multiple existing federal, State, County and Regional Parks regulations that will need to be referred to when implementing the Master Plan. All activities will be conducted consistent with all applicable laws, regulations and permit requirements. Various project components will be subject to permits from resource and regulatory agencies.

The Sonoma County 2020 General Plan Land Use map designates Taylor Mountain as Resource and Rural Development (RRD) and Diverse Agriculture. The site is primarily zoned RRDWA, Resources and Rural Development (Agricultural Preserve), with one portion zoned Diverse Agriculture (DA). The General Plan identifies a planned park on the property. As a part of this master planning process, the land use designation for the property will be redesignated as Public/Quasi Public (PQP), and all the parcels within the property will be rezoned to Public Facility (PF).

2.4 EASEMENTS, LICENSES AND LIFE ESTATE

A. Conservation Easement and Grant Agreement

At the time the District conveys the fee title interest in the Taylor Mountain properties to Regional Parks, the District will retain a conservation easement over the properties. The conservation easement will ensure the protection and preservation of the scenic, natural, agricultural, recreational and educational resources in perpetuity by limiting the uses and improvements on the property. The District and Regional Parks will also enter into a Transfer Agreement that will identify roles and responsibilities of each party to protect the property's resources and to provide public access.

B. Other Easements

There are a number of easements on the Property that may affect development of public access activities and facilities. In addition to the easements listed below, the property is encumbered by other minor easements, such as to Pacific Gas and Electric (PG&E), which can be found through a title search. The following easements should be taken into consideration when implementing the Master Plan.

- District-held easement over Sonoma Academy property to access the former Nunes property from Kawana Springs Drive. This easement can also be used to access the former Russell property.
- District-held easements over private property to access the former Nunes and Bath-Watt properties from Panorama Drive.

- District-held easements over private property to access the former Bath-Watt property from Holland Drive.
- Road Maintenance and Use Limitation Agreement between the District and Gordon and Laura Zlot over the former Nunes and Bath-Watt properties. This agreement identifies that Zlot owns easements for general road and utility purposes over District property and the District owns an easement for road and utility purposes over the radio tower parcel.
- Matteri Spring Reservation for water from a spring on the former Matteri property.
- City of Santa Rosa-held slope, drainage and tie-back easements over the former Russell property to build and maintain the Farmers Lane extension.
- Privately-held easement on the former Van Steyn property to access the adjacent parcel.

C. Farmers Lane Extension

The District and the City of Santa Rosa have entered into a Revocable Non-Exclusive License Agreement (License) related to the Farmers Lane extension (FLE). Per the License, the District, the Bambergers (see below), Regional Parks and the Sonoma County Water Agency (SCWA) reserve the right to access the property owned in fee by the City of Santa Rosa, which cuts across the former Russell property, before FLE construction commences, and to continue to use the interim staging area and driveway until such time that the City needs the property to construct the FLE project. The City will give the District, as property owner, a minimum of 12 months notice prior to terminating the License, unless the City will lose grant funds, in which case the City will have the right to terminate the License with a minimum of six months notice. The District will work with the City to identify other suitable locations for a staging area in the event that another staging area has not yet been developed by the time construction of the FLE commences.

The City will maintain reasonable access to these entities during construction. After construction is complete, the City will grant a permanent access easement to the District, Regional Parks and the Bambergers for ingress and egress under the future FLE bridge over Kawana Terrace, with a vertical clearance of a minimum of ten feet. At or before construction commences, the District, as property owner, will grant an access easement to the SCWA to provide access to the water tanks on the Agency's in-holding parcel as the FLE will cut off access to the SCWA property.

D. Life Estate

A condition of the purchase agreement of the former Russell property was to provide the Bamberger family (Bambergers) with a 3.7-acre life estate interest in the residence occupied by the Bambergers at that time. The Bambergers continue to reside in the life estate and may do so until the death of the last life tenant or until they decide to move, at which time the District, as property owner, would compensate the family according to a predetermined price chart. The following documents are associated with the life estate:

- Life Estate Deed & Agreement
- Conservation Servitude Deed & Agreement
- Private Access Easement
- Private Waterline Easement
- License Agreement for accessing Colgan Creek for habitat restoration activities

Former Owner	Year Acquired	Approx. Size (acres)	APN[a]
Matteri	1995	116	044-190-027
Bath-Watt	1998	47	044-061-035
Nunes	1999	120	044-061-027 044-180-010
Russell (Taylor Mountain Ranch)	2005	823	044-061-033 044-061-036 044-180-025 044-180-026 044-180-028 044-180-029 049-170-040
Van Steyn[b]	2011	5	044-200-035
		Total: 1,111	

a. Assessor parcels will be merged prior to the property's transfer from the District to Regional Parks.
b. This parcel was donated to the District with the intention for it to be part of, and provide an option for public access to, the future Regional Park and Open Space Preserve.

Table 1. Summary of Taylor Mountain Property Acquisitions by the District.

Figure 2. Former Property Holdings.

2.5 MASTER PLAN AMENDMENTS

There are two ways that the Master Plan can be modified if needed in the future: through an addendum or an amendment. Both would be processed by Regional Parks, with the appropriate input from the District as described below.

- **Addendum** - used when a proposed change is minor and existing management or mitigation measures adequately address the impacts. Examples of when an addendum might be appropriate would be the extension, relocation or widening of a trail, or where an approved use would be substantially in compliance with the Master Plan. The District will receive written notification of a planned addendum, and will have an opportunity to review it for consistency with the conservation easement.
- **Amendment** – used when a type of use is not identified in the Master Plan, and thus potential impacts have not been addressed in the environmental document. Since the District will hold a conservation easement over the property, consistency between the proposed use and the conservation easement must be determined prior to moving forward with any amendment; written approval from the District is required to process a Master Plan amendment. If the proposed use is deemed consistent with the conservation easement, then an Initial Study/CEQA process will be initiated. Ultimately, the Board of Supervisors needs to approve a Master Plan amendment.

PHOTO: JOHN BURGESS

3. Public Outreach Process

3. PUBLIC OUTREACH PROCESS

3.1 PURPOSE AND INTENT

The District and Regional Parks determined that an extensive community outreach effort was required to solicit input from a diverse group of citizens, neighbors, and future users during the preparation of the Taylor Mountain Regional Park and Open Space Preserve Master Plan. The community was asked to assist with the generation of goals and objectives, and a list of appropriate uses for Taylor Mountain, and to comment regarding the concept designs for future improvements. The District and Regional Parks desired that the community have a meaningful influence on the Master Plan which would guide the long term vision for preservation, public use of the property, and management of natural resources.

3.2 METHODOLOGY

A public outreach strategy was developed outlining the key activities that would be completed to facilitate healthy attendance at community meetings and create a meaningful dialog about the relevant natural resource protection and public access issues. The theme of the outreach strategy was "Celebrating and Protecting the Natural Wonders of Taylor Mountain". Methods and materials used to advertise the community meeting opportunities included press releases, web site postings, flyers, direct mailing of post cards, e-mail blasts, and presentations to community and neighborhood groups. All materials advertising the community meetings were presented in both English and Spanish.

Prior to the initial community meeting, the project team, including LandPaths, a local non-profit organization, met with nearly three dozen individuals representing nineteen agencies, community groups, non-profits, and neighborhoods to

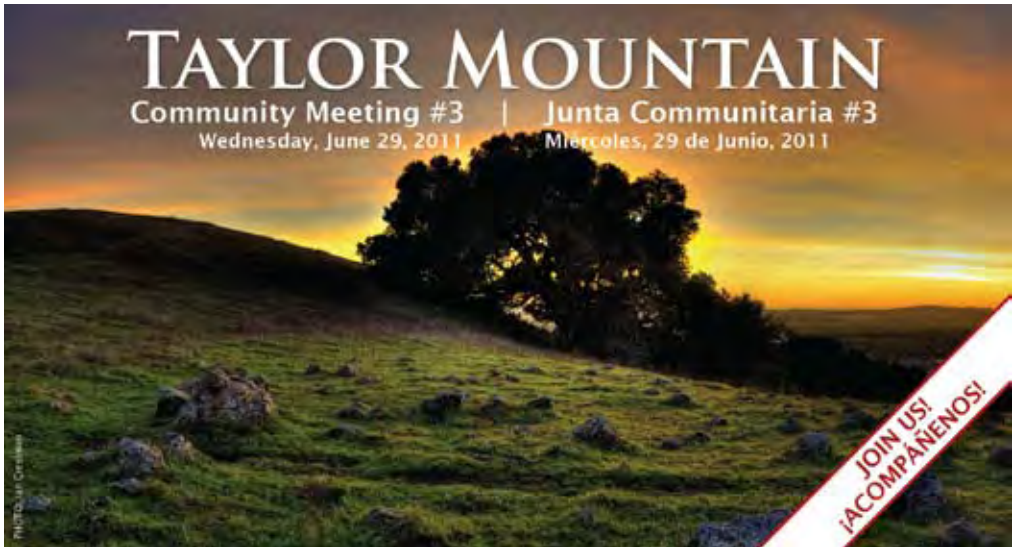

Image 2. *Example postcard used to notify residents via direct mailing.*
PHOTO: IAN CREELMAN

incorporate their ideas and concerns into the community dialog that would take place at the larger community gatherings or workshops.

Five major community meetings were organized to present a variety of information during the course of the planning process. At each meeting a specific objective was outlined and then achieved, which allowed the Master Plan to move forward with input from the attending community members. The meetings were scheduled to address major milestones during the preparation of the Master Plan including goal setting, priority determination of potential uses, review of alternative concepts, presentation of a Draft Concept Plan, presentation of natural resources protection strategies, and review of the Master Plan and environmental document. Spanish language interpretation was included in the presentations and Spanish language facilitation of small groups was available.

A written survey questionnaire was distributed at three of the workshops to obtain specific feedback from the public on design and planning topics. The responses were analyzed and used to inform the design process, confirm the direction of the Master Plan, and direct necessary adjustments in the design concepts and strategies for balancing the protection of resources with the provision of public access. The survey was distributed in both English and Spanish.

3.3 SUMMARY OF COMMUNITY MEETINGS

The community meetings were designed to be a progressive series of presentations and public input opportunities where each meeting built upon the feedback from the previous meeting and design efforts. Each meeting presented the public with new information, while referring to the results and direction from earlier meetings.

Image 3. *Workshop participants prioritizing uses based on small group discussions.*
PHOTO: RRM

Many of the participants, nearly seventy percent, attended multiple meetings, with quite a few staying engaged for all five workshops.

Community Meeting #1 was organized to engage the public in a discussion about goals and objectives that would guide the master planning process, and included participation in small group discussions to generate a list of potential future uses for the park and preserve. After the group lists were brought together, workshop participants ranked the recreational, educational, and conservation uses to form priorities to be used in the development of alternative concept plans.

Community Meeting #2 was hosted at the interim parking area on the property, and was advertised as "Taylor Mountain Day". Approximately two hundred adults and children participated in the day-long activities which included presentations of alternative concept plans, guided hikes to five different destinations, and a public input survey about the draft site concept designs. Hosting the meeting at the site allowed the community to connect the proposed concepts and potential uses to the unique natural resources of Taylor Mountain.

Community Meeting #3 was focused on the presentation of the draft conceptual site plan. Design plans and sketches were displayed illustrating concepts for each of the staging areas and their features including parking, trailheads, structures, and landscape features. A public input survey asked participants to give feedback on the number and locations of access points, trail lay-out and destinations, and the character and intensity of improvements in the development envelope areas. The

Image 4. *Workshop attendees on Taylor Mountain Day.*
PHOTO: RRM

Image 5. *A guided hike on Taylor Mountain Day.*
PHOTO: RRM

results of the survey confirmed the overall direction of the draft site plan while providing insight into some needed refinements.

Community Meeting #4 was presented to convey the master planning goal of balancing the protection and enhancement of the scenic and natural resources with the provision of appropriate public access for recreation and educational purposes. Much of the meeting was dedicated to explaining the proposed resource management objectives and strategies and how the Master Plan incorporates those strategies into the Concept Plan and design guidelines and standards for future improvements. The participant responses illustrate the community's commitment to preserving the beauty of Taylor Mountain while expressing a strong desire to open the property to access via hiking, biking and equestrian trails that explore the unique terrain and scenic landscape.

Community Meeting #5 provided an opportunity for the public to see a presentation of the Draft Master Plan and Draft Initial Study/Mitigated Negative Declaration (MND), or environmental review document. The meeting was held during the 30-day review period of the MND. The majority of the presentation focused on the physical improvements that are proposed, including overviews of each staging area and the trail network.

Image 6. *Participants at the community meetings were able to preview and provide input on preliminary trail routes and staging area design concepts.*
PHOTO: SCAPOSD

PHOTO: RRM

4. Environmental Setting

4. ENVIRONMENTAL SETTING

4.1 REGIONAL CONTEXT

Taylor Mountain is located within the unincorporated lands of the County of Sonoma, and adjacent to the city limits of the City of Santa Rosa. It is approximately two miles from downtown Santa Rosa, and is located at the edge of an established community that includes the Kawana Springs neighborhood.

4.2 ADJACENT LAND USES

Land uses surrounding the project area consist of the Kawana Springs neighborhood to the northwest; Sonoma Academy high school to the north; Bennett Valley residential neighborhoods to the northeast; privately-owned agricultural acreage to the east; and privately-owned agricultural properties and a landscaping materials supply yard to the west. The City of Santa Rosa has identified a future community park adjacent to the northwest portion of the property, across Kawana Terrace.

4.3 GEOLOGY AND SOILS

Taylor Mountain is underlain largely by layered lava flows composed of andesitic and basaltic rocks of the Sonoma Volcanics unit (Graymer et al. 2007). These flows were laid down approximately 5 to 10 million years ago in the Miocene-Pliocene age. Subsequent to their deposition, the lava flows have been uplifted, tilted to the northeast, and faulted. A recently active fault, the Rodgers Creek Fault, runs through the center of the property along a northwest/southeast trend. The Rodgers Creek Fault is thought to be a northern extension of the Hayward Fault and is responsible for the 1969 Santa Rosa earthquakes (magnitudes 5.6 and 5.7) (Blake et al. 2000). Several Quaternary landslide deposits are located in the northeast portion of the Taylor Mountain property along the fault zone.

The soils on the Taylor Mountain property are comprised primarily of clay loams in the Goulding and Toomes series and clays of the Raynor series (USDA 2005 and 2007). These are well-drained soils composed of weathered volcanic material that are considered suitable for non-irrigated land uses. The soil types vary in location by slope, depth to bedrock, and amount of clays, loams, and gravelly/cobbly material present. Bedrock outcrops occur along ridgelines and in scattered hillslope locations.

4.4 WATERSHED AND HYDROLOGY

The Taylor Mountain property encompasses the headwaters for Colgan Creek (also known as Kawana Springs Creek), Todd Creek, and a portion of the Matanzas Creek watershed, including Cooper Creek. Streamflows originating on Taylor Mountain provide cool, clean water to these creeks as they traverse through the urban areas of the Santa Rosa Plain. For aquatic and terrestrial wildlife, the creeks

and their associated riparian vegetation provide critical migration corridors from the Laguna de Santa Rosa through the cities of Santa Rosa and Rohnert Park to the uplands of Taylor Mountain.

The grasslands and forests of Taylor Mountain serve as a groundwater recharge and storage area. Structurally complex vegetative cover promotes rainfall infiltration through interception and absorption. The multitude of springs, their associated wetlands, and the grassland swales slowly release water stored in the shallow groundwater aquifer. These hydrologic processes help support the diverse array of vegetation communities and associated wildlife found on the property and buffer nearby urban areas from higher stormwater flows.

4.5 PLANT RESOURCES

The Taylor Mountain property supports a mosaic of grassland, wetland, riparian, scrub, and oak woodland community types. Grassland on the property consists of large expanses of non-native grasses interspersed with smaller patches of native-dominated valley needlegrass grassland and wildflower fields. Wetland habitat includes freshwater seep, freshwater marsh, and vernal marsh communities, all generally dominated by native plant species. Riparian habitats include riparian woodland and North Coast riparian scrub; these occur along Colgan Creek near the Kawana Springs Resort area. Coyote brush scrub is present on the Matteri parcel and at the southern tip of the Russell property. Large expanses of coast live oak and Oregon white oak grow on slopes throughout the property. Near the old resort and the old dairy, ruderal and other disturbed vegetation (i.e., weedy species tolerant of human disturbance and landscaping species that have become overgrown and naturalized) are found.

Of the plant communities present, several are considered sensitive habitats: valley needlegrass grassland, wildflower fields, all wetlands and riparian habitats, and Oregon oak woodland (Sawyer et al. 2009). No special-status plants have been documented on the property, but two rare species occur on adjacent private lands, and over 20 others occur in the region and in habitats similar to those found on the property. Figure 3 illustrates all of the biological communities mapped on the Taylor Mountain property. See the Ecological Resources Report (PCI 2011) for a more complete description of the plant communities of the Taylor Mountain property. Plant species common names are used throughout this document; scientific names are provided in Appendix B, Ecological Resources Report. (PCI 2011)

4.6 WILDLIFE RESOURCES

The Taylor Mountain property supports a wide variety and abundance of wildlife species due in part to the diverse vegetation communities. These diverse mixture of habitats provides nesting opportunities, food, shelter, and movement corridors for many native wildlife species. During wildlife surveys of the property, 5 reptile, 4 amphibian, 50 bird, and 12 mammal species were documented. The freshwater pond is a particularly important wildlife resource and supports a healthy

population of the special-status California red-legged frog. Two special-status bird species (golden eagle and grasshopper sparrow) have been recently observed on the property, and a number of other special-status bird and mammal species are likely to use the property as well. See the Ecological Resources Report for more information on the wildlife of the Taylor Mountain property. Wildlife common names are used throughout this document; scientific names are provided in Appendix B, Ecological Resources Report (PCI 2011).

4.7 LANDSCAPE CONTEXT AND ECOLOGICAL PROCESSES

The size, location, and topographic range of the Taylor Mountain property all contribute to its value in protecting and enhancing biodiversity. The property links the stream corridors, parks, and backyards of Santa Rosa to the Sonoma Mountains and provides pathways for wildlife movement, vegetation dispersal, and transport of cool, clean water into the Laguna de Santa Rosa, which is a biological hotspot and a recognized wetland of international significance. The property itself is large and diverse enough to support some wildlife species, such as California red-legged frogs and many birds and small mammals, throughout their entire life cycles. It provides key habitat for animals such as bobcats with bigger home ranges and contributes to the genetic diversity that helps build resiliency in regional plant and wildlife populations. The largely undeveloped nature of the property is crucial to maintaining the ability of the soil to retain rainfall and sustain summer flows in downstream channels.

Taylor Mountain's ecological role in the larger Sonoma County landscape, its mosaic of habitats, its visual beauty, and recreational appeal are all supported by basic ecological processes. The flows of water and nutrients within and through the property support diverse plant life as well as lush grasses for livestock feed. Nutrients essential to plant and animal life are continually recycled between the atmosphere, land, water, and living things through processes such as decay, nitrogen fixing, natural erosion, and even digestion. Sediment transport through the property's streams replenishes downstream aquatic habitat. The movement of native plant and animal species across the relatively unfragmented landscape allows populations to adapt to changes in habitat conditions and maintain genetic diversity, especially in light of climate change. Natural regeneration of native plant species maintains habitats, and successional processes support the recovery of disturbed habitats. Historic and current disturbance regimes, including fire and livestock grazing, have shaped the pattern of plant communities on the land and help keep a rich patchwork of habitat types.

The natural resource objectives and strategies in this document are designed to support natural ecological processes and to enhance the property's ecological role in the larger landscape. For further information on the ecological processes of Taylor Mountain, see Appendix B, Ecological Resources Report. These sections of the Ecological Resources Report also contain extensive scientific references not included here.

PHOTO: PCI

5. Natural Resource Management

5. NATURAL RESOURCE MANAGEMENT

5.1 GOALS FOR NATURAL RESOURCE MANAGEMENT

The overarching goals for natural resource management of the Taylor Mountain property are to preserve and enhance natural habitats, conserve native biodiversity, and protect ecological processes. Balancing recreational access and a variety of other human influences on the property with those goals is the central challenge for management of the natural resources. Achieving this balance will entail protecting and/or improving key physical and ecological processes, planning public access to minimize resource impacts, monitoring changes to the property where impacts may occur, and adjusting management strategies over time to incorporate new information gleaned from monitoring efforts or other relevant sources.

The following guidelines and standards are designed to meet the natural resource management goals and manage Taylor Mountain habitats. Natural resource guidelines and standards are provided for each of the property's main habitat types, special-status species, invasive species management, native habitat revegetation and enhancement, and climate change. Guidelines represent good natural resource management principles, and should be followed wherever possible and feasible. Guidelines are, to an extent, discretionary and are open to the interpretation of the District and Regional Parks. Standards, however, are less flexible and adherence is required. Many of the recommendations provided are interrelated and should be considered in the larger context across habitat types and in conjunction with other chapters in this Master Plan.

See Figure 3 for a map of the biological communities present on the Taylor Mountain property and Figure 4 for locations of high-priority resource management actions and restoration opportunities. See Appendix B, Ecological Resources Report for more complete maps of invasive plant species distribution and other areas of management concern based on 2010 and 2011 field surveys and additional biological community maps.

5.2 GRASSLANDS

Grasslands cover approximately half of Taylor Mountain's landscape and include patches of native valley needlegrass grassland scattered within a matrix of non-native-dominated annual grassland, as shown in Figure 3. Both types of grassland provide important functions, including forage and habitat for livestock and wildlife and protection of soils from erosion. Native perennial grasses, with their extensive root systems, are especially valuable for retaining soil, increasing the infiltration of rainfall and runoff into the ground, and filtering sediment and other potential pollutants before they reach waterways. Taylor Mountain grasslands also include beautiful fields of mostly annual wildflowers that provide pleasure to human visitors and food resources for insects and other wildlife. While valley needlegrass grassland is believed to have been one of the most abundant grassland types across

Image 7. *Native wildflower field.*
PHOTO: PCI

the state historically, it is now greatly reduced in extent and is considered sensitive habitat (Sawyer et al. 2009).

Grasslands on the property support a number of grassland-specialist birds (including grasshopper sparrow, a California Species of Special Concern), reptiles, amphibians, and many small mammals. Rocky outcroppings and seasonal wetlands mixed within the grasslands add to valuable habitat complexity, providing additional foraging and nesting opportunities. While each grassland species has a unique habitat preference, continuing to provide diverse, undisturbed habitats will support a varied assemblage of wildlife.

On the Taylor Mountain property, grasslands are the habitat most heavily used by cattle. They also contain most of the existing and proposed trails. A primary focus of the grassland objectives is to protect patches of native grasses and wildflower fields from further fragmentation and from incursion by invasive plant species. Control of invasive species throughout all of the property's grasslands is also important to maintain native plant diversity and to prevent Taylor Mountain from becoming a reservoir of weedy species that then spread into neighboring parcels. Although most of the non-native species that dominate annual grassland on Taylor Mountain are widely naturalized both across the property and throughout

California, there are also a number of invasive species that are of special concern, either because they currently occur only in small patches and have high potential to spread, or because of their damaging impacts on habitat quality. Additional information about invasive species is in Chapter 5.8, Invasive Plant Species.

A. Grassland Objectives

Working toward the following objectives will help sustain healthy, diverse grasslands on the Taylor Mountain property:

Grassland Objective 1. Keep patches of native grassland intact. Minimize alteration of the soil surface from new trails, park infrastructure, and other human activities in all grasslands.

Although they are generally long-lived and tough once established, native perennial grassland species are typically slow to establish. In contrast, most of the non-native annual species that are so abundant on Taylor Mountain grow and germinate rapidly and are often well adapted to disturbance. Ground disturbance in native grasslands is likely to facilitate invasion by non-native grassland species. Fragmentation of habitat can further increase the risk of invasions by both non-native plant and animal species, which thrive in disturbed environments along edges. Fragmented and non-native-dominated grasslands are less valuable to wildlife than are more intact native grasslands.

Grassland Objective 2. Restore native grassland in select locations.

The majority of the property's nearly 500 acres of grasslands are dominated by non-native annual species, and comprehensive restoration to native species is not likely to be feasible. However, opportunities exist for focused restoration efforts in selected areas, including trail decommissioning sites and invasive species removal locations in grassland. See Figure 4 for suggested locations.

Grassland Objective 3. Prevent the establishment of invasive plant species and control or eradicate existing infestations.

Invasive species such as distaff thistle, purple starthistle, fennel, and pampas grass have potential to spread on the property, and can develop into dense stands that eliminate habitat for natives, reduce habitat complexity and diversity, and decrease forage and habitat value for livestock and wildlife. Some species can also increase fire hazards, with large accumulation of dry plant material. See Figure 4 for high priority areas for invasive species removal. See Figure 8 in Appendix B, Ecological Resources Report (PCI 2011), for specific invasive plant locations based on field surveys in 2010 and 2011.

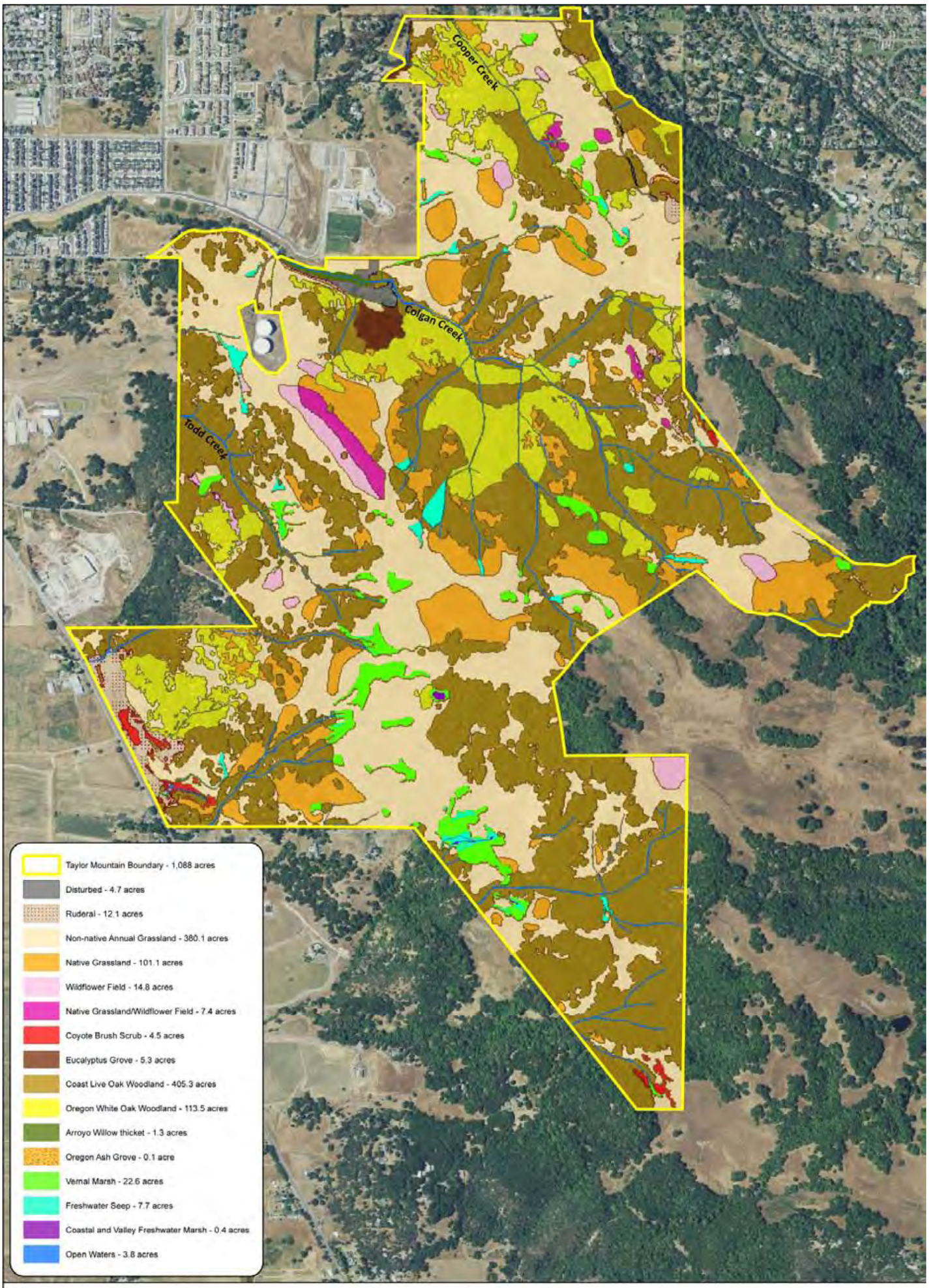

Figure 3. Biological Communities.

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Grassland Objective 4. Manage the effects of livestock grazing to benefit grassland habitat and native wildlife communities.

Livestock grazing has complex effects on grasslands and the wildlife communities they support. Impacts of livestock grazing on the Taylor Mountain grasslands depend on factors including intensity, duration, and timing of grazing as well as the composition of the vegetation where livestock graze, rest, and travel. Well-managed livestock grazing may help suppress some non-native plant populations and facilitate some native species while providing economic benefits and local food. Grazing can also be an effective management tool for many species of wildlife, especially grassland birds (DiGaudio 2010). Maintaining a range of vegetation densities and growth forms (i.e., short, medium, and tall grasses) with varying degrees of litter build-up and patches of bare ground is beneficial to the wildlife species utilizing the Taylor Mountain property. See Chapter 6, Grazing, for further information.

B. Grassland Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned grassland objectives:

GRASSLAND GUIDELINES

G1. Native grassland species should be restored to grassland locations where high-priority invasive plant populations (e.g., fennel, pampas grass, distaff thistle) are targeted for removal.

G2. Targeted restoration of native grassland species should be considered in one or more locations where park visitors can readily observe and learn about the restoration efforts (e.g., near park entrances, along educational trails). Educational signage should be installed to describe restoration efforts and other grassland management issues. See Chapter 5.11, Revegetation and Habitat Restoration, and Chapter 8.7, Signage and Wayfinding for further information.

G3. Reintroduction of rare species present on adjacent private property should be considered. See Chapter 5.11, Revegetation and Habitat Restoration, for further information.

GRASSLAND STANDARDS

S1. A restoration plan shall be developed for any proposed trails or other developments that are unable to avoid native grasslands, including wildflower fields. This may include salvage of existing bunchgrasses and perennial forbs, collection of local seed for nursery propagation,

and container planting. See Chapter 5.11, Revegetation and Habitat Restoration, for further information.

S2. A long-term monitoring program shall be developed to evaluate the effects of livestock grazing on plant species composition and wildlife usage within grasslands. Use the results to guide grazing management. Monitoring will also be important if grazing is removed from the site, which could result in changes to invasive and native species populations. See Chapter 5.13, Monitoring and Adaptive Management, Monitoring Task 6 and 14 in Table 4, and Table 5 for further information.

S3. Trails, visitor facilities, and other development-related disturbance shall be located outside of patches of native grassland and wildflower fields to the maximum extent feasible. Where ground disturbance is unavoidable, protection measures must be in place during and immediately following construction. These measures may include protecting soil surfaces by seeding or planting promptly with appropriate native species and covering with weed-free straw mulch.

S4. Minimum setbacks from native grasslands shall be maintained for all new development. Adequate vegetated buffers must be maintained or established for existing or new development. See S66, and Table 3 for additional information.

S5. Livestock shall be well-distributed throughout the grasslands. Maintain stocking rates detailed in G73-G78.

S6. Introduction of noxious weeds through livestock feed shall be prevented to the greatest extent feasible, in coordination with grazing lessee.

S7. The spread of invasive plant populations in grasslands shall be prevented to the greatest extent feasible. See Chapter 5.8, Invasive Plant Species, for preventative standards and management of invasive plant populations.

S8. High- and medium-priority invasive grassland species populations that are currently limited in extent on the property shall be eradicated to the greatest extent feasible. These currently include distaff thistle and Klamath weed. See Table 2 for management guidelines for invasive plant species.

S9. High- and medium-priority invasive species populations that are already extensive on the property shall be reduced and controlled to the greatest extent feasible. These currently include black mustard, French and Scotch broom, Italian thistle, medusahead, milk thistle,

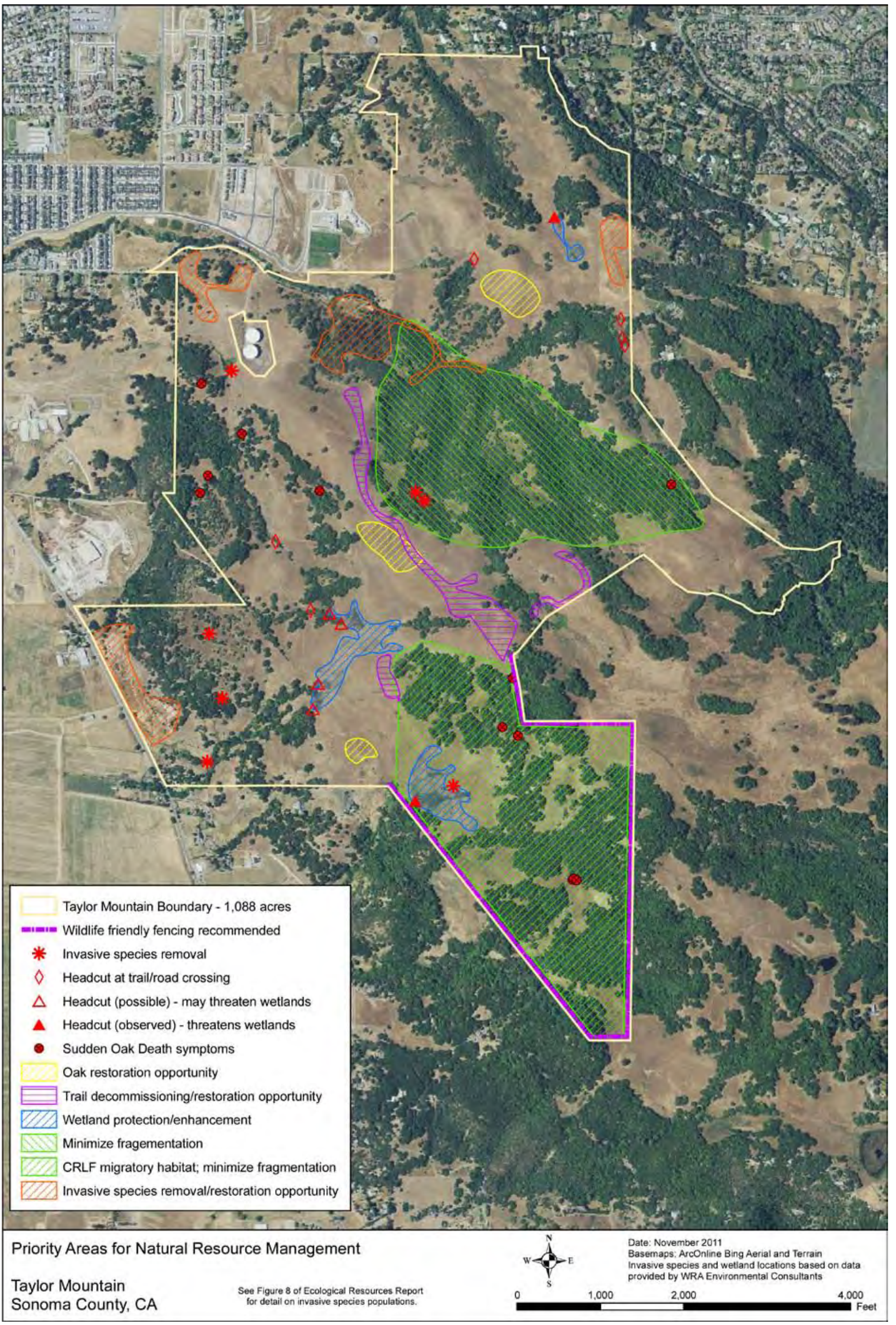

Figure 4. Priority Areas for Natural Resource Management.

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purple starthistle, and yellow starthistle. See Table 2 for management guidelines for invasive plant species.

5.3 SCRUB

A small acreage of native coyote brush scrub is present near the historic Matteri dairy, at the southern tip of the property, and on the eastern edge of the property near the barn, as shown in Figure 3. The coyote brush scrub near the historic dairy occurs within disturbed habitat with abundant invasive species, including fennel and pampas grass. Coyote brush scrub at the southern tip of the property, in contrast, represents more intact habitat, with an understory of native forbs and grasses that could serve as a model for restoring the Matteri parcel scrub habitat.

A. Scrub Objectives

Working toward the following objectives will help restore native scrub habitat on the Taylor Mountain property.

Scrub Objective 1. Keep patches of native scrub habitat intact. Minimize disturbance from new trails, park infrastructure, and other human activities in all native scrub.

Several small patches of native scrub habitat occur on the property. Ground disturbance in native scrub habitats is likely to facilitate invasion by non-native plant species. Fragmentation of the habitat can further increase the risk of invasions by both non-native plant and animal species, which thrive in disturbed environments along edges. Fragmented and non-native-dominated scrublands are less valuable to wildlife than are more intact native habitats.

Scrub Objective 2. Restore the highly disturbed patches of coyote brush scrub on the Matteri parcel.

This scrub habitat, on steep rocky slopes and ground disturbed by the historic dairy operation, is one of the most highly invaded by non-native species on the property. Plans to develop this site as a primary entrance to the park present an opportunity to eradicate high-priority invasive plants and restore healthy native scrub habitat.

B. Scrub Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned and scrub objective:

SCRUB GUIDELINE

G4. Native species should be restored to create a natural mosaic of scrub species. In addition to preserving existing coyote brush, plantings could include other shrubs, perennial grasses, and herbaceous

species tolerant of rocky, exposed conditions. In areas with deeper soils, native oaks, including coast live oak and blue oak, may also be appropriate. See Chapter 5.11, Revegetation and Habitat Restoration, for further information.

SCRUB STANDARDS

S10. Trails, visitor facilities, and other development-related disturbance shall be located outside of patches of native scrub habitats to the maximum extent feasible. Where ground disturbance is unavoidable, protection measures must be in place. These measures may include protecting soil surfaces by seeding or planting promptly with appropriate native species and covering with weed-free straw mulch.

S11. The spread of invasive plant populations in scrub habitat shall be prevented to the greatest extent feasible. See Chapter 5.8, Invasive Plant Species, for preventative standards and management of invasive plant populations.

S12. High-priority invasive species shall be eradicated to the greatest extent feasible, particularly pampas grass and fennel, from the western edge of the Matteri parcel. See Figure 4 for location and Table 2 for removal information.

5.4 FORESTS AND WOODLANDS

Native forests and woodlands on Taylor Mountain are dominated by coast live oak and Oregon white oak, as shown in Figure 3. California bay, black oak, buckeye, and Douglas-fir are also present, along with a suite of understory species that provide valuable forage and cover to wildlife, maintain soil stability, protect water quality, and add to the beauty of the property for human visitors. Statewide, Oregon oak woodland is considered sensitive because it has declined as a result of development, over-grazing, and fire exclusion practices (Sawyer et al. 2009).

Upland forests and woodlands on the Taylor Mountain property provide suitable habitat for a wide variety of terrestrial birds, mammals, amphibians, and reptiles. Native oak trees and oak communities are one of the most significant resources on the property and provide both food and shelter for wildlife. Forests and woodlands that are structurally diverse, with a healthy understory of low-growing groundcover, mid-story of shrubs and small trees, high canopy of trees and vines, and snags, are critical for supporting the various habitat needs of native wildlife.

Most of the forest and woodland habitats of Taylor Mountain are currently dominated by native plant species. Invasive species are not abundant in the oak woodlands, but there are patches of substantial infestations of French and Scotch broom. One grove of invasive blue gum eucalyptus occurs near the Kawana Springs Resort area; the grove appears to be regenerating and slowly expanding,

but seedlings have not been observed elsewhere on the property. Native plant regeneration appears to be significant in the interior of woodlands but more limited on the edges of woodlands and in savanna settings. In these areas, livestock trampling and browsing, herbivory or seed predation by native wildlife, greater heat and drought stress, and other variables may reduce the germination and establishment of native species. The spread of Sudden Oak Death (SOD), caused by a water mold (*Phytophthora ramorum*), is also a concern in Taylor Mountain woodlands. Human visitors can spread *P. ramorum* by tracking infected mud along trails and between the park and other locations. See Figure 4 for mapped locations of trees with SOD symptoms.

All of these forest and woodland health issues are influenced by the extent of fragmentation of habitat on the site. Fragmentation of forests and woodlands reduces the viability of local plant and wildlife populations by limiting genetic exchange and the number of individuals a habitat can support. Fragmentation also contributes to edge effects where microclimate changes alter the ecosystem and increases risk of invasions by exotic species that thrive in disturbed environments. Human activity on the property has the potential to fragment existing woodlands via roads and formal or informal trail use.

Image 8. *Native oak woodlands*
PHOTO: PCI

A. Forest and Woodland Objectives

Working toward the following objectives will help sustain robust, native forests and woodlands on the Taylor Mountain property.

Forest and Woodland Objective 1. Minimize the fragmentation of forest and woodland habitat.

Numerous trails and roads already cross the forests and woodlands on the Taylor Mountain property, and more may be considered for development or further enhancement over time. These linear features, including both existing and proposed trails and roads, fragment habitats, increase edge effects, and may reduce the ability of woodland plant species to regenerate, thrive, and support intact wildlife communities. See Figure 4 for high priority areas to protect from fragmentation.

Forest and Woodland Objective 2. Facilitate natural regeneration and actively restore forest and woodland species to support diverse plant and wildlife communities.

Healthy native forests and woodlands typically include an understory of low-growing herbaceous species, a mid-story of shrubs and small trees, a high canopy of trees and vines, and snags. On the Taylor Mountain property, natural regeneration of some of these layers, especially on woodland edges and savannahs, may not be sufficient to sustain the habitat over time. Protecting existing plants where they do occur, and actively replanting genetically-appropriate species where they do not, can help counteract factors that likely limit regeneration such as livestock trampling and browsing, wildlife herbivory, and drought stress.

Forest and Woodland Objective 3. Minimize the spread of *P. ramorum*, the pathogen that causes SOD.

Sudden Oak Death is present in Taylor Mountain woodlands and throughout Sonoma County. Following pathogen control standards and education may help contain the infection and reduce safety hazards (COMTF 2008, UCCE 2008). See Figure 4 for areas on the property exhibiting symptoms of SOD, and Chapter 5.10.3, Contaminant and Pathogen Control, for further information.

Forest and Woodland Objective 4. Prevent the establishment of invasive plant species and control or eradicate existing infestations.

Currently, invasive plant species are not abundant in Taylor Mountain forests and woodlands. However, several species occur in scattered or isolated locations. Controlling these before they become more abundant, monitoring to ensure that any new infestations are promptly addressed, and employing preventive measures will all help maintain the integrity of oak and bay woodlands on the property. See Figure 4 for high priority areas for invasive species removal. See Figure 8 in Appendix B, Ecological Resources Report (PCI 2011), for specific invasive plant locations based on field surveys in 2010 and 2011.

B. Forest and Woodland Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned forest and woodland objectives:

FOREST AND WOODLAND GUIDELINES

G5. Young naturally occurring trees should be protected in open areas where livestock grazing pressure is moderate to high. Protection may include plastic tree shelters securely staked with t-posts or rebar posts, individual fencing of trees with field fencing and t-posts, fencing of larger areas that encompass numerous seedlings, or other appropriate protection measures, especially in areas of livestock use; see McCreary 2010 for details on rangeland tree protection. Exclusion fencing can be removed when browsing no longer poses a threat to plant survival. Placement of brush piles or large downed limbs around young trees may also be effective. Strategic placement of water sources and/or supplements may also be used to direct livestock away from areas with young trees. See Chapter 5.11, Revegetation and Habitat Restoration, for further information.

