chapter 6

Resource Management Plan

TOLAY LAKE REGIONAL PARK
Master Plan Project

Photo credit: Regional Parks staff

RESOURCE MANAGEMENT PLAN

Introduction

Overview and Purpose

The purpose of the Resource Management Plan (RMP) is to guide conservation of natural and cultural resources in consideration of Park development, operation, and maintenance (O&M) actions. The RMP is based on the preferred conceptual site plan (Chapter 5), the Biological Resources Report (Appendix I), supporting technical studies (Appendices J – M), the Park's various conservation easements (Appendices N – P), and interviews with Regional Parks staff, Land Trust staff, and the Tribe. The RMP contains five sections:

1. Introduction and broad goals for natural and cultural resource management;
2. Existing conditions and management practices;
3. Natural and cultural resource management objectives, guidelines, and standards;
4. A summary of proposed habitat improvements; and
5. Adaptive management and monitoring requirements.

Management Goals

The goals of resource management within Tolay Lake Regional Park are to ensure the continued protection of natural and cultural resources and to enhance natural habitats and resources through restoration, preservation of native biodiversity, and protection of ecological processes. Implementing the resource management plan's goals while providing for educational opportunities, public recreation, preservation of prehistoric, cultural, and historical values, and maintaining the site's agricultural legacy poses significant challenges for park staff. Therefore, this management plan seeks to provide guidance for natural resource enhancement and restoration; avoidance and minimization standards for both project based activities as well as operations and maintenance of the park; detail monitoring and management activities to measure potential project-based and operations activities; and adaptive management techniques to ensure the mission is met.

The following objectives, guidelines, and standards are designed to meet the goals of the resource management plan. Objectives specific to each habitat type, special-status species, invasive species management, erosion and grazing management, native habitat enhancement and restoration, cultural resource protection, as well as buffering potential effects of climate change are outlined in this chapter. Guidelines and standards have been developed to clearly define actions and metrics to acknowledge if stated objectives are being met.

Guidelines are widely accepted natural resource management practices that should be followed where and when feasible. Standards are widely accepted natural resource management actions that should be followed more strictly than guidelines.

Support Studies and Methodology

Several natural and cultural resource studies have been conducted within and in the general vicinity of the Park that form the foundation of this document. In addition to the numerous scientific, regulatory, and policy literature reviewed, the following studies were essential in developing this plan:

- *A Cultural Resources Study for the Tolay Lake Regional Park Project* (LSA 2008) Confidential
- *Rangeland Resources Study: Tolay Lake Regional Park* (LSA 2009a)
- *Tolay Creek Ranch Grazing Plan* (Bush 2010)
- *Biological Resources Study: Tolay Lake Regional Park* (LSA 2009b)

- *Biological Resources Study: Tolay Creek Ranch* (LSA 2009c)
- *Biological Resources Report: Tolay Lake Regional Park* (WRA 2013)
- *Feasibility Analysis for the Restoration of Tolay Lake* (Ducks Unlimited 2005)
- *Hydrologic Feasibility Analysis for The Tolay Lake Ranch Property* (Kamman 2003)
- *Technical Memorandum: Tolay Lake Restoration Alternatives* (WRA 2014)

Existing Conditions

Setting and Location

The Park is in the southern extent of the Sonoma Mountains, between Petaluma Valley/Marsh and Sonoma Valley. Stage Gulch Road/Highway 116 is located to the north, Lakeville Highway to the west, Arnold Drive/Highway 121 to the east, and Highway 37 to the south. The cities of Petaluma, Sonoma, and Novato are approximately five miles northwest, northeast, and southwest, respectively (Figure 1-1). The Park resides almost entirely within the Tolay Creek Watershed, with the exception of the western ridge west-face that is part of the Petaluma River Watershed. The headwaters of Tolay Creek emerge north of the Park boundary, very near Highway 116 (Stage Gulch Road).

The Park is composed of several parcels, with the northern portion currently open to permit holders under the approved Interim Plan as Tolay Lake Regional Park, and the southern portion (Tolay Creek Ranch) purchased by The Land Trust and transferred to Regional Parks in 2017 (see Figure 1-2). Additionally, The Land Trust holds an easement on the undeveloped portion of the adjacent property to enhance the banks and riparian area of lower Tolay Creek. Public access to the Park is from Cannon Lane off Lakeville Highway in the northwest, with secondary and private access from Highway 121 in the south. The Park Complex (park office, visitor parking, historic ranch, etc.) is located at the former Cardoza residence in the northern portion of the Park (Figure 1-3).

The Sonoma Mountains are the southerly-most subset of ridgelines of the greater Mayacama Mountains, with Cougar Mountain being the most southern feature. To the west and east reside Petaluma and Sonoma-Napa marshes respectively. To the south is Cougar Mountain and beyond that, the tidal marshes and (formerly) diked baylands of Sears Point, which connect the Petaluma River estuary with that of Sonoma Creek. In its upper reach Tolay Creek is a freshwater perennial stream which flows southeastward onto the vast tidal plain of the Sonoma-Napa Marsh.

The Park and environs serve as a habitat core and provide several linkages, including from Cougar Mountain to Sonoma Mountain and onward north to the remainder of the Mayacama Mountains, and between the Petaluma and Sonoma-Napa marshes on an east-west plain (Merenlander et al. 2010). The Park, is within the Marin Coast to Blue Ridge Critical Linkage, which is inclusive of the Sonoma Valley Wildlife Corridor (BAOSC 2015, SLT 2014).

The seasonal wetlands particularly Tolay Lake, stock ponds, and streams provide important resting and foraging habitat for waterfowl on their north-south migratory patterns, providing critical functions between the Petaluma and Sonoma-Napa marshes. Being situated at the southern extent of the Mayacama Mountains, the Park and Cougar Mountain potentially provide a refuge for the region's peripheral plant populations where gene flow is increasingly limited and genetic variation is lower than core populations, and generally at a greater risk for extinction (Leppig and White 2006).

Photo credit: Regional Parks staff

Land Use and Infrastructure

Historically the Tolay Creek Watershed was the territory of the Alaguali a Coast Miwok Native American Tribe. They lived, hunted, and gathered resources to sustain life, and the lake valley was a place of spiritual reverence and ceremony. European settlement of the valley caused the displacement and loss of native life-ways and land use shifted to ranching, farming, and rural residences. A variety of agricultural activities have occurred in Tolay Creek Watershed including grazing, and cropping included: potatoes, grapes, hay, and pumpkins (Thompson 1877, LSA 2008).

The dominant natural feature within Tolay Creek Watershed is Tolay Lake, a naturally occurring shallow water body, which when unaltered, flooded up in the wet season, followed by a draw down in spring and early summer. Presumably, the lake ponded water due to being situated on heavy clay soils (Clear Lake clay soil series) with very slow permeability combined with a natural earthen dam that prevented rapid outflow. It is likely that the lake experienced pronounced inter-annual variation during the wet season, with dryer years exposing the lakebed from complete draw down, while wetter years witnessed inundated conditions through the summer.

To increase arable land, Tolay Lake was drained by removal of the natural earthen dam and drainage ditches dug to reroute surface flows. Stock ponds have been constructed to capture water for summer irrigation and flood control within the Tolay Creek Watershed inadvertently creating wildlife habitat. The current Park Complex is a collection of former Cardoza family residences and farm buildings located in the northern portion of the Park. Several ranch roads traverse the Park, with Cannon Lane-Mangel Ranch Road running from Lakeville Highway to Highway 121 alongside the majority of Tolay Creek. Overhead power lines and associated access roads run the length of the northern section of West Ridge. The Park continues historic agricultural practices utilizing cattle grazing and no-till, row crop agriculture near the Park Complex.

Climate and Watershed

The Park is within a mildly seasonal Mediterranean climate, with warm-hot dry summers and cool wet winters. The average annual maximum temperatures for Petaluma and Sonoma are 70.4 degrees and 73.7 degrees Fahrenheit, respectively while the average annual minimum temperature is 44.9 degrees Fahrenheit. For both Petaluma and Sonoma, the warmest months are June through September, while the coolest months are December through February (WRCC 2014).

Photo credit: Regional Parks staff

Predominantly, precipitation falls as rainfall with an annual average of 24.93 inches. Precipitation bearing weather systems are predominantly from the west and south with the majority of rain falls between November and March, with a combined average of 20.94 inches (WRCC 2014). Fog is common in the Park, with late spring and summer westerly / southerly advection fog arising from the Pacific Ocean flowing over the Marin Hills and north across San Pablo Bay in early evening and typically receding by midday. Low-lying fall and winter convection fog is common, particularly with the presence of the lake. Very rarely winter precipitation falls as snow, but typically is less than one inch and does not regularly remain for a period greater than 24 hours.

Geology and Soils

The geology within the vicinity of the Park consists of several geologic formations, faults, landslides, and contact zones (CDC 2002a, CDC 2002a). Several faults are present throughout the Park, with the Lakeville, Roche-Cardoza, and Rogers Creek faults being the most prominent. The Lakeville and Rogers Creek faults run the length of the West Ridge and East Ridge, respectively, each periodically entering the Park. The Roche-Cardoza fault breaks from the Rogers Creek Fault, entering the southern portion of the Park (Koenig 1963, CDC 2002a, CDC 2002b).

The northern park area including the lake bed, is underlain primarily by Holocene basin deposits composed of fine-grained alluvium. The central-eastern area is underlain primarily by the Donnell Ranch Volcanics composed of basalt and basaltic andesite, breccia, scoria, and rhyolite flows and tuffs. The southeastern park area is underlain primarily by the Petaluma Formation composed of predominantly of lacustrine and fluvial deposits of siltstone, sandstone, shale, conglomerate, with minor inclusions of silicified tuff, chert, and limestone. The southwestern area is underlain primarily by Jurassic period serpentinized ultramafic rock. The central-west and northwestern park area is underlain primarily by the Franciscan complex composed of sandstone, altered mafic volcanics, chert, gabbro, and schist and semischist (CDC 2002a, CDC 2002b).

The regional complex geology contributes to the formation of a diversity of soil structures, textures, chemistry, and depths contributing to the often pronounced and diverse vegetation communities within the Park. The Soil Survey of Sonoma County (USDA 1977) indicates the presence of 13 soil mapping units composed of seven soil series, and Table 6-1 summarizes the soil mapping units and relevant characteristics. Figure 6-1 depicts the distribution of soil types within the planning area boundaries. The predominant soil types are Clear Lake Clay Loam, 0-2 percent slopes, and Diablo Clay, 15 to 30 percent slopes.

Generally, clay-rich soils with low slope gradients (e.g. Clear Lake clay loam) have a much higher potential to support wetland habitat than well drained, coarser textured soils, particularly on higher gradient slopes (e.g., Laniger loam). However, seep wetlands are frequently associated with a diversity of soil textures on high gradient slopes where shallow lithic contact and/or rock outcrops are present.

Vegetation communities and plant species are often closely associated with the physical characteristics of soils including parent material (i.e., serpentinite), soil chemistry (i.e., alkaline), and soil texture (i.e., clay). Therefore, the complex geology and diversity of soil types within the Park, along with microclimate conditions are directly correlated with the potential for the presence of special-status plant species and sensitive vegetation communities.

Photo credit: Regional Parks staff

Table 6-1 Soil Mapping Units and Characteristics					
Soil Map Unit (map code)	Slope Class	Hydric (Sonoma County)	Parent Material & Chemistry	Drainage, Runoff, & Permeability	Ecological Notes
Clear Lake clay loam (CcA)	0-2%	Yes	Alluvium, sandstone & shale; Moderately alkaline (pH 8.0)	Poorly drained; Negligible to high runoff; Slow to very slow permeability	May support clay associated rare plants; High potential to support wetlands (clays, shrink-swell); Native grasses and forbs, non-native annual grasses; Low erosion potential (neutral slopes);
Diablo clay (DbC) Diablo clay (DbD) Diablo clay (DbE) Diablo clay, eroded (DbF2)	2-9% 9-15% 15-30% 30-50%	Yes No 	Residuum, sedimentary rock; Moderately alkaline (pH 8.0)	Well drained; Slow runoff (dry), medium to rapid (wet); Slow permeability	May support clay associated rare plants; May support wetlands (clay-rich and shrink-swell); Annual grasses and forbs; Moderate-high erosion potential (slopes)
Goulding cobbly clay loam Goulding-Toomes complex (GoF)	5-15% 9-50%	No No	Residuum, tuff breccia, basalt, andesite; Slightly acid (pH 6.0)	Well-somewhat excessively drained; Medium-rapid runoff; Moderate permeability	May support volcanic associated rare plants; May support seep wetlands; Oaks, scrub, grasses and forbs; Moderate-high erosion potential (slopes)
Haire clay loam (HcD)	9-15%	No	Alluvium, sedimentary rock; Slightly acid (pH 6.0)	Moderately well drained; Slow-rapid runoff; Very slow permeability	May support sandstone associated rare plants; May support seasonal wetlands (low slopes); Annual grasses and forbs; Low-moderate erosion potential
Laniger loam (LaC) Laniger loam (LaD) Laniger loam, eroded (LaE2)	5-9% 9-15% 15-30%	No	Residuum, rhyolite; Medium to slightly (pH 6.0-6.5)	Well-somewhat excessively drained; Medium-rapid runoff; Moderate-rapid permeability	May support volcanic associated rare plants; May support seep wetlands; Oaks, manzanita, ceanothus, and grasses Moderate-high erosion potential (slopes)
Montara cobbly clay loam (MoE)	2-30%	No	Residuum, serpentinite; Moderately alkaline (pH 8.0)	Well drained; Medium-high runoff; Moderately slow permeability	May support serpentine associated rare plants; May support seep wetlands; Native grasses and forbs; Low-moderate erosion potential (slopes)
Gullied Land	varies	No	mixed	Well drained	Unlikely to support rare plants (disturbance); May support swale wetlands and non-wetland waters; Non-native and ruderal plants; High-extreme erosion potential

Biological Resources

The following section summarizes Tolay Lake Regional Park documented biological resources. Specific descriptions of the biological communities, special-status species, invasive species, and other management considerations are found in the Biological Resources Report (WRA 2013) (Appendix I).

NON-SENSITIVE BIOLOGICAL COMMUNITIES

Non-sensitive biological communities are those habitats that are not accorded special protection under CEQA, and other state, federal, and local laws, regulations, and ordinances. However, these communities may provide suitable habitat for some special-status plant or wildlife species and frequently provide buffering for adjacent sensitive biological communities.

Non-sensitive biological communities mapped within the Park include:

- Developed and Disturbed Areas
- Blue Gum and Monterey Cypress Groves
- Non-native Grasslands

SENSITIVE BIOLOGICAL COMMUNITIES

Sensitive biological communities are defined as those habitats that are given special protection under CEQA and other applicable federal, state, and local laws, regulations and ordinances (Figure 6-2).

Sensitive biological communities mapped within the Park include:

- Non-wetland Waters
- Tolay Lake and Other Wetlands
- Red Willow Riparian Scrub
- Coast Live Oak, Valley Oak, and California Buckeye Woodlands
- Native Grasslands and Wildflower Fields
- Rock Outcrops and Scrubs

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES

Several surveys for special-status plant and wildlife species, as well as incidental observations of special-status wildlife have occurred in the Park. The following section, titled Natural Resources - Special Status Plants and Wildlife, details those species present or assumed to be present within the Park.

INVASIVE PLANT AND WILDLIFE SPECIES

Invasive plant species were documented within the Park concurrent with plant surveys and vegetation mapping. These species (Figure 6-3) along with invasive wildlife present or assumed to be present within the Park are detailed in the following section titled Natural Resources - Invasive Wildlife Species and Invasive Plant Species.

Photo credit: Regional Parks staff

Cultural Resources

The following section summarizes documented cultural resources including: pre-historic archeological resource sites, buildings and structures, circulation, land use, natural systems and features, small-scale features, vegetation, views and vistas, and water features. Specific descriptions of agricultural resources and historical resources are found in Appendix C – Historic Structures Report, and the Cultural Landscape Inventory Report (MIG 2013). The Cultural Landscape Inventory Report is not included in the Appendices due to the sensitive nature of its contents.

ARCHEOLOGICAL RESOURCES

Archaeological resources pertain to structures, artifacts, and sites associated with the indigenous Coast Miwok Tribe population that previously inhabited the Tolay Creek watershed environs. Federal law prohibits the disclosure of the description and location of sensitive cultural resources, and they are not included in this document.

AGRICULTURAL RESOURCES

Agricultural resources include features that relate to park grazing and farming operations and may include buildings and structures, circulation, land use, and small-scale features. Some examples from the Cultural Landscape Inventory Report include cattle scales, corrals, and water troughs. Historic documentation of agricultural practices in this area date from 1834–1966). The beginning date corresponds to the first documented agricultural euro-settlement of the area. The end date of the period of significance corresponds to the 50 year cut off for evaluating historical resource that is established by the National Historic Preservation Act (as amended) (MIG 2013).