G6. In savanna settings where natural oak regeneration is very low, oak regeneration "islands" should be created. In these locations, plant native trees and install temporary livestock and deer exclusion fencing or other form of plant protection from trampling and herbivory. Additional protection such as plastic tree shelters and weed mats may also be useful in some settings. Exclusion fencing can be removed when trees have grown above browse line and trunks are sturdy enough to withstand livestock rubbing. Planting locations can include those where a senescing or dead oak exists as well as large grassland expanses barren of trees but where oaks are likely to have occurred historically. Avoid siting plantings within native grassland. Temporary summer irrigation for two to three years following installation is critical for seedling establishment and will likely enhance survivorship. See Figure 4 for suggested restoration locations and Chapter 5.11, Revegetation and Habitat Restoration, for further information.

FOREST AND WOODLAND STANDARDS

S13. Tree removal shall be avoided to the greatest extent feasible during project construction, whether or not trees are "protected" under the County's Tree Protection Ordinance.

S14. Trails, visitor facilities, and other development-related disturbance shall be located outside of native forests and woodlands as feasible. Where ground disturbance is unavoidable, protection measures must

be in place. These may include protecting soil surfaces by seeding or planting promptly with appropriate native species and covering with weed-free straw mulch.

S15. A restoration plan shall be developed for any proposed trails or visitor facilities that are unable to avoid native forest and woodland habitats. The restoration plan will include habitat restoration measures, success criteria, and monitoring requirements. Tree replacement ratios will also be included in the plan and will be based on the Sonoma County Tree Protection Ordinance. See Chapter 5.11, Revegetation and Habitat Restoration, for further information.

S16. Train park staff and educate visitors about preventing the spread of Sudden Oak Death (SOD). See Chapter 5.10.3, Contaminant and Pathogen Control for further information, G42 for visitor education and S72 for park staff training.

S17. French and Scotch broom shall be reduced and controlled. Remove small, isolated infestations that are scattered through oak woodlands. See Table 2 for management guidelines for invasive plant species.

S18. The regeneration and/or spread of eucalyptus from the grove near the Kawana Springs Resort area shall be prevented. Small scale removal can be accomplished by cutting trees, covering sprouts with plastic sheeting, and monitoring for regrowth. For large scale removal, consult with a licensed pest control advisor on appropriate chemical control methods for eucalyptus and implement recommended control methods. Allow mature trees to senesce over time while taking into careful consideration the hazards of limbs and falling trees near recreation areas.

S19. The spread of invasive plant populations in forest and woodland habitats shall be prevented to the greatest extent feasible. See Chapter 5.8, Invasive Plant Species, for further information about preventing the spread of invasive plant populations.

5.5 RIPARIAN HABITATS

Creeks, seasonal drainages, and the unique vegetation they support serve many important functions in the landscape. Healthy riparian habitats can slow winter storm flows, increase infiltration of runoff into the soil, protect streambanks from erosion, and improve water quality. These areas also provide critical habitat, movement corridors, and water for wildlife. As our climate changes, riparian areas may become even more important as naturally resilient habitats, thermal refugia, and migration corridors. See also Chapter 5.12, Climate Change.

On the Taylor Mountain property, riparian habitats occur along Colgan Creek and its tributaries and along several other drainages that pass through the property, as shown in Figure 3. Vegetation in these habitats is primarily oak woodland, with a small grove of Oregon ash and arroyo willow scrub present on Colgan Creek near the Kawana Springs Resort area. The oak woodlands in these settings include a diversity of moisture-dependent understory species (e.g., ninebark, hazelnut, and snowberry) not found in the uplands. The stream channels on the property are not currently known to support native fish populations, although they may have in the past; however, the channels and adjacent moist woodlands provide important habitat and a water supply for macroinvertebrates, frogs, salamanders, snakes, and birds.

Riparian habitats, including both the vegetation along the stream corridor and the stream itself, are protected by a number of regulations and policies. Agency approval will be needed for development and many restoration actions in these areas. In addition, Oregon ash groves are limited in distribution in California and are considered sensitive habitat and subject to regulation.

Riparian habitats on the property have experienced varying degrees of alteration. Upstream reaches of Colgan Creek and small stream channels on the property support extensive native plant communities and are largely free from development. However, along Colgan Creek in the vicinity of the Kawana Springs Resort area, riparian habitat has been impacted by many years of human use. Buildings, roads, a bridge, and other structures and domestic landscaping have encroached on the riparian corridor, replaced native plant communities, and modified hydrology. Invasive species are abundant.

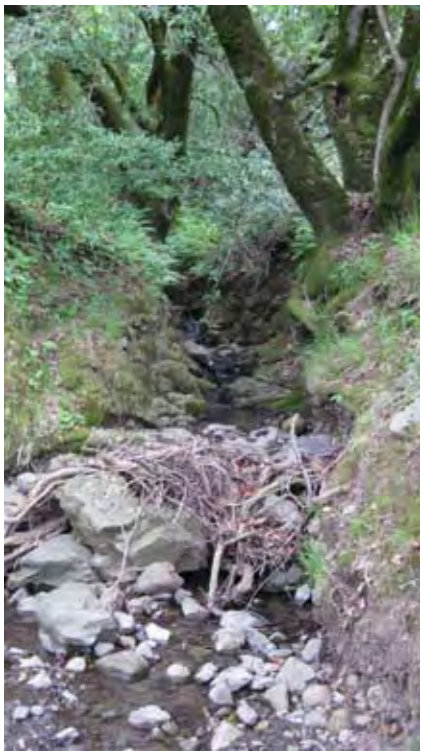

Image 9. *Stream channel.*
PHOTO: PCI

A. Riparian Objectives

Working toward the following objectives will help maintain resilient, complex riparian habitats on the Taylor Mountain property.

Riparian Objective 1. Facilitate natural regeneration and actively restore riparian habitats to support self-sustaining plant and wildlife populations, as well as maintain hydrologic processes.

Riparian habitat with dense, mature, native vegetation is vital to creating and maintaining high-quality habitat for wildlife. Providing adequate riparian buffers also improves the connectivity between aquatic and upland habitats and allows for natural regeneration. Limiting the number of trail crossings and actively enhancing and/or restoring existing habitats will help achieve the goal of providing self-sustaining native plant and wildlife communities.

Riparian Objective 2. Protect upland hydrology to maintain existing stormwater and sediment delivery levels to creeks.

Trails, whether human- or livestock-created and used, can concentrate runoff by either acting as channels themselves or by diverting water into a single area. When overland flows during rainfall events become

concentrated in grasslands or forest areas, a trickle of water can quickly become a stream, causing soil erosion and, ultimately, gullying or landslides. These areas of concentrated flow during rainfall events increase the number of small channels and drainages on the property. If there is connectivity with the drainage network, water and sediment that would otherwise be kept on site can travel downstream, potentially exacerbating flood and sedimentation issues on the Santa Rosa Plain. Increases to the amount of water or sediment delivered to the drainages on the Taylor Mountain property can initiate elevated channel bank erosion and headcut movement. Increased drainage densities, and the direct transport of water to defined channels, also reduce the amount of rainfall that infiltrates the soil and is available to recharge groundwater.

Riparian Objective 3. Monitor and halt actively eroding headcuts threatening stream channels.

Headcuts, sudden changes in stream channel elevation that have caused erosion, have been observed at several locations in stream channels on the Taylor Mountain property. Many of these headcuts are located at existing road and trail crossings where culverts have been installed; others are located in remote first-order tributaries. Several observed headcut locations are noted on Figure 4 to help guide management and monitoring activities. Where hardened road crossings have halted the upstream migration of headcuts, many of the downcut reaches appear to have stabilized with dense riparian vegetation growing on the banks. Monitoring and halting active headcuts will reduce the potential for channel incision, oversteepening and failure of adjoining streambanks, and protect native vegetation and in-stream habitat for aquatic animals.

Riparian Objective 4. Eradicate or control invasive plant species infestations that reduce riparian habitat value.

The riparian area near the Kawana Springs Resort area is one of the habitats most threatened by invasive plant species on the Taylor Mountain property. Creekside vegetation has been dramatically altered by abandoned and spreading ornamental plantings and other invasive species. For example, periwinkle has formed a dense mat in the understory, excluding native shrubs, ferns, and herbs. English ivy has climbed into native riparian trees and is likely to eventually kill them. Aggressive efforts to remove these species and replant with natives have the potential to greatly improve habitat quality.

B. Riparian Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned riparian objectives:

RIPARIAN GUIDELINE

G7. Active in-channel headcuts should be monitored annually to detect critical changes. Headcut monitoring can be done through repeat photography and installation of a location marker. See Tables 4 and 5, and Figure 4 for locations of existing headcuts and Chapter 5.13, Monitoring and Adaptive Management, for further information.

RIPARIAN STANDARDS

S20. Trails, visitor facilities, and other development-related disturbance shall be located outside of riparian habitats to the greatest extent feasible.

S21. Low Impact Development (LID) techniques shall be used in landscaped or other developed areas as required by the North Coast Regional Water Quality Control Board (NCRWQCB) MS4 Permit and as specified in the Storm Water LID Technical Design Manual, to intercept flows and allow water to percolate into soil and reduce sediment delivery. These techniques should be consistent with Chapter 1.4, Design Philosophy, and the guidelines and standards in Chapter 8, Conceptual Site Plan.

S22. Areas of historic erosion and existing culvert crossings shall be evaluated to determine if they warrant repair.

S23. Trails Best Management Practices (BMPs) shall be utilized to manage potential erosion and flow concentration, such as water bars, outsloping, energy dissipaters, and switchbacks for existing trail modifications and new trails. See trail design and construction standards identified in Chapter 8, Conceptual Site Plan.

S24. Livestock use on steep slopes and in fragile riparian areas shall be discouraged by strategically placing livestock attractants such as mineral supplements to draw them away from such areas.

S25. A restoration plan for any proposed trails that are unable to avoid riparian habitats shall be developed and implemented. See Chapter 5.11, Revegetation and Habitat Restoration, for further information on native plant revegetation and wildlife habitat enhancement.

S26. Minimum setbacks from the top of the bank for all new development along riparian corridors shall be maintained. Adequate vegetated buffers shall be maintained or established for existing development. See Table 3 for additional information.

S27. Where bank stabilization is warranted to protect built infrastructure, only bank stabilization methods that enhance instream and riparian habitat shall be used, such as biotechnical measures incorporating vegetation and/or large wood. In general, stream system management should focus on the restoration and enhancement of natural stream functions such as hydrologic, geomorphic and successional processes.

S28. Areas where concentrated flow is occurring from trails shall be repaired by re-grading slopes, revegetating, and installing flow dissipaters, as necessary.

S29. If fresh erosion is visible or if a headcut is moving rapidly upstream, an experienced and licensed landscape architect or civil engineer shall be consulted in collaboration with a qualified ecologist to evaluate, design and implement a repair. Headcuts that are active or threaten road crossings should be stabilized with biotechnical methods. All treatments must be performed in a manner to protect sensitive ecological resources. Depending on the scale and location, methods used could include small willow walls, brush protection, and sloping the headcut with hand tools, protecting it with erosion control blanket, and replanting with willow sprigs and herbaceous vegetation.

S30. High-priority invasive plant species shall be eradicated and/or reduced in especially important riparian habitats, to the greatest extent feasible, including near Colgan Creek adjacent to the Kawana Springs Resort area. Currently, these include periwinkle, English ivy, and French broom. See Table 2 for management guidelines for invasive plant species.

S31. The spread of invasive plant populations in riparian habitats shall be prevented to the greatest extent feasible. See Chapter 5.8.2, Invasive Plant Management, for further information.

Image 10. *Seasonal wetland.*
PHOTO: PCI

5.6 SEASONAL AND PERENNIAL WETLANDS

Taylor Mountain is characterized by many small vernal marshes and seeps scattered throughout the grasslands and one natural pond fringed by perennial freshwater marsh, as shown in Figure 3. These wetlands provide important hydrologic functions, storing water from winter storms, trapping sediment, and filtering nutrients and contaminants. They also support a distinctive set of plant species, dominated by natives, and provide green forage for livestock and other herbivores in summer months when the surrounding grasslands are dry. Wetlands provide a crucial water source for wildlife and breeding habitat for amphibians. The natural pond on Taylor Mountain is one of the most unique and valuable wildlife resources on the property. It supports a healthy population of California red-legged frog, a special-status species, and common amphibians like the California newt and Sierran treefrog.

On the Taylor Mountain property, wetlands are used extensively by cattle due to their proximity to existing water troughs and availability as forage. Existing trails also follow wetland contours, and these areas show signs of heavy human

use during the wet season. Most of the non-native plant species that dominate wetlands on Taylor Mountain are widely naturalized both across the property and throughout California; however, these species could become problematic and reduce plant species diversity and habitat quality. Protecting water quality, quantity, and native vegetation around wetlands will enable these special environments to continue to provide valuable hydrologic and habitat functions.

A. Wetland Objectives

Working toward the following objectives will support functional wetland habitat on the Taylor Mountain property:

Wetland Objective 1. Protect wetlands and water quality by minimizing delivery of sediment, nutrients, and other contaminants.

During periods of wet weather, livestock and human visitors trample wetlands, resulting in soil compaction, degraded water quality through elevated nutrient input from livestock waste, and impacts on native wildlife. Erosion from trampling or trails around marshes and seeps can increase sediment delivery into wetland habitats. Disturbance to wetlands during the winter months is of special concern because many amphibians use these areas for breeding during this time.

Wetland Objective 2. Revegetate degraded seeps and wetlands with native plants.

Healthy wetlands support a diversity of native vegetation types, including many perennial rushes, sedges, and grasses. These native wetland species typically have rhizomes, extensive fibrous root systems, or other adaptations that make them very efficient at stabilizing moist soils, filtering out sediments, and capturing excess nutrients. Where native vegetation has been damaged, restoring it will protect water quality and wildlife habitat.

Wetland Objective 3. Monitor and halt the advance of headcuts threatening wetland integrity.

In-channel headcuts have moved upstream in several tributaries and are now threatening to erode into and through critical wetland habitat. If this occurs, these wetlands would largely disappear as deep channels will be formed, the water table will drop, and the ability of the surrounding area to hold moisture throughout the dry season and support wetland species will be compromised. Observed headcut locations that threaten existing wetlands are included in Figure 4, as are locations to be checked for similar headcuts. In some locations, small channels are already present in the wetlands, and small headcuts are moving through the wetlands. Arresting these features will protect the wetlands from further damage and possible future demise.

Wetland Objective 4. Monitor and control the extent of invasive plant species in wetlands.

Most of Taylor Mountain's wetlands are dominated by native plant species, but several common, lower-priority invasive species are also present. Himalayan blackberry, poison hemlock, pennyroyal, common velvet grass, and Italian rye grass are all common in seasonally wet areas. Especially if hydrologic or disturbance regimes change over time, these species could spread and reduce native plant and habitat diversity in some wetlands. See Figure 4 for high priority areas for invasive species removal. See Figure 8 in Appendix B, Ecological Resources Report (PCI 2011) for specific invasive plant locations based on field surveys in 2010 and 2011.

B. Wetland Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned wetland objectives:

Wetland Guidelines

G8. Any new livestock water sources should be located away from wetland habitats to limit livestock usage of these areas.

G9. The use of seasonal or permanent livestock exclusion fencing, should be considered, as appropriate, if other livestock management practices (e.g., development of alternative upland water sources, placement of livestock supplements) are not effective at discouraging livestock from damaging wetlands. If cattle are excluded from wetlands, monitoring should be done to detect changes to invasive and native species populations. See Monitoring Tasks 6 and 14 in Table 4, Table 5, and Chapter 5.13, Monitoring and Adaptive Management, for further information.

G10. Enhancement of native plant diversity within existing wetlands should be considered when opportunities arise, especially in conjunction with invasive species removal.

G11. Headcuts at the downstream edge of wetlands should be monitored annually to detect critical changes. Headcut monitoring can be done through repeat photography and installation of a location marker. See Figure 4 for locations of active headcuts threatening wetlands, Monitoring Task 13 in Table 4, Table 5, and Chapter 5.13, Monitoring and Adaptive Management, for further information.

G12. If existing headcuts have already resulted in loss of wetland function, the use of small brush checkdams or other biotechnical techniques should be considered to trap sediment and rebuild the soil surface.

For more information on biotechnical erosion control techniques, see *Groundwork* (Marin Resource Conservation District 2007).

WETLAND STANDARDS

S32. Trails, visitor facilities, and other development-related disturbance shall be located outside wetlands to the greatest extent feasible. Existing trails within wetlands should be decommissioned. Exception: pedestrian-only boardwalks. See also G136-G140, and S116-S123.

S33. Where ground disturbance within wetlands is unavoidable, protection measures shall be in place. These measures may include protecting soil surfaces by seeding or planting promptly with appropriate native species and covering with weed-free straw mulch.

S34. A restoration plan shall be developed and implemented for any proposed trails that are unable to avoid wetland habitats. Restoration should consist of habitat enhancement activities that increase the functions and values of existing wetland habitats on the site. Examples of suitable restoration activities include removal of non-native invasive plant species from wetlands, revegetating wetlands with native plant species, decommissioning existing trails that go through wetlands and re-routing them outside of wetlands, and protecting wetlands from excessive cattle use during the wet season when they are most vulnerable to impacts and erosion. See Chapter 5.11, Revegetation and Habitat Restoration, for further information on native plant revegetation and wildlife habitat enhancement.

S35. If regulatory agencies determine that wetland restoration is not sufficient to mitigate for impacts on wetlands from project development, wetland replacement may be necessary. This can be accomplished through creating wetland habitats on-site or through purchasing mitigation credits at an approved bank. The wetland replacement ratio, which depends on the level of impact and quality of the impacted wetland, will be determined during the permitting phase of the project.

S36. Minimum setbacks from wetlands shall be maintained for all new development. Adequate vegetated buffers must be maintained or established for existing or new development. See Table 3 for additional information.

S37. Locate new trails well away from headcuts and ensure that runoff from existing and new trails is not concentrated into actively eroding areas. If a headcut is moving upslope or appears unstable, seek

consultation from an experienced and licensed landscape architect or civil engineer, in collaboration with a wetland ecologist, to evaluate and design a repair. Design must be as ecologically sensitive as possible and may include the use of biotechnical methods. Depending on the scale and location, methods used could include small willow walls, brush protection, and sloping the headcut with hand tools, protecting it with erosion control blanket, and replanting with willow sprigs and herbaceous vegetation.

S38. The spread of invasive plant populations in wetland habitats shall be prevented to the greatest extent feasible. See Chapter 5.8, Invasive Plant Species, for further information.

S39. Himalayan blackberry shall be removed in wetlands where opportunities to do so arise in conjunction with native plant restoration. See Table 2 for management guidelines for invasive plant species.

S40. High-priority wetland sites shall be monitored for extent of all non-native species, including pennyroyal and velvet grass (which are not listed as moderate or high priority for the property but are considered invasive in wetlands). If these are found to be increasing, remove by manual methods on an annual basis where they are encroaching on significant native plant populations. See Figure 4 to identify high-priority wetlands and Table 2 for management guidelines for invasive plant species.

5.7 SPECIAL-STATUS SPECIES

Existing natural communities on the Taylor Mountain property provide habitat for several special-status animal taxa and historically may have supported listed plant taxa. Special-status taxa are those listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS), NOAA's National Marine Fisheries Service (NOAA Fisheries Service), or California Department of Fish and Game (CDFG); taxa designated as candidates for listing; or any species of concern or local concern. In addition, the California Native Plant Society (CNPS) has compiled a list of plant species that are considered rare, threatened, or endangered. Consideration of these plants must be included during consultation with the regulatory agencies during project development.

5.7.1 Special-Status Plants

Several special-status plant taxa, while not found during focused surveys of the property, have recorded occurrences on or near Taylor Mountain. Two taxa are documented as occurring near the summit on adjacent private property to the east and south. These are fragrant fritillary (*Fritillaria liliacea*) and big-scale balsamroot (*Balsamorhiza macrolepis var. macrolepis*). Both of these taxa are listed by CNPS

as rare or endangered in California and elsewhere (List 1B.2). An additional 23 special-status plant taxa are considered to have moderate or high potential to occur on the property, given habitat types present and recorded occurrences in the region. Most of these special-status taxa occur in one of the following habitat types: freshwater marshes; vernal swales; serpentine habitat; and thin, rocky, often volcanic-derived soils. Several taxa occur in a variety of less specific grassland and woodland settings. All of these are habitats that occur on the Taylor Mountain property. See Appendix B, Ecological Resources Report (PCI 2011), for further information on these species.

Given the protected conservation status, property size, habitat diversity, and habitat quality of the Taylor Mountain property, reintroductions of rare or uncommon plant taxa that are likely to have occurred on the property in the past may be feasible and could contribute to the health of regional plant populations. The two taxa below are of particular interest because they are known to occur on Taylor Mountain adjacent to the park, but many other rare or uncommon taxa could also be considered for inclusion in restoration planting efforts.

Image 11. Fragrant fritillary.
PHOTO: AARON ARTHUR

Fragrant Fritillary

Fragrant fritillary is a bulb-forming perennial in the Liliaceae (Lily) family. It occurs in grasslands around the Bay Area, often on clay soils and sometimes on serpentine substrates (CDFG 2011). It has nodding white flowers that may or may not be fragrant. In addition to the sighting recorded on Taylor Mountain, several other occurrences are documented in and around nearby Annadel State Park. These occurrences are in the northern portion of the species' known range. They are located in grassland with a volcanic substrate or on the upper margins of vernal swales, in association with other native grassland species. All of these habitat types are present within the Taylor Mountain property. Some species found in association with fragrant fritillary in nearby occurrences include shooting star, sun cups, Greene's popcornflower, soaproot, marigold navarretia, and one-sided grass. Of these, all except marigold navarretia are known to occur on the Taylor Mountain property.

According to the CNPS Rare Plant Inventory, fragrant fritillary is threatened by livestock grazing, agriculture, urbanization, and competition from non-native plants (CNPS 2011). There are no published studies of the effects of grazing on this taxa, so details of its response to grazing by different livestock types or under different regimes are not known. The Taylor Mountain property offers an opportunity to protect potential habitat for fragrant fritillary, and to restore it to locations where it is likely to have occurred historically. Very little information on propagation or restoration of fragrant fritillary is available.

Big-Scale Balsamroot

Big-scale balsamroot is a perennial, taprooted herb in the Asteraceae (Aster or Sunflower) family that occurs in the foothills of the Sierras as well as in the eastern San Francisco Bay area (FNA 2011). It produces showy, sunflower type yellow

flowers. The two occurrences mapped on Taylor Mountain (on private property to the east) represent the only known occurrences in Sonoma County; they are located on the western edge of the species' known range (CNPS 2011). Those occurrences were found on basalt outcroppings in open grassland, associated with other native species, including California onion grass, soaproot, one-sided grass, mule's ears, barestem biscuitroot, and fairy mist. All of these species are known to occur on the Taylor Mountain property. In other areas, big-scale balsamroot has been found in chaparral and woodland, as well as grassland, and sometimes occurs on serpentine soils.

According to the CNPS Rare Plant Inventory, big-scale balsamroot is threatened by livestock grazing (CNPS 2011). The only documented occurrences of this species in Sonoma County, which were last reported in 1997, are on private land that is not dedicated for conservation. The protection of Taylor Mountain property offers an opportunity to protect potential habitat for big-scale balsamroot and to restore it to locations where it is likely to have occurred historically. Very little information on propagation or restoration of big-scale balsamroot is available. Undertaking a careful reintroduction effort also has potential to contribute to scientific understanding of conservation and management of both of these rare species.

Image 12. Big-scale balsamroot.
PHOTO: NEAL KRAMER

A. Special-Status Plant Objective

The following objective will contribute to conservation of the rare fragrant fritillary and big-scale balsamroot.

Special-Status Plant Objective. Investigate the possible reintroduction of special-status taxa to appropriate habitats on the Taylor Mountain property.

B. Special-Status Plant Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned special-status plants objective:

SPECIAL-STATUS PLANT GUIDELINES

G13. Local experts should be engaged (e.g., native plant scientists, graduate students, native plant nurseries, CNPS volunteers) in consideration, planning, and implementation of a special-status plant reintroduction effort. Many local native plant researchers and enthusiasts might welcome the opportunity to contribute to such an effort. See Chapter 10 for further information on volunteer stewardship opportunities.

G14. Sites for special-status plant reintroduction should be selected that match nearby occurrences in soils, hydrology, exposure, and associated species, and that are not likely to experience heavy foot traffic or livestock use.

G15. A detailed special-status plant reintroduction plan should be developed, which should include project goals, methods and locations for seed or bulblet collection, plans for direct seeding and/or propagation and container planting, weeding or other maintenance requirements, and monitoring methods. Methods to avoid impacts on donor populations and to support the genetic health of the introduced populations should also be addressed. See Chapter 5.11, Revegetation and Habitat Restoration, for further information.

SPECIAL-STATUS PLANT STANDARD

S41. CDFG and USFWS shall be consulted to discuss reintroduction, permitting requirements, and a review of the status of nearby special-status plant populations; see CDFG (1997).

5.7.2 Special-Status Animals

The Taylor Mountain property supports a healthy population of California red-legged frog (*Rana draytonii*), federally listed as threatened and a California Species of Special Concern. Several special-status bird species, such as the grasshopper sparrow (*Ammodramus savannarum*), utilize the property seasonally while others, such as the golden eagle (*Aquila chrysaetos*), may occur year-round. The property also supports potential habitat for Sonoma County's only native turtle, the western pond turtle (*Emys marmorata*), a California Species of Special Concern, and a number of special-status and common bat species.

California Red-Legged Frog

The California red-legged frog (CRLF) is federally listed as threatened by USFWS and is a California Species of Special Concern under the protection of CDFG. It is the largest native frog in the western U.S. and is most common in marshes, streams, lakes, reservoirs, ponds, and other water sources with plant cover. Breeding occurs in deep, slow-moving waters with dense shrubby or emergent vegetation from late November through April.

Aquatic sampling of the freshwater pond on the Taylor Mountain property occurred in May 2010. During a single survey, approximately 40 larvae were netted and 15 adults flushed from the shoreline, indicating a healthy breeding population. California red-legged frogs have also been observed within seasonal wetlands occurring adjacent to or within close proximity to the pond. Adjacent properties also support potential breeding ponds; however, no survey data for these features is available.

The decline of the California red-legged frog is attributed to multiple factors and varies by geographic location (USFWS 2002). Factors include widespread habitat changes through fragmentation, isolation of existing populations, degraded aquatic habitats, and the introduction of non-native predators such as American

bullfrog. Historically, within Sonoma County, California red-legged frogs may have been more widely distributed. Current reported sightings in the vicinity of Taylor Mountain are restricted to Annadel State Park and the headwaters of Copeland Creek, near Rohnert Park (CDFG 2011). The recent discovery of a breeding population on the Taylor Mountain property has important implications for understanding the overall population viability within the larger region. In addition to the presence of breeding habitat, the large expanse of upland habitat on the property and proximity to potential off-site breeding ponds is important for maintenance of a genetically diverse California red-legged frog population.

Many of the following objectives and strategies outlined for the California red-legged would also apply to other aquatic species utilizing the seasonal wetlands and freshwater pond on the Taylor Mountain property. These include amphibians, such as California newt, Sierran treefrog, and western toad, which may utilize seasonal wetlands and/or the freshwater pond for breeding and non-breeding habitat. Similarly, while there are no documented occurrences of western pond turtles utilizing the freshwater pond, the site provides excellent aquatic habitat for this species, and surrounding grasslands may also provide breeding habitat for turtles.

Image 13. *California red-legged frog.*
PHOTO: PCI

A. California Red-Legged Frog Objectives

The following objectives will help protect and maintain the population of California red-legged frog on the Taylor Mountain property. Many guidelines and standards already addressed elsewhere in this document would be applicable to the following objectives.

California Red-Legged Frog Objective 1. Protect existing California red-legged frog breeding, foraging, and migratory corridor habitat.

Protecting California red-legged frog breeding, foraging, and migratory habitat will help conserve the local population found within the watershed and surrounding lands. This includes protecting habitats within the property as well as allowing for contiguous habitats with adjacent parcels to allow for immigration and emigration and the maintenance of a genetically diverse population. In addition, proactively protecting California red-legged frog habitats and populations will help avoid expensive regulatory compliance liabilities and public concerns regarding the conservation of this special-status species. See Figure 4 for high-priority areas to minimize habitat fragmentation and preserve California red-legged frog migratory habitat. The most critical wetlands for California red-legged frog conservation include those to the west, southwest, and south of the pond, and the pond itself.

California Red-Legged Frog Objective 2. Protect individual California red-legged frogs during construction of park infrastructure, trail development, and on-going management.

Because the California red-legged frog is considered a special-status species, measures must be in place to protect both individual frogs and the habitats on which they depend. On the Taylor Mountain property, the potential to impact the species is high. Therefore, special precautionary measures should be in place to ensure impacts on this species are minimized or avoided.

California Red-Legged Frog Objective 3. Prevent the establishment of non-native predators and invasive plant species and manage existing predatory wildlife species.

Introduced American bullfrogs and warm water fish are leading contributors to the decline of California red-legged frog; however, other species may also play a role. The intentional introduction by humans of these non-native species into native habitats is a common occurrence. Invasive non-native plants may also change the suitability of aquatic habitats for frogs by altering habitat structure and water availability. Native wildlife, such as raccoons and skunks, can be problematic for California red-legged frogs and other native amphibians, especially at urban interfaces, where predatory animals adapted to humans can be abundant.

California Red-Legged Frog Objective 4. Protect California red-legged frog population from pathogens, parasites, and contaminants.

Amphibian populations worldwide have been experiencing significant declines. While there are many mechanisms involved, pathogens and chemical pollutants are thought to be contributing factors (Davidson et al. 2001). To protect the existing California red-legged frog population and native wildlife communities, measures to prevent the spread of disease and the introduction of chemical contaminants should be employed on the Taylor Mountain property.

California Red-Legged Frog Objective 5. Establish baseline population data, evaluate existing impacts, and monitor long-term trends for California red-legged frog on the property.

The presence of California red-legged frogs on the Taylor Mountain property is a recent discovery and important for understanding the overall population viability within the watershed and surrounding lands. Despite their presence, no baseline information exists on the population demographics and trends. In addition, the impacts of grazing on the population are not known.

B. California Red-Legged Frog and Other Herpetofauna Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned California red-legged frog objectives:

California Red-Legged Frog and Other Herpetofauna Guidelines

G16. Existing CRLF habitats should be monitored for establishment of introduced species, such as non-native American bullfrog, crayfish, warm water fishes, and invasive aquatic plants, and cattle usage and impacts. See Monitoring Tasks 8 and 11 in Table 4, and Chapter 5.13, Monitoring and Adaptive Management, for further information.

G17. A comprehensive monitoring program for California red-legged frog should be developed. This should include the collection of baseline information on the Taylor Mountain population size, age class, reproductive rates and survival, and relationship to potential off-site populations. As allowed, adjacent parcels should be evaluated to understand the overall population dynamics. Monitor trends, habitat conditions, and impacts from on-going grazing and recreational uses. The effects of grazing on wetland vegetation community structure and the effects of wetland community structure on California red-legged frog should be carefully monitored. See Chapter 5.13, Monitoring and Adaptive Management, for further information.

G18. A California red-legged frog adaptive management plan should be developed and implemented as necessary to allow for adjustments in park uses and/or livestock exclusion in known habitats and other areas with high potential for occurrence of frogs. This would include management guidelines to control/eradicate non-native species if they become established in the pond.

California red-legged frog and other herpetofauna standards

S42. CRLF and existing habitats shall be protected through appropriate trail development and decommissioning and seasonal trail closures in critical areas. See Chapter 5.6, Seasonal and Perennial Wetlands, standards to protect existing wetland habitats on the property. The most critical wetlands for California red-legged frog conservation include those to the west, southwest, and south of the pond, in addition to the pond itself.

S43. Prohibited use of the pond by visitors who go off designated trails shall be monitored. If heavy foot traffic is suspected or visitors are bringing dogs to the pond, especially during the breeding season, make adjustments in park use and/or access to this area. Monitoring could be accomplished through volunteer patrols and visual inspection of the pond and surrounding areas. Refer to Tables 4 and 5.

S44. New trails shall be sited at least 500' from the existing freshwater pond, and no new trails shall lead directly toward the pond. Exception: adaptive management.

S45. Educational signage shall be located along the western edge of the pond to inform visitors that go off designated trails about the importance of the habitat and why the pond is off limits to humans and dogs. Signage should not be visible from surrounding trails.

S46. Preconstruction biological surveys, installation of temporary exclusion fencing, and preconstruction trainings shall be completed prior to significant ground disturbance (i.e., grading, building, etc.). See S67-S71.

S47. CDFG and USFWS shall be consulted during project development to identify and implement any additional protection measures specific to this species. Implement such measures.

S48. A pathogen control policy shall be implemented to prevent the spread of pathogens and parasites that affect CRLF, such as chytrid fungus. See Chapter 5.10, Additional Biological Resource Protection, for more information.

S49. Vegetation removal (i.e. for fire fuel reduction) within 300' of the pond or riparian/wetland areas where California red-legged frog or herpetofauna are potentially present shall be conducted outside of sensitive herpetofauna dispersal periods (typically October 15 – April 15). See also G220 and S284-S286.

5.7.3 Special-status and Common Bat Species

The Taylor Mountain property supports a wide variety of habitats that provide critical foraging and roosting habitat for bats. There are approximately 20 bat species with known occurrences within California. Bats are highly mobile with many being migratory. Foraging habitats range from woodlands, forests, and grasslands to open waters. All of the local species are insectivorous and feed by echolocation. Bats use caves, mines, buildings, bridges, tree hollows, and other natural and man-made crevices for roosting. Worldwide, many bat species are experiencing population declines, primarily due to loss of habitat and human disturbance.

Image 14. Pallid bat.
PHOTO: GREG TATARIAN

Three bat species have reported occurrences within close proximity to the Taylor Mountain property (CDFG 2011). These include pallid bat, a special-status species, and hoary bat and fringed bat, identified as having moderate to high priority for conservation by the Western Bat Working Group, a local conservation organization comprised of agencies, organizations, and individuals. While focused surveys for bats have not been performed on the property, nocturnal observations, mist netting, or ultrasonic detection are sure to reveal a number of species utilizing the existing habitats or structures. Because bats are highly susceptible to disturbance, protecting existing populations and habitat is critical to those bat species that depend on Taylor Mountain and the native habitats it supports.

A. Bat Objectives

The following objectives will help protect and enhance special-status and common bat species potentially utilizing the Taylor Mountain property. Many guidelines and standards already addressed elsewhere in this document would be applicable to the following objectives.

Bat Objective 1. Protect existing bat populations and roosting habitat.

Bats are extremely susceptible to human disturbance, and primary contributing factors in the decline of many species are the direct and indirect actions of humans. For roosting bats, repeated disturbance, especially during hibernation and pupping can be detrimental to a population and can result in roost abandonment or even mortality. Because many bat species have strong site fidelity and strict roost requirements, protecting occupied roosts is critical for their survival. Special-status bats are also a protected resource, and precautionary measures must be in place to avoid or minimize impacts on these species.

Bat Objective 2. Protect and enhance bat foraging habitat and food resources.

Bats play a critical role in the health of our natural ecosystems and human economics. The primary food source for the approximately 20 species of bats found in California is night-flying insects, many of which are

agricultural pests. Bats forage over a wide range of habitats for their insect prey, from open grasslands and water sources to riparian woodlands. Providing a diverse array of habitats is critical for supporting the foraging needs of these animals. In addition, minimizing the use of chemical contaminants is also important for supporting the insects on which bats feed.

B. Bat Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned bat objectives:

BAT GUIDELINES

G19. To the extent practical, roosting habitat should be incorporated into the design of bridge crossings and/or alternative roost sites, such as bat boxes, should be provided. A qualified bat biologist should be consulted during the design phase to provide input on specific criteria (e.g., location, materials).

G20. If roosts are constructed, on-going monitoring should occur to determine if the target species have responded favorably and adjustments made as needed. See Monitoring Task 10 in Table 4, and Chapter 5.13, Monitoring and Adaptive Management, for further information.

G21. Existing livestock water troughs should be modified to increase accessibility and safety for bat species and new structures designed with wildlife in mind. This includes providing adequate escape structures, minimizing hazardous obstacles, proper placement, and water-level management. See Chapter 5.11, Revegetation and Habitat Restoration, for further information on water troughs.

BAT STANDARDS

S50. Preconstruction presence/negative finding bat surveys and preconstruction trainings shall be completed as stated in Chapter 5.10.2, Biological Surveys.

S51. If active roosts are identified on the property, appropriate avoidance measures shall be developed. Such measures may include postponing removal of trees, snags or structures until the end of the maternity roosting season, establishing buffers around roost sites, or construction of species appropriate replacement roosting habitat within, or adjacent to the proposed disturbance area. The location of these roosts must be carefully considered during the design and placement of trails, roads, lighting, and other site improvements.

S52. CDFG shall be consulted during project development to identify and implement any additional protection measures specific to special-status bats.

5.7.4 Special-status and Common Bird Species

The Taylor Mountain property supports a wide variety and abundance of bird species due in part to the diverse vegetation communities. Fifty species of birds were documented during wildlife surveys of the property (PCI 2011), although the actual number of species that utilize the property may be higher. The composition of bird species on the property varies by habitat and seasonality. Some species, such as western-scrub jay, house finch, and acorn woodpecker, may frequent the property year-round, while others, such as ash-throated flycatcher, Swainson's thrush, and orange-crowned warbler, are found only during the breeding season. While each species of bird that utilizes the property has unique habitat preferences and seasonal limitations, continuing to provide diverse, native plant communities will ensure avian wildlife have adequate food, shelter, and breeding habitat throughout their life stages.

Image 15. *Grasshopper sparrow.*
PHOTO: LISA HUG

A. Bird Objectives

The following objectives will help protect and maintain a diverse bird populations on the Taylor Mountain property. Many guidelines and standards already addressed elsewhere in this document would be applicable to the following objectives.

Bird Objective 1. Protect and enhance bird breeding, foraging, and migratory corridor habitat.

Bird species depend on a variety of habitat conditions and types for successful reproduction, foraging, and migration. Managing the Taylor

Mountain property to support intact native plant communities will provide habitat for a diversity of birds.

Bird Objective 2. Protect individual breeding birds during construction of park infrastructure, trail development, on-going park management, and general park use.

Nearly all birds breeding on the Taylor Mountain property are protected under both federal and state regulations. Under the federal Migratory Bird Treaty Act (MBTA), it is unlawful to take, kill, and/or possess migratory birds at any time or in any manner, unless the appropriate permits are obtained. Protections extend to active nests, eggs, and young birds still in the nest. Birds and their nests are also protected under the California Fish and Game Code. Most bird species, with a few specific exceptions, are protected under the MBTA and California Fish and Game Code. Heron and egret rookeries are also protected under the above-mentioned regulations, and, while not formally listed, CDFG considers rookeries to be a sensitive resource. In addition, several other species, such as grasshopper sparrow and golden eagle, are designated as special-status and afforded additional protection measures.

Bird Objective 3. Establish baseline population data, evaluate existing impacts, and monitor long-term trends for birds utilizing the property.

Establishing a long-term monitoring program of birds utilizing the property is essential for understanding relative abundance and population trends. Bird monitoring is relatively accessible when compared to other species monitoring. There is also a large network of local experts, many of them volunteers, who can assist with the efforts. The information gathered from this program will inform future management and restoration efforts.

B. Bird Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned bird objectives:

Bird Guidelines

G22. Bird nesting boxes should be installed in open grasslands along educational trails. These serve as a great opportunity for park visitors to learn about the nesting behavior of our local birds. If nesting boxes are installed, they will need to be properly secured and sized to prevent non-native species from colonizing them; they will also require yearly maintenance.

G23. Non-native birds and feral cats that pose a threat to native birds should be monitored and managed. See Chapter 5.9, Invasive Animal Species, for further information.

G24. A comprehensive monitoring program for birds should be developed. This should include the collection of baseline information on bird species relative abundance, species composition, habitat use, population size, and breeding status. Standardized area searches and point count protocols should be used for spatial and temporal comparisons (Ralph et al. 1993). Monitoring efforts should include focal species identified in habitat conservation plans by California Partners in Flight; see CPIF 2000; CPIF 2002; and RHJV 2004. See Chapter 5.13, Monitoring and Adaptive Management, Monitoring Task 9 in Table 4, and Table 5 for further information.

G25. An adaptive management plan should be developed as necessary to allow for adjustments in park uses, management, and/or enhancement of appropriate habitats if negative impacts on birds are detected.

BIRD STANDARDS

S53. Birds shall be protected through appropriate site development within native habitats. See Chapters 5.2 through 5.6 for habitat protection and enhancement guidelines and standards to benefit birds.

S54. Preconstruction breeding bird surveys shall be completed as stated in Chapter 5.10.2, Biological Surveys.

S55. Dogs off leash and off trail shall be prohibited. Post such signs at all park entrances. Educate the trail-user community in park stewardship and initiate volunteer trail patrols to monitor off leash and off trail dogs. Exception: if a permitted fenced off-leash dog park is developed.

S56. CDFG and USFWS shall be consulted during project development regarding additional protection measures specific to breeding birds.

5.8 INVASIVE PLANT SPECIES

Non-native plant species that are capable of spreading quickly into the natural landscape can have substantial effects on the habitats they invade. Invasive plant species, which typically thrive in disturbed settings, can outcompete natives to create large monotypic stands with low species diversity. Consequences can include disruptions to native wildlife, loss of quality forage for livestock, and increased fire hazards. Many invasive plant species are currently established on the Taylor Mountain property. See Figure 4 for high-priority invasive species removal locations. Also see Figure 8 in Appendix B, Ecological Resources Report (PCI 2011) for a more detailed map of all known invasive species populations based on 2010 and 2011 field surveys.

5.8.1 Invasive Plant Prevention

A. Invasive Plant Prevention Objective

Prevent the establishment and spread of invasive plant species on the Taylor Mountain property. Invasive species, by definition, typically grow, spread, and/or reproduce rapidly, making control very difficult once they have arrived in a landscape. Preventing their arrival or establishment is generally desirable.

B. Invasive Plant Species Preventative Guidelines and Standards

Following the guidelines and standards below will help prevent invasive plant establishment and spread on the Taylor Mountain property.

INVASIVE PLANT SPECIES PREVENTATIVE GUIDELINES

G26. Ground-alteration activities should be minimized, especially in high-quality habitats. Tilling, disking, digging, and removal of plant cover provide ideal conditions for most invasive species to establish.

G27. Weed seed introduction from livestock feed brought into the site should be minimized. Livestock feed is commonly contaminated with weed seeds and can easily result in the introduction of invasive species. The following guidelines will help minimize risks of weed seed introduction due to livestock operations:

- Inspect hay shipments visually for evidence of invasive grassland species such as yellow starthistle.
- Use certified weed-free hay if it is available locally at a cost similar to non-certified hay. The California Department of Food and Agriculture's Interior Pest Exclusion Program (http://www.cdfa.ca.gov/plant/pe/InteriorExclusion/), provides information on sources of weed-free feed.

- When feeding hay, limit the hay to selected areas and periodically check around feeding areas for signs of invasive plants.
- If new infestations of invasive plants are found where supplemental feed is located, treat them promptly; see Table 2.

G28. Staff and park volunteers should be trained to recognize invasive species and report new infestations promptly. Hikers, livestock lessees, staff and/or volunteer patrollers can serve as valuable eyes on the landscape to spot new infestations. Many resources are available for learning to identify invasive species, including:

- The California Invasive Plant Council (www.cal-ipc.org)
- CalWeedMapper (http://calweedmapper.calflora.org/maps/)
- CalFlora (www.calflora.org/)

INVASIVE PLANT SPECIES PREVENTIVE STANDARDS

S57. When ground alteration occurs, revegetate promptly with an appropriate suite of native species. Among species native to the habitat type, consider including natives that grow rapidly, and/or those that have growth habits and seasonal timing similar to the invaders, to help suppress invasive populations.