HISTORICAL RESOURCES

Historical resources encompass the remaining features not covered under cultural or agricultural resources; for example, dwelling units for the area's inhabitants from 1834–1966.

Encumbrances

The following section summarizes the encumbrances documented within and adjacent to the Park. Appendices N – R contains the legal definitions, responsible parties, and the details of the encumbrance.

ZONING

The zoning designations of the Assessor Parcel Numbers (APN) are:

- LIA60 & LEA 60 APN 068-060-057, 068-070-004, 068-070-005, 068-080-001
- LEA 100 APN 068-060-058, 068-080-007, 068-090-024, 068-090-022

The LEA land use designation stands for 'Land Extensive Agriculture District' while LIA stands for 'Land Intensive Agriculture District.' Below is a summary of purpose and permitted uses for these districts, as per Sonoma County's zoning regulations.

Land Extensive Agriculture District

- Purpose: To enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land; and to implement the provisions of the Land Extensive Agriculture land use category of the General Plan and the policies of the Agricultural Resources Element.
- Permitted Uses: Various (e.g. public parks, management of land for watershed, for fish and wildlife habitat, animal husbandry, beekeeping, agriculture, farmworker camps, etc).

Land Intensive Agriculture District

- Purpose: to enhance and protect lands best suited for permanent agricultural use and capable of relatively high production per acre of land; and to implement the provisions of the land intensive agriculture land use category of the General Plan and the policies of the agricultural resources element.
- Permitted Uses: Various (e.g. public parks, management of land for watershed for fish and wildlife habitat, animal husbandry, beekeeping, agriculture, farmworker camps, minor timberland conversions, small-scale ag. processing etc).

CONSERVATION EASEMENTS

A Conservation Easement ("CE") is an agreement recorded with a property deed that restricts uses and activities on a subject property in order to ensure the preservation and protection of identified "Conservation Values" and to prevent any use of the Property that will impair or interfere with those values. The various CEs and a summary description are included here. For CE details refer to Appendices N through P.

Wildlife Conservation Board Easement (Appendix N)

CE 2005144636

- Grantor is the sole owner in fee APN 068-060-057, 068-070-004, and 068-070-005.
- The Property possesses, or will possess in the future, wildlife and habitat values "conservation values" of great importance to Grantee and the people of the State of California;
- The property provides, or will provide, high quality wetland and aquatic habitats in the form of a large seasonal lake that supports diverse biotic life.
- The Department of Fish and Game (now California Department of Fish and Wildlife) has jurisdiction, over the conservation, protection, and management of fish, wildlife, plants and habitat for biologically sustainable populations.
- The Sonoma County Agricultural Preservation Open Space District acquired (and transferred to Regional Parks) the larger Cardoza Ranch property in part with funds provided by the Department of Fish and Wildlife and Wildlife Conservation Board for the purposes of protecting its natural and historic open space values and providing for recreational use compatible with those open space values.
- As a condition of the grant the District has agreed to provide the easement to the California Department of Fish and Wildlife and to prepare a Restoration and Management Plan for Tolay Lake (Plan). To restore the lake to a seasonal, shallow water lake primarily to benefit wildlife.

Photo credit: Regional Parks staff

Purposes – The purposes of the Conservation Easement are to ensure the Property will be retained forever in its natural condition and to prevent any use of the Property that will impair or interfere with the conservation values of the Property; to preserve, restore and enhance native species and their habitats.

Grantee's (District) Rights – To accomplish the purpose of the CE rights are given to the Grantee to ensure that purpose. An example of what is included: enter the property to monitor compliance, prevent activity on the Property that is inconsistent with CE purpose; mineral, air and water rights necessary to sustain biological resources.

Prohibited Uses – Any activity on or use of the Property inconsistent with the purpose of the CE.

Sonoma County Agricultural Preservation and Open Space District (Appendix O)

Tolay Lake Ranch

Grantor (Regional Parks) grants to the District a CE in the Property in perpetuity. Property as described in Exhibit A of the CE.

Purpose – To conserve, protect, enhance and restore habitat for diverse populations of species, while providing low-intensity public outdoor recreation compatible with the 'Conservation Values' of the Property, and to prevent any uses of the Property that would significantly impair or interfere with these Conservation Values.

Grantee Rights – Rights granted to the District include: the right to identify, preserve and protect the Conservation Values of the Property, the right to inspect the Property for compliance with the CE, and the right to review and approve certain uses and activities.

Prohibited Uses – Prohibits any activity on the Property or use of the Property which is inconsistent with the Conservation Purpose of the CE and includes several specific prohibitions. See CE Exhibit B for Reserved and Restricted Uses of the Property.

Grantor (Regional Parks) Rights – use of the Property for:

- low-intensity, recreational and/or educational purposes, consistent with the "Conservation Purpose"
- habitat enhancement
- fire management (i.e. Prescriptive burning, limited brush removal, grazing consistent with Rangeland Management Plan)
- Plant Collection for cultural interpretive uses so long as it is compatible with the Conservation Purpose of the CE.
- See CE Exhibit B for specific Reserved and Restricted Uses of the Property.

Only allowable commercial uses are:

- Recreational – concessions or short-term special events
- Park Complex/Visitor Center – development of visitor-serving uses within the Park Complex Area (Figure 6-4).
- Agricultural – engage in limited agricultural uses of the Property

Sonoma County Agricultural Preservation and Open Space District (Appendix P)

Tolay Creek Ranch

Grantor (Land Trust) grants a CE to District in perpetuity (the CE is binding on Parks as a successor land owner)

Grantor, grants to the District a CE in the Property in perpetuity. The Property as described in Exhibit A of the CE.

Purpose – To preserve the open space, scenic, and natural resource values of the Property; and to prevent any uses that will significantly impair or interfere with those values. The Property possesses natural scenic, open space, wildlife and watershed values including:

- Tolay Creek and Watershed
- Habitat for native plant and animal species
- Connectivity – protect viable habitat linkages, conserve contiguous areas of high quality

riparian habitat, and provide connections between natural areas through the county.
- Open Space and Scenic Resources

Grantee Rights – Rights granted to the District include: the right to identify, preserve and protect the Conservation Values of the Property, the right to inspect the Property for compliance with the CE; and the right to review and approve certain uses.

Prohibited Uses - Prohibits any activity on the Property or use of the Property which is inconsistent with the Conservation Purpose of the CE. See CE Exhibit B for specific reserved and Restricted Uses of the Property.

Grantor Rights – use of the Property for:

- Habitat management, restoration and management,
- Management and conservation of natural resources
- Low-intensity outdoor public educational and recreational activities
- Residential uses within a 5-acre Residential Envelope, which placement is subject to District approval
- See CE Exhibit B for specific Reserved and Restricted Uses of the Property.

Sonoma Land Trust/Roche Easement (Appendix Q)

The southern portion of the Park known as Tolay Creek Ranch was once formerly a portion of the Roche Ranch. The Tolay Creek Ranch property was sold to the Land Trust (transferred to Regional Parks) and the remaining property became Roche Ranch retained lands. Those remaining lands are now under new ownership and are referenced by the new owners as Tolay Springs.

There are two access easements on these neighboring lands for southern Parks access and public entrance. The easement over neighboring land is for public access, operations and maintenance, and emergency purposes on the parks southern end off of Hwy 121.

The Land Trust retains a riparian easement on Tolay Creek corridor (as defined in the Riparian Easement). The riparian easement will provide for periodic riparian corridor inspection, development of public access for recreational purposes, riparian management, restoration and enhancement, and the construction of livestock exclusionary fencing.

Further, the entire former Roche Ranch Property is under a Land Conservation Contract (Williamson Act), an agreement between the County and property owner to limit the use of the property to agricultural uses in order to discourage the premature and unnecessary conversion of the property from agricultural use. A notice of non-renewal was filed in 2006 initiating the ten-year phase-out of Williamson Act on the Property.

WATER AND ACCESS EASEMENT

Public Roadway, Parking and Trail Easement Agreement

The owner of the retained lands of Roche Ranch (adjacent southeast park) retain access and signage easement over a portion of the southern property for public access and advertising should the owners construct a winery on the lands.

Water Delivery System Easement Agreement

The adjacent property owner retains a water easement granting them the right to use and deliver

Photo credit: Regional Parks staff

a portion of the water from developed springs on Park lands in association with the reservoir and vineyard on their lands.

RIGHT OF WAYS

Cannon Lane Easement

Cannon Lane is dedicated as a County road, with a right of way easement for road and utility purposes generally 30 feet wide. Cannon Lane is defined as "that portion of the Parcels commencing at the center line of the Lakeville Road and running northeast for approximately 1.16 miles." The specifically identified areas at the entrance of Cannon Lane from Lakeville Road will have right-of-way easements greater than 30 feet for road improvements and areas that are needed for drainage maintenance. Described in exhibit B and C in Cannon Lane Easement.

Cardoza Road Easement

A right-of-way easement for non-routine Parks Operations and Maintenance Staff or emergency vehicle use.

Right-of-way Across Martinelli and Gilardi (Appendix O)

A right-of-way easement across the lands as described in the easement Exhibit A.

Existing Resource Management Practices

This section discusses the existing resource management practices and habitat restoration projects

TOLAY LAKE REGIONAL PARK INTERIM ACCESS & RESOURCE MANAGEMENT PLAN 2008

- East Ridge Area Oak Restoration and Enhancement oak restoration includes caging volunteer oak seedlings for protection from grazing activities.
- Tolay Creek Area general habitat enhancement and restoration includes: caging shrubs and trees, invasive plant eradication, and new native plantings. Please see the restoration section for a description of the general habitat enhancement and restoration program.
- Developed Springs used as watering troughs for livestock will include restoration of fencing the spring source, spring box, and the areas receiving the majority of the spring's runoff.
- STRAW Restoration Program by the Bay Institute began sponsorship of Students and Teachers Restoring a Watershed (STRAW), an ongoing project to restore and enhance riparian vegetation and habitat. Protect and enhance existing projects on Cardoza Creek and South Creek and collaboratively identify and restore additional wildlife riparian habitat.

SONOMA LAND TRUST

Sonoma Land Trust has focused significant attention and resources on enhancing and restoring the riparian corridor with the goal of improving the ecological functioning of the system. The enhancement strategy, more completely detailed in the Tolay Creek Riparian Enhancement Plan, is to replicate a natural riparian ecosystem and floodplain riparian oak woodland. When completed, the project will have helped reestablish a diversity of native tree and shrub species in the riparian area, enhancing the native biodiversity, as well as reducing the erosion and sediment inputs to the aquatic and wetland systems.

The Land Trust efforts have focused largely on planting and maintaining native plant species found in the watershed. Since 2009 thousands of native oaks, willows, and other native riparian plants commonly found in riparian zones have been planted along the banks of Tolay Creek and tributaries. The native plantings are irrigated, protected from animal browsing, and protected from exotic weedy species until they are established (for 3-5 years). Wildlife friendly exclusionary fencing was installed

along the Creek corridor to protect new plantings and manage livestock in the riparian zone. Once seedlings are established and vigorous enough to handle incidental livestock grazing the riparian areas will be open for quick flash grazing to reduce exotic weedy species and promote a more natural assemblage of shrubs, trees and grasses.

In several tributaries to Tolay Creek active down-cutting and erosion were serious problems. The down-cutting or incision destabilizes the stream banks, which increases erosion, sedimentation, ultimately strips vegetation from the banks which further increases erosion. Stream stabilization projects have been constructed on these tributaries to stabilize the system. When possible, “bioengineering” was used for bank stabilization using native willows or using willows woven together as wattles or willow walls. This supports the stream banks in addition to promoting the growth of willows in areas that have been denuded. In other areas rock structures have been installed in the stream channels to prevent head-cutting (e.g., the formation of a steep vertical drop from erosion) and stabilize stream banks. The project also reconnected areas of seasonal tributaries to the flood plain, helping to restore natural stream processes making the tributaries more resilient.

Thousands of native sedges, shrubs, and trees have been planted by youth from local elementary schools, Boy Scout troops, high schools, Santa Rosa JC, Americorps, and North Bay Conservation Corps. Often working through partner organizations such as the Students and Teachers Restoring a Watershed (STRAW), this community based conservation helps educate and connect our future citizenry to these important natural landscapes, recreating a local land ethic that will help ensure that our open spaces and Regional Parks will be valued for generations to come.

CARDOZA CREEK RESTORATION

The Cardoza Creek Restoration project in the summer of 2013 re-stabilized the existing creek spillway to a more natural setting and included removal of discarded auto bodies, concrete, and other items historically used to reduce erosion within the creek. The Creek below the spillway was re-graded and armored, and the length of the creek below the ponds re-vegetated with over 800 native plants and irrigated by solar powered water system using water from nearby stock pond.

restoration planting at Tolay Creek Ranch

Left and right image photo credit: Sonoma Land Trust

GRAZING

Regional Parks and Land Trust have continued on-going grazing by contracting with a rangeland manager. Grazing will continue to be utilized by park staff as a land management tool. Grazing related infrastructure is depicted in Figure 6-5. Elements of the Rangeland Resource Study for Tolay Lake Ranch (Appendix L) and Grazing Plan for Tolay Creek Ranch (Appendix M) include: fencing, exclusion areas, rotation, animal type, number of animals, frequency and other patterns for grazing, and developed springs and watering holes, mineral/salt licks, corrals, and other grazing infrastructure.

VEGETATION MANAGEMENT AND NOXIOUS WEED CONTROL

There are several invasive species in the park that the Baseline Documentation Report recommended for removal. Noxious weeds present in the grassland areas include medusahead, Harding grass, Mediterranean linseed, and a variety of thistle species. In seasonal drainages and riparian area on slopes invasive species include Himalayan blackberry, Fuller's teasel, and poison hemlock. In the Fresh Emergent Wetland area invasive species include pennyroyal, Fuller's teasel, and swamp smartweed. Swamp smartweed is a native plant and provides food for waterfowl but is behaving as an abundant invasive in the lakebed. The Wet Meadow area contains spiny cocklebur, Himalayan blackberry, Fuller's teasel, and pennyroyal. The Tolay Creek riparian area at the south edge of the property has an infestation of Himalayan blackberry, and a small area of Acacia (Circuit Rider Productions 2006).

Regional Parks will practice adaptive land management to minimize and/or eradicate noxious weeds as feasible. In consideration of this pursuit, park staff may modify the grazing regimes, experimenting with sheep/goat grazing, utilizing volunteers to hand remove, and partner with other conservation agencies to address noxious weed eradication.

ROADS AND TRAILS

Existing road and trail restoration programs address and remediate trail erosion problems. Road and trail restoration methods may include: bio-engineering, puncheons, armored crossings, drainage lenses, rolling dips, swale modifications, swale creation, headwall modifications, headwall installations, and the installation of rip-rap.

TOLAY LAKE

Maintenance activities of the lake include invasive species management, mosquito abatement, and causeway road maintenance.

Natural and Cultural Resources Management

Natural Resources

DEVELOPED AND DISTURBED AREAS

Although developed and disturbed areas around the Park Complex do not currently support native plant communities, these areas commonly provide critical habitats for birds and bats. But they also provide a conduit for the spread of invasive plant species, erosion, and contaminants as a result of Park operation and maintenance actions. It is critical to manage the unintended consequences associated with park use in order to protect the sensitive natural resources adjacent to the developed and disturbed areas.

Developed and Disturbed Area	
RMP-O1	Prevent the spread of non-native plant species from developed and disturbed areas into natural areas of the Park. Non-native plants intended for aesthetics or agricultural purposes can escape and come to out-compete native species and invasive plants are highly adaptable to disturbed areas of human development. To ensure that the ornamentals, agricultural plants, and invasive species in and around developed and disturbed areas do not escape into natural areas, monitoring and control should be implemented.
RMP-O2	Prevent erosion, sediment migration, and migration of pollutants from developed and disturbed areas into natural areas. The storage and use of potential contaminants (e.g., gasoline, oil, solvents) is a necessary function for operations and maintenance in and around the Park Complex. The compacted and impervious substrates in and around the Park Complex, roads, trails, and other infrastructure provide a conduit for water and sediment runoff and pose an erosion hazard. Measures to prevent water and sediment migration, erosion, and potential contaminants will be implemented in and around the Park Complex as well as during construction of infrastructure and regular park maintenance operations.
RMP-G1	Periodic monitoring will be conducted in and around the Park Complex to document and repair point-source erosion and pollutant hazards.
RMP-G2	Landscape planting in the Park Complex should be preferentially native species, particularly species native to the Park. A preferred native plant species list will be developed and species from the list will be used for new and replacement plantings. Where non-native and non-regional plants are selected for landscaping or agricultural uses, they will be drought tolerant. Plants likely to escape into the natural areas of the Park will not be used.
RMP-S1	Monitoring will be conducted monthly through the dry season and spot treatment of invasive plants will be conducted to eradicate them before they escape into natural areas.
RMP-S2	Point-source erosion or pollution will be halted immediately, and any remedial actions will occur as soon as feasible.