S58. All seed, straw, mulch, or other plant material brought onto the site for revegetation, landscaping, or erosion control purposes shall be weed-free to the extent possible.

S59. The introduction of weed seed from other sites into the Taylor Mountain property via vehicle tires and undercarriages shall be prevented as much as possible. Vehicles used in weed-infested off-road settings (e.g., vehicles used for maintenance activities) must be cleaned to the extent possible before entering uncontaminated areas.

S60. Only species native to Sonoma County shall be used for restoration, landscaping, and erosion control. Plants and seeds should be of local provenance if possible – from the Sonoma Mountains or adjacent areas with similar environmental conditions.

5.8.2 Invasive Plant Management

Management of existing populations of invasive plant species on the Taylor Mountain property may entail a strategy of control or one of complete eradication. Complete eradication is only likely to be feasible for isolated, small infestations.

The primary tools for invasive species management on the Taylor Mountain property include restoration of robust, invasion-resistant native habitat; manual

Image 16. Non-native Italian thistle.
PHOTO: PCI

or mechanical removal; managed livestock grazing; mowing; prescribed fire; and herbicide application. Each method has advantages and disadvantages. The appropriate strategy for any particular infestation will depend on the acreage involved, the management goals, and resources available. Often, using a combination of strategies will be most effective.

Native habitat restoration and invasive species control are two interconnected goals; accomplishing either one will facilitate the other. Replanting native species, in conjunction with weed removal around plantings, can be very effective in some cases. For example, establishing a dense, varied planting of native woodland species in a disturbed ruderal grassland area can eventually suppress understory invasives like yellow starthistle. However, establishing new plantings of native species takes time and funding, and will not necessarily eliminate invasive species populations.

Manual removal of invasives is generally safe, effective, and focused in its effects, but it can be extremely labor intensive and is best suited to small infestations. Volunteers of many ages can be trained to recognize and remove invasives by hand or with weed wrenches. This kind of work can also incorporate education of the public about invasive and native plants.

Livestock grazing, mowing, and prescribed burning are essentially three ways of introducing or imitating a disturbance regime in hopes of reducing the competitiveness of certain species. These can all be useful for large-scale efforts, but they may also require intensive management or infrastructure, and it is not always easy to focus on target species. Year-round cattle grazing already occurs on the property, so the use of targeted grazing may be feasible but may require frequent movement of animals and/or fencing; see Chapter 6, Grazing, for further information. Mowing can be costly, especially on uneven terrain. Prescribed burning has potential to treat large areas cost effectively, but it may be challenging to implement in settings like Taylor Mountain where protection of public safety, air quality, and buildings is important.

Herbicide application can be effective and relatively inexpensive but carries risks of contamination to soil, water supplies, and non-target organisms. See standards for herbicide use below.

Table 2 summarizes key invasive plant species mapped in 2010 and 2011 [see Figure 8 of Appendix B, Ecological Resources Report (PCI 2011)]. These are ranked as high- or moderate-priority for management. These rankings are based in part on listings by the California Invasive Plant Council (Cal-IPC) but are also based on the species' potential for natural resource impacts, spread, and opportunities for effective control on the Taylor Mountain property in particular. For instance, while Cal-IPC lists distaff thistle as moderately invasive, it is listed here as high-priority because it currently occurs in limited locations on the property, and control may be possible if undertaken promptly. Distaff thistle can outcompete native grassland vegetation, especially in disturbed settings, and can injure livestock with its stiff spines. On the other hand, a number of species listed by Cal-IPC as moderately invasive are not shown in this table because they are very widespread on the property, and management is unlikely to be practical. These include many of the

European annual grasses that dominate the annual grassland on the property (e.g., wild oats and barleys).

For high- and medium-priority species with currently limited occurrences on the property, eradication may be possible and, if so, is likely to be much more efficient than control attempts later when the species may have spread extensively. For high- and medium-priority species with extensive occurrences already on the property, control is likely to be a more realistic goal — preventing the further spread and/or reducing the existing infestation. Strategies for invasive control provided here are based on information from Cal-IPC (Bossard et al. 2000, available online); see that reference for additional details.

In addition to the species listed in Table 2, 57 other plant species have been found on the property that are considered invasive to varying degrees by Cal-IPC. Over time, the list of invasive species of greatest concern on the property is likely to change and should be reviewed periodically by land managers.

A. Invasive Plant Management Objective

Control the spread of invasive plant populations and eradicate target species on the Taylor Mountain property.

B. Invasive Plant Management Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned invasive plant objectives. See Table 2 for species-specific methods of management.

Invasive Plant Management Guidelines

G29. High- and medium-priority species with currently limited occurrences on the property should be eradicated. See Figure 4 for location and Table 2 for removal information.

G30. High- and medium-priority species with extensive occurrences already on the property should be controlled. See Figure 4 for location and Table 2 for removal infomation.

G31. When complete eradication or control of high- and medium-priority species is not immediately achievable, highest priority for management efforts of those species should be given to new infestations, plants at the edge of an existing infestation, or infestations within high-quality native habitat In large patches, work from the edges inward. Develop detailed control strategies for each invasive plant, based on its life history, physiology and proposed control method.

G32. Results of invasive species removal efforts should be monitored annually to assess effectiveness and identify follow-up needs. See Chapter 5.13, Monitoring and Adaptive Management, for further information.

G33. The map of invasive species on the property should be updated annually. See Figure 8 of Appendix B, Ecological Resources Report (PCI 2011), which identifies locations of invasive species populations in 2010 and 2011.

INVASIVE PLANT MANAGEMENT STANDARDS

S61. The use of herbicides shall be limited to spot treatments of high-priority infestations For more information, see Figure 4, and Figure 8 of the Ecological Resources Report (PCI 2011).

S62. A licensed Pest Control Advisor shall be consulted for specifications regarding use and application of herbicides.

S63. During removal of invasive plants, damage to existing native plants shall be avoided as much as possible, since, if left intact, native plants may help suppress the invasive species. Repeat treatments may be required from some species.

S64. After removal, disturbed sites shall be planted or seeded with genetically-appropriate robust native species as promptly as possible to protect soil and facilitate establishment of native competitors. Remove all invasive plant material with any potential to germinate (e.g., seeds, rhizomes, stem fragments for stoloniferous species) and burn or dispose of offsite.

S65. Management of invasive species shall be implemented as described in Table 2.

Invasive Plant Species Management			
Name	**Distribution on Taylor Mountain**	**Life Form**	**Management Guidelines** For herbicide specifications and implementation, consult with a licensed pest control advisor (PCA).
High Priority			
Distaff thistle *Carthamus lanatus*	Limited; disturbed grasslands.	Herbaceous annuals	ERADICATE. Occurs in a limited number of areas currently but has potential to spread. Hand pull or cut below ground level in spring as soon as it is identifiable.
Purple starthistle *Centaurea calcitrapa*	Common; disturbed grasslands, trails, roads.		CONTROL. For small infestations, cut plants at least two inches below the soil surface early in the growing season, as soon as it is identifiable. For large infestations, herbicide use may be appropriate. Prevent new infestations by limiting ground disturbance. One large infestation occurs near the interim access parking area. Control of this infestation, which is in a relatively high-use area, could help reduce spread further into the park.
Yellow starthistle *Centaurea solstitialis*	Common; grasslands.		CONTROL. Spot treatment of small infestations with herbicide can help prevent spread. For larger areas of particular concern, possible methods include prescribed fire in early summer, early spring mowing (when flowering has just begun), and/or intensive grazing by sheep, goats, or cattle in May-June (bolting stage).
Medusahead *Taeniatherum caput-medusae*	Common; grasslands.		CONTROL. Intensive livestock grazing in mid-spring, fall mowing to reduce thatch, and/or late spring burning may help control medusahead.
Pampas grass *Cortaderia jubata*	Limited; historic dairy area.	Perennial grass	ERADICATE. In spring, dig out individual plants by hand or with machinery where feasible. Chainsaw or weed whip may be used to remove foliage to make crown removal easier. Remove entire crown and upper roots from site to prevent resprouting. Remove or burn any inflorescences.
Klamath weed *Hypericum perforatum*	Limited; mapped in only two locations, grassland.	Perennial rhizomatous herb	ERADICATE. Only two small infestations currently known on the property. Remove by hand, including rhizomes and stolons. Use gloves to avoid skin irritation. Dispose off-site.
Fennel *Foeniculum vulgare*	Limited; historic dairy area.	Perennial, taprooted	ERADICATE. Removal could occur in conjunction with site development and restoration. Dig out plants, including root crown. Dispose off-site. Herbicide application in early spring may also be effective.

Table 2. Invasive Plant Species Management.

Table continued over page

Invasive Plant Species Management			
Name	**Distribution on Taylor Mountain**	**Life Form**	**Management Guidelines** For herbicide specifications and implementation, consult with a licensed pest control advisor (PCA).
French broom *Genista monspessulana*	Common; Kawana Springs Resort area, along creek, and scattered locations in grassland and woodland.	Evergreen shrub	CONTROL. Prioritize removal near the Kawana Springs Resort area, along Colgan Creek, as well as small, isolated infestations. For small infestations, pull by hand or with weed wrench. Minimize ground disturbance. For larger infestations, repeated mowing or brush cutting and/or herbicide application to mature plants can be effective. To control the many seedlings that may appear after removal of mature plants, using a propane torch to overheat (not ignite) the seedlings can be effective. If no developing seeds are present, pulled plants can be left on site; otherwise, dispose off-site.
Scotch broom *Cytisus scoparius*	Limited; grasslands and woodland.		ERADICATE. Only two occurrences have been mapped on the property. Pull these by hand or with weed wrench. Minimize ground disturbance. If no developing seeds are present, pulled plants can be left on site; otherwise, dispose off-site.
Himalayan blackberry *Rubus armeniacus*	Common; moist grasslands/wetlands.		CONTROL. Manage in locations where it appears to be spreading or is reducing habitat values (e.g., streambanks). Small infestations may be dug out by hand. For large infestations, use of machinery and/or herbicides may be appropriate. If cuttings were made before seed set, debris may be left in piles for wildlife habitat or chipped; otherwise, remove from site.
English ivy *Hedera helix*	Limited; Kawana Springs Resort area.	Perennial, evergreen woody vine	CONTROL. Prioritize removal of plants growing in native trees around Kawana Springs Resort area. Pull plants up from the ground and down from trees if possible. For larger vines in trees, cut through the vine near the base of the tree to kill the upper portions. Dig out the roots to prevent resprouting. Dispose off-site.
Periwinkle *Vinca major*	Limited; Kawana Springs Resort area, riparian areas.	Perennial stoloniferous vine	CONTROL. Control could occur in conjunction with site development and restoration. Hand removal for small patches or around sensitive native riparian plants. Work inward from the perimeter of patches, pulling periwinkle back in on itself to prevent further spread of the weed between removal sessions. Dispose off-site. Cutting with a weed whip and then applying herbicide may also be effective.

Table continued over page

Invasive Plant Species Management			
Name	**Distribution on Taylor Mountain**	**Life Form**	**Management Guidelines** For herbicide specifications and implementation, consult with a licensed pest control advisor (PCA).
Moderate Priority			
Black mustard *Brassica nigra*	Limited; historic dairy area.	Herbaceous annuals	CONTROL. Control could occur in conjunction with site development and restoration. Black mustard typically occurs in disturbed ground and may decline naturally over time if disturbance is removed. Establish native perennial species to shade out or outcompete mustard.
Italian thistle *Carduus pycnocephalus*	Common; grasslands.		CONTROL. Hand pulling can be used for small infestations if root can be removed. Efforts will need to be repeated annually to exhaust seed bank.
Milk thistle *Silybum marianum*	Common; disturbed grasslands, especially where cattle loaf .		CONTROL. Tends to occur in disturbed, nutrient-enriched soil such as cattle loafing sites. If possible, reduce soil disturbance, establish perennial native species, and remove milk thistle seedlings by hand. Herbicide application to young seedlings may also be effective.
Blue gum *Eucalyptus globulus*	Limited; one planted grove south of the Kawana Springs Resort area.	Tree	CONTROL. Remove seedlings and allow grove to senesce naturally. Monitor to ensure that it is not spreading. Replace with appropriate natives. Removed plants can be chipped for use on pathways.

5.9 INVASIVE ANIMAL SPECIES

Like plants, invasive animal species can have deleterious effects on native wildlife. Non-native animals displace native species, compete with and consume native wildlife, carry diseases, change the food web by displacing or destroying native food sources, and reduce biodiversity. Currently, invasive wildlife species on the Taylor Mountain property do not appear to be a significant problem. However, without proper management and monitoring, problematic species can become quickly established and pervasive. The Taylor Mountain property supports a small population of non-native wild turkeys. While the effects of turkeys on native wildlife are unknown, this opportunistic omnivore could pose a threat to native wildlife (CDFG 2004). Although they have not yet been observed on Taylor Mountain, introduction of bullfrogs could be devastating for the property's California red-legged frog population. Feral pigs and cats and several introduced bird species (e.g., house sparrow, European starling, Eurasian collared dove, brown-headed cowbirds) are either present on the property or increasing in numbers in the local area. While many of the bird species are ubiquitous across the county and difficult to control, more recent introductions (e.g., Eurasian collared dove) and larger species of animals (e.g., feral pigs and cats) may be able to be managed effectively.

A. Invasive Animal Species Objective

Prevent the establishment and control existing populations of non-native animal species on the Taylor Mountain property.

B. Invasive Animal Species Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned invasive animal objectives.

INVASIVE ANIMAL GUIDELINES

G34. Establishment of new invasive animals and changes in population size of existing populations should be monitored. See Chapter 5.13, Monitoring and Adaptive Management, for further information.

G35. Wild turkey populations should be monitored. If their numbers increase in size, and adverse effects on native wildlife are observed, engage in management activities and participate in any local management program if one becomes established.

G36. The presence of feral pigs should be monitored. Implement an aggressive eradication program if they begin to colonize the property.

G37. Aquatic habitats should be monitored for the establishment of non-native American bullfrog, crayfish, warm water fishes, and invasive

aquatic plants. If a non-native aquatic species becomes established, develop and implement a management plan, including physical removal of problem species.

G38. The presence of feral cats on the property and intentional feeding by local residents should be monitored. If they become a problem, they should be managed via removal and/or a visitor education campaign.

G39. The presence of non-native birds such as European starling and house sparrow should be monitored. If breeding is suspected, nests site can be modified or eliminated to discourage use, especially near the old resort. These species are not protected like most native bird species.

G40. Visitors should be educated about the importance of keeping the property free of non-native animal and plant species, avoiding accidental or intentional feeding of wildlife that may attract predators, intentional introductions, and general habitat protection measures.

5.10 ADDITIONAL BIOLOGICAL RESOURCE PROTECTION

In addition to the guidelines and standards provided in the previous sections, there are additional guidelines and standards specific to setbacks, biological surveys, and contaminant and pathogen control to follow in order to meet resource management goals and objectives. These standards apply to both site development and on-going management of the property.

5.10.1 Setbacks

Table 3 shows minimum vegetated buffer widths from typical park uses; these recommendations are designed to preserve the ecological process of the habitats and do not necessary reflect existing local policies. Exact buffer widths needed to provide benefits to natural resources will vary with the site conditions. Generally, the wider the buffer, the greater the protection provided to natural resources. The standards in Table 3 provide for a balance between maximizing resource protection and accommodating park uses. For instance, in a park setting, visitors will want to visit and explore special habitats regardless of formal trail placement, and requiring very wide setbacks for trails from creeks could lead to informal trail creation. Informal trail creation could in turn have greater impacts on habitat than carefully-planned formal trails closer to the creek.

SETBACK GUIDELINE

G41. A qualified ecologist should be consulted if park uses are proposed within the buffers stated in Table 3.

SETBACK STANDARDS

S66. To protect existing riparian, wetland, and native grassland habitats, minimum setback standards should be adhered to as feasible. Table 3 shows recommended minimum vegetated buffer widths from typical park uses.

5.10.2 Biological Surveys

The Taylor Mountain property supports a number of sensitive resources including several special-status species and common wildlife. Many of these species are protected by state and federal regulations. The following survey standards include those that would to be needed to comply with these regulations, but are not necessary comprehensive, for site development and on-going management of the property. As identified in the previous guidelines and standards, federal, state, and local resource agencies should be consulted to determine the extent of biological protection measures necessary on the Taylor Mountain property.

Setback Standards			
Habitat Type	**Proposed Development Intensity**	**Minimum Vegetated Buffer**	**Rationale**
Wetland/ Riparian (from top of bank)	Low-Medium: Trails, individual benches or picnic tables	50’	Allows space for natural creek/wetland adjustment Reduces erosion into creek/wetland Allows for natural regeneration of native vegetation and maintenance of creek shading Helps maintain terrestrial biodiversity and migration corridors for wildlife
	High: Parking, camping, group picnic areas, buildings	100’	Increases water quality protection (sediment and nutrient removal) Allows for greater natural regeneration of trees and greater vegetative diversity Protects against potential changes to temperature and hydrology Improved connectivity between aquatic and upland habitats and more effective wildlife corridors
Native Grassland	Low-Medium: Trails, individual benches or picnic tables	25’	Reduces likelihood of infestation by invasive species Allows for natural regeneration
	High: Parking, camping, group picnic areas, buildings	50’	Protects against potential changes to hydrology, sun/shade exposure Protects from associated foot traffic

Table 3. Setback Standards.

BIOLOGICAL SURVEY STANDARDS

S67. **Preconstruction training.** Before construction of infrastructure projects (i.e., buildings, parking areas, etc.) begins, a qualified biologist shall conduct a training session for all construction crew personnel. The training must include a discussion of the sensitive biological resources within the property and the potential presence of special-status species. This must include a discussion of special-status species' habitats, protection measures to ensure species are not impacted by project activities, project boundaries, and biological conditions outlined in the project permits.

S68. **Preconstruction surveys for bird nests.** Work on infrastructure projects and on-going park management activities (i.e., trail clearing, vegetation removal, mowing), shall occur outside of the critical breeding bird period (mid-March through mid-August) as much as possible. If activities must occur during this period, work areas must be surveyed by a qualified biologist prior to commencing. Surveys would be required for all human-related ground disturbance activities in natural habitats and vegetation trimming and removal. Since birds can also nest on man-made structures, such as buildings and barns, surveys of these areas would also be required prior to disturbance. For on-going park management, trained park staff would be qualified to complete the surveys. If active nests or behavior indicative of nesting are encountered, those areas plus a 50' buffer for small songbirds and 250' buffer for larger birds (e.g., owls, raptors) designated by the biologist must be avoided until the nests have been vacated. If the works areas are left unattended for more than one week following the initial surveys, additional surveys must be completed.

S69. **Preconstruction surveys for special-status species.** Prior to significant ground disturbance (i.e., grading, building, etc.) within native grassland, wetland, forest and woodlands, and riparian habitats, a preconstruction survey (on the day preceding work and/or ahead of the construction crew) shall be performed by a qualified biologist to ensure no California red-legged frogs and other potential special-status species are occupying the area. If a California red-legged frog or other special-status species is observed within the work area or immediate surroundings, these areas must be avoided until the animal(s) has (have) vacated the area, and/or, upon approval by the regulatory agencies, the animal(s) must be relocated out of the area by a qualified biologist.

S70. **Preconstruction surveys for bats.** Prior to disturbance of any habitats or structures potentially supporting bat roosts,

comprehensive presence/negative finding surveys shall be completed by a qualified bat biologist. These would include surveys of any trees subject to removal and demolition or retrofit of existing buildings and/or bridges. Because each individual bat species may use different roosts seasonally and from night to day, surveys must be conducted by a qualified bat biologist at the appropriate times.

S71. **Exclusionary fencing.** During construction of infrastructure projects (i.e., buildings, parking areas, etc.), temporary wildlife exclusionary fencing (e.g., silt fence, which is a piece of synthetic filter fabric [also called geotextile]) shall be installed around work areas. Openings would be restricted to areas of construction site access. This fencing will preclude animals from entering the work area and prevent construction debris and workers from entering adjacent aquatic habitats. Fencing should have one-way escape routes to allow animals to exit the work area and prevent them from re-entering the site.

5.10.3 Contaminant and Pathogen Control

In an effort to contain chemicals and minimize the spread of pathogens both within the property and from outside areas, the following guidelines and standards should be followed. See also Chapter 5.4, Forests and Woodlands.

CONTAMINANT AND PATHOGEN CONTROL GUIDELINES

G42. **SOD - education.** Park visitors should be educated via trailhead and other interpretive signs about the importance of preventing the spread of pathogens and use of preventative measures. Signage should be included at major trailheads, at a minimum, explaining that Sudden Oak Death (SOD) occurs on the property, showing typical symptoms and explaining that it can be spread by park users, especially in wet winters, during rainy and windy weather. This may be based on existing public educational materials such as those developed by the California Oak Mortality Task Force (COMTF; COMTF 2008). Request that park visitors:

- Park in designated parking areas.
- Stay on established trails and respect trail closures.
- Avoid transporting SOD on shoes, bicycles, and the feet of pet dogs and horses. Before visiting and after leaving the property, ask visitors to clean up and disinfect at home by removing mud from shoes using brushes and then spray shoes with a 10% bleach solution.

G43. **SOD - access limitations.** Access to areas that appear to be diseased should be controlled to the extent feasible, especially in wet, muddy conditions. This could be accomplished with signage, brush fences, or other physical barrier. Closure areas would need to be identified and closed by park staff.

CONTAMINANT AND PATHOGEN CONTROL STANDARDS

S72. **SOD - staff training.** Park staff shall be trained about SOD host species and disease transmission pathways and shall implement Best Management Practices to the extent possible to prevent the spread of SOD, such as:

- Equipment shall be cleaned after working in forest and woodland habitats, including chainsaws, boots, and truck tires (spray with a 10% bleach solution or other disinfectant, then rinse).
- Oak pruning shall be avoided or minimized in wet weather.
- Work in forest and woodlands shall be performed in the dry season instead of the wet season when spores are being produced and infections are starting.
- Potentially infected downed trees shall be left on site instead of transporting the material to an uninfected area. Where infection is already known to be present, leaving P. ramorum-infected or killed trees on site has not been shown to increase the risk of infection to adjacent trees (COMTF 2008). Removal from the property is only recommended if it is the first infected tree to be detected in the area, if fire risk is high, or for aesthetic or other reasons. If infected material is removed from site, dispose of at an approved and permitted dump facility within the quarantine zone encompassing the 14-county infected quarantine zone.
- If necessary to reduce safety or fire hazards, infected trees can be cut, branches chipped, and wood split. Avoid working in wet weather. Clean equipment after work is completed. Do not leave firewood and chips in an area where they might be transported to an uninfected location.

S73. **SOD - nursery stock.** Before purchasing any nursery stock for restoration plantings, it shall be confirmed that the nursery follows current Best Management Practices for preventing the spread of SOD (consult the California Oak Mortality Task Force, www.suddenoakdeath.org, for current standards). Inspect all plant materials for symptoms of SOD before accepting them from a nursery; do not bring any plants with suspected SOD symptoms onto the property.

S74. **Pesticides and herbicides.** Pesticides and herbicides shall be used only for spot treatment of high-priority invasive plant infestations, and shall be used with caution to prevent contaminated runoff. This is particularly important for all road and ditch maintenance activities completed by park staff or other county crews.

S75. **Hazardous materials BMPs.** Employ Best Management Practices for staging, maintenance, fueling, and spill containment of all potentially hazardous materials used on site.

5.11 REVEGETATION AND HABITAT RESTORATION

There are many possible approaches to habitat restoration. Revegetation is often the primary tool for restoration of habitat quality, and a restoration plan sometimes consists of revegetation alone. However, carefully selecting the origin and genetics of the plant material used for revegetation efforts and collecting seeds and plants is an important component of this. Other actions to improve habitat function, such as placement or maintenance of structures beneficial to wildlife, should also be considered when planning a restoration effort.

5.11.1 Restoration Plan Objective

Restore habitat quality on Taylor Mountain.

5.11.2 Restoration Plan Components

Restoration efforts, including revegetation, often entail substantial investment of resources. Thorough planning by qualified staff or contractors will increase the likelihood that those investments pay off. Revegetation planning should begin with site assessment and overall project planning, including identification of:

- General restoration goals.
- Funding or other resources available for the project.
- Site conditions such as slope, terrain, microclimate, soils, moisture availability and other potential revegetation constraints (e.g., invasive species, potential for herbivory or trampling, irrigation options, etc.).
- Potential for natural native plant regeneration (which may make a revegetation effort unnecessary).
- Vegetation community in adjacent areas, on-site currently and historically, or at a similar reference site, to determine appropriate native species composition, distribution, and plant density.
- Sources of local seed and/or planting stock.
- Permitting or resource protection needs for implementation of the project.

The revegetation plan itself will typically include a statement of project goals and/or restoration target; site planting design; species, plant counts, and propagule

types; seed or plant collection/propagation plans, as appropriate; site preparation and soil treatments; planting methods; plant protection (e.g., fencing, tree shelters, weed mats); irrigation; monitoring plan, including success criteria and remedial actions; maintenance needs; and schedule of work. Appendix A provides a detailed discussion of each of these elements.

5.11.3 Origin and Genetics of Plant Material for Revegetation

The origin and genetics of plant material used for revegetation on the property can have important effects on the success of such efforts, on the genetic variation of local plant populations, and on the broader ecological community (Rogers and Montalvo 2004, Center for Natural Lands Management 2004). All native plant revegetation efforts on the property should consider the sources of plant material, whether that material is purchased as seed or container plants, or are propagules collected on-site.

Two important considerations in native plant revegetation are conserving the natural genetic diversity within local populations, and maintaining adaptations of local populations. Genetic diversity enables populations to survive and adapt to varying environmental conditions. When collecting acorns for an oak planting effort, for example, seed should be collected from many individual trees rather than from just a few prolific trees, to increase the chances that genetic diversity in the planted population will help it survive the variety of environmental challenges it may face. Local adaptations can help a population of a widespread species thrive in specific settings. For instance, a number of the native perennial grass species that occur on Taylor Mountain also occur across California—but selecting seed from Sonoma County, rather than sources in distant parts of the state, is more likely to provide seed and plants that thrive in our local climate conditions.

Guidelines for genetic considerations in selecting plant material cannot readily be boiled down to simple rules. How locally seed should be sourced, for example, will vary by species of interest, its typical levels of within- or between-population variation seed sources available, site conditions at the project location, and other factors. Also, ecologists' understanding of genetic considerations in habitat restoration is still developing. Changing climate adds another layer of complexity to these considerations. The reintroduction of rare plants entails additional genetic considerations (Falk and Holsinger 1991, Falk et al. 1996). The following guidelines provide general guidance for selecting plant material for the Taylor Mountain property.

REVEGETATION GUIDELINES

G44. A native plant restoration expert should be consulted to plan revegetation efforts.

G45. Land managers should stay apprised of research on conservation and restoration genetics as it relates to key species on Taylor Mountain.

5.11.4 Seed and Plant Collection

In many cases, it will be practical and appropriate to collect seed for revegetation projects on the Taylor Mountain site itself. Collecting on-site addresses many of the concerns described above. Seed can then be planted directly (as with some tree species, although survival rates tend to be lower than with container-grown plants), sent to a local native plant nursery for propagation and later outplanting (for many tree, shrub and herbaceous perennial species), or may be sent to a growing facility where a small amount of seed can be increased over one or more growing seasons (as with grass and forb species). However, collecting native seed on-site can be time-consuming for some species, depends on annual variations in natural seed production, and may require significant advance planning (e.g., up to 18 months). For local seed collection, consider the guidelines below.

SEED AND PLANT COLLECTION GUIDELINES

G46. When selecting seed or other plant materials, the following should be considered:

- How much is the target species known to vary among populations? If this is not known, consider the species' geographic distribution, reproductive strategies, dispersal modes, and habitat variation for clues.
- How can natural genetic diversity, and/or potential local adaptations, be captured in the seed collection?
- Does the seed source match the revegetation site in terms of variables such as soils, elevation, climate, and exposure? What range of environmental tolerances is likely to be valuable at the revegetation site over time?
- For purchased materials, how might nursery practices affect genetic diversity? For example, are plants propagated from cuttings or seed? Have they been selected for specific horticultural traits, or collected from a variety of healthy wild individuals?
- How locally should the species of interest be collected? Can it be collected from within the property? If not, is the watershed, county, or region a reasonable source?

G47. A qualified native plant nursery should be retained to plan and implement a seed collection and propagation program that takes into account genetic diversity and the protection of native populations.

G48. Seeds and propagules to be planted on Taylor Mountain should be collected from the property or the local watersheds, with exceptions being made only after review by a qualified restoration ecologist with an understanding of native plant genetics.

G49. Collection of weed seed should be avoided to the extent feasible.

G50. Unless the donor population will be lost to development, propagule collection should not impact health and vigor of the donor populations. Typically, collecting no more than 5% of the seed available is recommended.

G51. To capture genetic diversity, propagules should be collected from many individual plants. Avoid unintentionally biasing the collection. Select donor plants randomly from among healthy plants, spaced throughout the population. If possible, collect seed at several points during the season, including early-, mid-, and late-ripening seed.

G52. Checks should be made during collection to ensure that seed collected is fully developed and likely to be viable. For small seeds, this may be done by dissecting a sample of seed. Larger seeds may be tested to see whether they float.

G53. Propagules should be stored at temperature, moisture, and air circulation conditions appropriate for each species.

G54. Collection locations should be mapped using GPS for future reference.

5.11.5 Wildlife Habitat Enhancement

An important component of any revegetation and habitat restoration plan is to take into consideration the needs of local wildlife. Trying to recreate the natural setting in which these species survive will provide the greatest benefit. In addition to restoration, the simple, on-going land management practices outlined in the guidelines and standard below can also improve habitat conditions for birds, mammals, reptiles, amphibians, and beneficial insects.

Wildlife Habitat Enhancement Guidelines

Following the guidelines and standard below will improve habitat conditions for wildlife species utilizing the property.

G55. For revegetation efforts, a mixture of plant types (i.e., shrubs, vines, perennials, and herbaceous species as well as trees) appropriate to the habitat should be included. The maintenance of structurally diverse habitats is especially important for birds.

G56. Decaying and dying trees, limbs, snags, and debris piles for wildlife habitat, and other downed wood within the stream channels and upland habitats should be retained, unless they pose a threat to public safety, including fire. If a downed trees crosses over a trail, cut

and move to the side. These features are fundamental ingredients of both terrestrial and aquatic ecosystems.

G57. Brush piles or large downed limbs should be used around native plantings as a browse protection method which will also provide course woody material for upland wildlife species.

G58. Bat and bird nesting boxes should be installed in appropriate locations. See G19 and G22, for further information.

WILDLIFE HABITAT ENHANCEMENT STANDARD

S76. To minimize impacts on wildlife, non-critical fencing shall be removed.

5.12 CLIMATE CHANGE

Climate change is an important factor to consider in planning management of Taylor Mountain's natural resources. Emissions of greenhouse gases have already caused average temperatures in the U.S. to increase by 1.5° F, leading to more intense heat waves, stronger storms, and more frequent and severe droughts (PEW 2011). Within California, most predictions are for slight declines in precipitation overall, but with more intense storms during a shorter rainy period and a longer, hotter dry season, resulting in both more droughts and more floods (Karl et al. 2009). In coastal California, fog patterns—an important element of Sonoma County's climate—may also change with altered ocean conditions, but the direction of that change is not yet clear (Bakun 1990; Johnstone and Dawson 2010).

These climate changes are expected to influence many ecological variables relevant to Taylor Mountain, from the geographic ranges of species, plant phenology, and species interactions, to stream flows, frequencies of wildfire, insect outbreaks, and disease outbreaks. Exactly how these variables will change at the local scale is unknown. For further discussion of climate change's effects as they relate to Taylor Mountain, see Appendix B, Ecological Resources Report.

In the face of rapid but uncertain change, an important conservation strategy is to manage for healthy ecosystem function so that the environment can retain maximum ability to adapt. Protecting the habitats and ecological processes described earlier in this document will become even more valuable over time. Limiting non-climate stresses, such as invasive species spread and habitat fragmentation, will also be increasingly important—and more locally manageable than climate changes.

A. Climate Change Objectives

Three key resources that may help allow natural systems to adjust to climate stresses are habitat connectivity, water resources, and biodiversity. In addition, adaptive management of the property will be necessary to address

future changes. Many guidelines and standards useful for coping with climate change are also addressed elsewhere in this document.

Climate Change Objective 1. Preserve and enhance habitat connectivity.

The protected lands on the Taylor Mountain property may provide valuable niches for species shifting upslope from surrounding unprotected lands. Conserving habitats across environmental gradients such as elevation may help allow for localized shifts within the property (Hansen and Biringer 2003). Riparian woodlands along Colgan Creek and other smaller channels are especially valuable, as these habitats are naturally resilient, provide thermal refugia for wildlife, and already serve as corridors for wildlife movement (Seavy et al. 2009).

Climate Change Objective 2. Protect water resources.

Taylor Mountain flora and fauna may experience increased water stress from increasing temperatures and more volatile precipitation regimes as the climate changes. For local amphibians, such as the California red-legged frog, the drying of breeding ponds earlier in the season would ultimately affect breeding success and overall survival. Restoring or conserving summer streamflow will help regulate water temperature and support instream and wetland habitat diversity.

Climate Change Objective 3. Protect Taylor Mountain's native biodiversity at all scales, from the genetic level to the landscape level.

Genetic diversity is an essential resource for plant and animal populations in a changing environment, increasing the chances that a population can adapt to new conditions over time. At the species level, diversity of plants and wildlife can contribute to ecosystem resilience to stresses such as climate change (Loreau et al. 2001, Dukes 2002, Hansen and Biringer 2003).

Climate Change Objective 4. Manage adaptively and collaboratively.

Given the many uncertainties about how climate change will continue to unfold, coping with climate change will necessarily require ongoing learning and adjustment of management approaches. Because climate-driven changes encompass lands beyond the property boundaries, working with other local landowners and resource agencies to address management issues collaboratively will also be more important than ever (Hansen and Biringer 2003).

B. Climate Change Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned objectives.

CLIMATE CHANGE GUIDELINES

G59. A variety of topographic locations for each habitat type should be protected to provide potential opportunities for species to shift in elevation in response to climate change.

G60. Robust native plant communities should be maintained on slopes and in wetlands to help maximize infiltration of rainfall and reduce overland flow.

G61. When restoration plantings are undertaken, collection of seed from within the local watershed but across a range of elevations and hydrologic settings should be considered to help increase the likelihood of long-term success in changing climate regimes (Seavy et al. 2009).

G62. The natural variety of plant functional groups (e.g., annual and perennial grasses, early- and late-season forbs) in each native plant community should be maintained or restored. Restoration efforts should typically include a diverse assemblage of appropriate species, rather than just one or two focal species.

G63. Changes in Taylor Mountain's habitat types and extents over time should be monitored. This may include the use of aerial imagery, on-the-ground mapping for limited habitats, and monitoring of regeneration for key species such as oaks.

G64. Staff should be supported in staying informed of current research on climate changes, ecosystem impacts, and emerging tools such as assisted migration of species, restoration genetics, and the use of prescribed burning to reduce the impact of changing wildfire regimes.

G65. Regional natural resource management efforts should be engaged in for developing and refining approaches to cope with climate change on the property.

CLIMATE CHANGE STANDARDS

S77. Habitat fragmentation shall be minimized and connectivity between different community types shall be provided by strategically placing road and trail development. See G123, G125, S97 and S138.

S78. Water quality, quantity, and streamflow patterns shall be protected by providing adequate riparian buffers and minimizing instream disturbances from humans and livestock. Restore natural processes where previous alterations have occurred. See Table 3 for additional information.

S79. Management strategies shall be reviewed as climate conditions change, or on a 5- to 10-year basis, to determine what adjustments are needed to continue to protect natural resources as effectively as possible.

5.13 MONITORING AND ADAPTIVE MANAGEMENT

Like all natural systems, the Taylor Mountain landscape will change over time. Effective long-term natural resource management of the property will require observing and understanding those changes, and making decisions about how to adjust management strategies accordingly. Monitoring can provide information on the impacts of park use, the effectiveness of restoration or protection efforts, and the local effects of larger ecological changes. Adaptive management will also entail staying informed of current research on relevant resource management issues and methods.

While there are countless interesting natural resource variables that could be monitored and analyzed on Taylor Mountain, Table 4 identifies the monitoring guidelines that will provide the most useful information to property managers. The monitoring tasks will need to be refined and prioritized based on which strategies are implemented and the availability of resources. Schedules, success criteria and/or action thresholds are included where appropriate. Table 5 provides an annual timeline for monitoring activities.

A. Monitoring and Adaptive Management Objective

Monitor park use and natural community changes present on the Taylor Mountain property and adjust management strategies as needed.

B. Monitoring and Adaptive Management Guideline

MONITORING AND ADAPTIVE MANAGEMENT GUIDELINE

G66. Monitor park use and natural community changes present on the Taylor Mountain property. Refer to Table 4, Monitoring Tasks for Natural Resource Management on the Taylor Mountain Property, and Table 5, Timeline for Long-Term Monitoring of Natural Resources on the Taylor Mountain Property.

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Monitoring Task Table

Focus	Monitoring Task	Questions to Address	Methods	Frequency and Season (See Table 5)	Using the Information Gathered	Notes
Habitats and Native Plants	1. Areal extent of sensitive habitats	Are sensitive habitats (valley needlegrass grassland, wildflower fields, wetlands, white oak woodland) changing in extent over time?	Mapping with GIS, using a combination of on-the-ground work and aerial image interpretation. Use data collected by WRA in 2010 as baseline.	Every 5 years; spring or summer	If sensitive habitats are shrinking, follow with analysis of possible causes (e.g. park user impacts, climate change, natural succession) and ways to address or adapt to the change.	Monitoring the changes in plant species composition is also important.
	2. Large-scale habitat changes using aerial imagery	Is the extent or distribution of native habitats (oak woodland, native grassland, forest and woodlands, wetlands, riparian habitats) present on the property changing over time?	GIS mapping and aerial image interpretation.	As new aerial imagery is available, or approximately every 5 to 10 years	If native habitat types are declining in extent, follow with analysis of possible causes (e.g. park user impacts, climate change, natural succession) and ways to address or adapt to the change.	
	3. Natural regeneration of key plant species	Are key species, including native oaks, regenerating?	Counts of trees by age/size class in selected areas in and adjacent to mature oak canopy, and/or mapping of areas with and without young trees. Comparison of areas on the basis of factors such as high and low grazing pressure, high and low native species dominance, may be useful.	Every 5 years	If natural regeneration is low, follow with analysis of possible causes (e.g., short- and long-term weather patterns, livestock grazing, park user impacts, surrounding vegetation) and develop strategies to improve regeneration.	
	4. Success of revegetation efforts	Are revegetation efforts successful? If not, what changes are needed to restoration methods?	As appropriate to the restoration effort: survival counts, plant health and growth assessments, photo monitoring, and species composition assessments.	Annually for 5 or more years after planting.	If success is low, follow with analysis of possible causes (e.g., herbivory, drought stress, inappropriate species selection) and adjust maintenance as needed (e.g., additional plant protection, irrigation, replanting).	
Pathogens and Invasive Plants	5. Symptoms of SOD and other pathogens	Is SOD spreading on the property?	GIS mapping of trees with symptoms of SOD. Laboratory analysis of some samples may also be desirable to confirm P. ramorum as cause.	Every 5 years	If SOD infection is spreading, consider stronger sanitation practices and/or seasonal trail closures.	
	6. Invasive plant populations	Are existing infestations changing in extent? Are new invasive species present on the property?	Mapping with GIS, using data collected by WRA in 2010 as a baseline, and on-the ground assessments.	Annual; spring and/or summer during appropriate blooming period for target species	If existing populations change or new ones are discovered, develop control strategies and/or continue monitoring.	
	7. Invasive plant control methods	Are control efforts working? Are managed infestations changing in extent?	Mapping with GIS, using data collected by WRA in 2010 as a baseline. In addition, more focused monitoring may be valuable for specific treatment locations to see how density, abundance, and plant community composition has changed with control efforts.	Annual; spring and/or summer	If control efforts have not been effective, test new methods or consider whether to discontinue efforts. For new infestations, develop new control strategies based on best available information.	

Table 4. Monitoring Tasks

Table continued over page

Monitoring Task Table						
Focus	**Monitoring Task**	**Questions to Address**	**Methods**	**Frequency and Season (See Table 5)**	**Using the Information Gathered**	**Notes**
Native Wildlife	8. California red-legged frog (CRLF) population trends	Is the CRLF population on the property changing? If so, do changes relate to park use or management?	Collect baseline data on the Taylor Mountain population size, age class, reproductive rates and survival, and relationship to potential off-site populations. As allowed, evaluate adjacent parcels to understand overall population dynamics. Monitor trends, habitat conditions, and impacts from ongoing grazing and recreational uses. Assess effects of grazing on wetland vegetation structure.	Annual; visual adult and egg mass surveys during breeding season; one spring dip-net survey for larvae; photo monitoring	If negative impacts are detected, develop a CRLF adaptive management plan to allow for adjustments in park uses and/or livestock exclusion in known habitats and other areas with high potential for occurrence of frogs.	Non-listed amphibians can also be monitored simultaneously. Collaborate with SSU, other research facilities, or volunteer biologists. Actual collection of CRLF will require permits from USFWS and CDFG and approval of monitoring components requiring handling of individuals. After 5 years, monitoring should be evaluated to determine what additional efforts are needed and duration.
	9. Bird population trends	Are bird populations on the property changing? If so, do changes relate to park use or management?	Collect baseline information on bird species relative abundance, species composition, habitat use, population size, and breeding status. Standardized area searches and point count protocols should be used for spatial and temporal comparisons (Ralph et al. 1993). Monitoring efforts should include focal species identified in habitat conservation plans by California Partners in Flight; see CPIF 2000; CPIF 2002; and RHJV 2004.	Annual; at least 4 times per year with at least 2 surveys occurring during the breeding season. Sampling locations should include at least 2 stations in each habitat type present on the property.	As necessary, develop an adaptive management plan to allow for adjustments in park uses, maintenance, and/or enhancement of appropriate habitats if negative impacts on birds are detected.	Collaborate with PRBO Conservation Science or volunteer organizations like Madrone Adubon Society. Property should be included in the annual Christmas Bird County and on-going (through 2015) Breeding Bird Atlas update by Madrone Audubon Society.
	10. Success of bat mitigation efforts	Are bat mitigation efforts successful?	Visual surveys of on-site mitigation roosts.	Annual	Mitigation roosts would be considered successful if they become occupied and the population persists. If mitigation roosts are unsuccessful, follow with analysis of possible causes and adjust location and configuration as needed.	Only required if bats are impacted during project implementation.
Invasive Wildlife	11. Invasive aquatic animal populations	Are invasive aquatic animals becoming established on the property?	Visual surveys of the freshwater pond and all wetlands and streams on the property. Focus on American bullfrog.	Twice annually in June and July	Remove bullfrog egg masses if observed during twice-annual surveys. Develop and implement a management plan, including physical removal of problem species if established.	
	12. Invasive terrestrial animal populations	Are invasive animals becoming established (e.g., feral pig, feral cats) or abundant (e.g., wild turkey) on the property?	Visual surveys of all habitats on the property.	Annual; as appropriate, in conjunction with other monitoring efforts	Participate in any local management program if one becomes available and/or develop eradication program.	