BLUE GUM AND MONTEREY CYPRESS GROVES

Blue gum (*Eucalyptus globulus*) and Monterey cypress (*Hesperocyparis macrocarpa*) groves are common in southern and western Sonoma County where trees were planted for screening, aesthetics, shelterbelts, and woodlots (Holland 1996, Sawyer et al. 2009). The Park contains several groves of planted blue gum, with the largest located immediately west of the Park Complex. One small grove of Monterey cypress is present along the banks of lower Tolay Creek, which may be indicative of an old homestead. These introduced species are typically present in monotypic stands, can spread to other areas, and in the case of blue gum, pose a high fire risk. However, both trees offer cover, breeding, and foraging habitat for native wildlife. Therefore, these groves are included in the management of the Park's natural resources.

Blue Gum and Monterey Cypress Groves	
RMP-O3	Prevent the spread of blue gum and Monterey cypress into natural areas. The fast-growing blue gum can reach heights of upwards of 200 feet under prime conditions, over-topping shorter native vegetation. Additionally, blue gum may have allelopathic chemicals that hinder the viability of understory vegetation. Blue gum in particular poses a more distinct threat because it reproduces rapidly, spreads into natural habitats and quickly over-tops shorter shrub and herbaceous native communities.
RMP-O4	Reduce fuel loading in blue gum groves, particularly near the Park Complex. Fallen leaves, branches, and shredded bark accumulate in the understory and bole forks of blue gum. Without manually removing this downed woody debris, the understory of blue gum groves poses a fire hazard. Therefore, periodic reduction of fuel loading in these groves will reduce fire hazard.
RMP-G3	Unless otherwise containing historical values, blue gum and Monterey cypress groves should be eradicated, through either direct action or abeyance. Direct action is mechanical removal of trees followed by herbicide treatment of stumps. Blue gum is a prodigious stump-sprouter which can continue to set seed following felling. Seedlings should be mechanically removed until the seed bank is exhausted. Should abeyance be the chosen course, caution should be taken to ensure that naturally dying and fallen trees do not pose a hazard to the public, park staff, park infrastructure, and/or livestock. Similarly, seedlings and saplings should be eradicated.
RMP-S3	Monitoring of blue gum and Monterey cypress will be conducted throughout the Park, particularly in areas of these non-native groves. Seedlings and saplings will be eradicated by mechanical removal, possibly followed by herbicide treatment. Monitoring for blue gum and Monterey cypress will occur at a minimum of every five years.

STREAMS, PONDS, AND RIPARIAN HABITATS

The Park contains several miles of ephemeral to perennial streams including the named drainages of Tolay Creek, Cardoza Creek, and the Oak Grove Fork of Eagle Creek, and their unnamed tributaries. There are several constructed ponds including Vista Pond, Fish Pond, Duck Pond, and Willow Pond, as well as unnamed seasonal ponds/vernal marshes in the southern portion of the Park.

Woody riparian cover confers many benefits to their associated streams including cooling, bank stabilization, increased infiltration of runoff into the soil, nutrient input, improved water quality, and buffering from flood events. Riparian areas act as migratory corridors for wildlife by providing cover, foraging, and, in the case of aquatic organisms, reliable clean water. Riparian habitats include willow thickets along Tolay and Cardoza creeks, and oak and bay over-stories in the lower reaches of Tolay Creek. The under-stories near the drainages contain moisture dependent species not found in upland settings such as grasslands and rock outcrops. Park plant diversity near streams is high; but native plant diversity is threatened from invasive plants throughout the park. Stock ponds provide potential California red-legged frog breeding and non-breeding aquatic habitat and streams provide dispersal habitat for the frog.

Photo credit: Regional Parks staff

Because streams are considered Waters of the U.S. and Waters of the State, special consideration needs to be made when conducting ground disturbing activity within or near these features, including restoration projects. Permitting with the U.S. Army Corps of Engineers and Regional Water Quality Control Board is required for any activities within the streambed. Streams and their associated riparian habitats are also jurisdictional under Section 1600 of the California Fish and Game Code and would require

permitting with the California Department of Fish and Wildlife.

Streams, Ponds, and Riparian Habitats	
RMP-O5	Monitor and reduce head-cutting in upper reaches and down-cutting in lower-gradient streams. Head-cuts are prevalent in the upper reaches of streams, particularly near roads, trails, culverts, and cattle-loafing areas. Down-cuts are ubiquitous on the lower-gradient streams, increasing water velocity and temperatures, increasing erosion and sediment inputs, and contributing to the loss of riparian habitat. Reducing head-cuts will improve water quality, reduce sediment migration, and provide cooler, cleaner waters downstream.
RMP-O6	Enhance native plants in existing riparian areas and expand riparian vegetation in areas where it is absent. Typical riparian vegetation is absent along many seasonal streams where ordinarily it might be expected. The loss of riparian vegetation can be contributed to head-cuts and down cuts, the lowering of the water table, and impacts from grazing and other anthropogenic disturbances. Supplemental planting of native species in existing riparian habitats can increase species diversity and provide additional forage and cover for wildlife. Restorative riparian plantings along streams will contribute to bank stabilization, decrease water velocity, and lower water temperature.
RMP-O7	Monitor, remove, and control invasive species that threaten habitat quality in riparian areas. Invasive species can out-compete the native flora in riparian habitats. Himalayan blackberry (*Rubus armeniacus*) is common throughout the Park, frequently covering both banks of the upper reaches of streams, excluding native shrubs and herbs. Water primrose (*Ludwigia* sp.) is a particular problem in the stock ponds where it forms extensive mats on the water's surface. This species can displace native plants, lower oxygen in the water column, and reduce water quality. Aggressive removal and control efforts should be administered for water primrose to improve water quality of the stock ponds and increase the quality of habitat for California Red Legged Frog (CRLF). Himalayan blackberry should be controlled to prevent its spread, and when feasible targeted for complete removal.
RMP-G4	Livestock troughs, feeding areas, and loafing areas should be discouraged near head-cuts.
RMP-G5	Head-cuts and down-cuts should be monitored to gauge rate and volume of increase. Monitoring should consist of annual documented photo-points and indicator markers (e.g. steel stakes) to measure the rate of increase.
RMP-G6	A targeted restoration plan to halt the continued advance of head-cuts will be developed. Check dams of stone and native brush cuttings may be used as an effective means to trap sediment migration and rebuild the soil surface. Livestock exclusion fencing may be used as necessary to reduce continued impacts from grazing animals.
RMP-S5	Minimum setbacks from the top of bank and outer extent of the riparian canopy dripline will be maintained to the greatest extent feasible.
RMP-S6	Trails, roads, and other Park infrastructure will avoid streams, stock ponds, and riparian habitats to the greatest extent feasible.
RMP-S7	Where roads and trails must intersect with ponds, streams, and riparian habitats ground disturbing activities will be accompanied by best management practices to avoid unnecessary soil erosion, soil compaction, and invasive species encroachment. A restoration plan for any proposed trail within riparian habitat, near or across streams will be developed and implemented.
RMP-S8	Erosion prone areas, bridges, and stream and culvert crossings will be evaluated to determine if repair and/or restoration are necessary. Areas where concentrated flow is occurring will be repaired by re-grading slopes, re-vegetating, and/or installing flow dispersal devices.
RMP-S9	In areas of new or recent erosion, a restoration and prevention plan should be developed in consultation with a qualified ecologist and civil engineer or landscape architect. Treatments may include willow walls, check dams of native natural materials (e.g., cut brush, limbs, stone), and/or re-grading and shaping of the erosion feature followed by native species plantings.

Streams, Ponds, and Riparian Habitats	
RMP-S10	High priority invasive plants will be eradicated or controlled in riparian habitats and along stream corridors to the greatest extent feasible. The spread of invasive plant populations into riparian habitats will be prevented to the greatest extent feasible. Currently, Himalayan blackberry (Rubus armeniacus) and poison hemlock (Conium maculatum) pose the greatest threat to riparian habitats.

TOLAY LAKE AND OTHER WETLANDS

Tolay Lake is the dominant wetland feature within the Park. It is a natural lake/seasonal wetland which has been substantially altered over the past century. To drain the lake for agricultural practices the natural earthen dam was removed, Tolay Creek widened and deepened, and North Creek diverted to enter the creek below the lake. Consequently, the extent and duration of ponding has been reduced, altering the biological functions of the lake. Tolay Lake is currently a large, shallow basin segmented into agricultural checks divided by drainage ditches. The lake becomes inundated in the winter months and begins to draw down through early spring.

Photo credit: Regional Parks staff

The vegetation within Tolay Lake varies spatially, seasonally, and annually, largely depending on the amount of rainfall and topographic position. A shift from meadow to freshwater marsh habitat is evident between the upper and lower lake margin and the lakebed, effectively dividing the lake into approximately three vegetation alliances: meadow barley patches, water smartweed marsh, and mixed-annual wetland forb patches. Other wetlands within the Park include marshes, vernal pool-like habitats, meadows, and seeps. These wetlands are not as extensive as Tolay Lake, but similarly the vegetation varies temporally and spatially depending on climate, topographic position, and soil type.

Wetlands provide valuable ecosystem functions through capturing stormwater runoff, reducing sediment migration, and filtering nutrients and pollutants. Wildlife and grazing animals frequently depend on wetlands for late season forage and watering, and amphibians utilize wetlands for breeding and non-breeding habitat. Many of the Park's wetlands are degraded from agricultural and other human uses, changes in their hydric regime, invasive species colonization, and upstream erosion. Restoration and enhancement activities along with targeted exclusions can protect water quality, native floral diversity, and this essential wildlife resource.

Tolay Lake and Other Wetlands

RMP-O8 Monitor and reduce head-cutting in drainages upstream from wetlands; monitor for and protect from sediment migration, nutrient runoff, and other contaminants into wetlands.
Head-cuts can deliver large sediment loads and increase the velocity of flowing waters contributing to erosion or filling in downstream wetlands. Increased soil volume and flow velocity can create incisions in wetlands channelizing the wetland and eventually converting it to upland habitat. Reducing head-cuts at upstream locations and within wetlands can prevent habitat type conversion and retain the ecologic and hydrologic function and integrity of the parks wetland habitats. Roads, cattle loafing areas, trails, and other sites with shallow or easily lifted soils are particularly susceptible to runoff during the wet season, and soil migration into adjacent wetland areas can threaten wetlands ability to perform water and habitat quality functions. Preventing or reducing excessive soil, water, nutrient, and contaminant runoff can be achieved through physical or temporal restrictions, grazing rotations, and/or road and trail design.

RMP-O9 Monitor, remove, and control invasive species that threaten habitat and water quality in wetlands.
The species composition of wetlands varies with their location, soil chemistry and texture, slope gradient, hydro-period, and distance to repeated disturbance, but most are dominated by or have substantial cover of native hydrophytes. These species are specially adapted to saturated and/or inundated conditions of the wetlands. However, several invasive plant species occur within wetlands, and in some instances dominate the native species cover, including: Himalayan blackberry (*Rubus armeniacus*), poison hemlock (*Conium maculatum*), Fuller's teasel (*Dipsacus fullonum*), bristly ox-tongue (*Helminthotheca echioides*), harding grass (*Phalaris aquatic*), curly dock (*Rumex crispus*), and several non-native annual grasses tolerant of seasonally saturated conditions. While it is not possible to completely remove these annual grasses, controlling the spread of them and other invasive species into wetlands will maintain native floral and habitat diversity. See page 115 Invasive Species for specific management actions.

RMP-O10 Re-vegetate wetlands with native hydrophytes.
While the wetlands contain a prevalence of native perennial hydrophytes, enhancing with planting of additional native plants can bestow several benefits to habitat quality. In contrast to the shallow and short-lived root systems of non-native annual grasses, native perennial rushes, sedges, bulrushes, and grasses typically have deep and complex root systems that maintain soil integrity, buffer wetlands from erosion, and assist in filtering nutrients and sediment. Wetland areas dominated by non-native annual grasses and areas of invasive species removal should be targeted for planting with native perennial hydrophytes.

RMP-G7 Livestock troughs, feeding areas, and loafing areas will be located away from wetlands a minimum of 100 feet.

RMP-G8 Head-cuts and down-cuts will be monitored periodically to gauge rate and volume of increase. Monitoring should consist of documented photo-points and indicator markers (e.g. steel stakes) to measure the rate of increase.

RMP-G9 Targeted restoration will be developed to halt the continued advance of head-cuts that affect wetlands. The plan will prioritize areas for restoration and will consider measures such as exclusionary fencing, vegetation and check dams of stone or native brush cuttings and will be used as possible effective means to trap sediment migration and rebuild the soil surface.

RMP-G10 Monitoring and assessment on effectiveness of livestock grazing on wetlands will be conducted periodically. If livestock grazing is contributing to a decline in native species, compromising water quality, causing erosion, or other deleterious effects on the wetland, techniques to deter livestock from entering wetlands will be implemented. Deterrence may include relocation of troughs, mineral supplements and supplemental feeding areas away from wetlands, and possibly exclusionary fencing around wetlands. Monitoring will then be done where livestock has been excluded to assess changes in non-native and native plants in the wetland.

Tolay Lake and Other Wetlands	
RMP-G11	Prioritize wetland areas for enhancement. Enhancement sites should be in or around areas where impacts from infrastructure building has occurred or in areas of targeted invasive plant removal. Informational signage or pamphlets should highlight these restorative actions and educate the public on the function and values of wetlands.
RMP-S11	Trails, roads, and other Park infrastructure will avoid wetland habitats to the greatest extent feasible. Where infeasible, ground disturbing activities will be accompanied by best management practices to avoid unnecessary soil erosion, soil compaction, and invasive species encroachment. Trails that bisect wetlands will be designed for minimal impact by using features such as boardwalks and viewing platforms.
RMP-S12	A restoration plan will be developed for any proposed road, trail, or other ground-breaking project within wetland habitats. This may include salvaging native perennial hydrophytes, collecting live seed, purchasing genetically (i.e., local) appropriate seed, and/or top soil to be relocated at or near the project area.
RMP-S13	Should wetland habitat be considered jurisdictional by federal or state agencies, the appropriate permits will be acquired. Impacts to jurisdictional wetlands will likely require a habitat mitigation and monitoring plan along with mitigation for wetland losses. Mitigation ratios will depend upon the type, functional value, and extent of wetland impacted, and will be arranged during the permitting process.

OAK AND BUCKEYE WOODLANDS

Park woodlands are dominated by coast live oak, California bay, with individuals of Pacific madrone and California black oak. Stands of valley oak are situated on the banks of the lower reach of Tolay Creek, and California buckeye groves are located on rock outcrops and interspersed with coast live oak woodland. The woodlands in the southern park area have a higher floral and structural diversity in the understory than those in the northern portion. Collectively, these woodlands provide valuable cover and forage for a suite of wildlife species, including small mammals (e.g. bats), birds, amphibians, and reptiles. With deep and extensive root structures, woodland trees maintain soil integrity and water quality through the prevention of erosion and filtration.

Photo credit: Regional Parks staff

Currently, invasive species are not a dominant feature in the Park's woodlands, but Italian thistle is prevalent at the drip line of trees, particularly where cattle gather. Native plant regeneration, including oak saplings, is much reduced in these areas. Sudden oak death (SOD), which is caused by a water mold (*Phytophthora ramorum*), is a threat to oaks in the red oak subfamily (*Lobatae*) including both coast live oak and California black oak, and can be readily transferred throughout the Park from human and wildlife visitation.