Table 4. Monitoring Tasks (continued)

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Monitoring Task Table

Focus	Monitoring Task	Questions to Address	Methods	Frequency and Season (See Table 5)	Using the Information Gathered	Notes
Erosion, Grazing, and Park Use Effects	13. Channel headcut monitoring at stream crossings, wetland edges, and in grasslands and forests	Is the headcut moving upstream? Is it threatening the integrity of a trail crossing or a wetland immediately upstream? Is it likely to erode a grassland swale or forested hillslope?	Document all headcuts of concern on the property - highest priority are headcuts at downstream edges of wetlands. Install markers (stakes) on the bank at the location of the top of the headcut. Visually survey headcut using repeat photography or tracking form. Upland headcuts should also be evaluated on a regular basis.	Annually beofre and after rainy season, less frequently for headcuts of lesser concern	If headcuts appear to be moving upstream and are threatening important resources, seek professional consultation on design and installation of an appropriate repair.	
	14. Livestock grazing effects	Is forage quality being sustained over time? In native-dominated habitats, is grazing intensity appropriate to maintain native plant cover and minimize erosion?	Ongoing: Informal observation by rancher and staff of residual dry matter levels and noxious weed levels. Annually: Formal monitoring of plant cover and composition in selected native grassland patches, with comparison to reference grasslands with low livestock usage. Perform monitoring for wetlands and riparian areas receiving livestock use. Annual monitoring may be discontinued or focus changed after patterns have been discerned.	Ongoing (informal) and annual (formal)	If grazing-tolerant or grazing-resistant species (e.g., non-native thistles) are increasing over time, consider reducing grazing intensity or adjusting timing. If native plant cover is declining in grazed grasslands compared to grasslands with low grazing levels, consider adjusting intensity or timing of grazing.	Also see natural regeneration monitoring of key plant species (Monitoring Task #3).
	15. Impact of park features and public use on natural resources	Are trails and park uses such as dog-walking, mountain biking, and hiking affecting natural resources?	Natural resource monitoring will depend on site development and extent of use and will need to be determined on an on-going basis. Methods will vary by impact but may include erosion assessments, plant community composition monitoring, wildlife monitoring, and volunteer patrols. For example, to assess dog impacts see monitoring guidelines specific to CRLF and birds; to assess biking and hiking impacts see wildlife, plant community, and erosion monitoring guidelines.	As needed, in conjunction with other monitoring efforts and during patrols. Ongoing monitoring will be needed to evaluate the direct impacts of trail use, such as off leash dogs and mountain bikes, on natural resources.	Changes to trail configurations and allowable uses, and targeted/additional enforcement may be needed if negative impacts are determined.	

Table 4. Monitoring Tasks (continued)

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Focus	Monitoring Task	Frequency of Monitoring	Month (Shaded months show window within which monitoring should occur.)											
			Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Habitats and Native Plants	Areal extent of sensitive habitats	Every 5 years			■	■	■	■	■	■				
	Large-scale habitat changes	Every 5 to 10 years												
	Natural regeneration of key plant species	Every 5 years						■	■	■				
	Success of revegetation efforts	Annual; for 5 years of more after planting						■	■	■				
Pathogens and Invasive Plants	Symptoms of SOD and other pathogens	Every 5 years						■	■	■				
	Invasive plant populations	Annual; during appropriate blooming period for target species			■	■	■	■	■					
	Invasive plant control methods	Annual			■	■	■	■	■					
Native Wildlife	California red-legged frog population trends	Annual; adult and egg mass surveys - 2 to 4 week intervals from December thru March; larval survey - once in May or June; evaluate after 5 years	■	■	■		■	■						■
	Bird population trends	Annual; at least 4 times per year with at least 2 surveys occurring during the breeding season.	■			■		■				■		
	Success of bat mitigation efforts	Annual; as appropriate to determine mitigation success												
Invasive Wildlife	Invasive aquatic animal populations	Annual; June and July						■	■					
	Invasive terrestrial animal populations	Annual; in conjunction with other monitoring efforts	■	■	■	■	■	■	■	■	■	■	■	■
Erosion, Grazing, and Park Use Effects	Channel headcut monitoring at stream crossings, wetland edges, and in grasslands and forests	Annual; before and after rainy season					■					■		
	Livestock grazing effects	Ongoing; annual				■	■	■	■					
	Impact of park features and public use on natural resources	Annual; in conjunction with other monitoring efforts and during patrols	■	■	■	■	■	■	■	■	■	■	■	■

Table 5. Timeline for Long-Term Monitoring of Natural Resources.

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PHOTO: LISA BUSH

6. Grazing

6. GRAZING

6.1 INTRODUCTION AND BACKGROUND

A. Relationship to Other Master Plan Sections

This chapter provides specific recommendations for conducting a livestock grazing program on Taylor Mountain. As discussed in Chapter 5, grazing can benefit grassland habitat and native wildlife communities, and reduces fire fuels, but can also have damaging effects on oak regeneration, erosion and water quality, and other natural resources if timing, intensity, livestock species and other factors are not appropriate to meet resource objectives. The following recommendations are designed to provide a beneficial disturbance regime to Taylor Mountain's grassland habitats and allow historic livestock use and local food production to continue, while addressing the potential negative effects of grazing. Disturbance is an important factor that influences the structure of ecological systems and is essential to maintaining species diversity (Cushman 2007).

B. Need for Continued Grazing

While past livestock grazing by unsustainable herds in the late 1880s was likely a factor in the loss of some native California grassland plant species, today, its vital ecological role in maintaining species diversity in California's grasslands is widely acknowledged by scientists (Marty 2004; Hayes and Holl 2003) and is among the principal reasons that livestock grazing should continue at Taylor Mountain.

Continued livestock grazing is recommended to preserve the open grasslands[1] on Taylor Mountain and prevent their conversion to shrublands, to manage fire fuels at the urban/rural interface, and to help prevent development of a thick and persistent thatch layer which can decrease plant diversity and interfere with habitat for some wildlife species.

Preservation of Grassland Habitats. California grasslands have suffered great losses from development and conversion to other habitat types. In ungrazed grasslands in the Coast Range of California, shrub invasion can result in vegetation type conversion, and thus, loss of the grassland plant and animal species. The native shrub coyote brush (*Baccharis pilularis*) is the primary invader, and grazing significantly reduces growth of coyote brush in open grasslands (Johnson and Cushman 2007; Ford and Hayes 2007; McBride 1974). However, coyote brush does not appear to be a problem on this particular site. Significant grassland acreage has been lost to shrub invasion within the Bay Area in areas where grazing has been removed. Although some coyote brush growth may be desirable for wildlife habitat, dense shrub cover not only causes loss of grassland habitat, but

1 Approximately 50% or 565 acres (land with 0% to 50% tree canopy) of over 1,100 acres.

increases fuel loading. McBride (1974) found that 51 years after grazing was removed from the Berkeley hills, coyote brush density had increased dramatically.

Management of Fuel Loading. In a study of seven San Francisco Bay Area open space sites, Russell and McBride (2003) found that increases in shrub-dominated communities and decreases in grassland since the 1940s and 1950s have increased the probability of high intensity fires. During this time, fire has been generally excluded, and grazing pressure has been reduced.

The heightened fire hazard is caused by the great increase of surface biomass in shrublands as compared with grasslands and oak woodlands, with a surface biomass in the coyote brush shrublands of more than 10 times greater than grasslands and more than five times greater than oak woodlands. In addition to greater fuel loading, study results indicated the greatest average flame length and fire-line intensity for shrublands.

Russell and McBride (2003) state that these changes suggest a dramatic increase in fire hazard in Bay Area open spaces due to the succession from grasslands to coyote brush shrublands and that "in the context of the landscape matrix as a whole, this increased hazard indicates a greater possibility of fire being spread into adjacent forested areas and residential communities."

Prevention of Thatch Accumulation. Dominance of Taylor Mountain grasslands by non-native annual grasses poses the risk of developing a thick thatch layer if grazing is removed. Thatch is the dead, herbaceous biomass that accumulates on the ground surface in ungrazed annual-dominated grasslands. Negative effects of thatch development include prevention of germination and growth of some grassland plants, development of a medusahead (*Taeniatherum caput-medusae*) monoculture[2], and interference with some wildlife species including grassland birds (DiGaudio 2010).

Medusahead is one of the most noxious plants that occurs in significant quantities on Taylor Mountain, where it forms dense stands. It is only palatable to livestock in early vegetative stages. It is a threat to native plants because it is an aggressive competitor that easily smothers other less competitive plants.

Medusahead's highly competitive nature stems from rapid fall germination and aggressive winter root growth, prolific seed output, and production of large quantities of high-silica litter, which forms a dense mat and decomposes slowly. It is a litterphile, and is specifically adapted to germinating and growing in its own thick litter patches that build up and smother other herbaceous plants, especially in the absence of grazing or fire. Unlike most other grassland species, medusahead is capable of germinating

2 Medusahead increases in the absence of grazing. (Dr. James Bartolome, personal communication 2011).

in the dense thatch layer that it produces, even if seeds are not in direct contact with soil.

Maintenance of Native Wildflower Fields. As mentioned above, thatch development can prevent the germination and growth of some native grassland plants. Small-statured, annual wildflowers need open areas in the grassland canopy to germinate and grow. Moderate grazing exposes small areas of soil within which this can occur. Disturbance and removal of thatch is essential to germination and growth of some native forb species including popcornflowers (*Plagiobothrys spp.*), clovers (*Trifolium spp.*), cream cups (*Platystemon californicus*), water chickweed (*Montia fontana*) and some species of *Castilleja* (Hayes 2006), all of which occur at Taylor Mountain.

Maintenance of Grassland Bird Habitat. Livestock grazing has been shown to heavily influence vegetation composition and structure characteristics that affect grassland bird communities (DiGaudio 2010). In a Sonoma County study that compared nearby grazed and ungrazed sites, DiGaudio's study showed that the grazed site[3] supported significantly higher species richness, species diversity, and relative abundance of grassland birds than did the ungrazed site. Study results suggest that livestock grazing may benefit certain grassland birds, whereas the long-term cessation of livestock grazing may be detrimental to grassland birds.

A six-year study by University of California Berkeley faculty and graduate students on East Bay grassland sites under light to moderate cattle grazing and repeated rotational sheep grazing has shown the presence of horned

3 The grazed site was heavily grazed for many years.

Image 17. Medusahead thatch in ungrazed exclosure.
PHOTO: LISA BUSH

larks to be significantly and positively associated with livestock grazing. It has also shown that grasshopper sparrows, which have been documented at Taylor Mountain, are more likely to be found where there are livestock grazing and native bunch grasses. Grasshopper sparrows are also associated with greater vegetation height variability (Dr. James Bartolome personal communication 2010).

Management of California Red-legged Frog Habitat. Although overgrazing has been identified by the United States Fish and Wildlife Service (USFWS) as a threat to the California red-legged frog (*Rana draytonii*), findings since it was listed as threatened in 1996 have concluded that managed livestock grazing at low to moderate levels has a neutral or beneficial effect on frog habitat. Managed livestock grazing around ponds can maintain a mix of open water habitat and emergent vegetation. In some cases, without managed grazing, stock ponds would quickly fill with emergent vegetation resulting in habitat loss. In some locations, fencing which had excluded livestock from ponds is being removed to improve habitat for red-legged frogs (USFWS 2006). Chapter 5.7.2 contains further information regarding the California red-legged frog.

6.2 EXISTING CONDITIONS RELATED TO GRAZING

A. Methods

This description of existing conditions related to the grazing operation at Taylor Mountain is based on field visits made on April 29 and May 31, 2010, and April 23, August 3, and November 15, 2011 and conversations with Jeff Jones, the Taylor Mountain grazing tenant. Field visits were conducted on foot and covered all areas of Taylor Mountain except the interiors of dense woodlands.

B. Existing Grazing Operation

The existing grazing operation consists of a year-round cow-calf beef operation on the former Russell and Nunes portions of Taylor Mountain. The former Matteri property has not been grazed for years and the former Bath-Watt property has been grazed occasionally but is not part of the current grazing operation. Jeff Jones keeps a herd of 45 to 60 mother cows on Taylor Mountain all year. The cows are bred by bulls that are on-site in winter and spring, and calving takes place August through October. Cattle receive no supplemental feed, and consume only the vegetation that naturally grows on Taylor Mountain.

Cattle are herded on horseback into the corral adjacent to the interim staging area near the Sonoma County Water Agency water tanks when they need to be gathered for veterinary treatments, branding, and loading. The calves are typically sold in July, when forage dries up and before the next calving cycle begins. At a stocking rate of 45 to 60 cows on 944 acres

(Russell and Nunes properties), the density of cattle at any one time is relatively low. The ratio of mother cows to acres is between 1:16 and 1:22; however, cattle do not spend much time in the densely wooded areas where forage is sparse or on steep hills. Although forage is adequate for the herd size, animals are poorly distributed throughout Taylor Mountain due the poor condition of the grazing infrastructure, topographic constraints, and behavior patterns. Grazing is heaviest in the southwestern part of Taylor Mountain where water sources are most prevalent and topography is gentle. Far eastern, southern, and northern parts of Taylor Mountain, including the former Nunes property, receive less grazing pressure, as do small pockets of grassland scattered within the woodlands.

C. Existing Grazing Infrastructure

Existing Fencing. There is no functional cross fencing on Taylor Mountain, but over 14 miles of boundary fencing separates Taylor Mountain from neighboring properties. Fencing along portions of the eastern boundary are in good condition, but virtually all of the remaining boundary fencing is in very poor condition, with posts rotting or falling over and large gaps in barbed wire. Hikers trespassing onto the adjacent property have stretched fence wires open to allow their access and there are numerous other occurrences along the boundary where people have twisted fence wires open. Boundary fencing is not currently adequate to securely contain cattle. Downed trees have also compromised fencing in numerous locations.

Image 18. *Boundary fence in need of replacement.*
PHOTO: LISA BUSH

Image 19. *Boundary fence in good condition.*
PHOTO: LISA BUSH

Corral. The corral adjacent to the interim staging area is functional and adequate for the needs of the current livestock operation.

Livestock Water System. The water system consists of nine spring-fed concrete water troughs that were constructed in the 1950s on the former Russell Property, and one spring-fed trough on the former Nunes Property (Jeff Jones personal communication 2009). Each spring was developed with a cylindrical concrete spring box and metal pipe, but many of the spring boxes and pipes have become clogged with sediment and are not currently functional. Refer to Figure 5 for trough locations.

At many of the trough locations, old metal pipes have been replaced with PVC that regularly breaks, rendering them useless until they can be repaired. During Spring 2010 site visits, only three troughs were functional.

There are no water troughs in the southern part of Taylor Mountain, which limits livestock distribution and there are no water troughs on the former Matteri or Bath-Watt sites, although there is a water tank on the former Matteri property.

Forage Quality and Quantity. Forage quality and quantity varies within Taylor Mountain according to slope, aspect, soils, and other factors. Herbaceous vegetation includes many palatable, high-quality forage plants, but is seriously degraded by the presence of medusahead. Production of herbaceous vegetation is moderate to good throughout most of Taylor Mountain, but the fact that medusahead, and other low-palatability species, make up a significant component of the grassland flora reduces the amount of available forage.

Image 20. Typical water trough in need of repair.
PHOTO: LISA BUSH

Image 21. Uncovered spring box.
PHOTO: LISA BUSH

The Soil Survey, Sonoma County (USDA 1972) provides estimates of forage production for the different soil map units in the soil survey. Preliminary evaluation of soil survey information, and field observations indicate that forage resources at Taylor Mountain are adequate to support the current stocking rate that ranges from 45 to 60 animal units year-round (see Section 6.3.C for more detail). 2010 was an extremely good forage production year due to the well-distributed and abundant rainfall. Even in years with much lower rainfall, forage production would likely be adequate to support the lower end of this stocking rate.

The current grazing regime results in a grassland structure, with varied heights and densities of herbaceous plants, which provides better habitat for many grassland bird and wildlife species than vegetation with a more uniform structure.

D. Observed Livestock Effects on Wetlands, Riparian Areas, Water Quality and Erosion

Cattle trampling is evident in most of the Taylor Mountain wetlands, especially wetlands that are associated with livestock water troughs. Whether or not these impacts have detrimental, beneficial, or neutral effects on wetland resources is unknown.

Generally, observed cattle impacts on riparian areas are minimal, due to the fact that most of the drainages are steep-sided and rocky, making cattle access difficult.

The only apparent signs of cattle-induced erosion are localized patches of surface erosion from wetland trampling. These areas are relatively small, and generally on gentle topography. No large gullies or active landslides were observed, though there are several small headcuts in the grasslands.

6.3 GUIDELINES AND STANDARDS FOR ONGOING GRAZING MANAGEMENT

Grazing is a complex ecosystem process that can have both beneficial and detrimental effects on resources. In addition to consumption of vegetation by herbivores, grazing has ancillary effects including trampling and redistribution of nutrients.

Grazing is influenced by many variables including timing and intensity, animal species, and animal distribution, which is largely dependant on location of infrastructure such as fencing and water sources.

This section provides recommendations for an ongoing Taylor Mountain grazing program including achieving vegetation targets, such as desired grassland structure and condition resulting from grazing, the grazing system, stocking rate, animal species, infrastructure improvements, and ways to avoid or minimize potential negative effects of grazing.

A. Residual Dry Matter and Grassland Structure Targets

Background. Residual dry matter (RDM) is the dry, herbaceous biomass remaining on the ground at the end of the grazing season, usually measured in October, and before fall rains begin. Retaining an appropriate level of RDM serves several purposes. Adequate RDM minimizes early season erosion from rain splash, provides favorable conditions for seed germination, and has been shown to affect future years forage production and species composition on annual rangelands. Excess RDM (thatch) can decrease grassland biodiversity and can inhibit germination and growth of forbs, including native species.

Generally, a moderate level of grazing should be maintained unless specific resources call for more or less intensive use. Rangeland researchers have defined and quantified "moderate grazing:" Clawson et al. (1982) found that too much RDM results in thatch, which inhibits early response of new forage growth, and that maintenance of seeded annual legumes and filaree (*Erodium spp.*) abundance[4] requires adequate but lower amounts of RDM than grass forages.

A moderate level of grazing, resulting in an appropriate level of RDM, should be maintained to ensure continued high forage production and grassland species diversity. For practical purposes, this means that significant bare or heavily grazed areas should not occur as this level of disturbance encourages invasion by thistles and other unpalatable noxious weeds, and that excessive lightly grazed areas should also be avoided to prevent thatch buildup, which is detrimental to early season forage production and maintenance of important forbs such as clovers and native wildflowers.

Recommended RDM. University of California researchers have established minimum RDM standards for different grassland types and climatic regions based on these attributes. Published standards (Bartolome et al. 2002) and professional judgment were used to determine a target RDM level of 1,200 pounds per acre for Taylor Mountain. This RDM level is considerably higher than the minimum level recommended by Bartolome et al. (2002) for annual grassland and hardwood range for this region. However, concern about soil erosion, aesthetics, and the fact that Taylor Mountain supports native perennial as well as annual grasslands, were the basis for increasing the recommended minimum RDM level for Taylor Mountain. Areas treated with targeted grazing for weed management may have RDM as low as several hundred pounds per acre in treatment years.

Low RDM in a single year is not apt to cause significant, lasting negative effects on forage resources, plant species composition, or other features. However, RDM below the recommended minimum level in two or more consecutive years should be avoided by destocking or supplemental feeding.

Image 22. Unpalatable medusahead plants.
PHOTO: LISA BUSH

Image 23. Cattle crossing on rocky creek bed causes minimal impact.
PHOTO: LISA BUSH

4 This indicates that excessive RDM can have a negative effect on some forb species.

Structural Variability in Grasslands. Patchiness rather than uniformity in grass height and RDM provides structural heterogeneity in grasslands, supporting a diversity of plant and animal life. Moderate, extensive grazing generally results in this desired patchiness.

RESIDUAL DRY MATTER AND GRASSLAND STRUCTURE GUIDELINES

G67. An average RDM level of approximately 1,200 pounds/acre should be maintained throughout Taylor Mountain.

G68. Patchiness rather than uniformity in grass height should be maintained to support a diversity of plant and animal life.

B. Grazing System

A grazing system defines the way in which grazing and nongrazing periods are arranged within the maximum feasible grazing season, which in coastal California, is year-round, either within or between years. Grazing systems often have descriptive names such as: continuous or year-long grazing; short-duration grazing; deferred grazing; and rest-rotation grazing. Continuous, or year-round grazing, is the simplest grazing system and is very common in low-elevation California.

Year-round grazing, which has occurred at Taylor Mountain for at least 19 years, should continue. Year-round grazing has maintained resources in good condition, as evidenced by the lack of any significant documented livestock-related erosion problems or other signs of serious resource degradation. Although year-round grazing does impact trails during the rainy season, it results in a relatively low density of cattle and is the only option that adequately manages annual grasses during winter and spring when they are actively growing and compete with native plants.

Additionally, grazing systems that involve rotations or deferment require cross fences, which for reasons described below, are impractical and undesirable at Taylor Mountain.

Spatial Management of Livestock. As shown on Figure 5, Taylor Mountain will be managed as one large 944-acre parcel composed of the Russell and Nunes parcels, the Bath-Watt parcel, and a portion of the Matteri parcel, with the option of dividing it with a proposed cross fence (see PCF2 in Figure 5) if a strong need is identified in the future (see Section 6.4, Grazing Infrastructure, and Figure 5). Reasons for minimizing fencing include the likelihood of gates being left open by recreationists, rendering the fencing ineffective, potential interference with wildlife movement, and cost.

Livestock will be distributed throughout the grazing area primarily by their attraction to fresh forage and water sources. Mineral supplements may be used by the grazing tenant to attract animals to underutilized areas if

necessary, avoiding placement near creeks, wetlands, water sources, and trails.

Areas Excluded From Grazing. Most of the former Matteri parcel will not be grazed, as much of the parcel is quite steep. Grazing will also be excluded from developed staging and camping areas at Petaluma Hill Road and the Kawana Springs Resort area, and also from the life estate. Grazing will also be excluded from portions of the in-holding radio tower parcel and from the approximately 20 acres at the northwest corner of the Russell parcel, north of the future Farmers Lane extension. Other small areas can be excluded from grazing in the future if a specific need is identified.

Image 24. *Patchiness and variable grass height resulting from moderate grazing.*
PHOTO: LISA BUSH

GRAZING SYSTEM GUIDELINES

G69. Taylor Mountain should continue to be managed as one large pasture composed of the majority of the former Russell, Nunes and Bath-Watt parcels, and approximately 24 acres of the former Matteri parcel. Grazing may also occur on a portion of the radio tower parcel.

G70. Dividing the Taylor Mountain grazing area with a cross fence (PCF3 on Figure 5) should be considered if a strong need is identified in the future. See Table 14 for proposed cross fencing recommendations.

G71. Grazing should be excluded from a majority of the former Matteri parcel, the Kawana Springs Resort area, and the life estate, except for targeted grazing for vegetation management and fire fuel reduction.

G72. Livestock distribution should be improved if necessary by placing mineral supplements in underutilized areas, and by avoiding placement near creeks, wetlands, water sources, and trails.

GRAZING SYSTEM STANDARDS

S80. Grazing shall be continued.

C. Stocking Rate and Grazing Capacity Estimates

As described in Chapter 5 and elsewhere in this Grazing Plan, a moderate level of grazing is desirable for a variety of reasons. Moderate grazing is achieved through application of an appropriate stocking rate, which is the number of animals in animal units (AUs) on a site for a given period of time, where one AU is a 1,000-pound animal or equivalent. Annual fluctuations in forage production mean that setting and adjusting stocking rates should be viewed as a process rather than an exercise in determining a precise number of animals that a site can support.

The former Russell and Nunes parcels have supported about 45 to 60 AUs in the 19 years that Jeff Jones has leased these properties (Jeff Jones, personal communication 2010), a stocking rate that is supported by estimates calculated from Soil Survey forage production information and from the scorecard method of estimating grazing capacity developed by the University of California. The current condition of natural resources on Taylor Mountain, including the considerable grassland species diversity, is in part due to livestock management within the current range of stocking rates.

Soil Survey Forage Production Estimate. Soil characteristics strongly influence forage production. The Sonoma County Soil Survey (USDA 1972) provides estimates of forage production[5] for "poor" and "good" forage production years. Soil types suitable for grazing are grouped into range sites, based on similar characteristics, and forage production estimates are provided for these range sites. Although these estimates are very general and conservative[6] and do not reflect site specific conditions such as past land uses and forage species composition, "good year" range site estimates provide rough guidelines for comparison with other methods.

Table 6 provides range site estimates by soil map unit for land with 0 to 50% tree canopy cover, acreage of dry weight forage production for "poor" and

5 Forage is the vegetation, including grasses, grass-like plants, and forbs eaten by grazing animals and forage production refers to the amount (usually measured by weight) of this vegetation that is produced on a site.

6 According to Leonard Jolley of the Natural Resources Conservation Service (NRCS) Resource. Inventory and Assessment Division in Beltsville Maryland "[Forage] production has often been described as very conservative, in part not to mislead the producers, particularly in your volatile climate".

"good" years in pounds per acre, and total forage produced where one AUM is equal to 1,000 pounds of forage.[7] Table 7 shows total available forage and the stocking rate in AUs for a year-round (12 month) operation that this forage production estimate could support.

Scorecard Grazing Capacity Estimate. University of California researchers developed a simple "scorecard" that can be used to estimate grazing capacity on annual-dominated rangelands based on desired RDM levels and general site characteristics. This method provides rough estimates based on rainfall, canopy cover, and slope (McDougald et al. 1991). The scorecard method of estimating grazing capacity accounts for animal behavior by recognizing that grazing use decreases on steeper slopes.

Slope and canopy data derived from a digital elevation model generated by Gold Ridge Resource Conservation District were used in conjunction with a customized scorecard for Taylor Mountain, shown in Table 8, to provide the estimated total AUMs, shown in Table 9.

Current Stocking Rate. Jeff Jones, the current grazing tenant, has run cattle on the Russell and Nunes parcels for 19 years. Currently, Jeff runs between 45 and 60 mother cows and calves year-round on Taylor Mountain and does not use any supplemental feed. Previous stocking rates are unknown.

Summary and Recommended Stocking Rate. Due to the interannual fluctuations in forage production, and the fact that recommended RDM levels are not absolute, stocking rates should be somewhat flexible.

The "good" year Soil Survey forage production estimate, the scorecard estimate, and observations of site conditions all indicate that a stocking rate within the current range of 45 to 60 AUs year-round, is appropriate for Taylor Mountain. The Soil Survey "poor" year estimate was not utilized as it drastically underestimates typical forage production on Taylor Mountain. If drought conditions resulting in significantly reduced forage production persist for more than one year, stocking should be adjusted downward as described in the following section. Table 10 summarizes and compares results of the three grazing capacity estimation methods used and shows the recommended range of stocking rates. Comparable stocking rates for other classes of livestock can be calculated from Table 11.

Stocking Rate Adjustments. In severe drought years or in years of above-average forage production, stocking rates may need to be adjusted downward or upward during the grazing season to achieve management objectives. This requires the livestock operator to be flexible and to respond quickly to unpredictable weather conditions that affect forage production. A livestock producer who must decrease stocking rates in response to a spring drought may suffer financially. In a good forage year, adding animals

7 An AUM is the quantity of forage consumed by one animal unit in one month; A stands for animal, U stands for unit, and M stands for month; 12 AUMs are needed to support one AU for 12 months.

may be difficult unless the operator has a large herd with the ability to move animals from other sites.

The stocking rate should be adjusted downward in poor feed years by weaning calves early, or culling more heavily than usual. In good forage years, culling animals lightly or retaining more replacement animals can be used to increase stocking rates. A process for adjusting stocking rates should be identified in the grazing agreement

STOCKING RATE GUIDELINES

G73. An initial stocking rate of approximately 50 AUs should be established.

G74. A stocking rate of 45 AUs to 60 AUs should be maintained, fine tuning stocking based on RDM and monitoring of natural resource conditions that are affected by grazing.

G75. In years of extreme drought, cattle should be culled more heavily than usual to decrease stocking by 10 to 15 percent.

G76. In years of unusually high forage production, cattle should be culled more lightly or more replacement heifers should be retained to manage excess forage.

G77. RDM below the recommended minimum level in two or more consecutive years should be avoided by destocking or supplemental feeding.

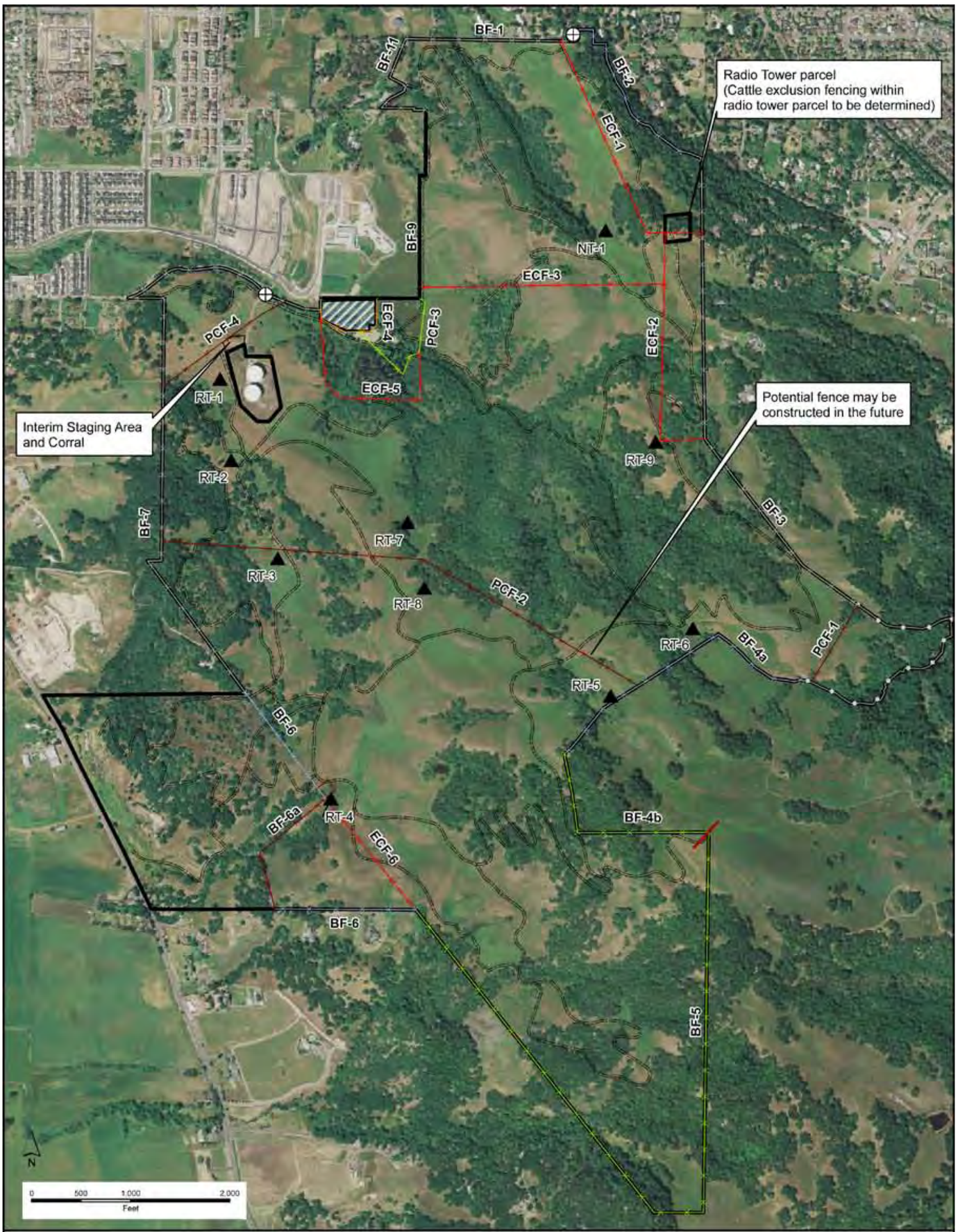
G78. A process for adjusting stocking rates should be identified in the grazing agreement.

D. Appropriate Livestock Species

Foraging habits, behaviors, and other characteristics differ between livestock species and classes[8] that may make one type of livestock preferable over another to meet site-specific management objectives. Predator issues, site topography, and local availability of livestock types are also important considerations.

Grazing animals are divided into groups based on their vegetation preferences and primary foraging methods. These groups include the grazers (cattle and horses), which have a diet dominated by grasses and grasslike plants, the browsers (goats), which consume primarily forbs and shrubs, and the intermediate feeders (sheep), which have no particular

8 Livestock class refers to age, gender, and reproductive status; heifers are a class of cattle and rams are a class of sheep.



Taylor Mountain Grazing Plan

Existing and Planned Infrastructure

Data Source:
- Lisa Bush Range Management Agricultural Consulting
- Sonoma County Agricultural Preservation & Open Space District
- RRM Design Group
- Resource Strategies, Inc./DigitalGlobe, 2009

Map Date: May, 2012

Note: This map is for illustrative purposes only and is not intended to be a definitive property description.

Prepared by: Katherine Gledhill Consulting

SONOMA COUNTY
AGRICULTURAL PRESERVATION
AND OPEN SPACE DISTRICT

- Taylor Mountain Property Boundary
- Bamberger Life Estate Boundary
- Gate and vehicle access
- Existing water trough
- Property Trails

Property Fence:

- Existing boundary fence to repair
- Existing boundary fence to replace w/ barbed wire fence
- Existing boundary fence to replace w/ wildlife-friendly fence
- Existing cross fence in good condition
- Existing cross fence to repair
- Existing fence to remove
- Proposed fence
- Property Boundary w/out fence

Figure 5. Existing and Planned Infrastructure

6 Grazing

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preference for grasses, forbs, or shrubs (Holechek et al. 1998). Browsers commonly consume large amounts of green grass during rapid growth stages but avoid dry, mature grass and often experience digestive upsets if forced to consume too much mature grass (Vallentine 1990).

Body size and reticulo-rumen capacity, anatomical differences in teeth, lips, and mouth structure, grazing ability, and differences in digestive systems account for some of the differences in foraging behavior among grazers. Cattle, because of their overall size and mouth design, are better adapted to grazing than browsing. They also have large rumens, giving them the ability to digest lower quality roughage, which makes them superior to goats or sheep for managing fibrous and abundant herbaceous vegetation like dormant grasses (Peischel and Henry 2006).

Sheep possess a narrow muzzle and a large rumen relative to body mass, allowing them to graze selectively and still tolerate substantial fiber content. Sheep, like all ruminants, have incisors only on the bottom, with a hard dental pad in their upper jaw. Sheep also have relatively small mouths, allowing them to graze close to the ground and take small bites to select specific parts of a plant, such as small leaves or buds. These anatomical characteristics give them a greater capacity than cattle to harvest prostrate plants or strip leaves or flowers from stems. These features result in sheep diets generally dominated by forbs (Peischel and Henry 2006).

Goats have a narrow, strong mouth with a dexterous tongue well designed for chewing branches and stripping individual leaves from woody stems. Goats are therefore most appropriate for controlling woody plants (Peischel and Henry 2006). Dietary preferences of different livestock species are shown in Table 12.

Animal unit equivalents (AUEs) are useful in estimating stocking rates and comparing forage demand of different ages and species of animals. Animal unit equivalents vary by source, actual weight of animal, and individual animal (USDA 2003). Table 11 provides AUEs for common domestic livestock and can be used as follows: 48 two year old cattle = 38 animal units (48 x .8).

Cattle are preferred over sheep or goats for continued grazing at Taylor Mountain because they are the most appropriate species for managing grassland vegetation, while minimizing impacts to native wildflowers. Additionally, cattle do not require extensive fencing, use of guard dogs, or human herders to protect them from predators as sheep and goats would.

LIVESTOCK SPECIES GUIDELINE

G79. Cattle should be the livestock species chosen for on-going grazing as described in Chapter 6.3.D, Appropriate Livestock Species.

Taylor Mountain Soil Map Units, Range Site Acreages and Associated Forage Production on Land with 0-50% Tree Canopy											
Code	Soil Map Unit	Soil Survey Range Site	Good Year Dry Wt. Production in AUMs	Approximate Acres				Total Forage Production in AUMs			
				Russell	Matteri	Nunes	Bath- Watt	Russell	Matteri	Nunes	Bath- Watt
DbD	Diablo clay, 9-15% slopes	3	3.6	7	0	0	0	25	0	0	0
DbE	Diablo clay, 15-30% slopes	3	3.6	26	0	0	0	94	0	0	0
GgE	Goulding clay loam, 15-30% slopes	1	3.0	7	0	0	0	21	0	0	0
GgF	Goulding clay loam, 30-50% slopes	1	3.0	3	0	0	0	9	0	0	0
GoF	Goulding-Toomes complex, 9-50% slopes	9	1.8	174	14	0	20	313	25	0	36
GlD	Goulding cobbly clay loam, 5-15% slopes	4	2.4	43	0	0	0	103	0	0	0
GlE	Goulding cobbly clay loam, 15-30% slopes	4	2.4	91	0	20	0	218	0	48	0
GlF	Goulding cobbly clay loam, 30-50% slopes	8	2.2	14	0	0	0	31	0	0	0
RaC	Raynor clay, 2-9% slopes	3[a]	3.6	5	0	10	0	18	0	36	0
RaD	Raynor clay, 9-15% slopes	3	3.6	22	0	0	0	79	0	79	0
RaE	Raynor clay, 15-30% slopes	3	3.6	31	0	35	4	112	0	126	14
RcD	Raynor clay, seeped, 2-15%slopes	3	3.6	9	10	0	0	32	36	0	0
Totals				**432**	**24**	**65**	**24**	**1,055**	**61**	**289**	**50**

a. The Sonoma County Soil Survey does not provide a range site for this map unit. or RaD, so the range site (3) for RaE and RcD was used.

Table 6. Soil Map Units, Range Site Acreages and Associated Forage Production.

Taylor Mountain Forage Production, Available Forage and Year-Round Stocking Rate for Land with 0-50% Tree Canopy		
Total AUMs Produced in Good Year	Total AUMs of RDM	Total AUMs Available for Forage[a] in Good Year
1,055+61+289+50 = 1,455	432+24+65+24 = 565 acres x 1.2AUMs[b]/acre = 658 AUMs	1,455–658 = 797
Year-round Stocking Rate for Good Forage Year Based on Soil Survey		**66 AUs**

a. Available forage is equal to forage produced minues 1,200 pounds/acre (1.2 AUMs/acre) of RDM.
b. 1,200 pounds/acre of RDM=1.2 AUMs/acre.

Table 7. Taylor Mountain Forage Production, Available Forage and Year-Round Stocking Rate.

Scorecard for Central Coast and Central Valley Foothills Zone (10 inch to 40 inch precipitation), with RDM Adjusted Upwards to 1.200 Pounds per Acre to be Specific to Taylor Mountain				
	Slope Classes			
Canopy Cover (percent)	<10%	10% - 25%	25% - 40%	>40%
	AUM/acre			
0% - 25%	1.2	.2	.1	0
25% - 50%	.7	0	0	0
50% - 75%	.2	0	0	0
75% - 100%	0	0	0	0
	RDM lb/acre			
	1,200	1,200	1,200	1,200

(Adapted from McDougald et al. 1991).

Table 8. Scorecard for Central Coast and Central Valley Foothills Zone.

Taylor Mountain AUMs and Year-Round Stocking Rate from Scorecard Estimate			
Canopy Cover and Slope Class	Acres	AUMs/acre	Total AUMs
<10% canopy cover; 0% to 25% slopes	347	1.2	416
<10% canopy cover; 25% to 50% slopes	31	.7	22
<10% canopy cover; 50% to 75% slopes	59	.2	12
10% - 25% canopy cover; 0% to 25% slopes	47	.2	9
75% - 100% canopy cover; 25% - 100% slopes	61	0	0
Totals	**545**		**459**
Year-round stocking rate based on scorecard: 459 AUMs ÷ 12 months			**38 AUs**

Table 9. Taylor Mountain AUMs and Year-Round Stocking Rate from Scorecard Estimate.

Table 10. Comparison of Results from Grazing Capacity Estimation Methods.

Comparison of Results from Grazing Capacity Estimation Methods		
Method of forage production estimation	**Available forage in AUMs**	**Stocking Rate in AUs for 12 Months**
Soil Survey	797[a]	66
Scorecard	459	38
Average current stocking rate	NA	57
Recommended range of stocking rates[b]		**38-66**
Recommended initial stocking rate		**50**

a. The "good year" values were used rather than the "poor year" values, as they more accurately represent typical forage production on Taylor Mountain.
b. This average stocking rate is on approximately 517 acres - about 9% fewer than proposed in this plan, so it was adjusted upward by 9%.

6.4 GRAZING INFRASTRUCTURE

Grazing infrastructure includes physical improvements necessary for livestock management, including fences, water sources, and corrals. Grazing infrastructure should meet the needs of the livestock operation, while minimizing negative effects on wildlife.

A. Fencing

Balancing the needs of wildlife to move freely within a site with the need to provide secure fencing that adequately contains livestock presents challenges. Livestock fencing must by law prevent the ingress and egress of livestock, with the top wire set four feet above the ground surface.[9] However, a four-foot high barbed wire can entangle and injure deer attempting to jump over it, and low wires to prevent escape of small livestock species and calves can interfere with the movement of small wildlife species.

To minimize impacts on wildlife, non-critical fencing including cross fencing, exclusionary fencing, and boundary fencing in areas where escape of calves would not create a safety hazard[10] should be constructed to "wildlife-friendly" specifications. Additionally, fencing should not be constructed where it would restrict movement through critical habitats such as stream corridors and wetlands, and fencing on steep slopes should be minimized because fences of any height are more difficult for wildlife to cross on steeper slopes (Jennifer Michaud personal communication 2011).

9 California Code Section 17121.
10 Young calves may also be able to move under the high, smooth bottom wire used in wildlife-friendly fencing.

Wildlife-friendly fencing may have a shorter than average life span and may need more frequent repair than standard 4- to 6-strand barbed wire fencing because a smooth top wire or fewer wires allow cattle to lean against the wires and push their heads through large gaps, both of which can strain and weaken fencing.

Wildlife-friendly Fencing Specifications. Wildlife-friendly fencing should ideally have:

- Four strands of wire;
- Smooth bottom and top wires;
- Barbed middle wires;
- A top wire at a maximum of 40" from the ground surface;
- A bottom wire at 12" from the ground surface;
- 12" between the top two wires; and
- Durable markers to make the fencing more visible to wildlife.

Barbed-wire Fencing Specifications. Long-lasting cattle fencing should have:

- Five strands of barbed wire;
- A top wire at 48" from the ground surface;
- A bottom wire at 12" from the ground surface; and
- Middle wires that are evenly spaced.

Boundary Fencing. Existing boundary fencing along portions of the eastern boundary is in good condition, but virtually all of the remaining boundary fencing is in very poor condition.

Table 13 provides recommendations for repair and replacement of existing fencing, including reaches that are suitable for wildlife-friendly fencing. Reach locations are shown in Figure 5.

Cross Fencing and Exclusionary Fencing. Cattle management, including gathering animals for veterinary care or shipment, would be improved with the construction of at least one cross fence that would divide the approximately 944-acre grazing area into two pastures. However, such a fence would likely be ineffective due to the high trail density and thus the need for several gates, which may be left open by public trail users. To avoid the problem of gates being left open, cattle guards could be used instead, but these are quite costly. Additionally, construction of a cross fence would add to the already large expense already required to repair and replace existing fencing, and could interfere with wildlife movement, although it would be constructed to wildlife-friendly fencing standards. An appropriate location for a pasture cross fence is shown in Figure 5, should a strong need for one be identified in the future.