Oak and Buckeye Woodlands	
RMP-O11	Maintain healthy woodland habitat by preventing or reducing impacts from habitat fragmentation. Woodlands provide important cover and migratory habitat for wildlife, but existing roads and trails can diminish this essential function. Minimizing the number of roads and trails through the woodlands, and maintaining the existing roads and trails for erosion and invasive species conduits will maintain healthy woodland habitat.
RMP-O12	Monitor and facilitate the natural regeneration of native woodland species, particularly trees and shrubs. Healthy native woodlands contain both species and structural diversity. Multiple vegetation strata provide habitat for several species of woodland birds that utilize specific elevations in the canopy. Herbaceous strata provide forage and browse for mammals while offering cover. Maintaining and enhancing a diverse understory and facilitating regeneration of overstory species will ensure that vertical structure remains a healthy component of wildlife habitat.
RMP-O13	Monitor and implement pathogen controls to minimize the spread of Sudden Oak Death. Sudden oak death has not been formally documented in the Park, but the prevalence of *Phytophthora ramorum* in coastal California, the extensive stands of coast live oak, and the repeat visitation within the park woodlands, suggest that this pathogen is a likely threat. Implement monitoring and pathogen controls to reduce the incursion and spread of sudden oak death into woodlands.
RMP-O14	Monitor invasive species, prevent colonization of invasive species, and remove or control existing invasive species populations. Currently, woodlands are relatively free of invasive plant species. Isolated populations of Himalayan blackberry and Italian thistle are present and pose a threat to the native understory flora. Other invasive species documented can pose a threat to park woodlands; therefore, monitoring the woodlands for invasive species, and preventing their colonization will help maintain the integrity of woodland habitat.
RMP-G12	Young trees, particularly oak species, should be encouraged in the understory and on the fringe of existing woodlands. Openings within woodlands provide habitat complexity and therefore may not be a desired location for targeted oak woodland restoration. A historical and cultural records study may reveal the extent of park woodlands, which would help guide any restoration efforts.
RMP-G13	Should oak and other woodland tree regeneration become a desired goal, fostering vegetation succession could be the chosen approach. Planting or seeding open scrub species such as coyote brush (*Baccharis pilularis*), California coffeeberry (*Frangula californica*), and toyon (*Heteromeles arbutifolia*), and raising these species to maturity provides a “nursery” for young oaks and other woodland trees. Protect these shrubs from grazing livestock and wildlife until established. Planting woodland trees directly into grasslands should protect new plantings from grazing wildlife. Protections include exclusion fencing or plastic tree shelters, weed mats, mulching, and possibly supplemental irrigation to stimulate robust root development.
RMP-S14	New trail, road, and other Park infrastructure will avoid woodland habitats to the greatest extent feasible. Where infeasible, ground disturbing activities will be accompanied by best management practices to avoid unnecessary soil erosion, soil compaction, and invasive species encroachment.
RMP-S15	Removal of individual woodland trees will be avoided to the greatest extent feasible with the exception of diseased or hazardous trees. Replacement planting of like species for native woodland trees will be encouraged; replacement ratio should be at least 3:1. Removal of native woodland shrubs will be replaced with like species.
RMP-S16	Park staff, visitors, and other guests will receive educational materials regarding the prevention and spread of sudden oak death. Current best management practices for pathogen prevention controls will be in place for all who work within the Park.

Oak and Buckeye Woodlands	
RMP-S17	Prevent the spread and establishment of invasive plant species within woodland habitats to the greatest extent feasible by physically eradicating exotic species and with installation of exclusionary fencing.
RMP-S18	Limited populations of high and medium priority invasive plants will be eradicated or controlled to the greatest extent feasible. In particular, seedlings and saplings of blue gum or Monterey cypress will be eradicated, while mature trees may be left standing.

GRASSLANDS AND WILDFLOWER FIELDS

The majority of the Park is composed of grassland habitats including non-native annual grasslands, native grasslands, and mixed wildflower fields. These herbaceous communities serve valuable habitat functions for native plants and wildlife, as well as provide forage for livestock grazing. Once a prevalent community type throughout cismontane California, native perennial grasslands have declined sharply since the 19th Century, and converted to non-native annual grassland (McNaughton 1968, Jackson 1985). Park grasslands have been used for grazing for over a century, which have dramatically altered the grasslands' species composition and soil characteristics from its native state. Although remnant patches of native dominated grasslands persist, these contain non-native, frequently invasive, species. Native grass species are typically comprised of perennial species, versus non-native annual grasses. Since perennial grasses have deeper and more extensive roots than annual grasses, this provides greater rainfall infiltration as well as greater soil and nutrient retention. Grasslands also buffer erosion in waterways and wetlands and provide valuable resources (e.g. food, forage, dispersal habitat) for several grassland specialist bird species, invertebrates, and other mammals.

Because grasslands are particularly susceptible to infestation by non-native plants, management of native grasslands, non-native grasslands, and wildflower fields are of utmost importance in order to retain the suite of beneficial services derived from these communities.

Grasslands and Wildflower Fields	
RMP-O15	Protect native grasslands and wildflower fields during construction of infrastructure. The fragmentation of native grasslands and wildflower fields with trails and roads threatens the integrity of these vegetation communities. Trails and roads can provide pathways for invasive plants as well as erosion, sediment migration, and soil compaction that can further threaten native species.
RMP-O16	Monitor and maintain stands of native grasses and wildflowers. Minimize soil erosion from park development activities and visitation. Despite being long-lived and resilient, perennial native grasses, ground disturbance can diminish their viability and provide a pathway for competitive non-native annual grasses. Non-native grasses frequently respond positively to disturbance such as road and trail building activities, and once established they produce dense mats of thatch that stymie or prevent the establishment/re-establishment of native grasses and annual wildflowers. The loss of perennial native grasses with their deep and extensive rooting systems can lead to soil erosion, while the loss of both native grasses and wildflowers diminish valuable forage resources for native mammals, birds, and invertebrates.
RMP-O17	Monitor and establish native grasses and wildflowers in targeted locations. Complete restoration of native grasslands and wildflower fields is infeasible given the extent of non-native grasslands in the Park. However, targeted locations with favorable conditions (e.g., serpentine soil, prevalent native herbaceous cover) offer the potential to increase native grass and wildflower cover that may establish and expand into native dominated habitat. Planting and seeding of native species in coordination with invasive species eradication and controlled grazing will be implemented in these areas.

Grasslands and Wildflower Fields	
RMP-O18	Monitor and prevent invasive species incursion into native grasslands and wildflower fields, and eradicate dense infestations of invasive species. The majority of the invasive species documented is within grassland habitats and/or pose the greatest threat to these habitats. These species can form monotypic stands that out-compete native herbs and less aggressive non-native species, resulting in increased fire hazard, diminished wildlife resources, and reduced species diversity and habitat complexity. Additionally, Medusahead (*Elymus caput-medusae*) and purple and yellow star thistles (*Centaurea calcitrapa, C. solstitialis*), severely diminish the quality of forage for grazing livestock. See page 115 Invasive Species for specific managment actions.
RMP-O19	Manage the beneficial effects of grazing on native grassland and wildflower field habitat. Managed grazing can confer benefits to native habitats through the reduction of non-native annual thatch, nutrient cycling, fire hazard prevention, and creation or maintenance of bare areas. However, when not managed properly, these same effects can become deleterious on native habitats contributing to erosion, nutrient runoff, invasive species spread, soil compaction, and wildlife browsing of tree and shrub saplings. Grazing timing, intensity, duration, and rotation are essential factors in the successful management of natural habitats with livestock, as well as the vegetation composition and density in areas where livestock loaf, travel, water, and graze. Creating and maintaining structural complexity in herbaceous communities (e.g., bare areas, varying grass heights) is important for wildlife and native flora habitat, and can be achieved through well managed grazing.
RMP-G14	Where invasive species are removed from grasslands, native grasses and wildflowers will be planted and/or seeded.
RMP-G15	Select native grassland and wildflower field areas for restoration. Restoration sites will be located in or around areas where impacts from infrastructure building has occurred or in areas of targeted invasive plant removal. Informational signage or pamphlets will highlight these restorative actions and educate the public on the function and values of native habitats.
RMP-S19	Trail, roads, and other infrastructure will avoid native grassland and wildflower habitats to the greatest extent feasible. When avoidance is infeasible, ground disturbing activities will be accompanied by best management practices to avoid unnecessary soil erosion, soil compaction, and invasive species encroachment.
RMP-S20	A restoration plan will be developed for any proposed road, trail, or other ground-breaking project within native grasslands and mixed wildflower fields. Restoration measures may include salvaging perennial grasses, collecting live seed, purchasing genetically (i.e., local) appropriate seed, and/or top soil to be relocated at or near the project area.
RMP-S21	Develop a long-term management plan evaluating the effects of livestock grazing on grasslands, with results intended to guide and alter grazing management. Evaluation of livestock animals alternative to cattle (i.e., sheep), and no grazing alternatives.
RMP-S22	Livestock will be rotated throughout the park, and as-well distributed as feasible. Supplemental feeding locales will be relocated periodically to discourage long-term loafing areas. Long-term loafing areas at water troughs will be monitored at least every two years to assess damage to native grasslands. Consideration will be given to moving trough locations to protect resources at that time..
RMP-S23	Invasive plant species in supplemental feeding (weed free hay) will be minimized in coordination with the grazing lessee to the greatest extent feasible.
RMP-S24	The introduction and spread of invasive plants within grasslands and wildflower fields will be prevented to the greatest extent feasible with adaptive land management including: adaptive grazing plan, exclusionary (temporary) fencing, native seed propagation, and manual removal of invasive species.

Grasslands and Wildflower Fields	
RMP-S25	Limited populations of high and medium priority invasive plants will be eradicated or controlled to the greatest extent feasible with adaptive land management including: adaptive grazing plan, exclusionary (temporary) fencing, native seed propagation, and manual removal of invasive species.
RMP-S26	Widely distributed populations of high and medium priority invasive plants will be controlled to the greatest extent feasible with adaptive land management including: adaptive grazing plan, exclusionary (temporary) fencing, native seed propagation, and manual removal of invasive species.

ROCK OUTCROPS AND SCRUB

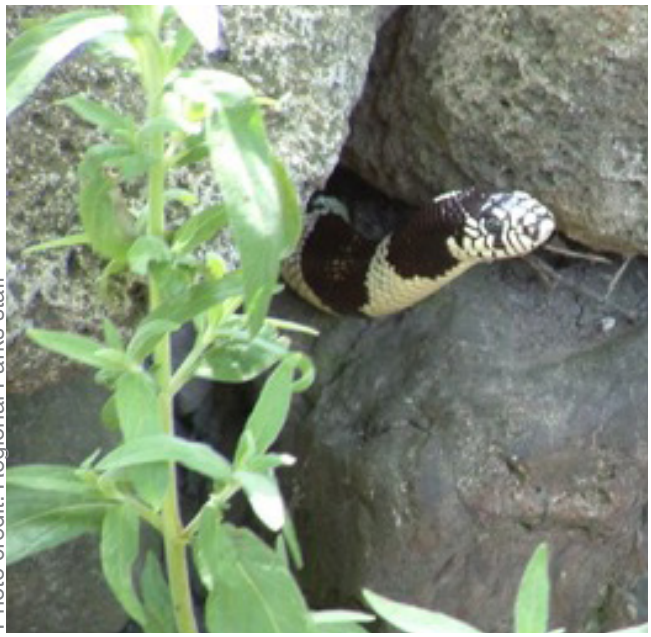


Photo credit: Regional Parks staff

Rock outcrops in the Park consist of boulder fields, large emergent rocks, and constructed rock walls that function similar to these natural geologic formations. Organic debris combines with mineral soil in rock fissures to provide a rooting matrix for many shrubs and native forbs. These features provide valuable habitat for a variety of fossorial mammals and bird species, unique soil substrate for plants, and aesthetic value for people. Some observed species include California ground squirrels (*Spermophilis beechyi*), burrowing owls (*Athene cunicularia*), and Western fence lizards (*Scleroporus occidentalis*), and a variety of butterflies and moths. Rock outcrops and rock walls are potential cultural resources and visible reminders of the history of southern Sonoma landscapes. They frequently attract human visitation that can have deleterious effects on native vegetation and wildlife function. Therefore, protection and enhancement of these features is essential to the preservation of the natural resource and cultural values they support.

Rock Outcrops and Scrub	
RMP-O20	Monitor rock outcrops for graffiti, trampling, erosion, and other negative effects of visitation.
RMP-G16	In rock outcrops where native species exhibit a lower diversity and/or non-native species dominate, native species plantings should be accompanied with non-native species removal.
RMP-S27	Trails, roads, and other developed infrastructure will be located away from rock outcrops and walls, and their associated scrub, where feasible. Where ground-breaking disturbance is unavoidable, best management practices should be implemented to avoid soil erosion, soil compaction, rock loss, and incursion of invasive species.
RMP-S28	The spread and establishment of invasive plants into rock outcrop and wall, and their associated scrub habitat will be prevented to the greatest extent feasible with adaptive land management including: adaptive grazing plan, native seed propagation, and manual removal of invasive species.
RMP-S29	When opportunities allow for trails to intersect with historical walls and/or natural rock outcrops that do not contain sensitive habitats, best management practices will be implemented to avoid soil erosion, soil compaction, rock loss, and incursion of invasive species. Educational opportunities at these locations will be monitored and managed on a needs basis. Interpretive signage may be installed at these locations, as feasible.

Rock Outcrops and Scrub	
RMP-S30	Limited populations of high priority invasive plants will be eradicated from rock outcrops to the greatest extent feasible with adaptive land management including: adaptive grazing plan, native seed propagation, and manual removal of invasive species.

SPECIAL-STATUS PLANTS

The Park has the potential to support several dozen special-status plant species; protocol-level rare plant surveys conducted between 2006 and 2008 resulted in the positive identification of three species, and a possible fourth. The three special-status plant species positively documented include fragrant fritillary (*Fritillaria liliacea*), Lobb's aquatic buttercup (*Ranunculus lobbii*), and marsh death zigadene (*Toxicoscordion fontanum*). Gairdner's yampah (*Perideridia gairdneri* ssp. *gairdneri*) may have been observed within the Park, but this species is very difficult to distinguish from the more prevalent, Kellogg's yampah (*Perideridia kelloggii*), and positive identification has not been confirmed.

In addition to the three (four) special-status plants, three regionally/ecologically significant plant species have been documented within the Park, California western flax (*Hesperolinon californicum*), cream cups (*Platystemon californicus*), and Johnny jump-up (*Viola pedunculata*). All seven species are described below.

Photo credit: Regional Parks staff

Fragrant fritillary (*Fritillaria liliacea*). CNPS Rank 1B. High Potential (Present): Fragrant fritillary is a low-growing, bulbiferous perennial forb in the lily family (Liliaceae) that blooms from February to April. It typically occurs in open, grassy areas in valley and foothill grassland, coastal scrub, and coastal prairie habitat underlain by volcanic or serpentine clay soils at elevations ranging from 10 to 1,345 feet (CDFW 2014, CNPS 2014). Observed associated species include soap plant (*Chlorogalum pomeridianum*), coyote brush (*Baccharis pilularis*), purple needlegrass (*Stipa pulchra*), California oat grass (*Danthonia californica*), large-flowered star tulip (*Calochortus uniflorus*), California buttercup (*Ranunculus californicus*), sun cups (*Taraxia ovata*), shooting stars (*Dodecatheon hendersonii*), needleleaf pincushion plant (Navarretia intertexta), one-sided bluegrass (*Poa secunda*), and Greene's popcornflower (*Plagiobothrys greenei*) (CDFW 2014, WRA observations).

Gairdner's yampah (*Perideridia gairdneri* ssp. *gairdneri).* CNPS Rank 4. Moderate Potential (Possibly Present): Gairdner's yampah is a perennial forb in the carrot family (*Apiaceae*) that blooms from June to October. It typically occurs in vernally mesic areas within broadleaf upland forest, chaparral, coastal prairie, valley and foothill grassland, and vernal pool habitat at elevations ranging from 0 to 1,985 feet (CNPS 2014, Baldwin et al. 2012). Because it is necessary to gather rooting structures, thereby killing the plant, to identify this species, positive identification has not been made to date. According to the CNPS, threats include agriculture, grazing, non-native plants, habitat alteration, and urbanization (CNPS 2014).

Lobb's aquatic buttercup (*Ranunculus lobbii*). CNPS Rank 4. High Potential (Present): Lobb's aquatic buttercup is annual aquatic forb in the buttercup family (*Ranunculaceae*) that blooms from February to May. It typically occurs in vernally inundated areas within cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pool habitat at elevations ranging from 45 to 1,530 feet (CNPS 2014). Observed associated species include mosquito fern (*Azolla filiculoides*), western mannagrass (*Glyceria occidentalis*), pale spike-rush (*Eleocharis macrostachya*), iris-leaf rush (*Juncus xiphioides*), common monkeyflower, calico flowers (*Downingia* spp.), perennial rye grass (*Festuca perennis*), meadow barley (Hordeum brachyantherum), and Mediterranean barley (*H. marinum*) (WRA observations).