Table 14 proposes smaller cross fences in several locations to exclude cattle from developed areas. Existing cross fencing around the historic Kawana Springs Resort area and the life estate which are currently fenced out should be maintained and will eventually need to be replaced. Exclusionary fencing for resource protection in specific areas, such as for the protection of oak plantings may be needed in the future. Cross fencing and exclusionary fencing should be constructed to be wildlife-friendly.

Existing remnants of cross fences between the Nunes, Bath-Watt and Russell parcels is mostly non-functional and should be removed as recommended in Table 15.

FENCING GUIDELINES

G80. Non-functional boundary fencing should be replaced with barbed wire fencing in reaches designated in Table 13 and shown in Figure 5.

G81. Wildlife-friendly fencing should be used to replace select reaches of boundary fencing listed in Table 13 and shown in Figure 5, and for construction of exclusion fencing and cross fencing.

G82. Boundary fencing should be repaired in reaches designated in Table 13 and shown in Figure 5.

G83. All fencing should be maintained in functional condition.

G84. A licensed fencing contractor or the grazing tenant should be utilized to construct all fencing to ensure that fencing is sturdy and long-lasting; unskilled labor crews should not be used for this specialized work.

G85. Fencing should be monitored regularly to identify reaches in need of repair due to livestock damage, vandalism, or damage due to fallen trees and make necessary repairs.

G86. If a pasture cross fence is constructed in the future, consideration should be given to installing cattle guard(s) instead of gates where trails cross the fence to avoid having recreational users leave gates open.

G87. Old non-functional and non-critical cross fencing should be removed, retaining wood posts for wildlife perches and nesting structures.

B. Corral

A corral for gathering animals for veterinary treatment and when calves are sold is an essential component of any grazing operation. Corrals must be appropriately sized to accommodate the herd, and must be accessible to large livestock trucks and trailers in wet or dry weather, with adequate room to turn around. Ideally, a water trough or source to fill a portable trough should be available in the corral. The current corral that is adjacent to the interim staging area is appropriately located and functional. When this parking lot is decommissioned in the future due to construction of the Farmers Lane Extension, a new corral will need to be constructed off of the Farmers Lane Extension or at another appropriate location, with adequate turn around room for a cattle truck and trailer.

Table 11. Animal Unit Equivalents.

Animal Unit Equivalents		
Animal kind and class	**Animal Unit Equivalent**	**Monthly Forage Consumption in Pounds**
Cow, dry	.92	727
Cow, with calf	1.00	790
Bull, mature	1.35	1,067
Cattle, 1 year old	.60	474
Cattle, 2 year old	.80	632
Horse, mature	1.25	988
Sheep, mature	.20	158
Lamb, 1 year old	.15	118
Goat, mature	.15	118
Kid, 1 year old	.10	79

(Adapted from Vallentine 1990)

Table 12. Generalized Dietary Preferences by Domestic Livestock Species.

Generalized Dietary Preferences by Domestic Livestock Species	
Species	**Dietary Preferences**
Cattle	Grazer: mostly grasses, some seasonal use of forbs and browse
Horses	Grazer: mostly grasses, minor forbs and browse
Sheep	Intermediate feeder: high use of forbs, but also use high volumes of grass and browse
Goats	Browser to intermediate feeder: high forb use, but can utilize large amounts of browse and grass; highly versatile

(Adapted from Vallentine 1990)

CORRAL GUIDELINES

G88. A water source should be provided in the corral if feasible.

G89. The existing corral should be maintained while the interim parking lot is open.

G90. When the interim staging area is closed, a new corral adequate to handle approximately 60 cattle should be constructed off of Farmers Lane Extension or at another appropriate location, with adequate turn around room for a cattle truck and trailer; consult with the grazing tenant regarding corral design and construction.

C. Water System

While rangeland water sources are designed primarily for use by livestock, they also serve as supplemental water for a variety of wildlife species. However, unless these structures are designed with wildlife safety in mind, they can pose a drowning hazard. Water troughs should all have well secured adequate escape structures that reach all the way to the trough bottom, and should not present hazardous obstacles, such as bracing, fencing, or vegetation over the water's surface.

Location of and distance between livestock water sources strongly affects livestock distribution, as water is a major livestock attractant, especially in warm weather and when forage has a low water content.

WATER SYSTEM GUIDELINES

G91. Existing water sources should be upgraded and retained as recommended in G92-G100; no new water developments are needed.

G92. Inspect and clean intact spring boxes that feed RT1 through RT3, RT5 through RT8, and N1, which are generally located near troughs, although the location of the spring box for RT7 is unknown and the spring box for RT5 is 30' to 40' away. See Figure 5.

G93. The broken spring box that feeds RT4 should be replaced, and if needed, the spring box that feeds RT8 should also be replaced. See Figure 5.

G94. Plastic pipe from spring boxes to troughs should be replaced with metal to avoid frequent breakages that render troughs dysfunctional.

G95. Crushed rock aprons should be installed around all troughs, extending a minimum of 2' out all around to prevent initiating new soil erosion or creating new wetland conditions immediately

adjacent to troughs where wildlife would be at risk of being trampled.

G96. Metal overflow pipes should be reinstalled on all troughs to carry overflow away from troughs, ensuring that newly located outflow does not create erosion.

G97. Wildlife escape structures should be installed in all water troughs, ensuring that structures extend to the trough bottom, meet the inside wall of the trough, are firmly secured with a slope of no more than 45 degrees, are made of non-slip materials, and are protected from livestock.

G98. Water troughs should be kept free of obstacles such as bracing, fencing, and vegetation over the water's surface that could interfere with wildlife use or present hazards.

G99. Water levels should be maintained at a completely full level when in use and drained completely when not in use. Any new water trough should have a minimum open water surface of 10' long by 2.5' wide. This represents the minimum "swoop zone" requirements for most western bat species.

G100. Consult Water for Wildlife – A Handbook for Ranchers and Range Managers (Taylor and Tuttle 2007) for additional information.

6.5 AVOIDING AND MINIMIZING NEGATIVE EFFECTS OF GRAZING

A. Avoiding Introduction and Spread of Invasive Plants

Although livestock grazing can aid in the management of some invasive plants, certain aspects of grazing and livestock management can introduce and/or spread these plants. Imported hay or other feed can be a source of weed introductions, and weed seed can be spread on livestock hooves, coats, and in digestive tracts.

B. Minimizing Grazing Effects in Forests and Woodlands

As described in Chapter 5, livestock grazing can negatively affect oak regeneration by trampling and/or browsing on oak seedlings and saplings.

MINIMIZING GRAZING EFFECTS IN FORESTS AND WOODLANDS GUIDELINE

G101. As stated in S24, attractants such as mineral supplements should be placed away from areas with young trees.

Boundary Fencing Repair, Replacement, and Installation Recommendations for Reaches as Shown in Figure 5				
Reach	**Location**	**Length in Feet**	**Comments**	**Recommendations**
BF-1	Northern boundary of Nunes Property	1,811	Old and in poor condition	Replace with barbed wire fencing
BF-2	Northeastern boundary of Bath-Watt	2,106	Fair to good condition	Make necessary repairs
BF-3	Eastern boundary of Bath-Watt and Russell/Hamilton;	5,130	Old and in poor condition	Replace with barbed wire fencing
BF-4a	Eastern side, Russell/Jackson boundary	2,984	Newer fence in good condition	Make necessary repairs; in the future when repair is no longer feasible, replace with wildlife-friendly fencing
BF-4b	Eastern side, Russell/Jackson boundary	2,135	In decent condition; damage from downed trees should be repaired	Make necessary repairs; in the future when repair is no longer feasible, replace with wildlife-friendly fencing
BF-5	Southern boundary of Russell with Jackson, Yahng, Frizelle, Goode, Dashielle, and Pennington	8,216	Old and in poor condition	Replace with wildlife-friendly fencing
BF-6	Western boundary of Russell with Matteri	2,750	Functional but needs some repairs	Make necessary repairs
BF-6a	Proposed new fencing	1,446	Will incorporate a portion of the Matteri parcel with Russell	To be installed
BF-7	Western boundary of Russell with Zamaroni, Cunningham, Carinalli, and Clegg	4,452	Old and in poor condition	Replace with barbed wire fencing
BF-8	Northwestern boundary of Russell at Kawana Terrace Drive	2,662	Old and in poor condition; will be cut off by Farmers Lane Extension	Replace with barbed wire; later relocate per Farmers Lane Extension
BF-9	Northwestern boundary of Russell and western boundary of Nunes with Jackson/Sonoma Academy	2,238	New fence in good condition	No repairs currently needed
BF-10	Northwestern boundary of Nunes	720	New 5.5' tall wire mesh deer fence	No repairs currently needed
BF-11	Northwestern boundary of Nunes	1,418	Very old sheep fence	Functional but should be replaced with barbed wire fencing
Total		**38,068**		

Table 13. Boundary Fencing Repair, Replacement, and Installation Recommendations.

Table 14. Proposed Cross Fencing Recommendations.

Proposed Cross Fencing Recommendations for Reaches as Shown in Figure 5				
Reach	**Location**	**Length in Feet**	**Comments**	**Recommendations**
PCF-1	Eastern tip of property	909	Instead of boundary fence in rugged terrain	Can be wildlife-friendly fence
PCF-2	Center of property	5,164	Potential future cross fence for improved livestock management	If constructed, should be wildlife-friendly fencing
PCF-3	Kawana Springs Resort	1,506	To exclude livestock from historic compound	Can be wildlife-friendly fence
PCF-4	Kawana Knolls	1,490	To exclude cattle from disc golf course	Can be wildlife-friendly fence
Total		**9,069**		

C. Minimizing Negative Effects of Livestock on Riparian Areas, Erosion and Water Quality

As described in Section 6.2, very little livestock-related erosion and damage to riparian areas was noted during site visits, but poor livestock management can cause degradation of these resources. Overuse of riparian areas by livestock can degrade water quality and cause streambank erosion, and can degrade plant and wildlife habitat. Woody riparian understory is important for birds that nest at or just above the ground level including Swainson's thrush (*Catharus ustulatus*), Spotted Towhee (*Pipilo maculates*) and California Quail (*Callipepla californica*) (Clinton Kellner personal communication 2010), and excessive browsing by livestock can degrade this habitat.

Livestock can cause or exacerbate some types of erosion, including stream bank erosion, and some hillslope erosional processes. Terracettes, which are caused by repeated traversing of steep slopes by livestock, lend the appearance of severe disturbance, but may actually increase water infiltration, which could have the effect of decreasing erosion associated with overland flow (gullying, sheet erosion, and rill erosion) but could increase the occurrence of debris flows.

Grazing can result in soil compaction, thus decreasing its porosity and infiltration rates and increasing runoff. Livestock trails can become loci for gully initiation by intercepting and concentrating runoff, thus increasing its erosive force.

Livestock can contribute to water quality degradation by addition of pathogens, nutrients, and sediment to creeks and waterbodies. Livestock

Existing Cross Fencing Recommendations for Reaches as Shown in Figure 5				
Reach	**Location**	**Length in Feet**	**Comments**	**Recommendations**
ECF-1	Separates northwest part of Bath-Watt from Nunes	2,679	Has been cut in numerous places	Remove
ECF-2	Separates southwest part of Bath-Watt from Nunes and Russell	2,547	Has been cut in numerous places	Remove
ECF-3	Separates Nunes from Russell	2,466	Has been cut, only partially standing	Remove
ECF-4	Separates life estate from Russell	F982	Partial fence	Retain and repair as needed
ECF-5	Remnant fence	2,150	Only remnant of old fence remaining	Remove wire and retain wooden posts for wildlife perches and nesting structures
ECF-6	Between Matteri and Russell Properties	1,444	NA	Remove
Total		**3,594**		

Table 15. Existing Cross Fencing Recommendations.

borne pathogens include *Cryptosporidium parvum* and particular strains of *E. coli*, both of which can cause illness in humans. These pathogens are of particular concern where contaminated drainages flow into water bodies that serve as drinking water sources and/or contact recreational areas, neither of which occur on or downstream of Taylor Mountain.

Nutrients, including nitrogen and phosphorous from livestock urine and fecal material, can degrade water quality and impact aquatic life. Livestock-related nutrient pollution is most serious where animals are confined, such as dairies and feedlots, which produce large quantities of concentrated animal waste. Land extensive grazing, such as occurs at Taylor Mountain, has a very low likelihood of causing significant nutrient pollution, although animal waste deposited directly into waterways, or placements of livestock attractants such as water near waterways, can degrade water quality.[11]

Minimizing Negative Effects on Riparian Areas, Erosion and Water Quality Guidelines

G102. Placement of livestock attractants such as mineral supplements should be avoided near riparian areas.

11 Fifty to 60 percent of cattle fecal loading on annual rangelands is near cattle attractants (Dr. Ken Tate personal communication).

G103. RT9 should be removed, as its location adjacent to a riparian area may cause water quality degradation from animal waste.

G104. If supplemental feeding is used by future grazing tenants, feeding near riparian areas should be avoided.

G105. Cattle trails or other potential loci for gully development created by cattle should be monitored and treated appropriately if erosion becomes a problem.

D. Minimizing Livestock Impacts to Trails

Livestock impacts to trails include defecation on trails and deformation of trail surfaces by livestock hooves. Small livestock species such as sheep and goats have less impacts on trails than do cattle as their feces is smaller and generally drier, and their hoof pressure is less, but for other reasons cattle are the preferred livestock species for grazing at Taylor Mountain.

Some degree of trail impact by livestock is unavoidable, but can be mitigated in part by trail location and choice of surface materials. Trail deformation by hoof action is most prevalent where trails are constructed on clayey soils, as are most of the soils at Taylor Mountain, and in wet areas. Rocky soils produce a much more durable trail surface that can withstand tramping. Especially susceptible trail reaches may be protected from livestock damage with fencing and/or major trails may be surfaced.

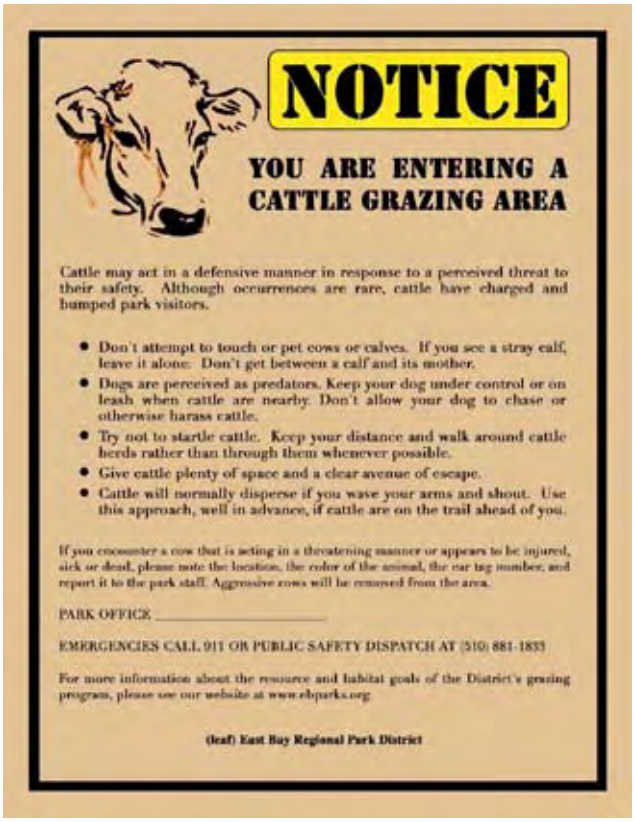
E. Minimizing Conflicts Between Recreation and Grazing

Livestock grazing can negatively affect the public's recreational experiences through adverse physical impacts to trails and other park infrastructure; by limiting park users' enjoyment due to fear of livestock, and, although rare, injury to recreationists or their dogs by cattle; and by aesthetic issues caused by livestock or related infrastructure.

Livestock grazing occurs on over 130,000 acres of public recreational land within the Bay Area, including some parks, such as Mission Peak Park in Fremont, that receive very heavy recreational use, with very few reported incidents of conflict. According to the rancher who leases Mission Peak Park, it is typical for 1,000 people to come through the park gates on to his grazing lease area before noon on a Saturday (Sheila Barry personal communication 2011). Intensive public use including a diversity of recreational pursuits and livestock grazing appear to be compatible based on statistics comparing visitor numbers, reports of livestock-related visitor injuries, and reports of other visitor injuries on the land where grazing and recreation coexist (Barry and Amme 2009).

Public land managers and livestock operators have implemented strategies to minimize public-livestock conflict on grazed recreational lands within the Bay Area. Public land managers have utilized educational materials,

Image 25. East Bay Regional Parks sign.



including brochures, websites, trailhead signage, special events, and interpretive programs to inform the public about grazing.

On East Bay Regional Park District lands, signage is often put at trail heads informing visitors of the presence of grazing cattle. At some parks, signs simply remind visitors to close gates because grazing cattle are present. Other parks have posted signs with extensive information about cattle behavior and how to safely share the parklands with grazing cattle.

F. Effects of Recreational Use on the Grazing Operation.

Livestock grazing can have negative effects on public recreation, but public recreation can also negatively affect livestock grazing operations. Because continued grazing is a desirable use of Taylor Mountain, steps should be taken to ensure that it continues with as little disturbance as possible. The primary impacts to grazing by public recreation include harassment of livestock by unleashed dogs, and interference with livestock infrastructure such as gates being left open and fencing being cut.

Additionally, the nuisance factor created by recreational users who complain about cow pies, trail damage, and other issues, which the grazing tenant often must respond to, can be time consuming and thus expensive to the grazing tenant.

MINIMIZING CONFLICTS BETWEEN RECREATION AND GRAZING GUIDELINES

G106. Educational signs should be developed and installed that explain:

- The importance of and reasons for grazing at Taylor Mountain.
- Appropriate behavior around cattle.

G107. Educational brochures should be developed and distributed at kiosks placed at points of entry to grazed portions of Taylor Mountain that outline safe and appropriate behavior around livestock.

G108. Cross fencing should be minimized to avoid animal distribution issues caused by gates being left open.

G109. Wet or especially clayey portions of trails should be surfaced with a thick layer of crushed rock to minimize damage from hooves.

6.6 RECOMMENDATIONS FOR TARGETED GRAZING

Small-scale, targeted grazing has been used with some success to help manage populations of select weed species. Grazing trials led by Dr. Emilio Laca of the University of California at Davis have successfully reduced cover and seed output of medusahead in experimental settings. Similarly, yellow star-thistle management through grazing has shown some success in California (Thomsen et al. 1996).

Grazing can be also used for management of fire fuels and other vegetation in developed areas not suitable for incorporation into the ongoing grazing program.

A. General Guidelines for Targeted Grazing for Weed Management

The most critical aspects of targeted grazing for weed management are timing, stocking density, repetition of treatment, use of appropriate infrastructure, and use of appropriate livestock species. These factors should be applied to targeted grazing of any weed species at Taylor Mountain.

When high-intensity grazing is used for weed management, treatment locations should be carefully selected, as severe grazing episodes could detrimentally affect sensitive resources. Livestock numbers, location and size of treatment areas, and exact timing should be arranged annually with the livestock operator based on site conditions.

Treatment areas should be identified a year in advance of grazing as some weeds are difficult to identify in their vegetative state. A global positioning system (GPS) should be used to define infested areas. In addition, treatment areas should be evaluated to ensure that they do not contain other resources that would be damaged by the intensive grazing treatment.

Target weeds and other vegetation must be grazed when they are palatable to the grazing or browsing livestock species, otherwise the grazing treatment will not be effective. Weeds should also be grazed when they are most susceptible to damage by defoliation and when flowering and/or seed set can be intercepted. Targeted grazing for fuel removal and general vegetation management should be timed to prevent re-growth, such as when soil moisture is low enough to prevent re-growth.

Stocking density should be heavy enough to reduce target plant species to one to two inches in height. Stocking densities of about 2.5 to 6 AUs per acre are typically used for weed management, but heavier stocking densities for shorter periods of time may be appropriate in some cases, and lower densities may be appropriate for general vegetation management.

Most weed species require repeated defoliation to either weaken plants or to intercept flowering and seed set. Plants will resprout after being grazed, but repeated, and/or heavy grazing may be effective at preventing or reducing flower heads. General vegetation management and fire fuel management may also require repeated grazing treatments.

Typically, weeds have lower palatability than other pasture plants, so livestock must be forced to graze or browse them. This is accomplished by confining livestock in the weed-infested area so they are forced to consume the target species. This is best accomplished with small enclosures made of electric fencing that is charged by a solar charger. Portable water troughs must also be provided.

As discussed in Section 6.3, generally goats and/or sheep more readily consume forbs and browse than do cattle. This means that these species are naturally more inclined to eat thistles, blackberries, and other weeds that occur on Taylor Mountain. However, cattle will graze yellow star-thistle in the rosette to bolting stage (Peischel and Henry 2006). Cattle and/or a small herd of goats and/or sheep can be used, depending on the weed species and/or area treated. Use of on-site cattle, assuming that their owner is not concerned with decreased livestock performance from consumption of the low quality forage that some weed species provide, would be easiest, but an off-site goat and/or sheep herd could also be used if adequate protection from predators was provided. However, contract grazing by goats and sheep is generally very expensive due to the time required for the livestock operator to gather and transport animals to the site, set up temporary fencing and water, provide protection from predators, and move the grazing operation between treatments areas.

Research has shown that yellow star-thistle and medusahead can be managed with carefully planned and executed targeted grazing. As recommended in Chapter 5, targeted grazing can be used on these species if adequate resources are available to utilize this labor-intensive weed management method.

B. Targeted Grazing of Yellow Star-thistle

Following is a prescription for yellow star-thistle management. Timing of grazing is the most important factor in reducing this species through grazing, as it becomes less palatable once spines develop. The following information was derived from Thomsen et al. (1996), Davison et al. (2007), and personal communication with Morgan Doran (2009):

- Three to five years is likely needed to reduce populations and deplete the seed bank.
- Grazing does not fully eradicate yellow star-thistle, yet can be effective to reduce populations if implemented often enough to prevent flowering for several years.
- Long term management requires continued use of livestock or other weed-control practices appropriate for the site; by grazing after the earlier-maturing annuals have completed their life cycle and produced seed, plant diversity can be maintained.
- Like mowing, grazing can either decrease or increase yellow star-thistle, depending on the frequency of defoliation and stage of plant growth.

Timing. Yellow star-thistle should be grazed before spines and flowers start developing, but after the plants have bolted, typically from early through late summer. At the bolting stage, yellow star-thistle can have about 14 percent protein and will be highly palatable to livestock. A complicating factor can be high soil moisture conditions resulting from heavy or late spring rains. If there is sufficient soil moisture, the plant will simply re-grow after defoliation. Adjustments to the density and duration of grazing episodes may be necessary as conditions change.

Stocking Density. Stocking density should be in the order of 6 AUs per acre for 10 to 14 days.

Repetition of Treatment. Grazing treatment should be repeated as needed if high soil moisture results in re-growth of yellow star-thistle. After initial grazing, depending on the rate of re-growth, one to three follow-up grazings at two-week intervals are required to adequately suppress yellow star-thistle growth.

Appropriate Livestock Species. By most accounts, sheep and goats consume yellow star-thistle more readily than cattle do and are the species of choice for yellow star-thistle management. Horses should not graze yellow star-thistle as prolonged ingestion can lead to the fatal nervous disorder *equine nigropallidal incephalomalacia*, or "chewing disease" (Thomsen et al. 1996).

Image 26. Medusahead plant at the proper stage for grazing.
PHOTO: UC DAVIS

C. Targeted Grazing of Medusahead

Research conducted by the University of California at Davis (UCD) under the direction of Dr. Emilio Laca, Associate Professor of Plant Sciences, has shown short duration, high-intensity grazing by sheep to be effective in greatly reducing medusahead. Precision grazing for medusahead management requires careful planning and timing because medusahead phenology is not always consistent; some plants may be at stage for grazing while some may not. UCD experiments have shown that:

- High utilization levels (i.e. severe grazing) were more successful in reducing medusahead with less post-grazing re-growth than were lower utilization plots; best results occurred when plots were grazed to a height of one to two inches.
- Stocking densities of 2.6 to 2.8 AUs, which is equivalent to 13 to 14 mature sheep, per acre for 14 to 17 days were most effective; higher stocking densities, of about 5 AUs per acre for a shorter period were also effective.
- Late vegetative stage is the best time for defoliation; this phenological stage is reached before awns from the flower head appear above the flag leaf, when bumps can be felt within the leaf sheath, and growing points are elevated; if grazing occurs too early (before elongation of the internodes and elevation of growing points), plants will keep growing and flower heads will develop.
- Follow-up seeding with species that have quickly-developing, deep roots like medusahead provides competition with future years' medusahead seedlings.

The following information, which provides a framework for implementing a medusahead management program, is based on personal communications with Morgan Doran (2004 and 2009) and Sheila Barry (2008) and attendance at a medusahead field day at UCD in July 2007.

Pre-planning. Treatment areas should be identified a year in advance of grazing as medusahead plants are difficult to identify in their vegetative state. A global positioning system (GPS) should be used to define infested areas. In addition, treatment areas should be evaluated to ensure that they don't contain other resources that would be damaged by the intensive grazing treatment.

Timing. Timing of medusahead grazing is critical because the window of opportunity for late-spring grazing is very small. Careful monitoring and the ability to move an adequate number of livestock into the fenced treatment areas in a timely fashion are essential. If grazing occurs too early, the plants will re-sprout and if it occurs too late, the livestock will not graze the flower heads. The timing of this optimal phenological stage will vary depending on weather conditions but should usually occur in late April.

Stocking Density. Grazing intensity for late-spring grazing should be heavy, which may result in a higher proportion of bare ground than would normally be considered acceptable. Stocking density for late-spring grazing should be on the order of 2.5 to 5 AUs per acre,[12] or as needed to graze herbage down to a height of one to two inches. Because grazing will be somewhat patchy, areas of bare ground will be interspersed with one- to two-inch-tall biomass.

Repetition of Treatment. Grazing treatment should be repeated as needed, for a minimum of two years.

Appropriate Livestock Species. Sheep have been used in most of the UCD trials, primarily because they were present on the main research site; cattle may be just as effective.

D. Targeted Grazing for Vegetation Management in Developed Areas

Fenced out areas such as the Petaluma Hill Road and Kawana Springs Resort Staging areas, and the Kawana Knoll area, will require vegetation management since grazing will generally be excluded. As appropriate, and if arrangements can be made with the grazing tenant or for a small herd of goats and/or sheep, grazing should be used within these small areas for fire fuel and general vegetation management.

Targeted Grazing Guidelines

G110. Targeted grazing should be used with appropriate livestock species for management of yellow star-thistle, possibly other annual thistles, medusahead, and for fire fuel and general vegetation management in developed areas.

G111. On-site cattle should be utilized if arrangements can be made with the grazing tenant, and/or the small goat herd managed by Sonoma County Regional Parks at Tolay Lake Regional Park, or a small herd of sheep or goats provided by a contract grazer, if funds are available; animal species should be selected based on target vegetation.

G112. For weed management, high-intensity grazing should be utilized with stocking densities of 2.5 to 6 AUs per acre.

G113. For weed management, University of California staff experienced in implementing targeted grazing programs through the Sonoma County University of California Cooperative Extension (UCCE) office or University of California campuses should be consulted.

12 Mr. Doran's research plots have been grazed at a rate of about 162 AUdays/acre, which equals 5.4 AUs/acre; these values were converted from 10 sheep/10m^2 plot for two days.

G114. Weed species should be prioritized for grazing treatment and resources should be focused on highest priority species as described in Chapter 5, Figure 4, and Figure 8 of Appendix B, Ecological Resources Report.

G115. Weed treatment areas should be identified the year prior to treatment, preferably with a GPS.

G116. For weed management, consider utilizing portable fencing and water to confine livestock in treatment areas; portable fencing is normally electric, which may not be suitable for use in areas with public visitation.

G117. Grazing for general vegetation management and fire fuel reduction should be conducted with provision of temporary water troughs within developed areas that are permanently fenced off from year-round grazing.

6.7 GRAZING AGREEMENT COMPLIANCE MONITORING

Monitoring should be conducted to ensure that the grazing tenant is complying with the grazing agreement provisions. Grazing agreement compliance monitoring should include checking to make sure that the grazing tenant is maintaining infrastructure as required, is maintaining the recommended stocking rate, and is achieving target minimum RDM levels. Several methods that vary in accuracy and required time and effort can be used to estimate RDM, but simple and quick estimation should generally be used unless RDM estimates are disputed by the grazing tenant, in which case more intensive sampling should be conducted.

RDM monitoring methods can include direct measurement and visual estimation. The dry-weight-rank method combines direct measurement and visual estimation. With direct measurement, small plots are clipped and RDM is weighed to determine pounds per acre, while visual estimation methods focus on estimating RDM weight based on stubble height and appearance of the landscape. Some clipping and weighing should be done with visual estimation to check and calibrate the monitor's visual estimations. The following methodology is recommended for RDM monitoring at Taylor Mountain.

- Conduct RDM monitoring in early- to mid-October before the rainy season begins.
- After clipping and weighing as many quadrats as needed to calibrate the monitor's eye, he or she should estimate the RDM throughout the property, continuing to clip and weigh the occasional quadrat as needed to maintain fairly accurate estimates.
- RDM should be clipped within one-square-foot quadrats, placed in small paper bags, and weighed with a hand held gram scale; weight in grams can be converted to pounds per acre by multiplying grams per square foot by 96.

- Photographs of target RDM levels (minimum 1,200 pounds per acre),[13] patches of RDM below 1,200 pounds per acre, and significantly higher weights should be taken to help future monitors visualize RDM levels.

More information on RDM monitoring can be found in the RDM Monitoring Photo-Guide available from Wildland Solutions http://www.wildlandsolutions.com[14] and Bartolome et al. (2002) ucanr.org/freepubs/docs/8092.pd.

GRAZING AGREEMENT COMPLIANCE MONITORING GUIDELINES

G118. RDM monitoring should be performed in the fall to ensure that minimum RDM standards are being met.

G119. Grazer should be required to record how many animals are on site, and when numbers change.

G120. Meet at least annually with grazing tenant to review RDM monitoring, and other grazing agreement provisions.

13 RDM levels may be significantly lower in serpentine areas, due to lower biomass production.

14 A drawback to this guide is that most of the photographs depict RDM levels that are inappropriately low.

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PHOTO: RRM

7. Cultural Resources

7. CULTURAL RESOURCES

7.1 ARCHAEOLOGICAL RESOURCES

7.1.1 Archaeological Overview

Archaeological evidence indicates that human occupation of California began at least 12,000 years ago. Early occupants appear to have had an economy based largely on hunting and social structures based on extended family units. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears coevolved with the development of sedentism (transition from nomadic to permanent, year-round settlement), population growth, and expansion. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

There were four Native American tribes that settled in village communities in Sonoma County - Pomo/Kashaya, Wappo, Coast Miwok, and Patwin. At the time of European settlement, the Taylor Mountain property was included in the territory controlled by the Southern Pomo language group. The Southern Pomo held the Russian River watershed, south of the Mendocino County line, with the exception of the mouth which was held by the Southwestern Pomo. The Southern Pomo occupied the extensive valleys and foothills within the county.

The Southern Pomo were hunter-gatherers who lived in rich environments, which allowed for dense populations that developed 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 procure particular resources that were especially abundant or available only during certain seasons. Sites were often situated near freshwater sources and in ecotones where plant and animal life was diverse and abundant. The Laguna de Santa Rosa's wetlands and open waters were a significant resource. There are several reported Southern Pomo village sites a few miles to the north of the Taylor Mountain property.

7.1.2 Archaeological Sites

The Taylor Mountain property contains several previously-recorded archaeological sites (Origer 2001; Steen and Origer 2006). These include scatters of obsidian flakes and rocky outcrops containing cupules, a type of petroglyph. Five sites are recorded with the State Office of Historical Preservation and the locations remain confidential.

7.1.3 Archaeological Resource Management

Sonoma County has a rich archaeological history, and the lands within and surrounding Taylor Mountain likely served as a significant resource for the native people. The potential for the disturbance of deposits and remains left by local Native American tribes is high. These artifacts represent an important resource for the Native American community and an important element of Sonoma County history.

A. Archaeological Resource Objective

Protect archaeological resources and human remains from disturbance.

B. Archaeological Resource Guidelines and Standards

Following the guidelines and standards below will help meet the above-mentioned objective.

ARCHAEOLOGICAL RESOURCE GUIDELINES

G121. New trails should be sited a minimum distance of 500' from known archeological sites. If development cannot avoid these areas, further study may be needed.

G122. Install educational signage at all trailhead locations that includes general information about the archaeological significance of the property and the need to respect resources on the property. See also G209-G214, S264 and S265.

ARCHAEOLOGICAL RESOURCE STANDARDS

S81. Archaeological sites shall be regularly inspected by Park staff or a designated consulting archaeologist. If vandalism or other adverse conditions are observed, staff will take the necessary actions to minimize any adverse impacts to those resources and address the vandalism or other changes in the condition of those resources.

S82. If any potentially-significant archaeological sites are uncovered, all work in the immediate vicinity of the discovery shall be halted immediately and the discovery evaluated by an archaeologist. Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and borders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Significant deposits will be removed using archaeological methods, or avoided and left in place.

S83. If human remains are encountered, excavation or disturbance of the location shall be halted and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be the most likely descendant from the deceased Native American. The most likely descendant will make recommendations regarding the treatment of the remains with appropriate dignity.

Image 27. *Main building at Kawana Springs, c. 1898.*
PHOTO: SONOMA STATE UNIVERSITY LIBRARY

7.2 HISTORICAL RESOURCES

7.2.1 Historical Overview

The area of Taylor Mountain that contains the most significant historical resources is known as Kawana Springs Resort and was developed in the 1860s through the turn of the twentieth century. Although the main building of the resort does not survive, elements of the complex remain that add to our understanding of the recreational and tourism history of Sonoma County.

Taylor Mountain was named for John Shackelford Taylor, one of the more famous of the Santa Rosa area's early residents. Taylor was born in Virginia in 1828 and came to California at the age of 21 as a prospector in the 1849 Gold Rush. He settled in Santa Rosa in 1853 before the establishment of the town.[1] Taylor became a prominent livestock rancher with a large house in the town of Santa Rosa. He also grew grapes and had a dairy. The profile of his business was in line with that

1 Gaye LeBaron, "SR's John Taylor Made the Most Out of his Mountain," *Santa Rosa Press Democrat* (28 August 2005).

of much of Sonoma County, where livestock ranching was a mainstay of the local economy in the late nineteenth century. Livestock ranching was a holdover from the land grant era; many of the practices of that era, including the annual round-up (or rodeo) were still in place. Grapes were also part of the production of Taylor's ranch, following another statewide trend as viniculture made tremendous increases in popularity in the early years of the 1860s.[2] Taylor married in 1876 and had two children, one of whom (his daughter Zana) would later live at the subject property (referred to in this section as Kawana Springs, the most recent name of the site).

In addition to its agricultural uses, Taylor's land possessed mineral hot springs, a common condition in the area. This prompted Taylor to establish a resort on the north end of his property close to the town of Santa Rosa, which he originally named White Sulphur Springs (later known as Kawana Springs).

The resort was known by several names, including Taylor's Springs, Taylor Sulphur Spring, and Taylor's White Sulphur Springs.[3] The date of its initial founding was approximately 1862, when many resorts were founded in the area due to the establishment of stage routes to bring tourists from San Francisco.[4] When the original resort building burned down in 1870, Taylor took the opportunity to expand the scope of his operation; the knowledge that rail service would arrive in Santa Rosa that year may have played into this decision. In 1870 he built a "charming two-story hotel with a wide veranda, a bathhouse, a gazebo, and landscaped grounds."[5] Of these buildings and structures, the gazebo, the garage, and the bathhouse (which was altered later) survive.

The resort relied on the patronage of those living in San Francisco, the nearest population center, many of whom would have been culturally attuned to the fashion for "taking the waters." The railroad arrived in Santa Rosa at the end of 1870, enabling easy access to these country sites; prior to that time, most travel to the springs resorts of the region was by stage coach, which in the 1870s (according to Gaye LeBaron) took five and one-half hours from San Francisco at a cost of $3.75.

Taylor's resort was a thriving business through the turn of the century, but the cataclysm of the 1906 earthquake changed the underlying geology of the area and the mineral springs that had sustained the resort ceased to produce. The resort continued to advertise its waters, although the flow may have lessened or changed. John Taylor leased the property to other operators after 1906. The name was changed in 1906 to "Kawana Springs Resort." A 1910 advertisement in the San Francisco Call (19 May 1910) for "Kawana Sulphur Springs" notes that the property was "named by Luther Burbank," Santa Rosa's best-known resident. "Beautifully

2 Mary Praetzellis, et al., *Before Warm Springs Dam: A History of the Lake Sonoma Area* (San Francisco, CA: U.S. Army Corps of Engineers, San Francisco District, 1985).

3 David Durham, *California's Geographic Names: a Gazetteer of Historic and Modern Names of the State* (Fresno: Quill Driver Books, 1998).

4 Gaye LeBaron, "SR's John Taylor Made the Most Out of his Mountain," *Santa Rosa Press Democrat* (28 August 2005).

5 Gaye LeBaron, "SR's John Taylor Made the Most Out of his Mountain," *Santa Rosa Press Democrat* (28 August 2005).

situated in the foothills of Taylor Mountain," the ad continues, "…its waters are unsurpassed. Headquarters for automobilists and traveling men." The managers were identified as "Preston & Winans, Santa Rosa, Cal." At this point, a few years after the 1906 earthquake, the resort was still advertising the waters from the springs, however compromised they may have been by the earthquake. Rather than arriving by coach in this period, people would arrive by their own private cars.

John S. Taylor died at the age of 99 in 1927. During this same year, a federal raid of the property revealed that the inn had been gutted and a large still had been constructed in the interior. According to LeBaron, the still was a major source of illegal alcohol supplied to the San Francisco Bay region; she notes that the federal officials estimated its production at up to 1,400 gallons a day. When this news reached Taylor's daughter Zana Weaver, who owned the property but was not living there at the time, she "was horrified to learn what the lessees had done to the gracious old hotel and she ordered it torn down." There has been no hotel on the property since the late 1920s. Gaye LeBaron describes that the resort was run as a "tavern or road house" after Taylor's death; by that time, the hotel would have been demolished and the bathhouse was probably the main building on the property.

Many resorts saw a dip in business and income during the period of Prohibition (1920-1933). Fewer people had the leisure time or disposable income for travel. The money made from alcohol sales at the resorts also ceased. The Taylor family was apparently unaware that the lessees of the property had converted it to another (illegal) use. Zana Weaver lived at the property beginning at an unknown date after the death of her husband, Eugene Weaver. Presumably it was for this purpose and at this point in time that the resort's bathhouse was converted to a residence. Zana Weaver died in 1970.

As late as the 1980s, the property was still in use, relatively well-tended, and available for rental for special events. By the early 1990s, the property was still tenant-occupied but it was no longer available for rental. Some of the property's springs reportedly flowed again after a 1969 earthquake, but only for a brief time.

7.2.2 Regulations and Criteria for Historic Resource Evaluation

Potential historic resources of Taylor Mountain were assessed as a part of the master planning process. The evaluation consisted of site visits to examine and photograph the Kawana Springs Resort area, primary and secondary research, and analysis of the buildings and site. The Kawana Springs Resort area was evaluated against the significance criteria of the National Register of Historic Places and the California Register of Historical Resources. Although Sonoma County does not have specific criteria for Landmarks, a review of their existing list of designations provided a basis for local evaluation.

A. National Register of Historic Places

The National Register of Historic Places (National Register) is the nation's master inventory of known historic resources. The National Register is

administered by the National Park Service (NPS) and includes listings of structures, sites, buildings, districts and objects that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state or local level. The National Register criteria and associated definitions are outlined in National Register Bulletin Number 15: How to Apply the National Register Criteria for Evaluation. The following is a summary from Bulletin 15:

Resources (structures, sites, buildings, districts, and objects) over 50 years of age can be listed on the National Register. However, properties under 50 years of age that are of exceptional importance or are contributors to a district can also be included on the National Register. The following list of definitions is relevant to any discussion of the National Register:

- **Structure:** a work made up of interdependent and interrelated parts in a definite pattern of organization. Generally constructed by humans, it is often an engineering object large in scale.
- **Site:** the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself maintains historical or archaeological value regardless of the value of any existing structure.
- **Building:** a structure created to shelter human activity.
- **District:** a geographically definable area - urban or rural, small or large - possessing a significant concentration, linkage, or continuity of sites, buildings, structures, and/or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history.
- **Object:** a material thing of functional, aesthetic, cultural, historical, or scientific value that may be, by nature or design, moveable yet related to a specific setting or environment such as a historic vessel.

There are four criteria for evaluation under which a structure, site, building, district, or object can be considered significant for listing on the National Register, as follows:

- **Criterion A:** are associated with events that have made a significant contribution to the broad patterns of history;
- **Criterion B:** are associated with the lives of persons significant in our past;
- **Criterion C:** embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;

- **Criterion D:** have yielded or may likely yield information important in prehistory or history.

A resource can be considered significant in American history, architecture, archaeology, engineering, and culture. When nominating a resource to the National Register, one must evaluate and clearly state the significance of that resource. A resource can be individually eligible for listing on the National Register for any of the above four reasons. A resource can also be listed as contributing to a group of resources that are listed on the National Register. In other words, the resource is part of a historic district as defined above.

B. California Register of Historical Resources

The California Register of Historical Resources (CRHR) is a listing of State of California resources that are significant within the context of California's history. The California Register criteria are modeled after National Register criteria. However, the California Register focuses more closely on resources that have contributed to the development of California.

All resources listed in or formally determined (by the State Office of Historic Preservation) eligible for the National Register are automatically listed in the California Register. In addition, properties designated under municipal or County ordinances are also eligible for listing in the California Register. The primary difference between the National Register and the California Register is that the latter allows a lower level of integrity. The property must be significant at the local, state, or national level under one or more of the following criteria:

- **Criterion 1:** it is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history and cultural heritage of California or the United States.
- **Criterion 2:** it is associated with the lives of persons important to the nation or to California's past.
- **Criterion 3:** it embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values.
- **Criterion 4:** it has yielded, or has the potential to yield, information important to the prehistory or history of the state or the nation.

The California Register criteria are linked to CEQA. Under CEQA resources are considered historically significant "if the resource meets the criteria for listing on the California Register" [Title 14 California Code of Regulations 15064.5 (3)].

C. County of Sonoma Historical Designations

The County of Sonoma has a historic preservation program that originated in 1974 that includes the surveying and designation of historic landmarks

and districts under the authority or guidance of a County Historic Preservation Commission. The Kawana Springs Resort is not among the County's currently listed landmarks.

The Criteria for Designation of Historical Landmarks are as follows:

- All structures, sites, and areas that are reminders of past eras, events, and persons important in local, state, or national history; or which provide significant examples of architectural styles of the past; or which are unique and irreplaceable assets to the County and its communities are eligible for consideration as a Sonoma County Historic Landmark.

Beyond this, the County's criteria essentially mirror the criteria of the National Register and California Register.

7.2.3 Evaluation of Historical Significance

The Kawana Springs Resort originated on this site nearly one hundred fifty years ago, and the structures on the site are over fifty years old. The site is associated with a significant person in local history, John Shackelford Taylor. The resort also represents significant historical themes in Santa Rosa's history, notably the tourism trade related to its proximity to San Francisco and the popularity of hot springs in Sonoma County. The Kawana Springs Resort property appears ineligible for listing in the National Register of Historic Places and the California Register of Historical Resources[6], yet the site and its remaining buildings may be eligible for designation as a Sonoma County Historic Landmark.

7.2.4 Existing Site, Buildings, Structures, and Site Features

A. Site

The site of the former Kawana Springs Resort is located in the northwestern area of the Taylor Mountain project site. The remains of this late nineteenth century resort form a small grouping of buildings and structures at the end of Kawana Terrace, a road that terminates in the open space approximately half a mile south and east of the nearest developed land.

The Kawana Springs Resort was located at a bend in Colgan Creek (also called Kawana Springs Creek), which runs through the property. Most buildings and structures are located south of the creek; a "garden area" was identified on the other side of the creek to the east (sketch map, Tom Origer and Associates, 9/14/2006).

The site of the Kawana Springs Resort consists of one building and two structures as well as a variety of objects in the landscape such as stone paths, bridges, and a small network of drives. These were depicted in a sketch map of the site from 2006 (Tom Origer and Associates 2006) and

6 Architectural Resources Group, Inc., Taylor Mountain Regional Park & Open Space Preserve Master Plan Historic Resources Evaluation Report (Draft June 16, 2010).

noted in a Phase One Environmental Site Assessment (EBA Engineering 2005). The former study describes two residences along with three outbuildings: a gazebo, a garage, and a building to house animals. Only one of the residences is historic and within the project site. The animal shed is located on the north side of the creek, outside the project site, and was not evaluated.

B. Bathhouse/Residence

The main building on the site is a former bathhouse that was converted to a residence. Over half of the building's footprint consists of additions to the north of the original portion. The building appears to have originated in the late nineteenth century when it was constructed as a bathhouse on the resort property. It appears to have been square in plan with a hipped, pyramidal roof with a small, square flat portion in the center. A stone chimney rises on the center of the south facade, and a pergola wraps the east, south, and west sides of the original building; the ground underneath the pergola is paved with flagstone. The siding covering all of the building is wood shiplap of a style that was widely used in the late nineteenth century; the older portions are distinguished from the newer portions by the presence of a broad board frieze at the top of the exterior walls, a feature not included in the later additions (though they otherwise have similar siding). The windows throughout are wood frame multi pane sash, with four-by-six light fixed windows in the main room and six-over-six double-hung sash

Image 28. *Bathhouse south elevation, 2011.*
PHOTO: ARG

elsewhere throughout. Utilitarian spaces have windows with single-light double-hung wood sash.

The bathhouse was converted to a residence at an unknown date (post 1920s) and has extensive additions from this conversion and possibly later. The profile and massing of the original building, however, remain prominent within the expanded building. This front portion is also the largest remaining historic feature on the resort site.

The main interior room has a vaulted ceiling with exposed wood beams and a stone fireplace (similar to the exterior stone of the chimney) with a wood mantel. This room was the major interior space of the old bathhouse.

Image 29. Gazebo, 2011.
PHOTO: ARG

C. Gazebo

The Queen Anne style gazebo is located approximately one hundred feet south of the bathhouse/residence along a roadway between the two structures. It is the most architecturally distinct structure on the site and the one that best connects the site to the pleasure- and health-seeking of the late nineteenth century through its fanciful design. The gazebo was created to house a still-extant spring head, which further increases its relevance to the historic use of the site.

The eight-sided structure has a pyramidal roof with a slight bell cast. The roof is covered in original fish-scale and saw-tooth wood shingles and capped by a decoratively saw-cut wood finial. The edges of the roof have a fringe-like trim of a repeating shape also saw cut in wood. The gazebo has a wood board ceiling. The posts that support the roof are square with chamfered edges, flanked by decorative brackets that form capitals at each corner with a bull's eye trim piece in the center-top of the column. A low wood railing with two turned wood posts per bay encloses the lower portion, with one bay open to pass inside. A raised spring basin occupies the center of the concrete floor.

Image 30. Gazebo detail, 2011.
PHOTO: ARG

D. Garage

The rectangular building that appears to be a garage has a shed roof and a small area (possibly for storage) enclosed with vertical board siding set in the center rear of the plan. The sides and rear are also enclosed with vertical board siding. The shed roof is lower in the rear and slopes upward towards the front. The wood roof framing supports a corrugated metal covering. Five arched bays punctuate the front façade, which is clad in horizontal board siding fixed to diagonal wood struts visible from the interior. A secondary series of structural posts (one at each bay) is located down the midpoint in a line parallel to the front. The garage does appear to be among the older structures on the property, but it was not a part of the visitor experience in the way that the bathhouse and gazebo would have been

The building is in very poor condition and unsafe. Due to its proximity to Colgan Creek, the foundation has been undermined and the entire east side of the building has been structurally compromised to the point where it is collapsing into the creek. The remainder of the building, including the arched west wall, is completely bound by mature vines which have damaged the structure, siding and roof.

Image 31. *Garage, 2011.*
PHOTO: ARG

E. Site Features

The original gardens on the Kawana Springs Resort property were characterized by their large trees and rounded beds of plants and flowers interspersed with areas of lawn and unpaved paths. Currently, most site features are obscured by dense vegetation and there is little documentary evidence of the original appearance of the site. Site features that still exist and are partially visible today include the concrete-lined pond with stone edges to the west of the bathhouse, the mortared stone alignment along the path to the south of this pond, and the flagstone paths and patios at the bathhouse. The prominently-placed date palm tree at the fork in the driveway may also be a remnant of the early landscape design. A concrete fountain in front of the bathhouse is not believed to be historic. Some elements of the garden area on the east side of the creek remain (Tom Origer and Associates 2006), but were not included in this study due to their inaccessibility.

7.2.5 Historical Resource Management

Whether or not the Kawana Springs Resort property is determined to be a Sonoma County landmark, it is recommended that all future work on or near the property should be carried out in accordance with The Secretary of the Interior's Standards for the Treatment of Historic Properties (The Standards). Projects that conform to The Standards are generally considered to not have a significant impact on historic resources and are generally exempt from CEQA. The Standards provide general information for stewards of historic resources to determine appropriate treatments. They are intentionally broad in scope to apply to a wide range of circumstances and are designed to enhance the understanding of basic preservation principles. The Standards are neither technical nor prescriptive but are intended to promote responsible preservation practices that help protect historical resources. The Standards provide philosophical consistency to a project. The four treatment approaches described in The Standards are Preservation, Rehabilitation, Restoration, and Reconstruction. Each treatment is defined by a series of broad guidelines. The approaches are outlined below in hierarchical order and explained as follows:

- *Preservation* places a high premium on the retention of all historic fabric through conservation, maintenance, and repair. It reflects a property's continuum over time, through successive occupancies, and the respectful changes and alterations that are made.
- *Rehabilitation* emphasizes the retention and repair of historic materials, but more latitude is provided for replacement because it is observed that the property is more deteriorated prior to work. Both Preservation and Rehabilitation standards focus attention on the preservation of those materials, features, finishes, spaces, and spatial relationships that, together, give a property its historic character.
- *Restoration* focuses on the retention of materials from the most significant time in a property's history, while permitting the removal of materials from other periods.
- *Reconstruction* establishes limited opportunities to re-create a non-surviving site, landscape, building, structure, or object in all new materials.

The buildings, structures, and site features that comprise the Kawana Springs Resort property are in need of architectural and structural repair. Of the four treatments outlined above, rehabilitation is the most appropriate for the Kawana Springs Resort property, as rehabilitation allows for flexibility in the adaptive re-use of a historic property. Changes and alterations may occur to stabilize and rehabilitate the buildings and structures on the exterior. On the interior of the buildings, changes and alterations may be desired to achieve modern requirements for comfort, function, and continued use.

No destructive or non-destructive testing was done. Such testing in the future may yield more information as to the chronology of the buildings and site and the remaining original features. With public outreach in the future, privately

held documents (photographs, personal correspondence, etc.) may be discovered. Additional physical evidence and documentary records may provide sufficient information to reproduce some original elements faithfully.

Other site features that are of significance to the history of Taylor Mountain can be found outside the Kawana Springs Resort site. The primary known features are a network of dry-stone fences; other features may be discovered in more remote areas of the Park and Preserve as the project progresses.

Specific guidelines and standards pertaining to the Kawana Springs Resort area can be found in Chapter 8.

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PHOTO: STEPHEN JOSHEPH

8. Conceptual Site Plan

Image 32. *Aerial view of Taylor Mountain from Bennett Valley with the Santa Rosa Plain in the background.*
PHOTO: STEPHEN JOSEPH

8. CONCEPTUAL SITE PLAN

8.1 INTRODUCTION

This chapter describes the overall design of the Taylor Mountain Regional Park and Open Space Preserve. It contains numerous guidelines and standards that relate to the physical development of the site's improvements. The guidelines and standards address specific topics such as trails, and key areas such as staging areas, development envelopes, and camping areas.

Guidelines and standards appear within the various sub-sections to which they pertain. As in the previous chapters, guidelines represent good design principles and/or best management practices, and should be followed wherever possible and feasible. Guidelines are, to an extent, discretionary and are open to the interpretation of Regional Parks and the District. A standard however, is less flexible and is required to be adhered to, primarily for the protection and management of natural resources.

Users of this document should be aware of the other important overlapping concerns that this plan addresses, and care should be given to interpret this chapter in the context of the overall Master Plan. For example, construction activities, regardless of how minor, will need to be implemented in consideration of the natural or cultural resources of the site.

Image 33. *View from an existing ranch road on the former Russell property.*
PHOTO: RRM

8.2 OVERALL CONCEPT PLAN DESCRIPTION

The goals and objectives for the Taylor Mountain Regional Park and Open Space Preserve emphasize the importance of protecting the natural and scenic resources of the property while accommodating reasonable recreational and passive access so that the public can enjoy the beauty and scenic richness of Taylor Mountain. This chapter describes and illustrates the concepts for development of trails and facilities to accommodate the allowable recreational and educational uses that may occur in various locations throughout the Park and Preserve.

The design concepts for trails and facilities were generated after considerable community input as described in Chapter 3 of this Master Plan. During the public outreach efforts, goals and objectives were discussed that guided the selection of allowable uses and the quality and type of development required to accommodate public access to the land for educational and recreational purposes.

The experience for visitors exploring Taylor Mountain is intended to be one that is largely based on appreciating the diversity of the natural conditions, habitats, plant communities and scenic vistas of the region. As shown in Figure 6, five staging areas function as gateways to the property, and provide a first impression of the property's richness. These primary access points will feature appropriate amenities, including information about the cultural and natural resources that lie within the Park and Preserve. The access points or staging areas described herein are located on Petaluma Hill Road, the interim lot off Kawana Terrace, the Kawana Springs Resort area, the terminus of Linwood Avenue, and at the end of Panorama Drive. The public access from Panorama Drive is limited to pedestrians and bicycles as well as vehicles with ADA placards and key cards, and groups with a special use permit. The other staging areas will provide public access for vehicles, pedestrians, mountain bikers, and equestrians.

The 17-mile trail system is described later in this chapter, and features six major trail loops that begin and end at the staging areas, comprised primarily of multi-use trails, with some pedestrian-only segments. The trail system is described in detail later in this chapter. There are many inherent benefits that public trails provide that collectively contribute to the general well-being of their users, including cleaner air, improved overall health, and even economic benefits to the community. In addition to these important contributions to the trail users, the trails at Taylor Mountain will provide educational benefits as the user will experience the specific plant and habitat communities that are being preserved and enhanced on the site. An editorial in The New York Times published in 1864 said, "Wilderness and recreation are two sides of the same coin". It is the essence of that balance between preservation of the Taylor Mountain wildness and the provision of recreation that the Master Plan seeks to provide.

8.3 ALLOWABLE USES

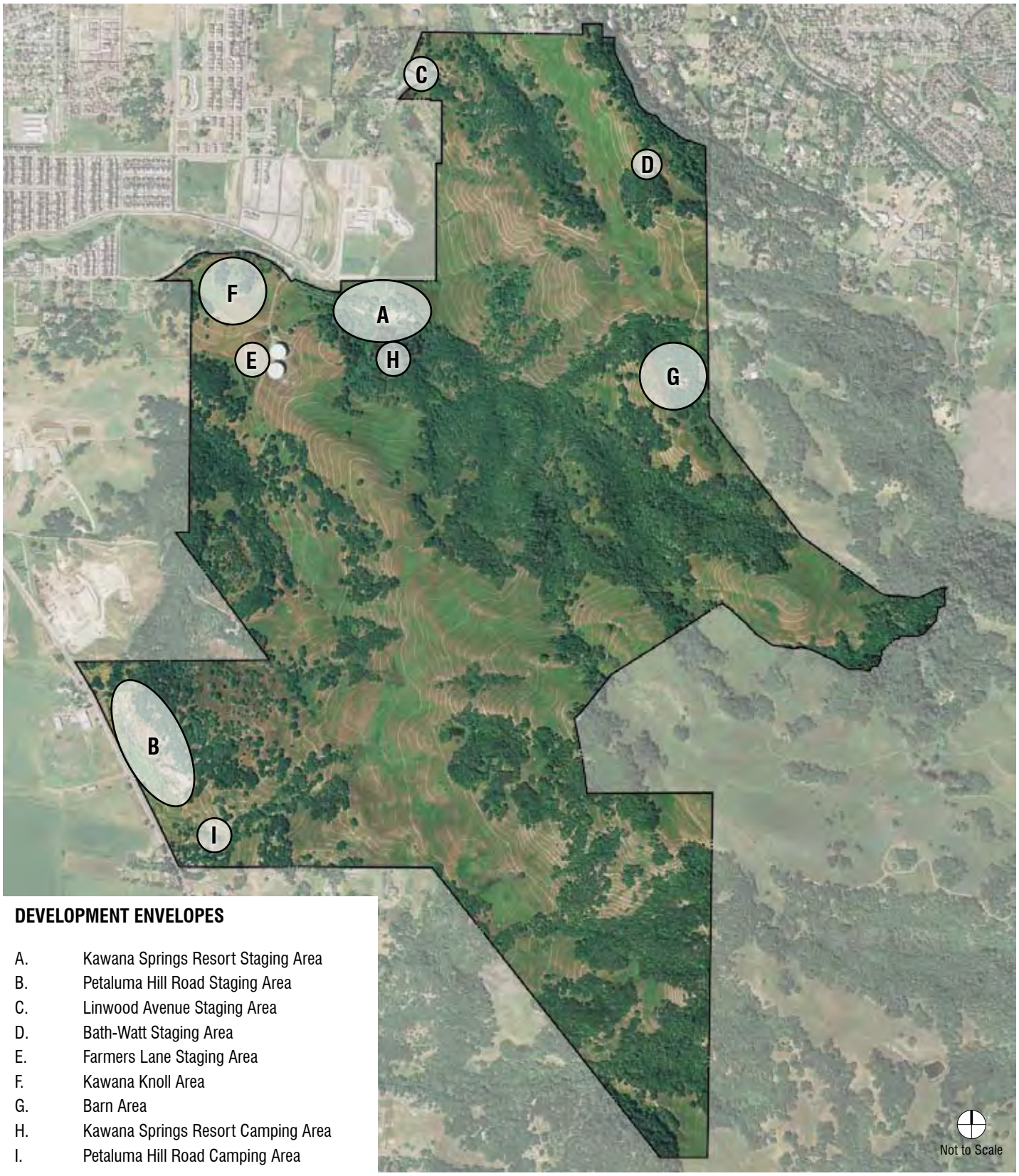
Early in the extensive public outreach efforts, community members participated in discussions and exercises to develop a list of potential uses for Taylor Mountain. The potential uses were discussed in terms of how they relate to the goals proposed during the workshop process. Most of the uses were consistent with the normal range of recreational activities found in existing Sonoma County regional parks. The District and Regional Parks checked all suggested uses against County policies and the District's purpose for acquiring the land, as described in Chapter 2. As described in Chapter 1, most organized uses and built structures will occur in development envelopes that are located on the edges of the property. Figure 6 identifies the nine development envelopes and Table 16 shows a matrix of allowable uses per location. The following site plans of the development areas do not necessarily include every allowable use, but are designed to include the uses most likely to be implemented. The guidelines and standards for each development area may also not reflect every allowable use, but are written to be consistent with Table 16.

8.4 TRAILS

Acknowledgement of the need for recreational trails in America began in the early twentieth century. In the 1930's and 1940's the Wilderness Society influenced the creation of the first federal funding proposals for a national system of wilderness trails. In California, the groundwork was laid for many long distance trails with the passing in 1945 of the California Riding and Hiking Trails Act. In 1968 the Pacific Crest Trail was established by the National Trails System Act. In the 2001 Progress Report to the Legislature on the California Recreational Trails Plan, State Parks Director Ruth Coleman referred to recreational trails when saying, "These facilities provide not only an outlet for the daily pressures of busy adults throughout the State, but also for the well-being of our children into the future." These significant national and state level efforts helped to give rise to local efforts for regional and site specific trail systems like the one proposed on Taylor Mountain.

The trail system proposed in this Master Plan is the principal means for providing comprehensive public access to Taylor Mountain. Access to nature provides the user with an opportunity to enjoy a sense of well being and an increased awareness of our natural and cultural treasures. Coupled with protection and enhancement of the site's natural resources, access for recreational and educational enjoyment was one of the primary reasons behind the acquisition of the scenic properties that comprise the 1,100-acre regional park and open space preserve.

The Taylor Mountain Regional Park and Open Space Preserve has many scenic and interesting destinations for park visitors who will travel along the trail system by foot, bike, or horse. Trail users will be able to experience a mixture of settings and environments, including the many native plants and micro climates found on the varied terrain. The trail system was conceived after extensive public input and consideration of the site's many unique opportunities and natural resource



DEVELOPMENT ENVELOPES

A. Kawana Springs Resort Staging Area
B. Petaluma Hill Road Staging Area
C. Linwood Avenue Staging Area
D. Bath-Watt Staging Area
E. Farmers Lane Staging Area
F. Kawana Knoll Area
G. Barn Area
H. Kawana Springs Resort Camping Area
I. Petaluma Hill Road Camping Area

Figure 6. Development Envelopes.

Figure 7. Conceptual Site Plan

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Allowed Uses Per Location									
	Location								
Use	Petaluma Hill Road Staging Area (including camping area)	Kawana Springs Resort Staging Area (including camping area)	Kawana Terrace (Interim) Staging Area (pre-FLE)	Farmers Lane Staging Area (post-FLE)	Kawana Knoll Area	Linwood Avenue Staging Area	Bath-Watt Staging Area	Barn Area	Trails
Benches	✓	✓	✓	✓	✓	✓	✓	✓	✓
Picnic tables	✓	✓	✓	✓	✓	✓	✓	✓	
Small group picnic areas	✓	✓	✓	✓	✓	✓		✓	
Large group picnic areas (up to 75 by reservation)	✓	✓	✓		✓				
Individual/environmental camping (up to 8 by reservation)	✓	✓							
Group camping (up to 25 by permit)	✓	✓							
Fire pits / cooking fires / BBQ's		✓							
Camp stoves only	✓								
Primitive cabins / yurts	✓	✓							
Natural play course	✓	✓	✓		✓				
Disc golf course	✓				✓				
Off-leash fenced dog park	✓	✓			✓				
Outdoor classroom / small amphitheater	✓	✓			✓			✓	
Visitor center / structure	✓	✓							

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Table 16. Allowed Uses per Location.

Allowed Uses Per Location									
	Location								
Use	Petaluma Hill Road Staging Area (including camping area)	Kawana Springs Resort Staging Area (including camping area)	Kawana Terrace (Interim) Staging Area (pre-FLE)	Farmers Lane Staging Area (post-FLE)	Kawana Knoll Area	Linwood Avenue Staging Area	Bath-Watt Staging Area	Barn Area	Trails
Community and demonstration gardens	✓	✓							
Café		✓							
Mobile food vendor	✓	✓	✓						
Rental space for daytime special events (limitations)	✓	✓	✓					✓ (education only)	
Indoor Accommodations		✓ (inn/B&B)						✓ (groups by permit)	
Maintenance shed(s)	✓	✓	✓			✓		✓	
Horse trailer parking	✓	✓ (in the long-term)	✓			✓			
Horse stables (8 total)	✓	✓							
Corral (for up to 12 horses)	✓	✓							
Restrooms (fixed or portable)	✓	✓	✓	✓	✓	✓	✓	✓	
Lighting - security (restroom)		✓						✓	
Lighting - entry (outside)		✓ (porch light)						✓ (motion sensor)	
Lighting - low-level wayfinding, including at parking areas		✓							

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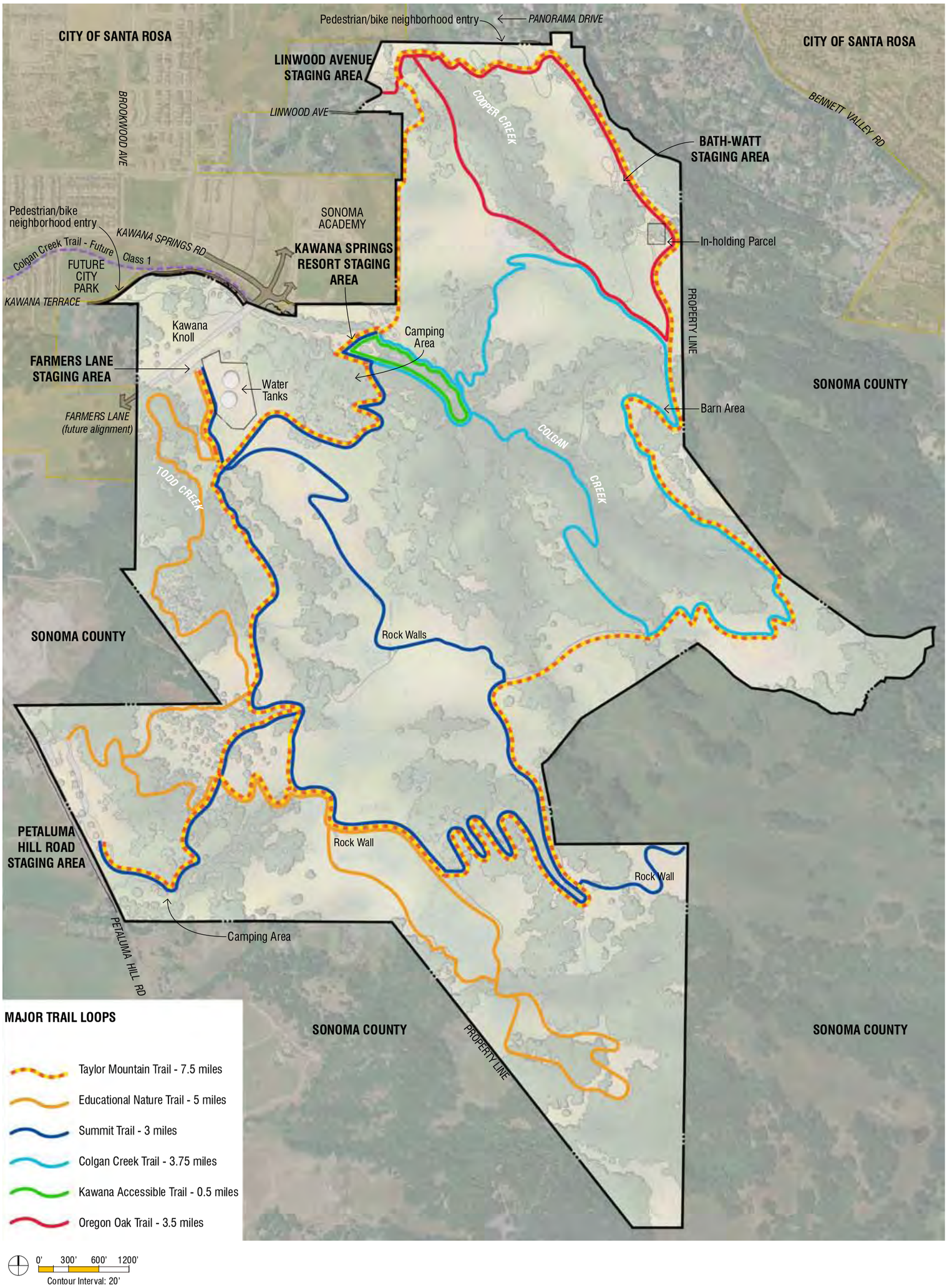

Figure 8. Major Trail Loops

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constraints. Figure 9 shows the proposed trail network, which can be organized into six loops.

Each of the trail loops and alignments were routed to allow users to view and experience a variety of native plant communities, and scenic vistas, while offering a range of degrees of difficulty and trail length. The trail alignments depicted on the Master Plan illustrate the intended routes and destinations but do not represent the precise location or distance of each trail footprint. By following the guidelines and standards contained throughout this Master Plan, trail planners will implement the intent of the trail route, while minimizing impacts and respecting core habitat areas.

8.4.1 Trail Types

Taylor Mountain Regional Park and Open Space Preserve will have two basic trail classifications: ***multi-use*** and ***pedestrian-only***.

A. Multi-Use Trails

Most of the trails on the Taylor Mountain property are defined as multi-use, which means they are open to the general public for hiking, mountain biking, and equestrian use. Multi-use trails will be constructed of native soil, stabilized soil, or gravel, with the possible exception of segments designated as "accessible" that are required to have an all-weather surface to comply with California State Parks Accessibility Guidelines.

There are three types of multi-use trail included in the Master Plan:

- **10' wide road.** This unpaved road will be open to emergency and Regional Parks maintenance vehicles in addition to all allowed trail users.
- **6' wide trail.** This is the predominant trail type in the Master Plan, and can comfortably accommodate hikers walking two or even three abreast.
- **1.5' wide single-track.** A limited number of trails are indentified as single-track. These segments are narrower than other trails, and are intended to be used in single-file formation. They provide a different experience for trail users, and also enable routes to traverse areas with steep terrain.

Multi-use trails such as these are consistent with the trail types found in other Sonoma County regional parks, and allow the most amount of users to gain access to the site's highlights and significant features. However, these trails can trigger a certain amount of friction between the different types of trail users. Recognition of common conflicts that may occur between different types of trail users is vital when planning multi-use trails. Research done on this topic indicates that the reasons for these conflicts are numerous; some factors include the mode of the experience (bird watchers

who are seeking a quiet experience will not mix well with mountain bikers who are seeking thrills and speed), activity style (such as intensity of participation), and tolerance for lifestyle diversity (some people have a tendency to not like or approve of others who do not share their values and priorities).

Following the guidelines and standards listed later in this chapter will help to avoid or mitigate some of the conflicts that can occur between trail users.

B. Pedestrian-Only Trails

In response to public requests for the provision of some quieter, more peaceful experiences within the trail system, the Master Plan features a select number of trails that will be limited to pedestrian use only.

In terms of construction, pedestrian-only trails are similar to multi-use trails, but will be signed at key locations alerting users to the trail's use limitations. Additionally, certain segments of the pedestrian-only trails are designed to meet the criteria for an "educational nature trail" as defined in Section 41 of the California State Parks Accessibility Guidelines.

There are a small number of instances where a pedestrian-only trail crosses a wetland or seep. In these areas, a boardwalk is an appropriate way to get trail users close to these sensitive habitats without adversely impacting the environment, and for providing environmental education opportunities.

8.4.2 Stacked Loop Trail Concept

The approximately 17-mile trail network is comprised of six major loops that expand outward to provide access to the key destinations located throughout the site. The loops share interconnecting trails to create additional loops and increase the variety of trail experiences while reducing the potential fragmentation of habitats found along the trail alignments. The resulting trail network is a series of stacked loops that start out with short distances and easier routes, and expand to longer routes with more challenging terrain.

The trails are accessible to the public from trailheads located at five staging areas, and from two additional walk/bike-in neighborhood entries at Kawana Terrace and Panorama Drive. Park visitors will access a desired trail from one of the staging areas depending on the trail segment or loop they are selecting to experience. Since the trails interconnect, beginning a hike or ride on a particular trail from different staging areas will change the trail experience, further enhancing the concept of the stacked loop trail system.

The six tentatively-named loops that are illustrated in Figure 8 and are described below are:

- Taylor Mountain Trail
- Colgan Creek Trail

- Grasslands Trail
- Kawana Trail
- Oregon Oak Trail
- Summit Trail

8.4.3 Trail Descriptions

The following are descriptions of the six major trail loops. The difficulty classifications listed - easy, moderate, and challenging - are subjective, and represent the relative overall strenuousness of each trail. Generally speaking, the difficulty classifications are defined as:

- ***Easy*** trails are typically flat or gently undulating, with most slopes less than 5%. Occasional steeper sections may be encountered, but are very limited.
- ***Moderate*** trails feature slopes that are often between 5% and 8%, and occasionally steeper for short distances
- ***Challenging*** trails feature significant elevation gains and/or losses, and frequent steep sections in excess of 8% slope.

A. Taylor Mountain Trail

- Trail type: multi-use including some single-track
- Length: 7.5 miles
- Difficulty level: moderate to challenging
- Highlights: highest point on property, the knoll, northern valley, the Kawana Springs Resort area, city and regional views
- Habitats: wetlands and aquatic, grassland, scrub, forest and woodlands

B. Colgan Creek Watershed Trail

- Trail type: multi-use including some single-track
- Length: 3.75 miles
- Difficulty level: easy to moderate
- Highlights: Kawana Springs Resort area, the knoll, the barn area, city and regional views
- Habitats: aquatic, forest and woodlands, grasslands

C. Grasslands Trail

- Trail type: pedestrian-only including some boardwalk segments
- Length: 5.0 miles
- Difficulty level: easy to moderate

Image 34. *The Taylor Mountain Trail is the longest loop, and skirts along the property-line in several places.*
PHOTO: RRM

Image 35. *Existing roadbed that parallels the Colgan Creek channel.*
PHOTO: RRM

Image 36. *Rock outcrops along the Grasslands Trail.*
PHOTO: RRM

Image 37. *The Kawana Springs Resort is a feature of the Kawana Trail.*
PHOTO: RRM

Image 38. *Oregon Oak Trail habitat.*
PHOTO: RRM

Image 39. *Historic stone wall near the top of the Summit Trail.*
PHOTO: RRM

- Highlights: southern end of property, rocky outcrops, wetlands
- Habitats: wetland and aquatic, grassland, forest and woodlands

D. Kawana Trail

- Trail type: accessible multi-use
- Length: 0.5 miles
- Difficulty level: easy
- Highlights: Kawana Springs Resort area
- Habitats: aquatic, forest and woodlands

E. Oregon Oak Trail

- Trail type: multi-use including some single-track
- Length: 3.75 miles
- Difficulty level: easy to moderate
- Highlights: northern valley, city views
- Habitats: forest and woodlands, grassland, aquatic

F. Summit Trail

- Trail type: multi-use
- Length: 3.0 miles
- Difficulty level: moderate to challenging
- Highlights: highest point on property, city and regional views
- Habitats: grassland, wetland, forest and woodlands

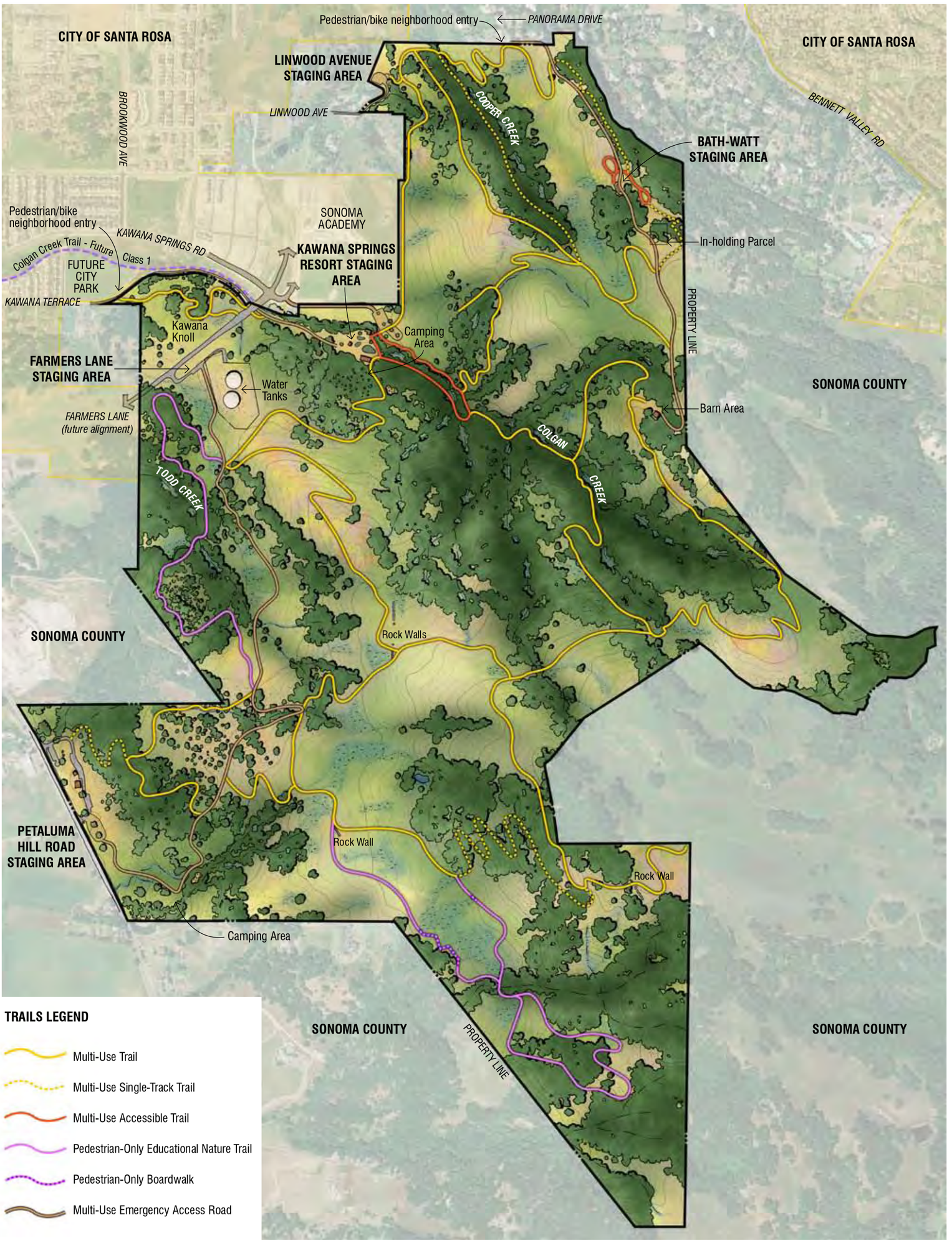

Figure 9. Trails Map.

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8.4.4 Trail Guidelines and Standards

The following pages contain guidelines and standards for designing and constructing the trail system on Taylor Mountain. General information is presented that applies to all trails, followed by specific detail on each of the different trail types.

A. General Trail Design and Construction

The following is a list of general guidelines and standards that apply to all trail types within the Taylor Mountain Park and Preserve.

GENERAL TRAIL DESIGN AND CONSTRUCTION GUIDELINES

G123. Trails should be located on existing roads or trails wherever possible and appropriate.

G124. Opportunities should be provided for visitors to experience a variety of environments, settings, and features.

G125. Strategies should be implemented to keep visitors on trails and discourage informal trail creation. These may be: installing clear directional signage at trailheads and intersections, providing educational signage, using volunteer trail patrols, engaging trail users in park stewardship, and keeping trails well maintained and usable.

G126. Benches or other seating opportunities should be provided along trails at key locations such as: at the top of steep inclines, near educational exhibits, at significant viewpoints, and at other intermittent locations. Benches should be sensitively placed in the landscape, such as under large shade trees. Avoid placing benches or other infrastructure in native grasslands. Fallen trees collected on-site can be utilized for the construction of rustic benches provided they are free of SOD.

G127. Trail alignments should be planned to minimize ground-alteration activities. Where ground alteration is unavoidable, revegetate promptly. See also S57.

Image 40. Full bench trail construction.
PHOTO: I.M.B.A.

Image 41. Trail surfing the contours.
PHOTO: I.M.B.A.

Image 42. Log causeway.
PHOTO: REGIONAL PARKS

Image 43. *Rock drain lens.*
PHOTO: REGIONAL PARKS

Image 44. *Armored crossing.*
PHOTO: REGIONAL PARKS

Image 45. *Switchback with barrier.*
PHOTO: REGIONAL PARKS

GENERAL TRAIL DESIGN AND CONSTRUCTION STANDARDS

S84. To maximize accessibility for most users, all trails shall meet the following criteria wherever practicably feasible:

- Minimum 32" in width. Exception: trail segments identified as single track may be narrower.
- Minimum 80" vertical clearance (to overhanging tree limbs, etc). If this cannot be mitigated, a cane-detectable barrier to warn the visually impaired shall be provided.

S85. Visual impact of trails shall be minimized. Final routing should be carefully considered in order to preserve the integrity of viewsheds into the property from the City of Santa Rosa and adjacent lands, and also from within the property. See also G137.

S86. Erosion shall be avoided or minimized to the greatest extent feasible. See also G95, G96, S22, S23, S29, S37, S87, S94, S95, S98, S141 and S267.

S87. Full bench construction shall be used where feasible. This means the full tread width is supported by undisturbed soil without the need for fill on the downhill side. This technique results in more stable trails that are less susceptible to erosion.

S88. Locally-sourced materials shall be used for trail construction if available.

S89. Recycled and/or renewable materials shall be used for trail construction where feasible.

S90. A clinometer or other device shall be used to determine running slope of final trail layout. See Table 17 for running slope standards.

S91. In instances where existing trails or roads are decommissioned, disturbed area shall be revegetated promptly with native plants in accordance with S57.

S92. All applicable County, State, and federal regulations for construction activities that are current at the time of construction shall be complied with.

S93. Rolling dips shall be constructed to direct water off the trail for minor seasonal drainage crossings and at appropriate intervals based on trail slope.

S94. Armored rolling dips shall be constructed at moderate seasonal drainage crossings to minimize erosion and sediment impacts and provide all weather access for trail users.

S95. Log causeways, armored crossings, or drainage lenses shall be constructed at seasonally wet areas (those that are not identified as wetlands) to minimize erosion and sediment impacts and provide all-weather access for trail users.

S96. Corner-cutting shall be discouraged through the use of physical barriers or by veering the trail away quickly at switchbacks.

S97. The development of new trail crossings over stream channels and through riparian vegetation shall be avoided to the greatest extent feasible. Where possible, trails shall be located on existing stable roads or pathways rather than developing new trails through undisturbed riparian habitat. See S20 and S66.

S98. New riparian/creek crossings shall be located on geomorphically stable sites (i.e. low slopes in channel and banks) and constructed to minimize, to the greatest extent possible, streambank and bed erosion. See S20 and S66.

S99. Location of landslides shall be confirmed prior to the construction of trails. New trails shall not exacerbate landslides. Development of new public trails through landslide areas shall be avoided.

B. Multi-Use Trails

A multi-use trail is able to be used by pedestrians, bikers, and equestrians. Most of the trails in the Taylor Mountain property are multi-use.

MULTI-USE TRAIL DESIGN AND CONSTRUCTION GUIDELINES

G128. Easy trail sections should be provided close to staging areas.

G129. Sudden transitions between open, straight sections and tighter, curvy sections of trail should be avoided. Smooth transitions help cyclists maintain control at higher speeds, and reduce a common cause of conflict with pedestrians.

G130. Trails should "surf the contours". On side slope traverses, consider creating a trail that dips and rises frequently but subtly about every 20' to 40'. Use existing natural barriers such as boulders or trees to surf around. This adds interest, and is especially appealing for mountain bikers.

Image 46. Multi-use trail.

Image 47. Multi-use single-track trail.

G131. Frequent grade breaks should be incorporated into trail routes. Long runs of constant grade encourage excessive cycling speed (if downhill), can be boring (if uphill), and can accelerate erosion issues. Long climbs with short descents mixed in allow users to catch their breath and regain momentum.

G132. Trails should provide good visibility to users when approaching sharp turns or crests.

G133. Trails should be designed to control speeds. Some techniques to consider include: add frequent turns, add or leave existing barriers, vary the terrain and trail surface, make steep sections one-way up only.

G134. At busy staging areas, consideration should be given to separating the different user groups by providing each group with their own trailhead. This allows the users on the trail to thin out before the trails converge into one trail a short distance ahead.

Multi-Use Trail Design and Construction Standards

S100. Width shall be between 32" and 72" (48" is ideal if terrain allows). Exception: single track segments may be as narrow as 18", and emergency access routes shall be 8' to 10' wide.

S101. Average trail slope shall be 10% or less for distinct segments of trail over the length of the trail. In other words, a trail from the Kawana Springs Resort staging area to the barn may have relatively flat segments and much steeper segments, but the average gradient shall not exceed 10%.

S102. Clear tread width shall be a maximum of 72".

S103. The running slope of a trail shall not exceed half the cross slope of the hillside (also known as the "half-rule").

Table 17. Running Slope Standards for Trails.

Percent Slope	Maximum Length	Rest Interval (min.)
0% to 5.0%	No Restriction	No Restriction
5.1% to 8.33%	200'	Every 200'
8.34% to 10%	30'	Every 30'
10.1% to 12%	10'	Every 10'

S104. Running slopes in the direction of travel shall be as shown in Table 17.

S105. Trail cross slope (perpendicular to the direction of travel) shall be 5% maximum, except at armored crossings and rolling dips where cross-slope shall not exceed 10%.

S106. Resting spaces shall be no less than 60" in length, and less than 5% running slope at the intervals listed in Table 17.

S107. Steps shall not be permitted on multi-use trails.

S108. Trail shall be constructed with pervious material. Appropriate materials are native soil, stabilized soil, and gravel.

S109. Trails shall be routed to the uphill side of established trees to avoid roots, and to utilize the structural support they provide.

S110. Cattle guards shall be installed at fence crossings. See Chapter 6, Grazing for more information related to fencing.

C. Educational Nature Trails

An educational nature trail is defined by the California State Parks Accessibility Guidelines as a pedestrian-only trail whose primary purpose is to educate the public on the natural or cultural resources of the area. On Taylor Mountain these trails will not be open to bikers or equestrians, and will offer visitors on foot the opportunity for a calm and relaxing experience. Educational nature trails place an emphasis on providing access to a variety of environments and features with a corresponding interpretive program aimed at highlighting the natural and cultural resources of the property. These trails are located at lower elevations of the property, and although they may contain some short, steeper segments they are relatively easy routes.

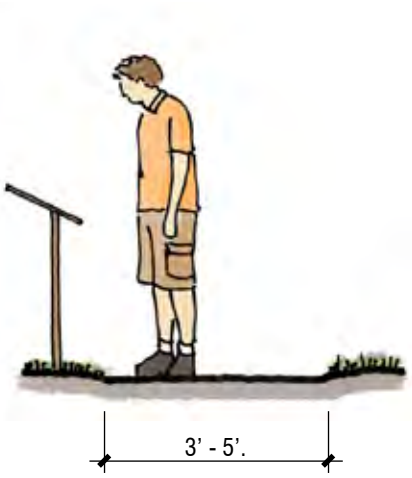

Image 48. Educational nature trail.

EDUCATIONAL NATURE TRAIL DESIGN AND CONSTRUCTION GUIDELINE

G135. Overall average slope should be gentle, preferably 5% or less. Steeper sections should be kept to a minimum.

EDUCATIONAL NATURE TRAIL DESIGN AND CONSTRUCTION STANDARDS

S111. Educational nature trails shall be pedestrian-only.

S112. Clear tread width shall be 3' minimum, and 5' maximum.

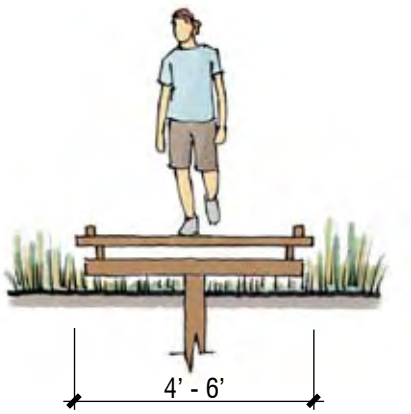

Image 49. Boardwalk with single-post construction technique.

Image 50. Volunteers constructing a boardwalk with steel helical piers to minimize ground disturbance.
PHOTO: LEIGH DRAPER

S113. Running slopes in the direction of travel shall be as shown in Table 17.