Marsh zigadene (*Toxicoscordion fontanum*). CNPS Rank 4. High Potential (Present): Marsh zigadene

is a bulbiferous perennial forb in the false-helleborine family (*Melanthiaceae*) that blooms from April to July. It typically occurs in vernally mesic areas underlain by clay substrate derived from serpentine in chaparral, cismontane woodland, lower montane coniferous forest, meadow and seep, and marsh and swamp habitat at elevations ranging from 45 to 3,250 feet (CNPS 2014, CDFW 2014). Observed associated species include non-native annual grasses (e.g., soft chess, Mediterranean barley, Italian rye grass, meadow barley, western mannagrass, California oat grass, and fragrant fritillary (WRA observations).

Cream cups (*Platystemon californicus*). No Rank – Opler's longhorn moth larval host plant. High Potential (Present): Cream cup is an annual forb in the poppy family (*Papaveraceae*) that blooms from February to May (Baldwin et al. 2012). It typically occurs on a variety of substrate, including volcanics and serpentine, in valley and foothill grassland, as well as open woodlands, chaparral, and coastal scrub habitat at elevations ranging from 0 to 3,000 feet (Baldwin et al. 2012, Calflora 2014, WRA observations). Observed associated species include California poppy, bluehead gilia, bird's-eye gilia, owl's clovers, tidy tips, goldfields, lupines, needlegrasses, small fescue (*Festuca microstachys*), Idaho fescue (*Festuca idahoensis*), California onion grass, and a suite of non-native annual grasses (WRA observations). Cream cups are the host plant for Opler's longhorn moth.

Johnny jump-up (*Viola pedunculata*). No Rank – Silverspot larval and nectar host plant. High Potential (Present): Johnny jump-up is a perennial forb in the violet family (*Violaceae*) that blooms from February to April (Baldwin et al. 2012). It typically occurs on a variety of well-drained substrates located on hillsides and ridgelines in full sun within valley and foothill grassland, and open cismontane woodland and chaparral habitat at elevations ranging from 0 to 5,000 feet (Baldwin et al. 2012). Observed associated species include oaks, needlegrasses, checkerblooms (*Sidalcea* spp.), lupines, blue-eyed grass, blue dicks, California poppy, purple sanicle, and a suite of non-native annual grasses (WRA observations). Johnny jump-up is the host plant for silverspot butterfly.

California western flax (*Hesperolinon californicum*). No Rank – Regionally Significant. High Potential (Present): California western flax is an annual forb in the flax family (*Linaceae*) that blooms from May through June. It typically occurs on serpentine substrate in valley and foothill grassland, chaparral, and cismontane woodland at elevations ranging between 0 to 2,000 feet (Baldwin et al. 2012, CCH 2014). Observed associated species include bluehead gilia (*Gilia capitata* ssp. *capitata*), needlegrasses (*Stipa* spp.), California onion grass (*Melica californica*), Torrey's onion grass (*M. torreyana*), June grass (*Koeleria californica*), Idaho fescue (*Festuca idahoensis*), and small fescue (*Festuca microstachya*) (WRA observations).

Special-Status Plants	
RMP-O21	Protect existing and potential occurring special-status plant species during Park development activities. Although several protocol-level surveys and incidental site visits have resulted in the observations of special-status plant populations, other populations may occur within the Park. Locating new or overlooked populations would be a positive sign for the overall health special-status species, and would merit further protection.
RMP-O22	Periodically monitor and census existing special-status plant populations and their habitats, including potential effects from grazing, human visitation, and park development. Grazing, human visitation, development, drought stress, and other physical environmental factors can affect the health, number, vigor, and reproductive potential of plant species. Inter-annual variation in the number of individuals within populations of special-status species is common. Periodic observation and documentation of the special-status plant populations can form the basis for understanding these species' response to their physical and biologic environment, and can result in successful management of their habitats to ensure their populations are sustained.

Special-Status Plants	
RMP-O23	Monitor, control, and eradicate invasive plants that threaten special-status plant populations. Frequently, non-native invasive species out-compete special-status plants for water and nutrients, over-top natives eventually shading them out, and increase the fire risk that can kill desirable native species. Monitoring and controlling aggressive invasive species in the vicinity of special-status plant species populations will eliminate the threat of their loss from invasive species. See page 154 for specific actions for invasive species management.
RMP-G17	Propagules from the Park's special-status plant species should be collected, propagated, and redistributed in analogous habitats within the Park where these species are absent. This should be conducted under guidance of local experts and may incorporate volunteer networks.
RMP-G18	Regional Parks will encourage botanical subject matter experts to conduct research about the distribution and ecology of special-status species.
RMP-S31	Trails, roads, and other developed infrastructure will be located away from special-status plant species. Where ground-breaking disturbance in the general vicinity of special-status plant species is unavoidable, best management practices will be implemented to avoid soil erosion, soil compaction, and incursion of invasive species. Protocol-level rare plant surveys will be conducted along the course of proposed trails, roads, and other development projects to ensure that such species are not present.
RMP-S32	Should translocation efforts occur (see Guidelines above), CDFW will be consulted for said translocation, permitting requirements, and a review of the status of nearby special-status plant populations.

SPECIAL-STATUS WILDLIFE

Invertebrates

Opler's longhorn moth (*Adella oplerella*). No Status (Special Animals List). High Potential (Present): Opler's longhorn moth is endemic to grasslands where its larval food plant, cream cups, grows. Descriptions of the life history and early stages of this moth are incomplete, but it is known that the moth completes the active portions of its life cycle during the winter-spring wet season (Powell 1969). Eggs are deposited directly into the unopened flowers of the host plant, and larvae emerge after they have consumed the developing seeds. The larvae may enter diapause during the summer and re-emerge after the winter rains to continue feeding until they are large enough to pupate. The adult host plant is not known, though it appears that the adults may feed on the nectar of cream cups, and other native forbs. Therefore, this species is typically associated with low fertility soils that support a sufficient density of host plants. One individual was observed within the Park in native grassland habitat underlain by serpentine substrate in the southwest.

Zerene silverspot butterfly subspecies (*Speyeria zerene*). No Status (Special Animals List). High Potential: An unnamed subspecies of Zerene silverspot butterfly has been documented from the Cougar Mountain property located immediately south of the Park. Currently, this subspecies has not been formally described in the taxonomic literature, and therefore has no official legal protection. However, this subspecies appears to be highly restricted to the Cougar Mountain area, and therefore, following formal description is likely to receive protective status. Other silverspot butterfly larva host on native violets (*Viola* spp.), and it is assumed the unnamed subspecies documented from Cougar Mountain does so as well. Due to the relative location of documented occurrences of this subspecies of silverspot butterfly and the presence of large Johnny jump-up colonies on the East and West ridges, this subspecies has a high potential to occur in the Park.

Special-Status Wildlife: Invertebrates	
RMP-O24	Monitor and enhance significant patches of cream cups and Johnny jump-up, which both serve as host and nectar wildflowers. Lepidoptera are closely associated with host and nectar wildflowers, requiring these resources through certain periods of the year. A decline in the population of their host plants would threaten these special-status invertebrates. Enhancing and expanding cream cups and Johnny jump-up populations will help sustain the populations of these special-status invertebrates.
RMP-G19	Monitor any develop baseline survey methodology to determine the presence and extent of special-status invertebrates in the Park. Partner with subject matter experts to establish the extent and utilization of species.
RMP-G20	Lepidoptera experts should be consulted and partnered with to determine the taxonomic status of the silverspot butterfly in the Cougar Mountain/Tolay Valley region.
RMP-S33	Trails, roads, and other developed infrastructure will be located to the greatest extent feasible away from cream cup, Johnny jump-up, and other dense wildflower populations. If ground disturbing activities in the general vicinity of dense wildflowers are unavoidable, best management practices will be implemented to avoid soil erosion, soil compaction, trampling, and incursion of invasive species. Surveys for wildflowers will be conducted along the course of proposed trails, roads, or other Park development projects to ensure that such species are not present.
RMP-S34	If Park development has the potential to cause adverse impacts to cream cups, Johnny jump-ups, and/or other potential nectar resources for special-status invertebrates, a management and monitoring plan will be developed. Seeding and/or planting of such species may need to be conducted, as well as monitoring of success criteria following restoration efforts.

Amphibians and Reptiles

California red-legged frog (*Rana draytonii*). Federal Threatened, CDFW Species of Special Concern. High Potential (Present): California Red-legged Frog (CRLF) was listed as Federally Threatened May 23, 1996 (61 FR 25813-25833). Critical Habitat for CRLF was designated on March 17, 2010 (75 FR 12815 12959). A Recovery Plan for CRLF was published by the USFWS on May 28, 2002. The Park falls within the Petaluma Creek-Sonoma Creek Core Recovery Area. There are four Primary Constituent Elements (PCEs) that are considered to be essential for the conservation or survival of this species. The PCEs for California red-legged frog include: (1) aquatic breeding habitat; (2) non-breeding aquatic habitat; (3) upland habitat; and (4) dispersal habitat (USFWS 2006).

Aquatic breeding habitat consists of low-gradient fresh water bodies including natural and manmade (e.g., stock) ponds and pools in perennial streams, marshes, lagoons, and dune ponds with still or slow-moving water, and dense shrubby riparian vegetation (Hayes and Jennings 1986, Jennings 1988, Jennings and Hayes 1994). Aquatic breeding habitat must hold water for a minimum of 20 weeks in most years to allow for egg, larvae, and tadpole development (USFWS 2006). Aquatic non-breeding habitat may or may not hold water long enough for this species to hatch and complete its aquatic life cycle, but it provides shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult CRLF. These waterbodies include plunge pools within intermittent creeks, seeps, quiet water refugia during high water flows, and springs of sufficient flow to withstand the summer dry period. CRLF can use large cracks in the bottom of dried ponds as refugia to maintain moisture and avoid heat and solar exposure (Alvarez 2004).

Upland habitats (e.g., grasslands, woodlands) provide shelter, forage, and cover, and include areas within 200 to 300 feet of aquatic habitats. Upland habitat can include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and moist leaf litter (USFWS 2006). Dispersal habitat includes accessible upland or riparian habitats between occupied locations within 0.7 mile of each other that allow for movement between these sites, but dispersal of up to 1.8 miles has been documented (USFWS 2002, Fellers and Kleeman 2007). Moderate to high density urban or industrial developments, large reservoirs and heavily traveled

roads without bridges or culverts are considered barriers to dispersal (USFWS 2006). Short-distance dispersal movements are generally straight-line movements, and dispersal typically occurs at night during wet weather (Bulger et al. 2003, USFWS 2002, Bulger et al. 2003, Fellers and Kleeman 2007). CRLF tend to remain very close to a water source during dry weather; however, overland dispersal may occur in response to receding water (USFWS 2002).

CRLF is known from northern Baja California to southern Mendocino County, where it has been extirpated from approximately 70 percent of its habitat. According to the CNDDB, there are 201 documented occurrences from Marin, Napa, and Sonoma counties, with the majority from Point Reyes Peninsula (CDFW 2014). Documented occurrences are universally from perennial aquatic or near perennial aquatic features.

Several documented occurrences are from the southern extent of the Mayacamas in very low density in or near the Tolay Valley (CDFW 2014). Numerous surveys with sonsistantly few findings between 2001 and 2003, CRLF were observed within a stock pond located on the property immediately north of the Park. In 2002 and 2004, CRLF were positively identified at the Sonoma County Waste Management Agency Transfer Station on Stage Gulch Road, approximately 1.5 aerial miles north of the Park. CRLF have been documented on several surveys from the Sears Point-Sonoma Raceway property immediately adjacent to the south of the Park. Likewise, the CNDDB reports CRLF from private property between SCAPOSD and Land Trust lands on Lakeville Highway. Finally, as part of the Sears Point Restoration project, the Land Trust has conducted an approximately 15-acre restoration and habitat enhancement for CRLF on an unnamed intermittent drainage of the western flank of Cougar Mountain, approximately one mile south of the Park (SLT 2012).

In addition to numerous documented occurrences from areas within the immediate vicinity of the Park, CRLF have been observed within and adjacent to the Park on several occasions in the past twenty years (Parsons 1996). The Park's stock ponds, as well as Tolay Lake and Tolay Creek provide aquatic breeding and non-breeding habitat for CRLF. The intermittent and ephemeral streams, seasonal wetlands, and mesic portions of woodlands within the Park provide dispersal and estivation habitat for CRLF. Because there is extensive documentation from the vicinity of Cougar Mountain, and there are virtually no barriers to dispersal between these populations and the Park, it is assumed that the CRLF continues to be present within the Park. Additionally, the Park provides a potential crucial linkage between these populations, particularly that the Park shall be protected in perpetuity while some of the neighboring lands' future use and/or management are unknown.

Foothill yellow-legged frog (*Rana boylii*) CDFW Species of Special Concern. Moderate Potential: This species is typically located in forested and woodland habitats, occurring in shaded, shallow streams and riffles with a rocky substrate. Egg masses are attached to the rock substrate, and at least some cobble-sized stones are necessary. Tadpoles require at least 15 weeks to metamorphose into juvenile form. Foothill yellow-legged frog does not estivate and is rarely found far from a source of permanent water. Historically, this species was known to occur in most Pacific drainages from Oregon to Los Angeles (Jennings and Hayes 1994). Populations have declined due to siltation and the introduction of American bullfrogs and exotic fish. Tolay Creek and its tributaries contain suitable breeding, foraging, and dispersal habitat for foothill yellow-legged frog; however, this species was not observed during site visits in 2006-2008.

Western pond turtle (*Actinemys marmorata*). CDFW Species of Special Concern. High Potential: Western pond turtle is the only freshwater aquatic turtle native to most of California, associated with rivers, creeks, lakes, and ponds throughout much of the state. Typical aquatic habitat features stagnant or low gradient water, aquatic vegetation, and aerial basking sites such as logs, rocks, and mud-banks. Adult females excavate nests in riparian and upland areas in the spring or early summer. Nest sites are generally located on sunlit slopes, and require friable soil that

Credit: Regional Parks staff

is sufficiently dry to promote successful egg development (Holland 1994). The young generally hatch and overwinter in the nest (Jennings and Hayes 1994, Reese and Welsh 1997). At least under some ecological conditions, pond turtles may regularly utilize terrestrial habitats (Reese and Welsh 1997). Western pond turtle is a dietary generalist, subsisting principally on invertebrates as well as plant material and carrion. Formalized surveys for this species have not been conducted, but anecdotal observations and high quality habitat suggest that it occurs within the Park.

Special-Status Wildlife: Amphibians and Reptiles	
RMP-O25	Protect potentially occurring amphibian and reptiles, and their habitat during construction of park infrastructure, trail building, and regular maintenance. These species require protective measures to ensure that they are not impacted during construction or normal maintenance activities.
RMP-O26	Monitor, remove, and control invasive plant species that threaten special-status herpetofauna habitat. Prevent the establishment of and control the existing populations of predatory wildlife. Invasive plant species, particularly water primrose, negatively affects the quality of CRLF and other wildlife dependent on aquatic environments. Aquatic invasive plants can alter water chemistry and de-oxygenate the water column. Although they can provide strata for egg masses, they also provide shelter for predators, such as the introduced American bullfrog and warm water fish. Bullfrogs and fish have been implicated in exacerbating the decline in CRLF. See page 118 for Invasive Wildlife Species for specific managment actions.
RMP-O27	Protect special-status herptofauna from parasites, pathogens, and chemical pollutants. Pathogens such as the fungus chytrid (*Batrachochytrium dendrobatidis*) have been implicated in the decline of CRLF and other native amphibians, as well as chemical pollutants. To protect CRLF and other wildlife in the Park, measures to prevent the introduction and spread of pathogens and chemical pollutants will be implemented. See Section titled Natural Resources: Invasive Wildlife Species for specific actions for invasive wildlife species management.
RMP-O28	Conduct protocol-level surveys to determine the presence of special-status herpetofauna in the Park in areas where new development is planned. Periodically monitor population trends of these species. Possibly introduce CRLF into the Park.
RMP-G21	For any ground disturbing activities Protocol-level baseline surveys will be conducted determine the presence and extent of CRLF and other special-status herpetofauna in the Park.
RMP-G22	If determined to be on-site, continued monitoring will be conducted to determine population trends, potential relationship with off-site populations, migratory patterns, and the effects of grazing and other management activities on CRLF and/or other special-status herpetofauna.
RMP-G23	Develop a management plan specifically for CRLF and/or other special-status herpetofauna. The plan will monitor the interaction between amphibian populations and Park use, livestock grazing, and infrastructure development. Targeted eradication and/or control of invasive species will be accompanied with specific pathogen, such as chytrid, should they become established. If constituent elements exist, a plan will be developed to reintroduce CRLF to the Park. Reintroduction would require extensive consultation with the USFWS and CDFW.
RMP-S35	Trails, roads, and other developed infrastructure will be located away from special-status herpetofauna species to the greatest extent feasible. Where ground-breaking disturbance in the general vicinity of special-status herpetofauna is unavoidable, best management practices will be implemented to avoid soil erosion, spread of pathogens, and incursion of invasive species. Protocol level surveys for special-status herpetofauna will be conducted along the course of proposed trails, roads, or other park development projects to ensure that such species are not present. Biological monitors may need to be on-site during activities if there is the potential to directly impact special-status herpetofauna.
RMP-S36	Effects of foot traffic and other visitor uses near stock ponds and other potential special-status herpetofauna habitat will be monitored periodically. Excessive native vegetation trampling, soil compaction, sediment migration, and/or other deleterious effects on habitat will be corrected immediately.
RMP-S37	Dogs will be excluded from stock ponds and other potential special-status herpetofauna habitat. Dogs will be confined to approved trails on no longer than 6' lead at all times.

Special-Status Wildlife: Amphibians and Reptiles	
RMP-S38	Educational materials, either through brochures or signage, will be provided to park visitors, staff, volunteers, and contractors to clearly convey the importance of minimizing impacts and visitation to CRLF and other special-status herpetofauna habitats.
RMP-S39	CDFW and USFWS will be consulted during project development to identify and implement any additional measures to avoid and minimize direct and indirect impacts to CRLF and/or other special-status herpetofauna.
RMP-S40	Any alteration of vegetation within 500 feet of the stock ponds and/or other potential special-status herpetofauna habitat will occur outside of these species' dispersal periods.

Common and Special-status Birds

White-tailed kite (*Elanus leucurus*). CDFW Fully Protected Species. High Potential (Present): White-tailed kite is resident in a variety of open habitats, including agricultural areas, grasslands, scrub and open chaparral habitats, meadows, and emergent wetlands throughout the lower elevations of California. Nests are constructed mostly of twigs and placed in small to large trees, often at habitat edges or in isolated groves (Dunk 1995). This species preys upon a variety of small mammals and other vertebrates. The Park provides open habitats for foraging and suitable trees for nesting, as well as contiguous high-quality foraging habitat adjacent to the Park. White-tailed kites have been observed by LSA foraging within the Park. Although no nesting location has been documented to date, suitable nesting habitat is present within the Park.

Golden eagle (*Aquila chrysaetos*). CDFW Fully Protected Species, USFWS Bird of Conservation Concern. High Potential (Present): A fully protected species, the golden eagle is largely resident in open and semi-open areas from sea level to 11,500 feet elevation. Occupied habitats include shrublands, grasslands, desert, mixed woodlands, and coniferous forests. This species is usually found in mountainous areas, but it may also nest in wetland, riparian, and estuarine habitats at lower elevations (Kochert et al. 2002). Golden eagles typically build or maintain multiple nests prior to selecting one nest for a given year; however, they do not exhibit strict site fidelity, often moving nesting locations between years, and may not nest each year (Peeters and Peeters 2005). Nests are large and typically built on cliff ledges or in large, relatively isolated trees; therefore, many of the blue gum and possibly larger coast live oak trees in the Park provide potential nesting locations.

Golden eagles forage over wide areas, most frequently above open canopied shrub or woodland, or grassland habitat, and feed primarily on ground squirrels, rabbits, large birds, and carrion. The expansive grassland habitat is optimal for foraging, and the mix of riparian, woodland, and minor shrub elements provide cover for many of the prey animals of the golden eagle.

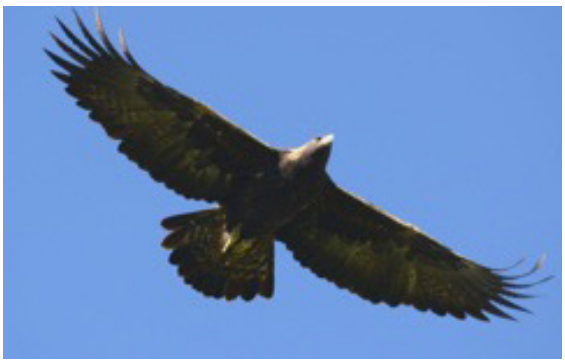


Photo Credit: Regional Parks staff

Golden eagles have been repeatedly observed in and immediately adjacent to the Park, and the Tolay Lake area is thought to host five active golden eagle nests (Janet Thiessen pers. comm. in LSA 2009b), likely lending to the frequent observations. Optimal nesting location is at the midslope position of north- and east-facing ridges gaining maximum protection from strong winds (Peeters and Peeters 2005). Golden eagles have been observed soaring, foraging, and perching over the site and the Park provides suitable nesting habitat.

Burrowing owl (*Athene cunicularia*). CDFW Species of Special Concern. High Potential (Present): Burrowing owl is a state protected species, but does not have any federal listing. These birds prefer short grass-grasslands with burrow networks, and frequently with boulder fields or rock outcrops. Burrows of small mammals, such as ground squirrels, are utilized for year-round shelter and nesting, and are often modified by burrowing owls. Constructed burrows are readily occupied by burrowing

owls, and have been constructed for habitat enhancement and mitigation in several sites in California.

Burrowing owls have been observed within park grasslands, particularly in areas of burrow activity and rock outcrops. Single individuals have been repeatedly observed at rock outcrops and boulder fields in winter and spring, though infrequently in summer, suggesting dispersing juveniles or over-wintering birds. Breeding burrowing owls have not been observed in Sonoma County since 1987, and breeding colonies are considered extirpated from the county (Burridge 1995).

Short-eared owl (*Asio flammeus*), CDFW Species of Special Concern, High Potential (Present): Short-eared owl is a state protected species, but does not have any federal listing. These owls are ground-nesting, and therefore require tall herbaceous vegetation to conceal their nests. Typically located in grasslands and emergent wetlands (Holt and Leasure 1993), within California short-eared owls are concentrated on the Modoc Plateau, Great Basin, western Sacramento Valley, and southern Coast Ranges, with isolated populations around the state (Shuford and Gardali 2008).

A short-eared owl was observed within grassland habitat on the West Ridge on November 18, 2005 (Jake Newell, pers. comm.). Short-eared owls do not typically breed in Sonoma or Marin counties, but fledged young have been observed in Point Reyes National Seashore and Annadel State Park in 1979 (Shuford and Gardali 2008). The Park provides suitable foraging and overwintering habitat, but regular nesting is unlikely due to the presence of grazing. There has been very limited observation of breeding in the North Bay.

Photo credit: Gearld Moore

Grasshopper sparrow (*Ammodramus savannarum*). CDFW Species of Special Concern. High Potential (Present): A second priority species of special concern (Unitt 2008), grasshopper sparrow generally prefers moderately open grasslands and prairies with patchy bare ground. They select different components of vegetation depending on grassland ecosystem. This sparrow typically avoids grasslands with extensive shrub cover, although some level of shrub cover is important for birds in western regions (Vickery 1996). Grasshopper sparrows are ground nesting birds, creating cupped nests domed with overhanging and eggs are usually lain in early to mid-June and hatch within 14 days. Both males and females provide care to the young, and second broods are common. This species primarily feeds on insects (Vickery 1996). Suitable foraging and breeding habitat for this species is widely present, where open shrubs and grasslands with bare ground create a habitat mosaic.

Tricolored blackbird (*Agelaius tricolor*), CDFW Species of Special Concern, USFWS Bird of Conservation Concern. High Potential: The tricolored blackbird is a locally common resident in the Central Valley and along coastal California. This species breeds adjacent to freshwater, preferably in emergent wetlands with tall, dense cattails (*Typha* spp.) or tules (*Schoenoplectus* spp.), thickets of willow (*Salix* spp.), blackberry and/or tall herbs, as well as flooded agricultural fields with dense

vegetation (Shuford and Gardali 2008). Insects are the primary food source. The species is highly colonial; nesting habitat must be large enough to support a minimum of 30 pairs, and colonies are commonly substantially larger, ranging from 100 to tens of thousands of individuals. Several confirmed and probable breeding locations have been observed in southern Sonoma County (Burridge 1995). Tricolored blackbirds have been observed within the Park, and have a high potential to nest within the Park due to relative documented nesting locations observations in southern Sonoma County and the presence of emergent freshwater marsh vegetation.

Nesting birds (various spp.). MBTA, CFGC. High Potential (Present):

Despite no federal or state listing, all native birds are protected either by the Migratory Bird Treaty Act (MBTA) or the California Fish and Game Code (CFGC). The MBTA protects active nests of all birds including migratory species. Upland game and waterfowl birds are allowed to be taken, but strict seasons have been developed around the life cycle of these birds. Breeding bird season may vary dependent upon species, site condition, annual weather and legal agreement (e.g., mitigation plans), but generally runs from February 1 to August 31 in a given year. Red-tailed hawk and western meadowlark have been observed nesting on site by LSA (LSA 2009b), and several other species undoubtedly nest each year within the Park's boundaries.

Special-Status Wildlife: Common and Special Status Birds	
RMP-O29	Protect and enhance nesting, foraging, cover, and migratory bird habitat in the Park. Species diversity is correlated with habitat diversity and complexity, with healthier and richer ecosystems supporting diverse species populations. Managing the several different habitats of the Park will benefit and sustain diverse bird populations.
RMP-O30	Prevent impacts to individual birds, nests, and eggs during construction of infrastructure, trail building, and routine maintenance. Under the federal Migratory Bird Treaty Act (MBTA) it is unlawful to take, kill, and/or possess migratory birds, as well as their nests, eggs, and young in the nests. The California Fish and Game Code protect nests, eggs, and birds as well. Special-status birds are protected under a variety of federal and state codes. Therefore, birds and their nests require protection during construction and Park operations.
RMP-O31	Continue monitoring migratory activity and census to evaluate long-term trends of birds in the Park. The Park is a popular attractant for bird watchers and ornithologists. The Petaluma Wetland Alliance (PWA) has performed numerous bird surveys in the Park, and LSA summarized their observations in a report to Regional Parks (LSA 2009b). Updated observations and analysis will be synthesized and then utilized as a baseline for overall bird diversity and population health.
RMP-G24	Nesting boxes will be manufactured and installed on the edge of seasonal wetlands and grasslands near trails and other high visibility areas. Educational materials either through signage or brochures to inform the Park's visitors and volunteers of the efforts to provide nesting habitat for birds. Owl boxes will be installed in the Park Complex. Should these boxes be installed, preventative measures will be necessary to prevent invasive species from colonization and annual monitoring and maintenance outside of the active nesting season to reduce pathogens.
RMP-G25	Non-native birds (e.g., European starlings) and feral cats that pose a potential threat to native birds will be monitored and managed.
RMP-G26	Continued coordination with bird-watching and volunteer groups such as PWA and Audubon Society to perform regular monitoring of the avian fauna of the Park. A comprehensive monitoring program will be developed, and incorporative of volunteer work, to collect information on species abundance, species composition, habitat use, population distribution, population size, breeding status, and inter-annual variation.

Special-Status Wildlife: Common and Special Status Birds	
RMP-G27	Develop a management plan for common and special-status bird species to account for park activities and uses, grazing management, infrastructure development, and the potential eradication and/or control of invasive species and pathogens if they become established and pose a deleterious effect on nesting bird populations.
RMP-S41	During the nesting season (approximately February 1 through August 31), breeding bird surveys will be conducted prior to the construction of trails, roads, and all other park infrastructure with the potential to impact nesting birds. Should breeding birds be detected, a qualified avian biologist will make recommendations to park staff to avoid impacts to breeding birds.
RMP-S42	Dogs will be confined to approved trails only and on no longer the 6' lead at all times.
RMP-S43	Educational materials, either through brochures or signage, will be provided to park visitors, staff, volunteers, and contractors to clearly convey the importance of avoiding breeding birds and bird nests.
RMP-S44	CDFW and USFWS will be consulted during project development to identify and implement any additional measures to avoid and minimize direct and indirect impacts to common and special-status birds within the Park.

Common and Special-status Bats

Townsend's big-eared bat (*Corynorhinus townsendii townsendii*). CDFW Species of Special Concern, WBWG High Priority Species. Moderate Potential: This species ranges throughout western North America, from British Columbia to the central Mexico. It is typically associated with caves, but also found in man-made structures, including mines and buildings (CDFW 2013a). While many bats wedge themselves into tight cracks and crevices, big-eared bats hang from walls and ceilings in the open. Males roost singly during the spring and summer months while females aggregate in the spring at maternity roosts to give birth. Females roost with their young until late summer or early fall, until young become independent and can fly and forage on their own. Hibernation roosts tend to be made up of small aggregations of individuals in central and southern California (Pierson and Rainey 1998). Although there are no documented roost sites within the Park or its immediate vicinity, the presence of old farm buildings offers the potential for suitable roost sites. Townsend big-eared bats roosting elsewhere in the area may forage in the park at night.

Pallid bat (*Antrozous pallidus*).CDFW Species of Special Concern, WBWG High Priority Species. Moderate Potential: Pallid bats are distributed from southern British Columbia and Montana to central Mexico, and east to Texas, Oklahoma, and Kansas. This species occurs in a number of habitats ranging from rocky arid deserts to grasslands, and into higher-elevation coniferous forests. Pallid bats are most abundant in the arid Sonoran life zones below 6,000 feet, but have been found up to 10,000 feet in the Sierra Nevada. They often roost in colonies of between 20 and several hundred individuals. Roosts are typically in cliffs, rock crevices, tree hollows, mines, caves, and a variety of man-made structures, including vacant and occupied buildings, bridges, and bird boxes (Jameson and Peeters 2004). Tree roosting has been documented in large conifer snags (e.g., ponderosa pine [*Pinus ponderosa*]), inside basal hollows of giant sequoias (*Sequoiadendron giganteum*), and within bole cavities in oak (Quercus spp.) trees. They have also been reported roosting in stacks of burlap sacks and stone piles. Pallid bats are primarily insectivorous, feeding on large prey that is taken on the ground, or sometimes in flight (Texas Parks and Wildlife 1997). Prey items include arthropods such as scorpions, ground crickets, and cicadas (WBWG 2013). Pallid bats have a moderate potential to occur due to the presence of several documented roost sites in the general vicinity of the Park (CDFW 2013a) and the presence of suitable roosting habitat (e.g., old farm buildings).

Common and Special-Status Bats	
RMP-O32	Prevent impacts to individual bats and their roosting habitat during construction of infrastructure, trails, and routine maintenance. Bats are particularly susceptible to perturbations from human activities which have contributed to the decline in several species. Disturbance during hibernation and rearing can result in roost abandonment and mortality, particularly to young bats. Light pollution can alter foraging behavior and compromise bat populations. Many bat species exhibit high site fidelity and the removal or damage to roosts can lead to roost abandonment or exposure. Therefore, avoidance and minimization measures will be required when conducting potentially impacting activities in areas of bat roosts.
RMP-O33	Protect and enhance roosting and foraging habitat in the Park. Similar to birds, habitat complexity supports healthier and more diverse populations of bats. Bats forage at night for night-flying insects, many of which are agricultural and human health pests (e.g., mosquitos). The preservation of existing roosts, the creation of roosts, protecting the Park's diverse habitats, and minimizing the use of chemical insecticides will contribute the enhancement and protection of bat populations.
RMP-G28	Roosting boxes will be manufactured and installed on the edge of seasonal wetlands, grasslands, and Park Complex. The boxes will be regularly monitored to determine their use and if special-status bat species have taken residency.
RMP-G29	Livestock troughs will be reviewed and modified to accommodate access and safety for bat species and other wildlife, including escape structures, water-level management, and removal of hazardous obstacles.
RMP-S45	During the roosting season, bat surveys will be conducted prior to the construction of trails, roads, and all other park infrastructure with the potential to impact roosting bats. Should roosting bats be detected, a qualified biologist will make recommendations to park staff to avoid impacts to bats.
RMP-S46	If active roosts are located, impacts will be postponed or cancelled. Avoidance measures may include postponing removal of trees, snags, buildings, bridges, or other structures supporting bats; establishing buffers around roost sites; or construction of replacement roosting habitat.
RMP-S47	CDFW will be consulted during project development to identify and implement any additional protection measures specific to special-status bat species.

American Badger

American badger (*Taxidea taxus*). CDFW Species of Special Concern. Moderate Potential: The American badger is a semifossorial mammal in the weasel family (Mustelidae). Macrohabitat includes dry, open woodlands, extensive forest meadows, open scrub, and grasslands. Microhabitat conditions require loose friable soils for burrow creation and foraging potential. Badgers are typically solitary, nocturnal, and construct burrows for refuge during daylight hours. Badger burrows are usually elliptical, with only one entrance, and are located in areas with plentiful prey sources. The primary prey is composed of ground squirrels and pocket gophers, which are typically pursued by digging into their burrows (Jameson and Peeters 2004). Alternative prey resources include mice, rats, reptiles, amphibians, and bird eggs. Young are born in the spring and independent by the end of summer.