S114. Widened areas shall be provided near interpretive signage and at frequent intervals along trail to enable small groups to gather and/or pass.

S115. When an educational nature trail crosses a wetland or seep, a boardwalk shall be constructed. See boardwalk guidelines and standards below.

BOARDWALK DESIGN AND CONSTRUCTION GUIDELINES

G136. Boardwalks should be constructed using the longest practicable post spacing to minimize site disruption.

G137. Boardwalks should be constructed between 12" to 18" above the ground where practical to avoid need for safety rails, and to minimize visual impact.

G138. Boardwalks should have frequent changes in direction to provide interest, minimize visual impact, and discourage non-permitted (i.e. mountain biking and equestrian) use.

G139. Boardwalk width should be wider where interpretive or educational exhibits are located.

G140. Technology and installation techniques should be utilized to minimize disruption to the site. For example, steel helical piles have a smaller footprint and require less excavation than wood posts.

BOARDWALK DESIGN AND CONSTRUCTION STANDARDS

S116. Boardwalks shall be pedestrian-only.

S117. Clear tread width shall be 48" minimum, and 72" maximum.

S118. Openings in the surface shall not be greater than ½" wide.

S119. Elongated openings shall be either perpendicular or diagonal to the dominant direction of travel. Exception: Openings may run parallel to the direction of travel if the openings are no wider than ¼".

S120. Running slope shall not exceed 3%.

Image 51. *Boardwalk segment of the educational nature trail with interpretive signage.*

S121. Cross slope perpendicular to the direction of travel shall not exceed 2%.

S122. Objects that protrude into the boardwalk between 27" and 80" from the deck surface, such as a mounted sign, shall not protrude more than 4" into the path of travel. Objects mounted below 27", such as an interpretive exhibit or bench, may protrude any amount but shall not reduce the clear width of the boardwalk to less than 36".

S123. Install a safety rail or toe plate wheel guard along edge if boardwalk surface is equal to or greater than 30" above the adjacent ground.

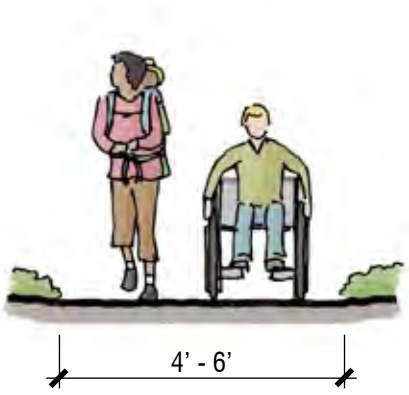

Image 52. Accessible trail.

D. Accessible Trails

In keeping with the stacked loop concept, ADA-accessible trails shall be connected to developed staging areas. They are intended to be the most easily accessible of all the trail types and should comply with Americans with Disabilities Act (ADA) guidelines. These trails are intended to be utilized by the broadest section of the community, including the physically impaired, seniors, and parents/caregivers with strollers or wheelchairs.

ACCESSIBLE TRAIL DESIGN AND CONSTRUCTION GUIDELINE

G141. Accessible trails should be a loop where feasible.

ACCESSIBLE TRAIL DESIGN AND CONSTRUCTION STANDARDS

S124. Primary facilities and programs shall be connected by an outdoor recreation route pursuant to ADA Section 1016.

S125. Clear tread width of accessible trails shall be 48" minimum, and 72" maximum.

S126. Cane-detectable edging shall be provided along at least one side of accessible trails. This can either include an elevation change (such as curb, 3" minimum height), or texture change (such as a transition from gravel to vegetation).

S127. Running slopes of accessible trails in the direction of travel shall be as follows:

- 5% or less for any distance.
- From 5.1% to 8.33% for 200' maximum.

S128. Cross slope (perpendicular to the direction of travel) of accessible trails shall be 3% maximum.

S129. Where accessible trail clear tread width is less than 60", and the running slope is greater than 5%, a 60" long resting space shall be provided at least every 200'.

S130. Accessible trails shall be constructed with an all-weather surface that retains its surface integrity when wet. Examples include stabilized soil or decomposed granite, wood or plastic decking, unit pavers, asphalt paving, or concrete.

S131. Steps shall not be permitted on accessible trails.

S132. Accessible trails shall not have tread obstacles, such as roots or rocks, higher than 3".

S133. Objects that protrude into an accessible trail between 27" and 80" from the ground shall not protrude more than 4". Objects mounted below 27", such as interpretive exhibits or benches, may protrude any amount but shall not reduce the clear width of the trail to less than 36".

E. Emergency Access Road

These routes are designed to allow emergency vehicles and other authorized vehicles (such as Regional Parks operations and maintenance trucks) occasional access to some key areas of the mountain, and will have the character of a ranch road. In daily use, emergency access routes simply function as wide multi-use trails. It is acknowledged that these routes do not provide access to large portions of the property, but rather make vital cross-property connections such as between Petaluma Hill Road and Kawana Springs Resort staging areas. In the event of a true emergency, these roads would present a launching point for 4WD vehicles to access more remote areas.

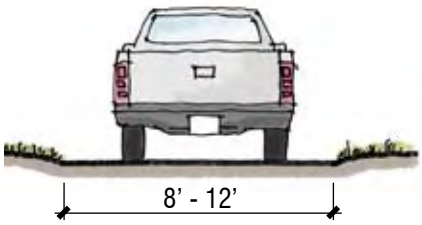

Image 53. Emergency access road.

Emergency Access Road Design and Construction Standards

S134. Emergency access roads shall be permeable wherever feasible. Suitable materials include compacted or stabilized native earth, or gravel.

S135. Emergency access roads shall be a minimum of 8' wide and a maximum of 12'.

S136. Corner radii shall be 20' minimum to accommodate truck turning movements.

8.5 STAGING AREAS AND DEVELOPMENT ENVELOPES

The following section identifies guidelines and standards for the staging areas and development envelopes, and includes conceptual site plans for each staging area based on the allowed uses that are most likely to be implemented. This section applies to all the staging areas and additional development envelopes shown in Figure 6.

A. General Design and Construction

GENERAL DESIGN AND CONSTRUCTION GUIDELINES

G142. Vehicular and pedestrian paving should be permeable wherever feasible. See also G166, G178, S151 and S214.

G143. Site lighting should be operated with motion-sensors, timers, and/or automated photo cells to regulate and minimize the effects on wildlife. See also S148, S162, S172, S202 and S211.

G144. Alternative, renewable energy sources should be considered wherever feasible. See also G186.

G145. Existing ranch buildings and structures (such as the shacks on the former Bath-Watt property) should be left intact if safe, to highlight the historic ranching uses of the property.

G146. Stone fences should be inspected by staff or designated consulting archaeologist on a quarterly basis, or more often if vandalism or other adverse conditions are observed, to ensure that the permitted public access has not resulted in adverse impacts and to address vandalism or other changes in the condition of the fences. See also S258.

GENERAL DESIGN AND CONSTRUCTION STANDARDS

S137. Low Impact Development (LID) principles shall be implemented when designing all trails and other amenitites to the greatest extent feasible. Further information can be found on the Environmental Protection Agency website: www.epa.gov/owow/NPS/lid. See also S21 and S151.

S138. Sensitive environments shall be avoided wherever feasible. Priority areas for conservation are noted on Figure 4 in Chapter 5. See also G41 and S66.

S139. All development other than trails shall be contained within the designated development envelopes shown in Figure 6.

S140. If any potentially-significant paleontological sites are uncovered, all work in the immediate vicinity of the discovery shall be halted immediately and the discovery evaluated by a qualified paleontologist. See also G121, G122, and S81-S83.

S141. Staging area development shall comply with the statewide Construction General Permit, including the preparation and implemention of a Stormwater Pollution Prevention Plan (SWPPP) that includes detailed erosion and sedimentation controls and BMPs for controlling stormwater runoff. See also S151.

S142. Structural improvements and staging areas shall be appropriately landscaped to minimize visual impacts on public views and scenic vistas. See also G189 and S147.

S143. Soil studies shall be conducted in advance of septic system design work. Leach fields shall be designed and located to avoid sensitive resources and habitats. Restrooms shall not be installed until suitable leach field location has been identified.

S144. Restrooms that feature waterless systems shall be allowed, provided they meet County standards.

S145. Site improvements that require water shall not be constructed until a suitable water source has been identified and is available.

S146. Lockable gates shall be installed at all vehicular access points. Gates shall have both County and City knox padlocks installed.

S147. New buildings and structures shall be limited to 14' height, maximum. Exception: new bed and breakfast inn at Kawana Springs Resort staging area may be 20' high. See also S142.

S148. All site lighting shall have full cut-off fixtures (also known as "dark-skies friendly"). See also G143 and S162.

S149. New buildings shall comply with the California Green Building Standards Code (CALGreen) where applicable.

S150. Landscaping shall comply with the Sonoma County Water Efficient Landscape Ordinance. See also G168, S60 and S157.

S151. Site drainage shall be designed according to governing agencies' regulations and the Storm Water LID Technical Design Manual. Stormwater should be retained on-site to the greatest extent feasible. See also S21, S137 and S141.

Image 54. *Bathhouse renovated into a visitor center with demonstration gardens in foreground.*

B. Kawana Springs Resort Staging Area

The Kawana Springs Resort area is planned to be one of the primary staging areas for accessing Taylor Mountain, the other one being Petaluma Hill Road. Although the area is steeped in history, it has been deemed ineligible for listing on either the National Register of Historic Places or the California Register of Historic Resources. As a result, Regional Parks and the District can exercise discretion in the renovation, restoration, or improvement of the existing structures and their surrounds.

The Master Plan envisions this area as the heart of the property, with a wide variety of visitor-serving facilities throughout the historic core, including a vistor center in the existing bathhouse, demonstration native gardens, picnicking areas, a special event lawn, restrooms, trailheads, a new vehicular bridge across Colgan Creek, and an outdoor classroom. The existing driveway is retained. For a list of allowable uses in this area see Table 16. The historic

core is the area between the creek and the original hotel site, including the bathhouse and gazebo.

Two plans are shown herein for development of the Kawana Springs Resort Staging Area, short-term and long-term.

Short-Term Plan. Figure 10 shows the proposed short-term improvements to the area. The need for a short-term plan is primarily due to two reasons:

- Before Farmers Lane is extended through the Taylor Mountain property, less parking spaces are required at the Kawana Springs Resort Staging Area due to the existence of the interim access parking lot. The decommissioning of the interim lot at the time of the Farmers Lane extension will trigger the need for a larger lot at the Kawana Springs Resort staging area.
- The short-term plan depicts less substantial improvements in order to be respective and sensitive to the privacy of the life estate residents whose property is immediately adjacent to the staging area.

Access to the Kawana Springs Resort staging area in the short-term would be from the end of Kawana Terrace in either of the following two ways:

- Access via Kawana Terrace to the parking area shown on Figure 10. Kawana Terrace would be converted to a park driveway starting at the Park and Preserve boundary. The driveway from the end of Kawana Terrace would have a 5 mph speed limit and would require construction of pull-out locations.
- Access via Kawana Terrace to the long-term parking area shown on Figure 11, on the north side of Colgan Creek. A new bridge would cross Colgan Creek that could accommodate pedestrians, bikers, equestrians, and vehicles, including maintenance and emergency vehicles. An option for this approach would be to provide a one-way loop by continuing the road to the boundary between the Taylor Mountain property and Sonoma Academy, and then west along the boundary, connecting to Kawana Springs Road. This additional road would require approximately 12 to 14' of paved surface and approximately 2' of unpaved shoulder. The optional loop road could also be constructed as a two-way loop road which would require increasing the paved width to approximately 24'.

Long-Term Plan. Figure 11 depicts a long-term vision for the staging area that essentially builds upon the short-term plan. The basic arrangement of the site is the same, with the addition of a small bed and breakfast inn, and a new parking lot on the north side of Colgan Creek adjacent to the boundary between the Park and Preserve and Sonoma Academy that could accommodate 60 or more parking spaces. The parking lot used in the short-term could either be retained or decommissioned and used for other purposes.

Figure 10. Kawana Springs Resort Staging Area, Short-term Site Plan.

Figure 11. Kawana Springs Resort Staging Area, Long-term Site Plan.

Image 55. *Kawana Springs Resort short-term improvements with restored gardens and special event areas.*

The 3.7-acre life estate area will present considerable opportunities when it expires in the future. The buildings could be utilized, for example, for park ranger housing or as guest accommodations for visiting research scientists. This area also opens up new possibilities for parking and vehicular access into the resort area.

Access to the Kawana Springs Resort staging area in the long-term could be in multiple ways:

- Pedestrians, bikers, equestrians, and authorized vehicles would access from Kawana Terrace.
- Vehicles would access from Kawana Springs Road, along the boundary with Sonoma Academy, to the parking area shown in Figure 11. A new bridge would allow pedestrians, bikers, equestrians, and maintenance and emergency vehicles to cross Colgan Creek to access the core of the staging area.

Image 56. *Kawana Springs Resort long-term improvements with small inn.*

- After the life estate expires, if Farmers Lane Extension is not yet constructed, vehicles could access from Kawana Terrace and park at the life estate area or cross Colgan Creek in the life estate area to access the parking area shown in Figure 11. This would require increasing the existing paved width by approximately 10', and potentially providing a new vehicular bridge.

KAWANA SPRINGS RESORT STAGING AREA GUIDELINES

G147. Existing driveway/road should be utilized for maintenance and emergency vehicle access, as well as for public access as shown in Figures 10 and 11.

G148. Existing driveway should be utilized for site circulation where feasible.

G149. Following removal of overgrown vegetation, site features including walls, pathways, and landscape features should be located and

Image 57. Gazebo.
PHOTO: RRM

Image 58. Garage/stable.
PHOTO: RRM

Image 59. Rock walls flank the old driveway.
PHOTO: RRM

documented for reference in future planning and site design development. See also S30 and S63.

G150. Further research should be undertaken to determine which features date to the era during which the bathhouse was used as a bathhouse (1870 to c. 1920).

G151. Historic site features outside the historic core of the site (stone walls, fences, other possible features unknown at this time) should be stabilized for safety. These could be rehabilitated or restored at a later date. The historic core is the area between the creek and the original hotel site, including the bathhouse and gazebo.

G152. A plant survey should be undertaken to determine what, if any, historic specimens remain on the site. Those that do remain should be preserved, if they have not reached their natural lifespan, where possible.

G153. Disabled access paths throughout the site should be provided, at a minimum, to the extent required by code.

G154. Materials that are appropriate and visually and structurally compatible with the historic materials should be used for new walkways, paths, walls, railings, etc.

G155. Efforts should be made to to stabilize the creek embankment adjacent to the bathhouse. Refer to Chapter 5.5, Riparian Habitats. See also S152 and S155.

G156. The approximate location of the original hotel footprint should be identified for future development of bed and breakfast inn. Remnants of the hotel foundation should be preserved in situ, if existing and if possible.

G157. If a new bed and breakfast inn is constructed, it should be located generally on the historic hotel site; it should be oriented and scaled to reflect the scale and orientation of the original hotel and to not dominate the site. See also S147, S149 and S156.

G158. Further investigation and testing of the bathhouse should be undertaken to determine the original extent of the building when it was in use as a bathhouse for the following reasons:

- Later additions to the bathhouse and features related to its residential conversion are not considered character-defining features. Such features should be removed where they negatively impact the character of the building by obscuring the original plan,

elevations and/or details, or by causing damage to the original materials.

- Consideration should be given to retaining later additions to the bathhouse, if they are located on secondary facades and are compatible with the original building, and where they can serve a useful function complementary to the rehabilitation of the significant portions of building. Interpretation of the chronology of construction should be provided.

G159. The bathhouse's primary historic spaces should be programmed for public occupancy (e.g., visitor center, exhibits, café, retail).

G160. Required new functions in the bathhouse (depending on use, these could include restrooms, kitchen, offices, etc.) should be located in less significant or non-historic spaces.

G161. The bathhouse's patios should be rehabilitated for appropriate uses.

G162. Disabled access to the patios and the bathhouse should be integrated in a manner that does not compromise the character of the building.

G163. The gazebo should be restored to the extent possible based on available documentation.

G164. Disabled access to the gazebo should be provided.

G165. The garage should be demolished.

G166. Existing asphalt should be ground/pulverized in-place to increase permeable area where feasible. See also G142.

G167. Use of greywater, reclaimed water, or harvested rainwater should be considered for irrigation of landscape areas. See also S150.

G168. Demonstration gardens should accomplish one or more of the following goals:

- Provide an example of the application of appropriate native landscaping.
- Display a wide variety of endemic plant species, with tags that indicate botanical and common names.
- Provide opportunities for volunteer organizations or individuals to be stewards of the gardens.
- Employ sustainable gardening techniques such as composting, irrigation with harvested rainwater, or biological pest control.

Image 60. *Bathhouse.*
PHOTO: RRM

Image 61. *Remnants of resort gardens.*
PHOTO: RRM

Image 62. *Resort driveway at the end of Kawana Terrace.*
PHOTO: RRM

G169. Interpretive exhibits should be installed. Topics could include history of the resort area, history of the property, Colgan Creek watershed, habitats and wildlife on the property, historic plant specimens, and native flora at the demonstration gardens. See also G209-G214, S264 and S265.

G170. The future intersection of Farmers Lane extension and Kawana Springs Road should be the primary access point, pending negotiations with the current life estate holders and/or the adjacent Sonoma Academy.

G171. When access is developed off of Kawana Springs Road, pedestrian and bicycle paths should be included between the end of Kawana Springs Road and the Preserve to provide safe connections with the surrounding neighborhoods. Paths do not need to be paved.

G172. Exterior treatments to existing buildings should focus on the preservation and rehabilitation of existing fabric and intact character-defining features.

- Deteriorated architectural elements should be retained, repaired, and rehabilitated, where possible.
- Deteriorated features should be rehabilitated using small-scale patching, Dutchman repairs, or replacement of individual components.
- In the course of rehabilitating and maintaining the buildings and structures, consideration should be given to reinstating character-defining features that are no longer in place.
- Where significant structures or other elements have been compromised by alterations, such alterations may be removed and there may be opportunities to introduce more compatible design solutions to meet future uses.

G173. Any interior work should be carried out as a rehabilitation project, with restoration and/or preservation of select elements.

KAWANA SPRINGS RESORT STANDARDS

S152. New development along Colgan Creek shall comply with Section 20-30.040 of the City of Santa Rosa Zoning Code, and shall not create or contribute to a flood hazard.

S153. The adjacent life estate property shall be visually screened from staging area with planting, fencing, or a combination of both.

S154. Minimum parking spaces:

- Prior to decommissioning of interim lot: 24 (see Figure 10)
- After decommissioning of interim lot: 56 (see Figure 11)

S155. Renovation of bathhouse shall include removal of more recent additions that encroach into the Colgan Creek channel. See also G155.

S156. New bed and breakfast inn shall be limited to 4,000 square feet maximum, up to 20' high, with up to eight rooms.

S157. Landscaping shall consist of a mixture of native drought tolerant plants appropriate to the habitat. See also G44-G55 and S150.

S158. A new multi-use bridge shall be constructed across Colgan Creek in the approximate location of the previously existing bridge. It shall be a single clear span structure capable of supporting emergency/ fire vehicles, per Fire Department requirements. The bridge should be constructed with materials and details that are compatible with the context of the surrounding site, but with contemporary details to distinguish it from a historic feature.

S159. Horse hitching rails and bike racks shall be provided.

S160. Garbage and recycling bins shall be provided.

S161. Restrooms shall be provided.

S162. The following site lighting only shall be installed:

- Security lighting at restrooms - may be on all night.
- Security lighting at building entrances and dark areas - may be on all night.
- Wayfinding lights at parking area, along paths to visitor center, bed and breakfast inn, and camping area - these lights shall turn off by 10pm. See also G143.
- Site lighting for evening special events shall be kept to a minimum, and limited to specific key areas (such as picnic structure and primary walkways), as opposed to illuminating the entire area. Lights must be turned off by 10pm.

S163. Turf grass shall be allowed, but shall be limited only to areas that function for picnicking or events.

S164. The existing driveway from Kawana Terrace shall be improved to accommodate 2-way traffic prior to opening of a short-term parking lot. This could include pull-outs and other devices where full road widening is not practical. See also G142.

S165. Potable water shall be provided at spigots, drinking fountains, and restrooms.

S166. Water source shall be either:

- New well.
- Existing spring after expiration of life estate.
- Municipal water or other private purveyor.

S167. A new 10,000 gallon holding tank shall be installed at the time a new well is drilled.

C. Petaluma Hill Road Staging Area

Along with the Kawana Springs Resort area, the Petaluma Hill Road area is a primary access point and staging area for trails, picnicking, and limited camping. The site of a former dairy operation, and adjacent to Petaluma Hill Road, this is one of the most degraded areas of the property. There has been significant earth disturbance over time that has resulted in eroding slopes and invasion of non-native weeds.

The proposed plan, shown in Figure 12, includes two entry points. The primary entry is at the southern end of the area, at the location of an existing entry gate, and is identified by an entry monument sign that meets the District's and Regional Parks' signage standards. There is a new left turn lane for southbound traffic entering the site, and a new acceleration lane for southbound traffic leaving the site. The northern access point is also an existing driveway, and will allow for right-in, right-out movements only due mainly to sight distance constraints. The internal vehicular circulation generally follows the existing ranch roadbed between the two access points. Pockets of parking are distributed along the driveway to reduce its visual mass, and provide convenient access to the different staging area features.

A large picnic area is located toward the center of the area, and includes a large shade structure and restroom building that feature architectural details that evoke the ranching history of the site. This concept takes advantage of the existing concrete foundations left over from the previous dairy operation, and adaptively reuses them as patio gathering space. Educational exhibits are located at several locations throughout the central portion of the site.

Image 63. *Petaluma Hill Road staging area with northern driveway (right-in, right-out) in foreground.*

There is a large, separate parking area for horse trailers at the southern end, designed to provide a dedicated staging area for equestrians and to reduce common conflicts between horses, pedestrians, bikers, and cars.

Development of this staging area will present significant opportunities for landscape and habitat restoration, including a wetland restoration area near the main entry, and an eroded embankment along the east side of the driveway.

A multi-use ranch road at the southern end of the site connects visitors into the property's trail network, and to a walk-in campground approximately 1/4 mile along the trail.

Other features include trailhead information kiosks, and a natural play-course nestled amongst the trees at the northern end.

One of the primary benefits of this location as a staging area is the relative ease by which it can be accessed by vehicles and bicycles. Petaluma Hill Road is a major arterial road that connects Santa Rosa and Rohnert Park. It has good visibility for drivers, and there is space to perform required road widening to accommodate turning, accelerating, and braking. Additionally, there are no residential neighborhoods in close proximity to adversely affect. For these reasons it is planned to become the primary point of entry for equestrians. For a list of allowable uses in this area see Table 16.

PETALUMA HILL ROAD STAGING AREA GUIDELINES

G174. Interpretive exhibits should be installed. Topics could include historic agricultural use, history of the property, habitats and wildlife on the property, and native landscape restoration. See also G209-G214, S264 and S265.

G175. Rehabilitation/reuse of existing concrete dairy foundations should be considered in lieu of new paving at picnicking areas. See also G142.

G176. Landscape restoration areas should be identified. See G44-G55 and S150.

G177. Coordinate with Sonoma County Transit about the possibility of adding a bus stop near the proposed Preserve entrance for routes currently serving Petaluma Hill Road.

PETALUMA HILL ROAD STAGING AREA STANDARDS

S168. Widening of Petaluma Hill Road shall not encroach into privately-owned property.

S169. A minimum of 35 vehicle parking spaces shall be provided.

Figure 12. Petaluma Hill Road Staging Area Site Plan.

S170. Parking for horse trailers shall be provided.

S171. Building architecture shall be rural in character, appropriate to historic dairy use.

S172. Security lighting shall be provided at staging area restrooms only. Lighting fixtures shall be full cut-off type, and be operated with motion-sensors. No other site lighting shall be permitted. See also G143 and S148.

S173. Primary vehicular circulation shall follow the existing roadbed as much as possible.

S174. Pedestrian circulation throughout staging area shall be ADA compliant.

S175. Horse hitching rails and bike racks shall be provided.

S176. Garbage and recycling bins shall be provided.

S177. Restrooms shall be provided.

S178. Potable water shall be provided at spigots, drinking fountains, and restrooms.

S179. Water source shall be either:

- New well.
- Existing spring-fed tank with new filtration system.
- Municipal water or other private purveyor.

D. Linwood Avenue Staging Area

This secondary, neighborhood-scale staging area, is located at the end of Linwood Avenue and provides convenient access to the north-west quadrant of the property. There is an existing relatively flat area at the end of a short, narrow driveway that can be developed with minimal grading into a functional area.

Linwood Avenue staging area includes a restroom, an informational kiosk, and picnic tables/benches. The trailhead includes the construction of a new pedestrian bridge to cross a small creek before the trail heads up the mountain and connects to the multi-use trail system.

The limiting factor in improving this staging area is the sub-standard width of Linwood Avenue. Initially a pedestrian/bike gate will be installed to allow access to the trailhead. When an upgrade of the public street occurs, the staging area can then be developed, along with the installation of a vehicular

Figure 13. Linwood Avenue Staging Area Site Plan.

gate. This location has the potential to accommodate up to approximately 20 vehicles, and even a limited number of equestrian trailers. Until such time, this will primarily be a public walk/bike-in entrance. For list of allowable uses in this area see Table 16.

Image 64. *Linwood Avenue staging area.*
PHOTO: RRM

LINWOOD AVENUE STAGING AREA GUIDELINES

G178. Driveway should be permeable where feasible.

G179. Parking for horse trailers should be included.

LINWOOD AVENUE STAGING AREA STANDARDS

S180. Linwood Avenue shall be widened to meet the relevant County and/or City public works standards prior to public vehicular access being permitted at this location.

S181. Parking lot shall be designed to minimize site grading. See also S21, S137, S141 and S151.

S182. Bicycle/pedestrian gate shall be installed adjacent to vehicular gate. The gate may be installed prior to constructing public vehicular access.

S183. Horse hitching rails and bike racks shall be provided.

S184. Garbage and recycling bins shall be provided.

S185. Restrooms shall be provided.

S186. Staging area shall be screened from neighboring homes with appropriate native plants.

S187. Driveway shall be constructed on existing roadbed, and shall be 12' wide minimum. A turn-out shall be provided to enable safe passing.

S188. A minimum of 17 vehicle parking spaces shall be provided.

S189. Existing 30' wide access easement to adjacent parcel shall be accommodated.

S190. No lighting shall be permitted.

S191. Provision of potable water shall not be required.

S192. If water is provided, the water source shall be either:

- New well.
- Harvested rainwater.
- Municipal water or other private purveyor.

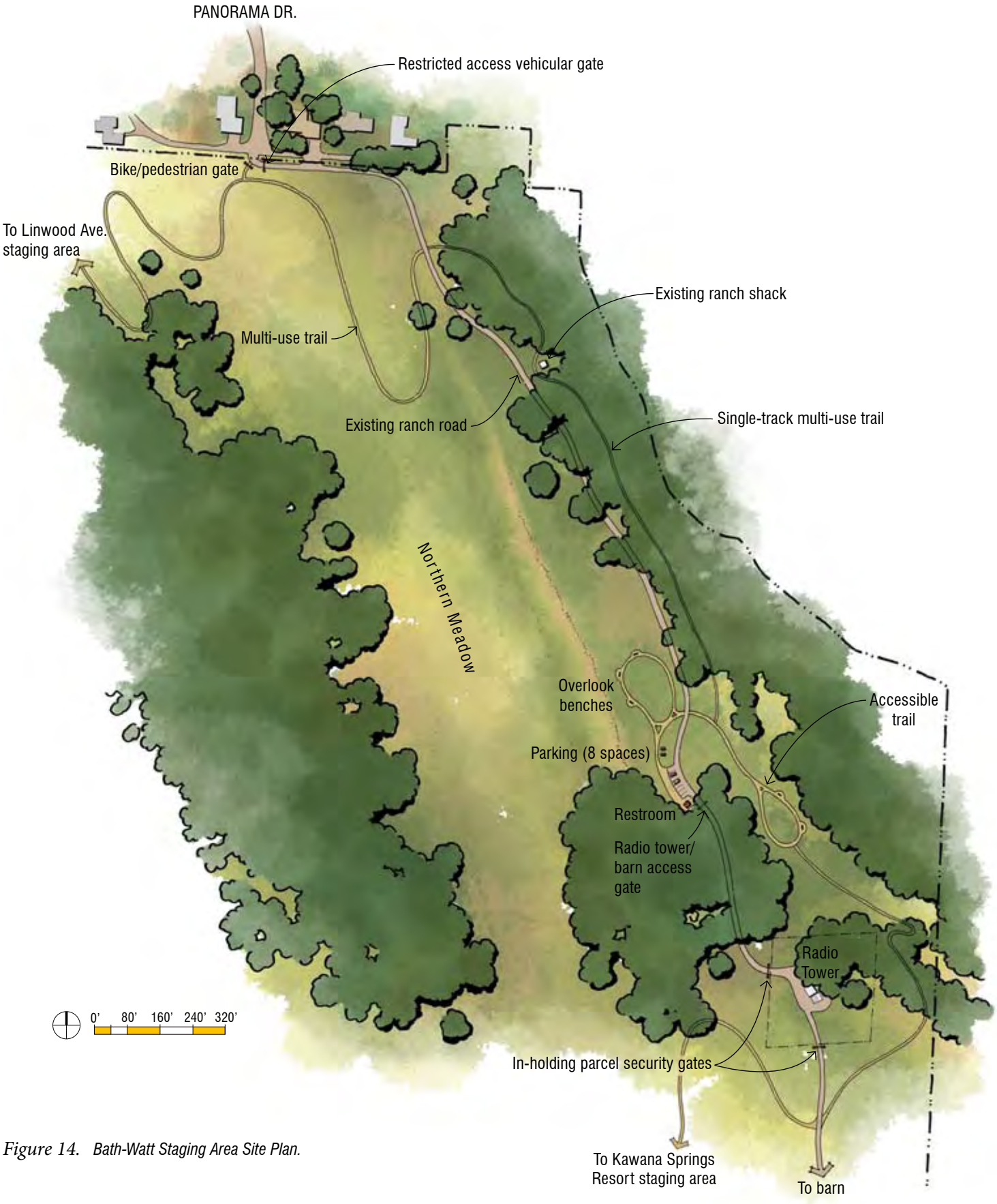

Figure 14. Bath-Watt Staging Area Site Plan.

E. Bath-Watt Staging Area

This secondary, neighborhood-scale staging area is reached from a driveway that starts at the end of Panorama Drive, and provides access to the upper elevations of the mountain, as shown in Figure 14. Limiting factors are road safety and parking concerns in the Holland Heights neighborhood, and therefore, this area provides the fewest number of parking spaces of any of the public staging areas, with limited vehicular access. Due to the limitations of the existing ranch road, this staging area is not appropriate for full sized buses.

The staging area itself consists of a restroom, a small number of picnic tables, and benches. There is a short accessible trail that loops out and back from the parking lot that provides good views of both sides of the ridge: the city to the northwest, and Bennett Valley to the east.

Image 65. Old ranch building on former Bath-Watt property.
PHOTO: RRM

Initially a pedestrian/bike gate will be installed at the end of Panorama Drive to allow access to the trail system. The staging area will then be developed later, including the installation of a restricted-access vehicular gate. For a list of allowable uses in this area see Table 16.

BATH-WATT STAGING AREA GUIDELINES

G180. Improvements should be located out of the view of adjacent neighborhoods wherever possible.

G181. Responsible agencies should work closely with local law enforcement and property neighbors to monitor traffic and parking issues. See also S194 and S195.

G182. Restrooms should be provided.

BATH-WATT STAGING AREA STANDARDS

S193. Existing road shall be utilized for staging area access.

S194. Install vehicular gate at the end of Panorama Drive, located so that vehicles can safely turn around without proceeding through the gate. The gate shall be operated by keycard or other permitted user system. Public access will be permitted for vehicles with an ADA placard, for groups or individuals that obtain a special use permit, and for authorized personnel. Obtaining permission will occur through Regional Parks and will include receiving rules and

Image 66. *View of the northern meadow viewed from the Bath-Watt staging area site.*
PHOTO: RRM

regulations for use of the Panorama Drive access point. The gate will be locked at night; however, there will be 24-hour access for emergency services, operations and maintenance activities, and for access to the radio tower by using a code that opens the gate.

S195. A residents-only parking program for the neighborhood streets in Holland Heights shall be developed and implemented by the County Department of Transportation and Public Works as soon as feasible, and prior to installation of the pedestrian/bike gate and opening of Bath-Watt staging area.

S196. A pedestrian/bicycle gate shall be installed adjacent to vehicular gate. The gate may be installed prior to constructing public vehicular access.

S197. A minimum of 8 spaces and maximum of 10 spaces shall be provided.

S198. A locking vehicle gate shall be installed past and adjacent to the parking lot to restrict public access to the radio tower.

S199. No lighting is permitted.

S200. Provision of water shall not be required.

F. Kawana Terrace Staging Area (Existing Interim Lot)

KAWANA TERRACE STAGING AREA GUIDELINE

The interim parking lot shall remain in operation until the City of Santa Rosa begins construction of the Farmers Lane extension.

G183. Existing solar powered keycard-operated gate should be removed and relocated to Bath-Watt access point at the end of Panorama Drive if construction sequencing allows.

Image 67. Appoximate location of new neighborhood pedestrian trailhead at Kawana Terrace. PHOTO: RRM

G. Farmers Lane Staging Area (Future)

When the City of Santa Rosa constructs the planned Farmers Lane extension, it will significantly alter the landscape and circulation patterns around and into the Taylor Mountain site. The existing interim parking lot will be demolished, as will the driveway to it from Kawana Terrace. Maintaining some level of access in this vicinity is worthwhile, however, as it provides the most convenient access to the center of the site. A new road will be constructed as a part of the City extension project, as illustrated in Figure 15, in order to access the Sonoma County Water Agency water tanks; this road is also proposed to access a staging area for Park and Preserve visitors. For list of allowable uses in this area see Table 16.

Image 68. Exploring on Kawana Knoll during Taylor Mountain Day. PHOTO: RRM

FARMERS LANE STAGING AREA GUIDELINES

G184. The City of Santa Rosa should be consulted to determine the feasibility of constructing pedestrian and bicycle paths in conjunction with development of the Farmers Lane extension.

FARMERS LANE STAGING AREA STANDARDS

S201. The proposed driveway connecting to the future Farmers Lane extension shall be designed to provide adequate sight lines.

S202. Low level security lighting shall be provided at the parking lot. See also G143 and S148.

S203. Lockable vehicle gates shall be installed to control access to the water tanks. See also S146.

S204. A minimum of 10 parking spaces shall be designed in a manner that ensures that adequate sight lines are provided.

S205. Provision of water shall not be required.

S206. Portable restroom shall be provided.

H. Kawana Knoll Area

Kawana Knoll is the piece of the Taylor Mountain property that will be physically isolated from the main portion of the property as a result of the Farmers Lane extension. It represents approximately 18 acres, or less than 2% of the entire property. The existing interim parking lot is located immediately adjacent to the knoll, but in the future there will be no direct vehicular access to it. Rather, visitors on foot or bike will be able to enter from Kawana Terrace or from Farmers Lane. A proposed bus stop on Farmers Lane would also provide convenient, direct access via transit.

Prior to the Farmers Lane project, the knoll simply blends seamlessly into the rest of the property, close to the interim lot and to the Kawana Terrace residential neighborhood. Afterwards however, because of its physical separation, this area lends itself to being a transitional zone between the urban edge and the open space beyond. For list of allowable uses in this area see Table 16.

KAWANA KNOLL AREA GUIDELINE

G185. A portable restroom should be provided.

KAWANA KNOLL AREA STANDARDS

S207. Permanent improvements made prior to the Farmers Lane extension shall be located so that they are not displaced by the future road construction.

S208. Pedestrian/bicycle gate shall be installed to provide access from Kawana Terrace.

S209. Provision of water shall not be required.

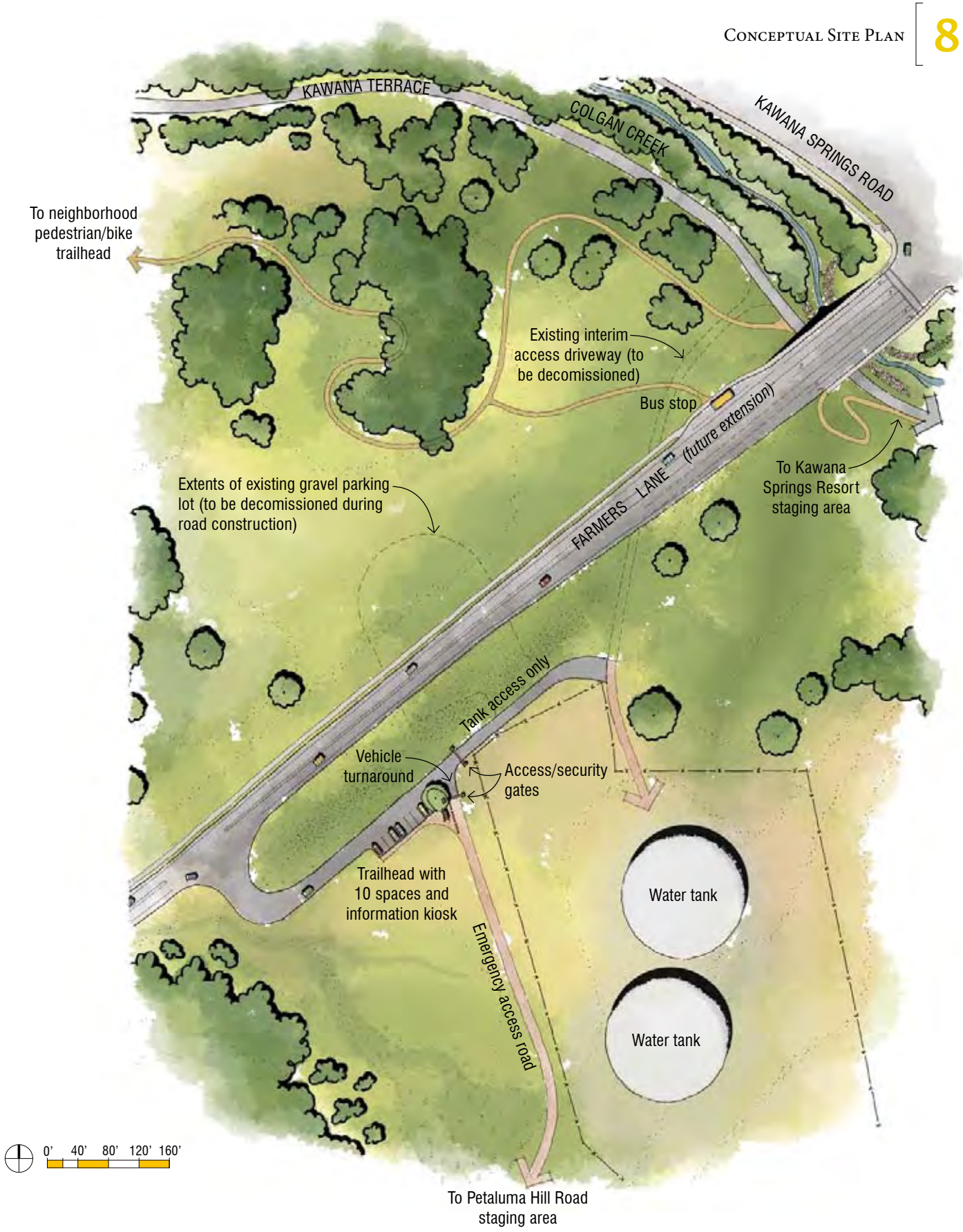

Figure 15. Farmers Lane Staging Area and Kawana Knoll Area Site Plan.

Image 69. *Barn area with outdoor classroom.*

Image 70. *Existing barn.*
PHOTO: RRM

I. Barn Area

The barn is a natural destination point from multiple staging areas. It offers seclusion and a significant opportunity for outdoor education. The site is flat, and with minimal effort could be improved to provide gathering areas, such as an outdoor classroom or picnicking. The inclusion of other amenities such as restrooms, potable water, and horse hitching rails would also make it well suited to act as a rest stop for park users as they enjoy the trail loops that pass nearby.

Improvements in the barn area are shown in Figure 16, and include a rustic outdoor classroom and picnic tables on the edge of the existing meadow, horse hitching rails, and a restroom. Dry stacked stone walls help to define the space in an appropriately informal way.

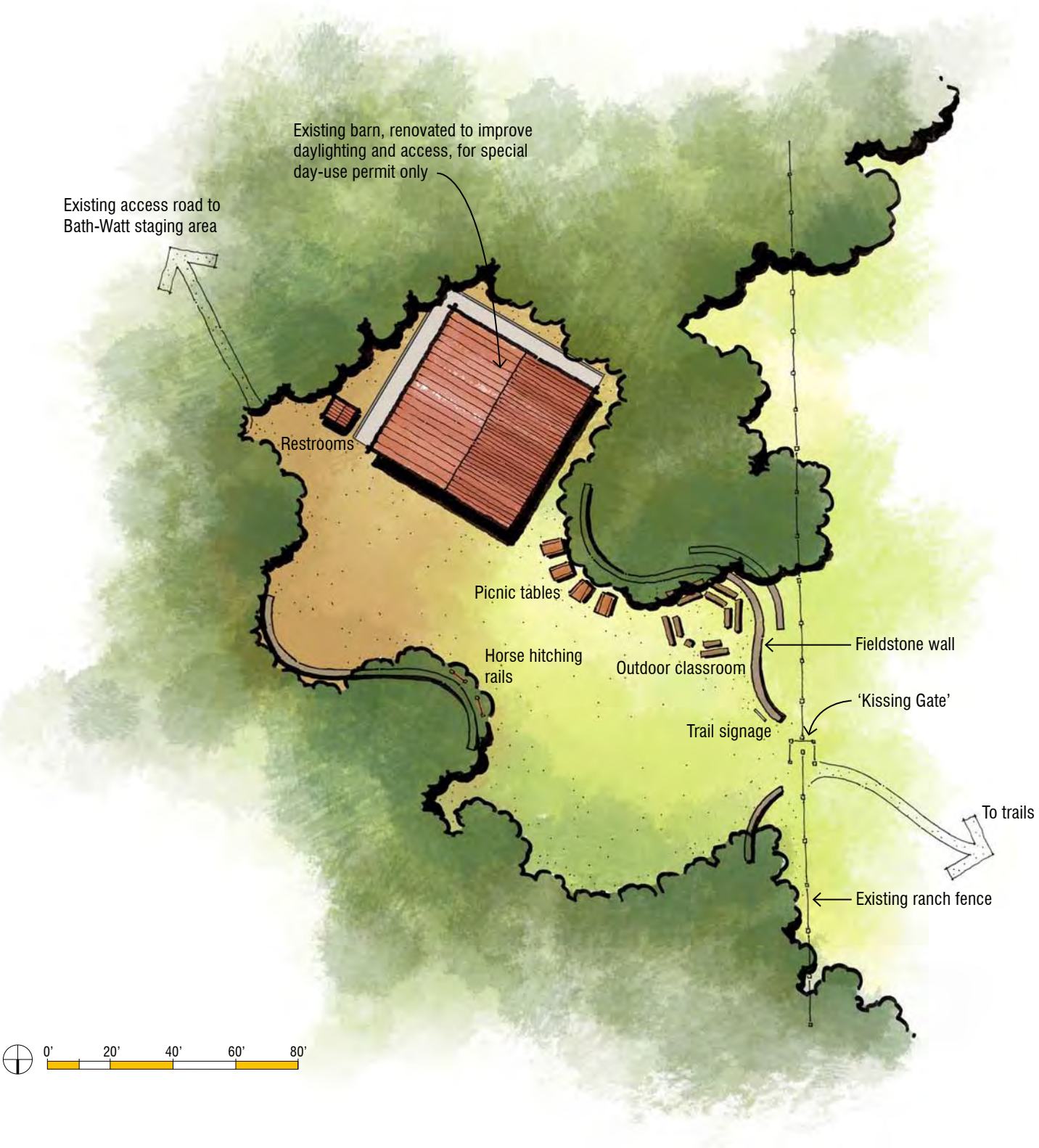

Figure 16. Barn Area Site Plan.

The barn itself, while in decent condition, could be modified and/or renovated to include windows or skylights for natural day-lighting, doors for better ingress and egress, and interior improvements dependent upon anticipated use. Examples of this might be adding storage and benches for science camp equipment and experiments. The large roof area, combined with the distance of the barn from available electrical service, make this an ideal candidate area for solar panels. For list of allowable uses in this area see Table 16.

BARN AREA GUIDELINES

G186. Alternative energy sources such as solar panels should be considered for providing electricity to this site. See also G144.

G187. New stone walls should be constructed with on-site materials if possible, or if not, stone should be from a local Sonoma County source.

G188. Use of on-site fallen trees should be considered for the construction of log benches at the outdoor classroom. Trees that died from Sudden Oak Death (SOD) are not appropriate for this use.

G189. New buildings (i.e. restrooms), and modifications or renovations to the barn structure shall be architecturally appropriate to the rural character of the site.

BARN AREA STANDARDS

S210. Modifications to the existing building shall not increase the overall height. Exception: addition of solar panels.

S211. Security lighting shall be provided at the barn doorway and at future restrooms. No other site lighting shall be permitted. See also G143 and S148.

S212. Fires shall not be permitted in this area. See also S283.

S213. No overnight camping shall be permitted outside. Staying overnight shall be allowed inside the barn.

S214. Paved surfaces shall be limited to accessible routes required by applicable building codes, and shall be permeable where feasible. See also G142.

S215. Horse hitching rails and bike racks shall be provided.

S216. Garbage and recycling bins shall be provided.

S217. Restrooms shall be provided.

S218. Potable water source shall be one of the following:

- Restored existing well located near radio tower.
- A new well.
- Harvested rainwater.
- Municipal water or other private purveyor.

J. Camping Areas

Camping will be allowed in limited areas on Taylor Mountain, as shown in Table 16, and must comply with Regional Parks' policies. Campsites are walk-in only and are located in close proximity to developed staging areas. They are also carefully located in areas that have adequate vegetation and/or topography that provides visual screening.

Image 71. *Typical environmental campsite.*
PHOTO: REGIONAL PARKS

GENERAL CAMPING GUIDELINES

G190. Sites should be carefully placed to be visually discrete from trails and other public vantage points.

G191. Generous space should be provided between sites to provide users with as private and peaceful an experience as possible.

G192. Existing natural features, such as trees or boulders, should be utilized as natural site delineators.

G193. Electrical outlets may be provided at some campsites.

G194. One picnic table per individual and four picnic tables per group site should be provided.

GENERAL CAMPING STANDARDS

S219. Camping areas shall be 'walk-in'. Public parking shall be at staging areas only.

S220. Camping shall be in defined areas only. Sites shall be identified with discrete but clear signage.

S221. Regional Parks' camping rules shall apply, unless otherwise stated herein.

S222. Campsites shall be classified as "environmental sites', 'individual sites', or 'group sites' as defined in Regional Parks' Camping Information and Rules.

S223. Camping shall be by permit only.

S224. Camp host or County staff shall maintain a presence on-site.

S225. Vehicular access for maintenance vehicles shall be provided to camping areas. No site shall be allowed to have more than 25 people at one time.

S226. Signage educating visitors about good stewardship (such as not collecting firewood) shall be installed at each camp area.

CAMPING STANDARDS – KAWANA SPRINGS RESORT AREA

S227. A maximum of 50 individual sites and four small group (25 people maximum) sites shall be provided.

S228. Approximately 6 shared hose bibs shall be provided with potable water.

S229. The water source shall be shared with the Kawana Springs Resort staging area.

S230. Fires are allowed only in designated areas where fire pits/rings and BBQs are provided. See also S283.

S231. Camping and cooking fires shall not be permitted on Spare the Air days.

S232. Barbeques are allowed in provided fire pits/rings only.

S233. One picnic table per family site and four for small group sites shall be provided.

S234. Trash cans shall be distributed throughout the camping area. Additionally, a large trash bin in an enclosure will be provided at a convenient distance from the sites.

S235. Dogs shall be allowed as long as they are physically controlled on a leash no longer than 6' at all times, pursuant to Regional Parks' rules. See also S55.

S236. Restrooms for this area shall be the one located at the Kawana Springs Resort area.

S237. One RV space with hook-ups shall be provided for an on-site camp host.

S238. No site lighting shall be installed.

CAMPING STANDARDS – PETALUMA HILL ROAD AREA

S239. A maximum of 10 environmental sites and 1 small group (25 people maximum) environmental site shall be provided.

S240. No potable water will be provided.

S241. Camp stoves are allowed.

S242. Barbecues and open fires are not allowed.

S243. Trash cans and a large trash bin in an enclosure shall be located at the Petaluma Hill Road staging area only.

S244. A portable restroom shall be provided.

S245. No dogs or other animals shall be allowed.

S246. No site lighting shall be installed.

8.6 UTILITIES AND INFRASTRUCTURE

Each of the staging areas will require either upgraded or new infrastructure and/or utilities, as described below.

Water. The site is not currently served by City or County services. New improvements will be from either on-site wells or springs, or possibly from a municipal or private water purveyor in the future. Refer to individual area standards for more information.

Sewer. The site is not currently served by City or County services. New improvements that include permanent restrooms will either utilize septic systems if the conditions are found to suitable, or a waterless toilet system.

Electricity. Although solar lighting is encouraged throughout the site, electrical service will likely be needed at the Kawana Springs Resort staging area and the Petaluma Hill Road staging area. Other staging areas and the barn area can utilize solar panels to operate gates and power security lights.

8.7 SIGNAGE AND WAYFINDING

Clear, concise and unified signage contributes to an enjoyable user experience, and also helps protect natural and cultural resources. When trail users are able to plan their trip with a clear understanding of distance, trail type and intensity, the liklihood of off-trail use, injury, and habitat damage is reduced. The goal of the signage and wayfinding system for Taylor Mountain is to direct, guide, and educate trail users in order to maximize enjoyment while also protecting and preserving the natural beauty of this regional park and open space.

GENERAL SIGNAGE GUIDELINES

G195. Signage should include consistent design elements such as colors, lettering, materials, etc.

G196. All entry monument and staging area signage should incorporate logos of the Sonoma County Agricultural Preservation and Open Space District and the Sonoma County Regional Parks.

G197. Sign locations should be assessed periodically to ensure their placement is serving the intended purpose.

G198. If a new sign is needed that is not part of the Sonoma County Regional Parks standards, then the new sign should use those standards as the basis for design.

GENERAL SIGNAGE STANDARDS

S247. Sonoma County Regional Parks Sign Program, Standards and Specifications shall be the basis for internal and directional sign design and installation. Exception: Entry and trailhead signs. See also S250 and S251.

S248. Signage shall conform to ADA Guidelines for exterior signs.

S249. Signs shall be installed periodically at locations where trails come within 50' of a property boundary fence, indicating "Park and Preserve Boundary."

A. Park and Preserve Entries

ENTRY SIGNAGE GUIDELINE

G199. Entry signage should be easily viewed from passing cars while also being sensitively placed and designed to minimize visual impact from neighboring properties and the property itself.

ENTRY SIGNAGE STANDARDS

S250. Entry signs at Petaluma Hill Road and Kawana Springs Resort shall match the design developed by the District and Regional Parks for monument entry signs. See Sonoma County Agricultural Preservation and Open Space District's and Regional Parks' signage standards.

S251. Entry signs at other staging areas shall match the design developed by the District and Regional Parks for trailhead signs. See Sonoma County Agricultural Preservation and Open Space District's and Regional Parks' signage standards.

S252. Entry signage shall include:

- Sonoma County Regional Parks and Sonoma County Agricultural Preservation and Open Space District logos.
- Property name.
- Staging area name, if appropriate.

S253. Height of park entry signage shall not exceed 8'.

S254. Entry monument signs shall clearly identify the location of park entry points.

Image 72. Sample entry sign.
DESIGN: SCAPOSD

B. Staging Areas and Trailheads

STAGING AREA AND TRAILHEAD SIGNAGE GUIDELINES

G200. Trailhead signage should be placed perpendicular to the trail.

G201. Wayfinding/trailhead signage should be located near the parking areas, in plain view.

G202. Information about trail type, length and difficulty should be placed at trailheads.

STAGING AREA AND TRAILHEAD SIGNAGE STANDARDS

S255. Trail signage and information shall be located in the vicinity of trailheads.

S256. Parking signage at staging areas shall clearly designate parking areas, hours of use, and any related rules and regulations.

Image 73. Sample trailhead signage.
DESIGN: SCAPOSD

S257. Trail use hours, rules, and regulations shall appear on signage in an obvious location, and associated with trailhead, wayfinding signage, and/or trail kiosks.

S258. Trailhead signage shall include general information about cultural resources located on the property and the need to respect the stone fences that remain visible. Information will encourage the public not to sit on, remove stones, or in any other way disturb the fences.

C. Trail Signage

TRAIL SIGNAGE GUIDELINES

G203. Any instance where a pedestrian-only trail intersects a multi-use trail, signage should be installed to alert users from both trails ahead of time with yield and/or crossing signage.

G204. Signs should be located approximately 2' from the edge of the trail shoulder.

G205. Trail etiquette signage should be placed in locations where recurring user conflicts have occurred.

G206. Trail signage should be located at logical points along the route such as trail intersections, halfway points, near destinations and at key overlook areas.

G207. Trail markers should be placed periodically to guide users along longer routes.

G208. Signage that enhances the safety of trail users should be installed.

TRAIL SIGNAGE STANDARDS

S259. Wayfinding signage shall be installed at trail intersections, and at interim points along long uninterrupted segments.

S260. Signage shall be installed at the start and end of educational nature trail sections indicating permitted users.

S261. Provide signage at boardwalks clearly indicating that boardwalk is pedestrian-only.

S262. Signage with accessibility symbol shall be installed at accessible trailheads and at designated access points. Signage shall indicate total distance of the accessible segment and the location of the first point of departure from the accessible guidelines.

S263. Signage at accessible trailheads shall be accessible to users with vision impairments in compliance with ADA Section 4.30 – Signage.

D. Interpretive Signage

Trails and wayside exhibits serve as connectors between people and place, and give meaning to the current experience. Such signage tells the story of a place, providing opportunities for education, awareness and stewardship. Intepretive signage on Taylor Mountain will help create respectful and educated trail users.

INTERPRETIVE SIGNAGE GUIDELINES

G209. An interpretive program plan should be prepared that outlines topics, locations, and types of interpretation that are appropriate for Taylor Mountain.

G210. Interpretive signage should be located at staging areas, key trail intersections, locations of notable features, views and/or destinations, and/or associated with trail facilities such as trailheads, group gathering areas, staging areas, etc.

G211. Interpretive signage should be carefully designed and located to draw in users while also being sensitive to the surrounding natural landscape.

G212. Interpretive signage should be fabricated from durable exterior materials such as fiberglass or high pressure laminate panels to ensure longevity and weather resistance.

G213. A standard template should be established for use in all interpretive signage in order to create a unified series of panels.

G214. Design of interpretive panels should be simple, concise, and display a clear hierarchy of information.

INTERPRETIVE SIGNAGE STANDARDS

S264. Interpretive signage shall be located with a minimum of 5' horizontal clearance from trail shoulder to allow trail users to view them while avoiding conflict with other pedestrian or bicycle circulation.

S265. Interpretive signage shall be mounted in such a way that the signs can be easily removed, replaced, and reinstalled by Regional Parks staff.

8.8 NAMING OF FEATURES

There are numerous features and elements contained within the Master Plan that should be named for easy identification and reference, and also to reinforce the site's history and resources. These include, but are not limited to, the staging areas and building envelopes, trails, picnic and camping areas, and pedestrian access points. All the names provided within, such as the trail loops and the staging areas, are suggestions based primarily on physical features, landforms, predominant biological communities, or after existing named elements such as roads.

Final naming of features will need approval of the District and Regional Parks. Suggested inspirations for naming conventions include:

- Natural resources of the site.
- History of the site.
- People who have special connections to the property.

PHOTO: RRM

9. Operations and Maintenance

9. OPERATIONS AND MAINTENANCE

The average number of daily users of the Taylor Mountain Regional Park and Open Space Preserve will increase incrementally over time as each new staging area is opened and trails are developed. The operations and maintenance of the property will need to be flexible to adjust and respond to changing needs and future demand. In addition to implementing the guidelines and standards listed in this document and following Regional Parks rules, the following additional guidelines and standards address operations and maintenance of the property.

A. General Operations Guidelines and Standards

GENERAL OPERATIONS GUIDELINES

G215. Periodic patrol of facilities (e.g. the barn) and staging areas should be conducted to discourage unauthorized or after-hours use.

GENERAL OPERATIONS STANDARDS

S266. Staging areas and trails shall be closed from dusk to dawn. Exception: campers with valid permits. See also S146 and S278.

S267. Seasonal limitations on trails through wetland habitats and other areas where potential impacts are likely to occur due to weather or ground conditions shall be implemented. Trails should be closed or their use restricted during the wet season if fresh erosion and/or vegetation trampling are visible. This could be accomplished through fencing and/or signage and would be limited to the wet season and/or periods of inundation. See Chapter 5.6, Seasonal and Perennial Wetlands, and Figure 4 for high-priority wetland protection and restoration locations. Closures shall be applicable to all users. See also S42.

S268. Dogs shall be on a leash not more than 6' in length at all times, and under immediate physical control. Dogs shall be prohibited within 500' of the freshwater pond. See also S43, S45, S55, S235 and S245.

S269. Dog feces shall be removed per Sonoma County Code 5-125(a). Signage directing owners to pick up after their dogs and dog "pick-up" stations shall be installed at all staging areas and trailheads.

S270. Camping areas shall observe "quiet time" from 10pm each night until sunrise. See also S162.

S271. Adequate number of restrooms (permanent or temporary) shall be provided to accommodate demand.

S272. Parking shall only be allowed in designated lots and marked spaces.

B. General Maintenance Guidelines and Standards

GENERAL MAINTENANCE GUIDELINES

G216. Construction personnel should be educated on the symptoms of Sudden Oak Death on common forest plants, pathogen transmission pathways, prohibition of unauthorized movement of plant material, and equipment cleaning procedures. The risk of movement and spread of the organism is greatest in muddy areas and during rainy weather. If possible, work should not be conducted in oak woodlands during the wet, rainy and cool times of the year. See also G42, G43, G126, G188, S16, S72 and S73.

G217. Trails should be kept in good and safe condition.

G218. Signage should be periodically checked for damage resulting from vandalism or cattle. Damaged signs that are either no longer legible or functional shall be restored or replaced.

G219. Graffiti should be removed within 48 hours of its discovery if feasible.

GENERAL MAINTENANCE STANDARDS

S273. Mowing equipment and undercarriages of other park vehicles shall be cleaned after passing through weed-infested areas and before entering and leaving the property. See Chapter 5.10, Additional Biological Resource Protection. See also S72.

S274. Use pesticides and herbicides with caution to prevent contaminated runoff. Employ best management practices (BMPs) for use and application of potentially hazardous materials. See Chapter 5.10.3, Contaminant and Pathogen Control. See also S61, S62 and S74.

S275. Trash bins shall be emptied on a regular basis to avoid excessive buildup or overflow of on-site trash facilities.

S276. Water outlets (e.g. drinking fountains and hose bibs) shall be checked regularly for leaks. Repair leaking fixtures as quickly as possible.

S277. Tree removals shall be consistent with the County of Sonoma's Tree Protection Ordinance. Unless a tree poses an immediate safety risk, it should be left intact. See also S13.

S278. Staging area gates shall be kept in an operable state.

S279. Mowing during bird nesting season shall be preceded by bird nest surveys as described in S46, S54, S67 and S68.

C. Fire Management

In California's Mediterranean climate, with annual cycles of lush vegetative growth during mild, wet winters and springs, followed by extended warm, dry summers and falls, fire has periodically reshaped the landscape and vegetation communities for millennia. Many of the region's plant communities are tolerant or even dependent on fire to germinate and thrive. Longstanding fire regimes include both lightning-ignited fires and those struck by indigenous people managing their landscapes. It is thought that fire has played an important role in maintaining grassland patches in areas where oak woodland or other woody communities would otherwise have dominated. Indigenous people used fire to increase the abundance of plant species they used for food, as well as of those that supported game animals.

Now that central Sonoma County is densely populated and developed, wildfire prevention and suppression is normal. Land managers in the county are increasingly concerned about the effects of fire suppression on the rich mosaic of forest, woodland, chaparral, and grassland habitats that characterize much of the county. As a result, prescribed burns are one tool land managers use to control unwanted vegetation and invasive species. However, the use of prescribed burning can be challenging in settings near urban areas, such as Taylor Mountain, due to the need to protect buildings, public safety, and air quality. Prescribed burning may be a valuable management tool in some locations on the property. Air quality permitting, controlled burns would be most appropriate in the central portion of the park, distant from residential areas and other buildings.

In addition to the use of prescribed burns, there is the potential for human-caused wildfires and natural wildfires on the Taylor Mountain property. Given the property's proximity to urban development, the need to manage the property to reduce the risk of fire and allow for appropriate control measures in the event of a fire is a real concern. The following guidelines and standards will help protect both the natural resources and built structures on the property, as well as the community, in the event of a fire.

Fire Management Guideline

G220. The use of prescribed fire should be considered when it is the most effective and efficient means to achieve vegetation management objectives. See also G64.

Fire Management Standards

S280. Provide multiple site access points and connections between them to allow for good fire response. Connections should allow remote vehicle access between Petaluma Hill Road and Kawana Springs Road.

S281. Provide adequate barriers and fences at trailheads and access points that would keep non-authorized motorized vehicles off the property, especially motorcycles.

S282. Smoking shall be prohibited per Sonoma County Ordinances 5947 and 5953. Signage shall be installed at staging areas and trailheads that reference the Ordinances and their enforcement.

S283. Fires are allowed only in designated areas where fire pits/rings and BBQs are provided. See also S230. Fire pits shall also meet the following criteria:

- Fire pits shall be constructed to limit the fuel area to 3 feet in diameter by 2 feet in height.
- Fire pits must be at least 25 feet from combustible material (such as vegetatative fuels).
- There must be a means of extinguishing the fire (such as a hose bib).
- Fires must be constantly attended.

S284. If native plant removal is necessary to provide fire protection around buildings, consult with a vegetation ecologist to minimize impacts to native habitats. See S49 for vegetation removal around ponds, wetlands and riparian areas.

S285. Where possible, use livestock grazing or mowing to reduce fire fuels. Remove only enough vegetation to accomplish fire hazard management goals. Minimize the use of disking for fire hazard reduction. See also G71, G110 and G117.

S286. Prevent the establishment or control invasive plant species that can increase the risk for fire. These include Himalayan blackberry and eucalyptus. See also S65.

S287. During periods of high and very high fire hazard, the use of power tools for maintenance or other activities shall be prohibited.

S288. During periods of high and very high fire hazard, maintenance vehicles shall not be driven into undeveloped areas of the property except during emergencies.

PHOTO: SCAPOSD

10. Community Stewardship

Image 74. *Community volunteers construct a trail, Sonoma County.*
PHOTO: SCAPOSD

10. COMMUNITY STEWARDSHIP

Engagement of the community and general public in various aspects of stewardship of Taylor Mountain will help to achieve the long term conservation and recreation goals of the Master Plan.

There are many potential activities and programs that interested individuals could volunteer either their time or skills for. There are also numerous community-based groups and organizations that might be interested in one-time events or ongoing programs. These include, but are not limited to, the following groups that are active in the community:

- Equestrians
- Mountain bikers
- Conservationists
- Walking/hiking groups
- Runners
- Local youth and school groups

Many of these organizations have experience and skill sets that would make them valuable partners for Regional Parks as they implement various components of the Master Plan. For example, the Backcountry Horsemen have a long history of successful trail construction, and also own their own trail building equipment. Key partnerships such as this, as well as individual volunteering, can build community pride and ownership of the Park and Preserve. Table 18 outlines some of the opportunities for involving the community.

Programs could also be implemented for research scientists or post-graduate students to assist with the various biological monitoring tasks outlined in Chapter 5, Table 4. The same concept could also be modified for local school children.

Image 75. *Volunteers participate in restoration planting, Sonoma County*
PHOTO: SCAPOSD

Table 18. Volunteering Opportunities.

Volunteer Activity	Commitment
Trail patrols	On-going
Trail construction	By project
Trail maintenance	Seasonal
Docent led hikes	On-going
Clean-up days*	Intermittent
Weed removal	On-going
Restoration planting	By project
Invasive plant monitoring	On-going
Education partnerships	Variable
Research studies	Variable
Resource inventories and assessments	On-going

* Includes trash pickup from staging areas, campgrounds, trails, creeks, etc. Good opportunity for school groups.

Image 76. Group on a guided hike stops to inspect a snake
PHOTO: RRM

In addition to these volunteering opportunities, another way of fostering an appreciation of the land is to schedule occasional special events. These could include educational wildlife tours with biologists, or guided nighttime hikes with an emphasis on nocturnal wildlife or stargazing. Activities such as these strengthen peoples' connection to Taylor Mountain and also highlight the importance and value of being good stewards of the environment.

The District currently conducts volunteer workdays on Taylor Mountain and Regional Parks conducts a number of activities in their "Park Celebration" program that translate well to the Taylor Mountain site, including:

- iWalk Challenge
- Wildflower walks
- Family hikes
- Bird-watching walks
- Campfire with a ranger

PHOTO: SCAPOSD

11. Implementation

11. IMPLEMENTATION

11.1 PROJECT TYPES

Within the Taylor Mountain Master Plan there are a number of distinct project areas that can be implemented in both the near and long term. Some of these improvements can be completed independently as stand-alone projects, while others are dependent on other projects or project areas being completed or constructed concurrently.

The main project type categories are:

- **Staging areas:** Petaluma Hill Road, Kawana Springs Resort, Linwood Avenue, Bath-Watt, and Farmers Lane (future).
- **Other development envelopes:** the Barn area, Kawana Knoll area, Petaluma Hill Road campground, and Kawana Springs Resort campground.
- **Trail network:** There are approximately 17 miles of trails in the proposed network. Each of the trail loops described in Chapter 8 and shown in Figure 7 can be considered a project area. Trail segments that are a sub-set of a trail loop can also be considered for individual project completion.
- **Restoration:** there are myriad opportunities for landscape restoration projects, ranging from weed abatement to the enhancement of less pristine areas with native plants. Chapter 5 has information on the various restoration opportunities that exist.

Various design requirements and permits will be required depending on the specific details of individual projects. Projects will be implemented in close coordination with relevant permitting agencies and in full comliance with permit conditions. Codes and regulations that may be applicable include but are not limited to:

- City of Santa Rosa and County of Santa Rosa Storm Water Low Impact Development Technical Design Manual (which satisfies the Santa Rosa Area MS4 permit requirements).
- California Green Building Standards Code (CALGreen).
- Statewide Construction General Permit.
- Sonoma County Water Efficient Landscape Ordinance.
- Sonoma County Water Agency Flood Control Design Criteria.
- Local grading and building codes.

11.2 IMPLEMENTATION PHASES

Development of any components identified in this Master Plan may be done as one project or in multiple sub-phases, based on numerous factors including but not limited to funding sources and availability, capital improvement plan priorities,

available infrastructure, cultural and environmental constraints, and community volunteerism and support. Table 19 summarizes many of the various projects that could be undertaken individually by Regional Parks when funding opportunities arise. The following sections identify some of the more significant phasing and priority considerations for some of the Master Plan components.

A. Petaluma Hill Road Staging Area and Connector Trails

The District and Regional Parks have identified the Petaluma Hill Road staging area as the probable first phase of implementation. This area is an obvious candidate for early development because it has convenient access from a public road, has no neighbors in close proximity, will open up a new section of the property that was previously closed to the public, and will accommodate all users including equestrians. The Petaluma Hill Road location will also help to distribute parking and ease pressure on Kawana Terrace, a residential street, and the existing interim parking lot.

B. Trail Development

Access to Taylor Mountain and trail construction were among the most highly rated goals and future uses by the community workshop participants. It is fair to assume that the public will have expectations that at least some of the planned trails will be constructed as an early phase to open up more access to the property. Logically, trail construction priority should be given to those segments that link to existing or new staging areas and development envelopes. Therefore, one of the first trails to be developed should be a connector from the Petaluma Hill staging area to an existing trail on the interior of the property. Likewise, each time a staging area is opened and/or developed it should be connected to the existing trail system or a new trail in order for it to be functional.

Over time as funding for more trails is available, and where feasible, priority should be given to trail segments that accomplish key goals. Therefore, when prioritizing trail construction projects, consideration should be given to:

- Providing access to key focal points (such as the knoll, unique plant communities, barn, Kawana Springs Resort).
- Completion of one or more trail loops.
- Opening up previously inaccessible areas to the public (such as the northern and southern reaches).

C. Kawana Springs Resort Area

The most significant (and probably also the most costly) project area to develop is the Kawana Springs Resort staging area. This is due to several factors, including building renovation, site work, a new bridge over Colgan Creek, and a new access driveway and parking lot. Some of these

improvements will not be necessary in the short term; however, when the extension of Farmers Lane is constructed it will result in the loss of the existing interim parking lot and driveway, which will in turn make the development of the new resort area access driveway and parking lot more important, to replace the lost parking spaces.

D. Linwood Avenue and Bath-Watt Staging Areas

Other secondary staging areas at Linwood Avenue and on the former Bath-Watt property (accessed from Panorama Drive) are less critical to the functionality of the overall circulation and parking scheme, but could easily be implemented earlier than that fact would suggest due to the relative ease and low cost for which they could be improved. In particular, the pedestrian/bike gates could be installed prior to the development of the rest of the staging areas.

11.3 PRIORITY SETTING

While much of the implementation of the Master Plan relies heavily on the availability of funding, Regional Parks has identified the following more immediate priorities, in order:

- Petaluma Hill Road staging area and associated trails.
- Interim area trails.
- Connection between Petaluma Hill Road staging area and Interim staging area (emergency access route).
- Connection between Panorama Drive and Barn area (improvements to existing road).
- Residential parking permit program in Holland Heights neighborhood.
- Pedestrian/bike gates at Linwood Avenue and Panorama Drive.

This list is not intended to be a phasing plan, but rather to provide Regional Parks with a framework within which to pursue various projects.

11.4 FUNDING SOURCES

Funding for projects in the Taylor Mountain Regional Park and Open Space Preserve will come from a variety of sources including but not limited to donations of time and services, park in-lieu fees, development impact fees, state-wide bond initiatives (e.g. Proposition 84), local bond measures, and federal and state grants.

Preliminary statements of construction and maintenance costs for individual projects should be prepared to assist Regional Parks with priority setting and phasing decisions.

Taylor Mountain Project Areas									
	Location								
Sub-Projects or Phases	Petaluma Hill Rd Staging Area	Kawana Springs Resort	Barn Area	Linwood Ave Staging Area	Farmers Ln Staging Area	Kawana Knoll	Bath-Watt Staging Area	Multi-Use Trails	Educational Trail
Street Improvements	✓								
Access Road Improvements		✓		✓	✓		✓		
Automobile Parking (long term - includes monument signs, gates, fencing)	✓	✓		✓	✓		✓		
Interim Auto Parking (24 spaces)		✓							
Equestrian Parking	✓	✓		✓					
Group Picnic Shelter	✓	✓							
Smaller Picnic Areas/Picnic Tables		✓	✓			✓			
Trailhead improvements and signage	✓	✓		✓	✓		✓		
Educational and Interpretive Exhibits	✓	✓						✓	✓
Camping Area	✓	✓							
Restrooms (fixed or portable)	✓	✓	✓	✓	✓	✓	✓		
Flexible-use Lawn Area		✓							
Colgan Creek Vegetation Restoration		✓							
Vegetation Restoration	✓	✓	✓	✓	✓	✓	✓		
Gazebo Restoration/Event Lawn Area		✓							
Colgan Creek Bridge		✓							
General Landscape Improvements	✓	✓							
Outdoor Classroom		✓	✓						
Bed and Breakfast Inn		✓							
Bathhouse Renovation		✓							
Barn Renovation			✓						
Fencing/Gate/Signage (Pedestrian, Auto)	✓	✓	✓	✓	✓	✓	✓		
Hitching Rail	✓	✓	✓	✓					
Disc Golf Course						✓			
Trail Construction & Signage						✓		✓	✓
Interpretive Signage	✓	✓	✓	✓			✓	✓	✓
Boardwalk									✓

Table 19. Taylor Mountain Potential Project Areas

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PHOTO: RRM

12. References

12. REFERENCES

Natural Resources

Bakun, A. 1990 Climate Change and Intensification of Coastal Ocean Upwelling. Science 247: 198-201.

Blake M.C. Jr., et al. 2000. Pamphlet to Accompany Miscellaneous Field Studies MF 2337, Online Version 1.0. Geologic Map and Map Database of Parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, CA. U.S. Geological Survey.

Bossard, C. C., et al. 2000. Invasive Plants of California's Wildlands. University of California Press. Berkeley, CA. Available at: http://www.cal-ipc.org/ip/management/ipcw/online.php.

California Department of Fish and Game (CDFG). 1997. Guidelines for Conducting Research on Rare, Threatened and Endangered Plants and Plant Communities. Available at: http://www.dfg.ca.gov/wildlife/nongame/t_e_spp/guidelines_proposal_format.html.

California Department of Fish and Game (CDFG). 2004. Strategic Plan for Wild Turkey Management. November 2004.

California Department of Fish and Game (CDFG). 2011. California Natural Diversity Database, RareFind Version 3.1.1. California Department of Fish and Game. Sacramento, CA.

California Native Plant Society (CNPS). 2011. Inventory of Rare and Endangered Plants (online edition, v7-11). California Native Plant Society. Sacramento, CA. Available at: http://www.cnps.org/inventory.

California Oak Mortality Task Force (COMTF). 2008. Best Management Practices. [A set of guidelines for a variety of user groups, including arborists, recreational users, and firefighters.] Available at: http://www.suddenoakdeath.org/diagnosis-and-management/best-management-practices/.

California Partners in Flight (CalPIF). 2002. The Oak Woodland Bird Conservation Plan: A Strategy for Protecting and Managing Oak Woodland Habitats and Associated Birds in California, Version 2.0. Point Reyes Bird Observatory, Stinson Beach, CA.

California Partners in Flight (CalPIF). 2000. The Draft Grassland Bird Conservation Plan: A Strategy for Protecting and Managing Grassland Habitats and Associated Birds in California, Version 1.0. Point Reyes Bird Observatory, Stinson Beach, CA.

Center for Natural Lands Management. 2004. Why Do We Care About Genetics. [Set of 12 factsheets.] Available at: http://cnlm.org/cms

City of Santa Rosa. 2007. Santa Rosa Citywide Creek Master Plan. Utilities Department. Available at : http://ci.santa-rosa.ca.us/Pages/default.aspx.

Davidson, C., et al. 2001. Declines of the California red-legged frog: Climate, UV-B, Habitat, and Pesticides Hypotheses. Ecological Applications 11(2):464-479.

DiGaudio, R. 2010. Grassland Bird Monitoring at the Jenner Headlands: Draft report of the 2010 field season. December 2010. PRBO Conservation Science, Petaluma, CA.

Dukes, J. 2002. Species composition and diversity affects grassland susceptibility and response to invasion. Ecological Applications 12(2): 602–617.

Flora of North America Editorial Committee, eds. (FNA). 2011. Flora of North America North of Mexico. 16+ vols. New York and Oxford. Available at: http://www.fna.org/

Falk, D. A., and K. E. Holsinger, eds. 1991. Genetics and conservation of rare plants. Oxford University Press, New York, NY.

Falk, D., C. Millar, and M. Olwell, eds. 1996. Restoring Diversity: Strategies for Reintroduction of Endangered Plants. Island Press. Washington, DC.

Graymer, R.W., et al. 2007. Pamphlet to accompany Scientific Investigations Map 2956, Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, CA. U.S. Geological Survey.

Hansen, L. and J. Biringer, eds. 2003. Buying Time: A User's Manual to Building Resistance to Climate Change. World Wildlife Fund. Washington, DC. Available online at: http://wwf.panda.org/about_our_earth/all_publications/?8678/BUYING-TIME-A-Users-Manual-for-Building-Resistance-and-Resilience-to-Climate-Change-in-Natural-Systems

Karl, T. R., et al., eds. 2009. Global Climate Change Impacts in the United States. A State of Knowledge Report from the U.S. Global Change Research Program. Cambridge University Press.

Johnstone, J. and T. Dawson. 2010. Climatic context and ecological implications of summer fog decline in the coast redwood region. Expand+Proceedings of the National Academy of Sciences 107: 4533-4538.

Loreau, M., et al. 2001. Biodiversity and Ecosystem Functioning: Current Knowledge and Future Challenges. Science 294: 804.

McCreary, D. 2010. Regenerating Rangeland Oaks in California. University of California, Division of Agriculture and Natural Resources. Oakland, CA. Available at: http://ucanr.org/sites/oak_range/files/59453.pdf.

Paige, C. 2008. A Landowner's Guide to Wildlife Friendly Fences. Landowner/ Wildlife Resource Program, Montana Fish, Wildlife and Parks, Helena, MT. 44 pp.

Pew Center on Global Climate Change (PEW). 2011. Climate Change 101 – The Science and Impacts, January 2011.

Prunuske Chatham, Inc. (PCI). 2011. Ecological Resources Report, Taylor Mountain Master Plan. July 2011.

Ralph, C.J., et al. 1993. Field Methods for Monitoring Landbirds. USDA Forest Service Publication, PSW-GTR 144. Albany, GA.

Riparian Habitat Joint Venture (RHJV). 2004. The Riparian Bird Conservation Plan: A Strategy for Reversing the Decline of Riparian Associated Birds in California, Version 2.0. California Partners in Flight.

Rogers, D.L. and A.M. Montalvo. 2004. Genetically appropriate choices for plant materials to maintain biological diversity. University of California. Report to the USDA Forest Service, Rocky Mountain Region, Lakewood, CO. Online: http://www.fs.fed.us/r2/publications/botany/plantgenetics.pdf.

Sawyer, J., et al. 2009. A Manual of California Vegetation. Second Edition. California Native Plant Society and California Department of Fish and Game. Sacramento, CA.

Seavy, N., et al. 2009. Why climate change makes riparian restoration more important than ever: Restoration recommendations for practice and research. Ecological Restoration 27(3): 330-338.

Taylor, D.A.R. and M.D. Tuttle. 2007. Water for Wildlife: A Handbook for Ranchers and Ranch Managers. Bat Conservation International.

U.S. Department of Agriculture (USDA). 2005 and 2007. Soil Survey Data. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

U.S. Fish and Wildlife Service (USFWS). 2002. Recovery Plan for the California Red-legged Frog (Rana aurora draytonii). U.S. Fish and Wildlife Service, Portland, OR.

University of California Cooperative Extension (UCCE), Sonoma County and Sonoma County Department of Emergency Services (SCDES). 2008. Sonoma County Sudden Oak Death Strategic Response Plan. Sonoma County, CA. Available at: www.sonoma-county.org/des/pdf/sodsr_plan.pdf.

Marin Resource Conservation District. 2007. Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California. 2nd Edition. Marin County, CA. Available online at: http://mcstoppp.org/acrobat/Groundwork.pdf.

Grazing Plan

Barry, Sheila J. and David Amme. 2009. Cows, bikes, hikes and kites: Minimizing conflict between public recreation and grazing livestock. Keeping Landscapes Working Newsletter, University of Cooperative Extension, San Jose.

Bartolome, JW, WE Frost, NK McDougald, and M Conner. 2002. California guidelines for residual dry matter (RDM) management on coastal and foothill annual rangelands. University of California Division of Agriculture. Rangeland monitoring series. Publication 8092.

Clawson, W., N. McDougald, and D. Duncan. 1982. Guidelines for Residue Management on Annual Range. University of California Division of Agricultural Science Leaflet 21327.

Cushman, J. H. 2007. History and ecology of feral pig invasions in California grasslands. In California Grasslands: Ecology and Management (M. Stromberg, J. Corbin and C. D'Antonio). University of California Press, Berkeley, CA.

Davison, J., E. Smith, and L. Wilson. 2007. Livestock Grazing Guidelines for Controlling Noxious Weeds in the Western United States. Universities of Nevada and Idaho Coopertive Extensions and Western SARE. 80 pp.

DiGaudio, R. 2010. Grassland Bird Monitoring at the Jenner Headlands: A report of the 2010 field season. PRBO Conservation Science report. Petaluma, CA. 35 pp.

Ford, L.D. and G.F. Hayes. 2007. Northern coastal scrub and coastal prairie. Pages 180-207 in: M.G. Barbour, T. Keeler-Wolf, and A.A. Schoenherr (eds), Terrestrial vegetation of California. Berkeley, CA: University of California Press.

Hayes, G.F. and K.D. Holl. 2003. Cattle grazing impacts on annual forbs and vegetation composition of mesic grasslands in California. Conservation biology 17: 1694-1702.

Holechek, Jerry L., Rex D. Pieper, and Carlton H. Herbel. 1998. Range Management: Principles and Practices, Third ed. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 501 pp.

Johnson, B. E., & J. H. Cushman. 2007. Large herbivore reintroduction influences plant invasion dynamics and community composition in a California grassland. Conservation Biology 21:515-526

Marty, J. 2004. Vernal pools are home on the range. National Wetlands Newsletter 26(4).

McBride, J. "Plant Succession in the Berkeley Hills, California," Madroño 22:3 (1974): 317–329.

McDougald, N. K., W. J. Clawson, J. W. Bartolome, and W. E. Frost. 1991. Estimating livestock grazing capacity on California annual rangeland. U.C. Davis Range Science Report 29.

Peischel, A. and D. D. Henry Jr. 2006. Targeted Grazing: a natural approach to vegetation management and landscape enhancement. American Sheep Association. 199 pp.

Taylor, D.A.R., and M.D. Tuttle. 2007. Water for Wildlife—A handbook for ranchers and range managers. Bat Conservation International. Austin, TX.

Thomsen, C.D, WA Williams, M Vayssieres, CE Turner, and WT Lanini. 1996. Yellow starthistle biology and control. University of California, Division of Agriculture and Natural Resources Publication 21541. 19 pp.

Russell W. H. and J. R. McBride. 2003. Landscape Scale Vegetation-type Conversion and Fire Hazard in the San Francisco Bay Area Open Spaces. Landscape and Urban Planning 64: 201–208.

U. S. Department of Agriculture (USDA). 1972. Soil Survey, Sonoma County California. Washington, DC, Superintendent of Documents, U.S. Government Printing Office. 188p.

U. S. Department of Agriculture (USDA). 2003. National Range and Pasture Handbook. Natural Resources Conservation Service Grazing Lands Technology Institute.

U. S. Fish and Wildlife Service (USFWS). 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Red-Legged Frog, and Special Rule Exemption Associated With Final Listing for Existing Routine Ranching Activities; Final Rule. April 13, 2006. 71 FR 19244 19346.

Vallentine, J. F. 1990. Grazing Management. Academic Press, New York. 533 p.

Personal Communications

Bartolome, James. 2010. Personal conversation with Lisa Bush August 31.

Bartolome, James. 2011. Personal conversation with Lisa Bush on December 14.

Barry, Sheila. 2008. Telephone conversation with Lisa Bush, January 22.

Barry, Sheila. 2011. Email correspondence to Lisa Bush on December 15.

Hayes, Grey. 2006. Telephone conversation between Grey Hayes, Elkhorn Slough Foundation, and Lisa Bush on February 9.

Jolley, L. Email correspondence to Lisa Bush on October 13, 2006.

Kellner, Clinton. 2010. Voicemail message received by Lisa Bush on March 31.

Doran, Morgan. 2004. Telephone conversations with Lisa Bush on, September 17, 21, 22, and October 6.

Doran, Morgan. 2009. Email correspondence to Lisa Bush on September 9.

Jones, Jeff. 2009. Personal conversation with Lisa Bush.

Jones, Jeff. 2010. Telephone conversation with Lisa Bush.

Michaud, Jennifer. 2011. Correspondence to Lisa Bush on December 22.

References – Cultural Resources

Chambers, Thomas A. Drinking the Waters: Creating an American Leisure Class at Nineteenth-Century Mineral Springs. Washington and London: Smithsonian Institution Press, 2002.

Durham, David. California's Geographic Names: a Gazetteer of Historic and Modern Names of the State. Fresno: Quill Driver Books, 1998.

Irvine, Leigh Hadley. A History of the New California: its Resources and People, Volume 2. New York and Chicago: The Lewis Publishing Co., 1903.

LeBaron, Gaye. "SR's John Taylor Made the Most Out of his Mountain." Santa Rosa Press Democrat, 28 August 2005.

"The Spa Vacation in the Days Before We All Had Wheels." Santa Rosa Press Democrat, 5 September 1993 (reprint with additional photographs of an article first published 3 July 1983).

Mark West Lodge, History of Mark West Lodge. http://www.markwestlodge.com/history/

"Summer Resorts" advertising page, San Francisco Call, 19 May 1910, p 7.

"Taking the Waters: A Tale of Boyes Hot Springs." http://www.iktome.com/svvb/waters.html

Tom Origer & Associates. "A Cultural Resources Survey for the Taylor Mountain Site Assessment – Russell Property, Sonoma County, California." Sept. 14, 2006.

Praetzellis, Mary, Adrian Praetzellis and Suzanne Stewart for the Army Corps of Engineers. "Before Warm Springs Dam: A History of the Lake Sonoma Area, Sonoma County, California" Anthropological Studies Center, Sonoma State University, 1985. http://www.sonoma.edu/asc/projects/warmsprings/

Origer, T.M. 2001. A Cultural Resources Survey for the Taylor Mountain Regional Park Project, Sonoma County, California. January 29, 2001.

Steen, E. and T.M. Origer. 2006. A Cultural Resources Survey for the Taylor Mountain Site Assessment – RussellProperty, Sonoma County, California. September 14, 2006.

Trails, Staging areas and Development Envelopes

California State Parks. (2009) Accessibility Guidelines (Internet). Available from www.parks.ca.gov. Accessed 11.22.11.

Moore, R. (1994) Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice. Raleigh: U.S. Department of Transportation.

Bergmann, R. (2000) Soil Stabilizers on Universally Accessible Trails. San Dimas: USDA Forest Service

Steinholtz, R. (2007) Wetland Trail Design and Construction. Missoula: USDA Forest Service

Hesselbarth, W., Vachowski, B., and Davies, M. (2007) Trail Construction and Maintenance Notebook. Missoula: USDA Forest Service

Groenier, J. (2006) Accessible Gates for Trails and Roads. USDA Forest Service, Tech Tip 2300/7700

International Mountain Biking Association. Trail Building and Design (Internet). Available from www.imba.com/resources/trail-building. Accessed 11.22.11.

Zeller, Janet; Doyle, Ruth; Snodgrass, Kathleen. (2006) Accessibility Guidebook for Outdoor Recreation and Trails. 0623 2801. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center.

Hancock, Jan ; Vander Hoek, Kim K. Jones; Bradshaw, Sunni ; Coffman, James D.; Engelmann, Jeffrey . (2007) Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds. 0723 2816. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center.

Department of Justice. (2010) ADA Standards for Accessible Design (Internet). Available from www.ada.gov. Accessed 2.20.12.

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