Badgers have very large home ranges, depending on available habitat. Males can forage across a range of approximately one square mile to 25 square miles in patchier habitat, while females can range from one-half square mile to 15 square miles (Messick and Hornocker 1981, Newhouse and Kinley 2000). However, in general, densities are one badger per square mile in occupied, prime habitat (Long 1973). Badgers have not been recorded in the Park or immediate vicinity, but suitable habitat is present on hillsides (i.e., East and West ridges) away from heavy clay soils, soil disturbance, and frequent human visitation in Tolay Valley. Several large holes have been observed in the Park that may have been constructed by American badger (Steve Ehret pers. comm.)

American Badger

RMP-O34 Prevent impacts to individual American badger during construction of Park infrastructure, trail building, and regular operations. Minimize impacts to woodland and grassland habitat.
American badgers are sensitive to repeated human activities, particularly actions that alter soil integrity. Repeated human visitation may affect routine behavior of American badger, resulting in burrow abandonment and relocation. Therefore, park activities should avoid extensive burrow network that may potentially support American badger.

RMP-O35 Protect and enhance open foraging and range habitat in open woodlands and grasslands for American badger.
American badgers have extensive ranges in open habitat and require robust prey populations of smaller fossorial mammals. Boom and bust cycles of ground squirrels (i.e., prey) are expected, but unnecessary controls of American badger prey should be avoided.

RMP-G30 Surveys for the presence of American badger should be conducted. If located within the Park, periodic monitoring should occur to determine the population size, health, migratory patterns, utilization of the site, and interactions with grazing livestock.

RMP-S48 Pre-construction surveys by a qualified mammal biologist will be conducted prior to ground-breaking activities that have the potential to impact American badger dens.

RMP-S49 Trails, roads, and other developed infrastructure will be located away from potential American badger dens. Where ground-breaking disturbance in the general vicinity of potential dens is unavoidable, best management practices should be implemented to avoid direct and indirect impacts to American badger.

Photo credit: Regional Parks staff

INVASIVE PLANT SPECIES

Invasive plant infestations can have a profound negative impact on native vegetation communities by altering wildlife patterns and breeding, increasing fire hazard and frequency, increasing sedimentation and erosion, reducing livestock forage capacity, among other threats to healthy ecosystems. Invasive species are typically non-native in origin and out-compete locally native plant species through several advantages: resistance to predation, lack of natural predators, high recruitment rates, and high adaptation to disturbance.

Invasive Plant Management focuses on prevention of new infestations, either from species not previously reported from existing, isolated populations within the Park to other areas, as well as managing (controlling, eradicating) existing populations within the Park. The following objectives will curb new infestations of invasive plant species both from on and off-site locations.

Invasive Plant Prevention and Management

RMP-O36 Prevent the establishment of invasive plant species within the Park.
Invasive plant species pose a significant challenge to land managers because of their competitive advantage over native species, prodigious reproduction, and rapid dispersal mechanisms.

Invasive Plant Prevention and Management	
RMP-O37	Control the spread of invasive plants and eradicate populations of targeted invasive plants within the Park.
RMP-G31	High and medium priority invasive species with limited distributions should be eradicated, with exception of blue gum.
RMP-G32	High and medium priority invasive species with extensive distributions as well as blue gum should be controlled to prevent new infestations and weaken existing populations.
RMP-G33	If eradicating and/or controlling all of the Park's invasive species proves infeasible, then the following prioritization should be followed: ○ Recently established or young infestations; ○ Infestations within high quality and sensitive native habitats; ○ Edges of existing infestations, working inward.
RMP-G34	Annual monitoring of the Park for invasive species, existing infestations, and treated areas. The invasive plant map should be updated annually, and copies provided to staff, volunteers, and visitors soliciting any new observations be logged with park staff.
RMP-G35	Notes and observations should be recorded regarding control and eradication techniques, results, labor and financial costs, timing, etc. to develop an internal methodology for best treatment outcomes for each invasive plant species.
RMP-S50	Prioritization and management of invasive plants will follow the standards specified below.
RMP-S51	A licensed Pest Control Advisor will be consulted prior to implementation of control and eradication methods to refine appropriate quantities and methods of herbicide application. Licensed Pesticide Applicators will conduct any herbicide treatment within the Park.
RMP-S52	Herbicide treatment will be confined to limited uses for spot treatments; extensive infestations of invasive plants will be controlled by mechanical or other means.
RMP-S53	Mechanically removed invasive plants will be either burned on-site or hauled off-site in a manner to prevent propagule (i.e., seed, rhizome) escape. Every feasible attempt will be made to remove all vegetative propagules; repeat and spot treatment may be necessary.
RMP-S54	Native species will be immediately planted and/or seeded into treated areas once it is confirmed that the infestation has been eradicated. Back-planting will reduce the potential for secondary invasion.

High Priority			
Species	Life Form	Distribution	Management Approach
Himalayan blackberry *Rubus armeniacus*	Evergreen shrub	Common; Tolay Creek and other stream courses	CONTROL.
Tamarisk *Tamarix* sp.	Evergreen shrub	Limited; lower Tolay Creek	ERADICATE. Cut stem to near ground, apply herbicide (triclopyr). Repeat treatment.
Water primrose *Ludwigia* sp.	Herbaceous perennial, aquatic	Limited; stock ponds	ERADICATE. Drain ponds, mechanical removal. Application of herbicide (triclopyr) may be necessary, followed by mechanical removal.
Fennel *Foeniculum vulgare*	Herbaceous perennial, taproot	Limited; Park Complex, roads	ERADICATE. Mechanical removal of entire root system, dispose off-site. Herbicide (triclopyr or glyphosate) treatment and/or mechanical removal for spring seedlings.
Harding grass *Phalaris aquatica*	Herbaceous perennial, rhizomatous	Common; grasslands	CONTROL. Intensive grazing in dense stands, grazing in thin stands. Herbicide (glyphosate) for small stands. Prescribed fire for extensive stands.

Invasive Plant Prevention and Management			
Purple star thistle *Centaurea calcitrapa*	Herbaceous annual	Common; disturbed grasslands, roads, livestock loafing areas	CONTROL. Cut root for small stands, herbicide (2,4-D; clopyralid) for large stands. Avoid disturbing soil to discourage new populations.
Yellow star thistle *Centaurea solstitialis*	Herbaceous annual	Common; grasslands	CONTROL. Intensive grazing in early spring; mowing, weed whipping in early spring; prescribed fire in late spring.
Medusa head *Elymus caput-medusae*	Herbaceous annual	Common; grasslands	CONTROL. Intensive grazing in mid-spring, fall mowing to reduce thatch; prescribed fire in spring.
Medium Priority			
Species	**Life Form**	**Distribution**	**Management Approach**
Blue gum *Eucalyptus globulus*	Evergreen tree	Limited; groves near Headquarters and West Ridge	CONTROL. Mechanical removal of seedling; cut and apply herbicide (triclopyr or glyphosate) to cut stem for saplings. Allow groves to senesce naturally.
Poison hemlock *Conium maculatum*	Herbaceous perennial, taproot	Common; Tolay Lake edge, stream courses	CONTROL. Mechanical removal for small stands. Weed whipping in spring, with repeated whipping in summer for large stands.
Fuller's teasel *Dipsacus fullonum*	Herbaceous perennial, taproot	Common; wetlands	CONTROL. Mechanical removal for small stands. Weed whipping in spring, with repeated whipping in summer for large stands.
Bristly ox-tongue *Helminthotheca echioides*	Herbaceous perennial, taproot	Common; upper margins wetlands	CONTROL. Weed whipping for small stands. Mowing for large stands.
Curly dock *Rumex crispus*	Herbaceous perennial, taproot	Common; wetlands	CONTROL. Weed whipping for small stands. Mowing for large stands.
Italian thistle *Carduus pycnocephalus*	Herbaceous annual	Common; grasslands, woodland edges, livestock loafing areas	CONTROL. Weed whipping and/or mowing for large stands in spring. Repeat treatments necessary to exhaust seed bank.
Black mustard Brassica nigra	Herbaceous annual	Limited; disturbed grasslands, Headquarters	ERADICATE. Weed whipping and/or mowing for large stands in spring. Repeat treatments necessary to exhaust seed bank.

The table above summarizes the medium and high priority invasive species targeted within the Park. Invasive species ranked by the California Invasive Plant Council (Cal-IPC) as "assessed" and "limited" were evaluated and determined that only two, bristly ox-tongue and curly dock, appeared to pose a substantial future threat to certain habitats or species within the Park. All four invasive species with a rank "high" and seven of the 29 species ranked "moderate" were determined to pose a current or future threat to substantially alter the native habitat or management regime. In general, non-native grasses (e.g., soft chess) constitute their own vegetation alliances or are characteristic species within other vegetation alliances and are nearly impossible to eradicate; therefore, these species are not addressed as potential threats to the existing habitats and species within the Park. Additionally, these species, although competitive with native grasses and forbs, often provide habitat for native wildlife and valuable forage for livestock which are a potentially vital component of overall management of the Park.

INVASIVE WILDLIFE SPECIES

Similar to invasive plants, invasive wildlife species can alter the normal function of a region's fauna. These species can displace, prey upon, compete with, and exchange disease and pathogens with native wildlife. Hybridization between related organisms from separate parts of the world can diminish local genetics. Forage resources can be destroyed or diminished by non-native wildlife, and agricultural enterprises can be compromised. Comprehensive studies to understand the relationship between invasive and native wildlife have not been conducted within the Park, but it does not appear that there currently are non-native species causing deleterious effects on native wildlife.

Several non-native wildlife species have been documented within or have a high potential to occur in the Park. Although CRLF and American bullfrog co-occur and have breeding cycles separated by up to ten weeks (Cook and Jennings 2007), predation by American bullfrogs has been documented (Cook and Jennings 2001, Wilcox 2011). Several of the stock ponds support suitable breeding habitat for both of these amphibians, and therefore, American bullfrog could pose a localized threat to the existing or established populations of CRLF. Wild turkeys are present within the Park; however, it is unclear if this species has deleterious effects on oak regeneration and small invertebrates. Studies from Annadel State Park suggest that the diet of wild turkey is predominantly non-native plants supplemented by insects and small vertebrates (Barrett and Kucera 2005), and wild turkeys have very little overlap with California quail (Lau 2006).

Of greater concern may be feral pigs which are frequent migratory residents in the Sonoma Mountains. Feral pigs cause excessive damage to soil through rooting and wallowing, increasing erosion and providing a pathway for invasive species. Invasive brooms (*Genista* spp., *Cytisus* spp.), and other soil disturbance adapted invasive plant species may spread more rapidly and form dense thickets precluding native vegetation where feral pigs frequent (Sheppard and Hosking 1998, WRA observation 2010). No broom species have been reported in the Park, and continued exclusion of these species will rely on proper management of human visitation as well as non-native wildlife, such as feral pigs.

Downed trees, which are evidence of beaver (*Castor canadensis*) activity, have recently been reported from the Park (Ehret pers. comm. 2014). Historical evidence of beaver from the Sonoma Creek watershed suggests that this species is native to the region, and possibly ranged in the Tolay Creek watershed (Lanman et al. 2013). Beaver convey several benefits to a healthy ecosystem including creating habitat for aquatic organisms, contributing to accretion and sediment storage, and reducing the energy of storm pulses (Rosell et al. 2005, Gurnell 1998). Conversely, in areas within a built environment, beaver dams can lead to flooding and mortality of desirable trees and shrubs (Pollock et al. 2003).

Invasive Wildlife Species	
RMP-O38	Prevent the establishment of and control existing populations of non-native wildlife species such as feral pig and wild turkey.
RMP-O39	Reduce the potential impact of beaver on the Park's built environment and Tolay Lake restoration areas; otherwise, allow for natural functioning of this species in the natural areas of the Park.
RMP-G36	Wild turkey populations should be monitored for size, range extent, seasonal patterns, and any adverse effects on native wildlife or native vegetation communities.
RMP-G37	Monitoring for feral pigs should be conducted routinely. Coordination with neighbors regarding feral pig observations should be logged by park staff. Should feral pigs invade the Park, an aggressive eradication program should be implemented.

Invasive Wildlife Species	
RMP-G38	Tolay Lake, stock ponds, and other aquatic resources with the potential to support CRLF should be monitored annually for American bullfrogs, warm water fishes (e.g., bass), crayfish, and invasive plants. If these invasive species become established and diminish the habitat for CRLF, a detailed management program should be developed to eradicate or control the species.
RMP-G39	The presence of European starling should be monitored. Unlike most other birds, the European starling is not protected under the federal Migratory Bird Treaty Act and their nests can be removed.
RMP-G40	An education program should be implemented informing volunteers and visitors about the accidental and intentional introduction of non-native plant and wildlife species, and the potential negative effects on native natural resources.
RMP-S55	Agricultural demonstration and enterprise(s) within the Park involving animals with the potential to escape will be tightly monitored to prevent impacts to the natural areas of the Park (e.g., pigs).
RMP-S56	Should feral pigs enter the Park, a detailed eradication program will be developed. A depredation permit issued by the CDFW will be acquired to eradicate the feral pigs.
RMP-S57	Should wild turkey negatively affect wildlife or native vegetation communities, a detailed control program will be developed. A depredation permit issued by the CDFW will be acquired to take wild turkey.
RMP-S58	Should beaver pose a deleterious effect on the built environment, desirable/historical landscaping, restoration efforts, and/or are creating flood damage, preventive and relocation efforts should be implemented to discourage continued beaver use in these areas. Practices may include trapping and relocation, and shielding trees with wire mesh or electric fencing (VFWS 2004).

GRAZING

Despite the complex interactions between grazing and natural biota, some beneficial and deleterious effects from grazing are well understood and measurable. Primarily, grazing affects vegetation through direct herbivory, trampling, changes in the nutrient cycle, soil and hydrologic disturbance through compaction and erosion (Bush 2006). These effects favor plants adapted to or tolerant of disturbance, which are often non-native annual grasses and invasive species. Additionally, shrubs, saplings, and even large trees can be browsed or impacted in areas where cattle gather thereby reducing regeneration of woodlands and shrublands, contributing to type conversion (Bartolome et al. 2007). Sensitive habitats including riparian areas, wetlands, and plant species with a high susceptibility to direct herbivory can quickly be negatively impacted (Fleischner 1994, Painter 1995, Belsky et al. 1999). A history of grazing may be contributing to stream bank incision, head-cuts, reduced shrub understory, and browsed tree limbs.

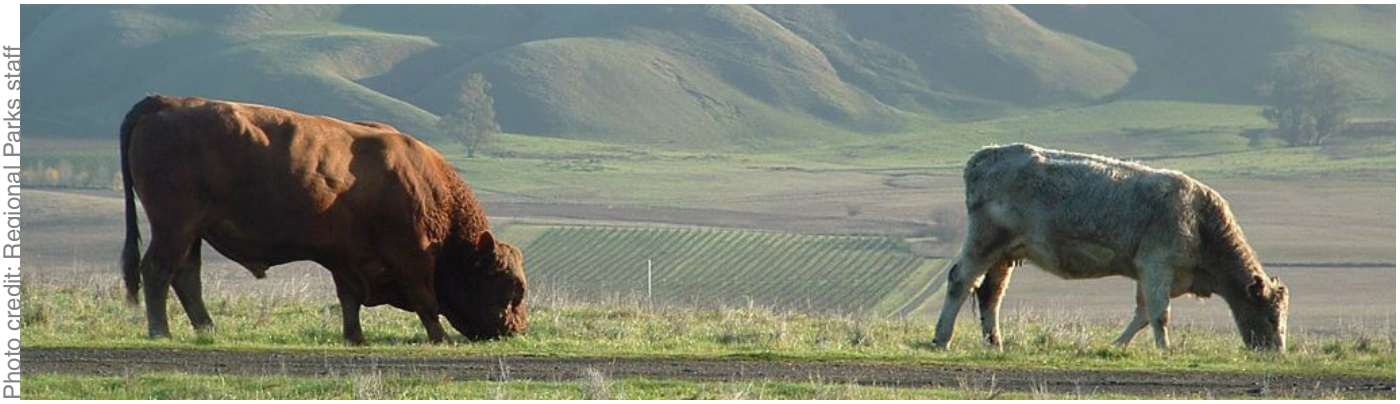


Photo credit: Regional Parks staff

When managed properly, livestock grazing confers several benefits, including thatch reduction, floral diversity, reduced fuel load, and the maintenance of wildlife habitat. Non-native annual grasslands develop excessive thatch accumulation that can inhibit seed germination of other species and increase fire hazard (Kyser et al. 2007). Properly timed grazing can promote native plant species growth through reduced competition for space and nutrients, thatch reduction, and a long-term reduction of non-native species in the seed bank (D'Antonio et al. 2001, Hayes and Holl 2003, Huntsinger et al. 2007). In turn, native wildlife dependent upon specific plants gain benefits, and perhaps continued survival, through grazing, such as the Bay checkerspot butterfly and Callippe silverspot butterfly whose host plants can readily become out-competed by non-native grasses (Weiss 1999, Weiss et al. 2007). The deleterious and beneficial effects of grazing on wildlife are well documented.However, grazing is an effective tool for wildlife and vegetation management when adaptive management principles guide the grazing regime and monitoring results are used to adjust practices as needed. In 2009 and 2010 rangeland resources studies were conducted independently for the northern and southern portions of the Park (LSA 2009a, Bush 2010). The grazing management plan should be update to synthesize these works to include the entirety of the Park boundary and incorporate any infrastructure changes that have occurred since 2009 and 2010.

Grazing Management	
RMP-O40	Maintain the agricultural heritage of the Park through a livestock grazing program. Incorporate livestock grazing into the overall natural resources management of the Park.
RMP-O41	Ensure that livestock grazing confers maximum benefit while minimizing impacts to natural and cultural resources.
RMP-G41	Residual dry matter (RDM) levels should average approximately 1,200 pounds per acre across the Park. There may be spatial and temporal variability in this number with lower RDM targets in gentler terrain, in drier years, and/or where high intensity grazing confers particular enhancement benefits for natural resources (e.g., bare ground creation).
RMP-G42	Grass height and density should exhibit patchiness rather than heterogeneity to provide wildlife habitat and floristic diversity.
RMP-G43	Pasture infrastructure should remain intact and updated when necessary to provide rotational grazing and location specific management such as high intensity grazing if needed.
RMP-G44	Livestock movement should be encouraged to reduce trampling effects. The strategic location of supplemental feeding, watering, and mineral supplements can encourage livestock to distribute more broadly across a pasture.
RMP-G45	Livestock attractants such as troughs and mineral supplements should be located away from known pre-historic archaeological sites, wetlands, riparian habitats, oak regeneration sites, etc. to prevent or reduce grazing and trampling on or near sensitive resources.
RMP-G46	RDM values below the recommended minimum level in two or more consecutive years should be avoided by destocking, rotation, or supplemental feeding. Process for stocking rates, rotations, and supplemental feeding should be identified within the grazing lease agreement.
RMP-G47	Targeted exclusion fencing should be considered for existing sensitive resources, such as riparian, wetlands and prehistoric cultural resources.
RMP-G48	Stream crossings and extensive wetland use by livestock should be evaluated and if deemed an impact or impairment to these features, corrective measures should be adopted.
RMP-G49	Educational materials and signage should be developed and provided to park visitors to inform the public of the historical legacy of grazing, the management benefits it confers, and safe behavior around livestock.
RMP-S59	Livestock grazing will be maintained to management natural resources as well as to preserve its historical legacy. Livestock grazing will be managed to protect pre-historic cultural resources.

Grazing Management	
RMP-S60	Stocking rates will be calculated for individual pastures or grazing units based on forage productivity, topography, vegetation type, presence of special-status species and sensitive habitats, distance to water and mineral supplements, and soil type and erosion potential. Because year to year increases or decreases in stocking rates will be necessary based on market and climatic conditions, stocking rates will be expressed in a range of values.
RMP-S61	Downed or damaged fences will be replaced as soon as practically possible. Boundary fences will be regularly maintained to prevent incursion of neighboring livestock and out-migration of park livestock.
RMP-S62	Exclusion fencing may be erected as needed to protect pre-historic cultural resources from cattle, and restoration and enhancement areas to allow for the establishment of native vegetation. In some cases the fencing may act as enclosures for flash or high intensity grazing as part of the enhancement activity (e.g., reduction of non-native grass thatch, reduction of invasive species).

FIRE

Much of California including Tolay Lake Regional Park lands, vegetation has evolved with fire as a major component of its disturbance and renewal process. Plant species and vegetation communities are frequently dependent upon fire, which can contribute to patchiness and floral diversity. Fire has been used as a tool to reduce vegetation cover for visibility and movement, provide favored wildlife habitat, and increase abundance of desirable food sources.

The most prevalent non-native grasses of California are overwhelmingly annual and from the Mediterranean and these species are not particularly well adapted to fire. Fire has been utilized to control and reverse the spread of these species with varying success (Jackson 1985).

Prior to European contact, Coast Miwok used fire as a tool to manage the land. Periodic fires in grasslands after seed collection removed thatch and encouraged healthy new growth and seed. Fires kept coyote brush and scrub in check and the intensity of fires appears to have been such to create type conversion from shrubland and woodland to open savannah and grassland (Keely 2001, Anderson 2005). The arrival of the colonial powers from Spain brought major changes in the fire regime in California. In 1793, Governor Arrillaga outlawed all deliberate fires set by Indians in California, citing "widespread damage which results to the public from the burning of fields." Unknown is whether this negative assessment derived from a fear of grass fires spreading into towns, or a misunderstanding of natural fire dynamics, or simple racism. (Geoffrey Coffey, Getting Burned Bay Nature July 2005)

The Tribe values the use of small setting, prescribed fires not only for restoring the land but also for its value to bring back cultural burning. The historical management of the land was not, as is often assumed, an untouched Eden but a practically human-made landscape, a series of habitat patches that were deliberately ecologically managed. From this cultivated landscape issued not just a year-round supply of food, but the basis upon which Native Americans constructed their material culture. For example, they burned to promote uniform, straight, and flexible deer grass, willow, and other plant stalks with which they made their basketry (and still do). (Mary Ellen Hannibal, Lighting Cultural Fires, Boom Fall 2014)

Prescribed fire can enhance soil carbon sequestration and nutrient-cycling. Frequent, low-intensity fires in scrub habitat can increase the below-ground biomass of native shrubs, and sequestered carbon (Norton and Howarth 2006). In grasslands, fast-moving low intensity fires are less likely to volatize soil carbon and nitrogen, while having the potential to control annual grasses and assist the re-colonization of native perennials which, generally, sequester more carbon in soil (DiTomaso et al. 2006, Reiner 2007). Of course, fires themselves contribute to the release of greenhouses gases, but generally, the benefits conveyed by appropriate fire management suggest that this release would be absorbed with increased vegetative vigor and conversion to perennial and woody species (Delonge et al. 2014).

There are ecological risks associated with prescribed fire. Fire can promote some invasive species, such as filarees (*Erodium* spp.) and mustards (*Brassica* ssp.), posing a risk to native habitats and restoration goals (D'Antonio and Dudley 2010). It is important to determine an appropriate fire return interval to avoid undesirable type conversion, soil-nutrient loss, exposure of bare ground, all of which can contribute to continued invasive species and loss of biodiversity (DiTomaso et al. 2006, Keeley 2006, Brooks et al. 2004). Chaparral and scrublands are particularly susceptible to type conversion and post-fire infestations of invasive plants from frequent, short-interval fires (Keeley 2006, Lippit et al. 2013). Therefore, if prescribed fire is used to manage the Park's scrub species, caution should be taken to ensure that the return-interval and intensity is such that native shrubs survive the fire to continue to provide cover and buffer effects of invasive species.

In general, fire is an effective tool for land management when applied in conjunction with other management techniques (e.g., grazing, soil grubbing, herbicide treatment). For instance, control of yellow star thistle is most effective when repeated fires are conducted or with a follow-up treatment with herbicide (DiTomaso et al. 1999). Similar to grazing, fire can be a cost-effective management technique over broad areas where herbicide, mechanical removal, and other treatments for invasive species are impracticable. However, public health and safety are associated concerns with both the intentional use of fire as a management tool as well as unintentional wildfire. Therefore, the Park's fire management should account for both the risk of wildfire and the potential use of fire for land management and traditional cultural practices.

Fire Management	
RMP-O42	Protect the natural resources, cultural resources, public safety, and park infrastructure from wildfire.
RMP-O43	Prescribed burning should be a consideration for native resources management including native grassland restoration, invasive species management, and wildlife habitat enhancement. And consideration should be given to bring back cultural fire burning.
RMP-G50	A fire management, prevention and suppression plan should be developed for both the prevention of damage to cultural resources, Park infrastructure and public safety as well as restoration and/or enhancement of natural resources particularly grasslands and wildflower fields, to protect Park resources as feasible in the event of a fire, from firefighting crew tactics (i.e. excavation & other heavy equipment).
RMP-S63	Provision of multiple access points to prevent and control wildfire. Access should include from Lakeville Road and Highway 121, as well as designated helipads for air landings. See Figure 9-1 and 9-2, Emergency Access Plans for the Park.
RMP-S64	Off-road vehicles operated by the Park, their contractors, and volunteers will have spark arrestors. Operators of street vehicles will park vehicles in low fire risk areas (e.g., low-growing vegetation, bare ground). During high and very high fire hazard days, the use of power tools for regular maintenance and vehicle access to undeveloped areas will be prohibited unless in the case of emergencies.
RMP-S65	Smoking will be prohibited in the Park to reduce fire risk and per Sonoma County Ordinances 5947 and 5953. Signage clearly designating the Park as a No Smoking environment will be posted at all entry points, campsites, Park Complex, and informational brochures.
RMP-S66	Fixed barbecues, fire rings, and visitor open air cooking equipment will only be located or allowed in designated campsites and picnic areas.
RMP-S67	Vegetation management for fire protection will consider native dominated habitats and all feasible protections for native plants will be considered. Where it is essential to remove native species, replacement and/or translocation planting of native plants should be conducted elsewhere in the Park.

Fire Management	
RMP-S68	Livestock grazing and mowing will be the preferred methods for herbaceous fuel reduction around park infrastructure. Disking will be kept to a minimum to reduce the potential for invasive species establishment.
RMP-S69	Monitoring and reduction of fuel loads throughout the Park will be implemented on a regular basis (see Section titled Blue Gum and Monterey Cypress Groves). Particular attention should be paid in areas of high thatch accumulation (i.e., ungrazed grasslands), downed woody debris (i.e. blue gum groves, oak woodlands), and areas of downed trees from SOD or other pathogens. RDM monitoring results should be used to target potential areas of high thatch accumulation in grasslands (see Section titled Grazing).

AVOIDANCE AND MINIMIZATION OF POTENTIAL IMPACTS

Development and improvement activities pose potential impacts to the cultural and natural resources within the Park, precipitating the need to provide objectives, guidelines, and standards to avoid, minimize, or mitigate these impacts. In some cases, minimum setbacks are sufficient to prevent direct and indirect impacts to natural resources. Where development and improvements cannot be setback from resources, several localized biological studies, archaeological resource studies, surveys, and assessments may be necessary to determine if sensitive resources are present, to delineate these resources, and then provide permitting or other management measures to avoid and minimize impacts.

Avoidance and Minimization of Potential Impacts	
RMP-O44	Prevent direct and indirect impacts to sensitive cultural and natural resources by placing setbacks on these resources. In the instance where direct impacts to sensitive resources result, surveys or assessments need to be conducted to analyze the extent of the impact and determine appropriate minimization and mitigation to offset the impact. Furthermore, potential impacts from contaminants and pathogens to the resources should be minimized.
RMP-O45	Habitat restoration and enhancement areas should serve as the primary locations for mitigation for unavoidable impacts associated with park development and maintenance. Identified prehistoric archaeological resource sites should serve as primary locations for protection management and monitoring activities.

Photo credit: Regional Parks staff

Setback Guidelines and Standards

The following guidelines and standards will assist Park Staff and volunteers with establishing and maintaining buffers sufficient to protect sensitive natural and pre-historic archaeological resources. Activities set back from sensitive resources provides buffering protection to the resource through the capture of sediments; slowing water runoff and erosion that might enhance the likeliness of exposing archaeological resources; and retards invasive species advancement allowing for the continuation of healthy ecological processes to occur within the adjacent sensitive resource. Generally, the narrower the buffer, the less the buffering effect; however, sufficient buffer width is determined on a case by case basis. A narrow buffer in recreational settings can allow visitors to experience natural and cultural resources while discouraging informal trail creation through these sensitive areas.

Natural Resource Setback Guidelines and Standards

RMP-G51 A qualified biologist, ecologist, and/or wetland scientist should be consulted when improvements and/or development are within the established setback buffers.

RMP-S70 To protect sensitive natural resources, minimum setback standards will be adhered to where feasible. The following standards summarize the suggested minimum vegetated buffer from the Park's natural resources.

Habitat Type	Potential Development Intensity	Min. Buffer	Rationale
Wetland / Stream / Riparian Habitat	Low-medium: Trails, picnic tables, viewing platforms	50' Centerline of stream	Allows space for natural stream channel change Buffers erosion into stream channel Allows for natural and assisted regeneration Maintains integrity of wildlife corridor
	High: Built infrastructure	100' Top of bank	Buffers sediment and nutrient runoff Allows for natural and assisted regeneration of trees and large shrubs Buffers water temperature Maintains connectivity between aquatic and terrestrial habitats
Native Grassland	Low-medium: Trails, picnic tables, gathering (e.g., docent led hikes, large hiking groups)	25'	Reduces potential for invasive species establishment Allow for natural and assisted regeneration
	High: Built infrastructure	50'	Buffer from trampling/foot traffic Buffer potential changes in local hydrology Buffer potential shade/sun impacts
Rock Outcrop	Low-medium: Trails, picnic tables, viewing	25'	Reduces potential for invasive species establishment Reduces potential disturbance to wildlife
Special-status Plants	Low-medium: Trails, picnic tables	25'	Reduces potential for invasive species establishment Allow for natural regeneration and recruitment
	High: Built infrastructure	50'	Buffer from trampling/foot traffic Buffer potential changes in local hydrology Buffer potential shade/sun impacts
Bat Roost	Low-medium: Trails, picnic tables	species dependent	Reduces roost abandonment
	High: Built infrastructure	species dependent	Reduces roost abandonment
Bird Nest	Low-medium: Trails, picnic tables	species dependent	Reduces nest abandonment
	High: Built infrastructure	species dependent	Reduces nest abandonment

Cultural Resource Setback Guidelines and Standards

RMP-G52 Development within the established setback buffers will be conducted in coordination and collaboration with the Tribe.

RMP-S71 To protect sensitive cultural resources, minimum setback standards will be adhered to the greatest extent feasible. The following standards summarize the suggested minimum buffer from cultural resources.

Type	Potential Development Intensity	Min. Buffer	Rationale
Existing known prehistoric archaeological sites or Tribal Cultural Resources (TCR's)	Low-medium: New trails, picnic tables, viewing platforms	150'	In avoidance of casual unknowing disturbance of cultural resources by the visiting public. All ground disturbing construction activities will be coordinated for monitoring by the Tribe.
	Natural habitat restoration; Including Lake and wetlands, woodland, and native grass and wildflower	Project Specific	Project level development of any of the sites natural habitat restoration will be done in coordination and collaboration with the tribe. With the Tribe's understanding of the need to balance natural resource enhancement with the protection of pre-historic cultural resources. All ground disturbing construction activities will be coordinated for monitoring by the Tribe.
	High: New southern parking lot and other associated park access infrastructure	500'	Coordinate with the tribe to have Tribal Monitors present during all ground disturbing construction activities.
	High: New infrastructure within the Park Complex	Project specific	Setbacks within the Park Complex are unfeasible due to Conservation Easement restricting new building development within the defined Park Complex/Visitor Center Area and the known cultural sensitivity of the Park Complex. Pre-historic resources will be avoided to the greatest extent feasible. Projects within the Park Complex will be constructed in coordination and collaboration of the Tribe and as laid out within the approved Master Plan. All ground disturbing construction activities will be coordinated for monitoring by the Tribe.
	Low-medium: Benches, picnic tables, gathering areas	Site Specific	Established tables, benches and gathering areas will be moved as possible recognizing that other land constraints may also dictate location. Assessment and mitigation will be in coordinated with the Tribe.
In the case of new pre-historic archaeological finds	Low-medium: Trails	Site Specific	If a newly discovered site is within the area of an established trail Regional Parks will work collaboratively with the Tribe to assess and prescribe protective solutions. Protective solutions might include but not be exclusive to trail re-alignment, site resource capping, and/or site exclusionary fencing.
	High: Built infrastructure	Site/Project Specific	Methodologies and practices in coordination with the Tribe will define actions for newly discovered artifacts.

General Biological Survey Guidelines and Standards

The Park supports numerous sensitive biological resources that are protected through several federal, state, and/or local codes and ordinances. Frequently, resource agencies have provided guidance and protocols for surveying or delineating the extent of these resources. Where agencies have not provided specific methods for determining the presence and/or extent of sensitive natural resources, it may be acceptable to the governing agency for a qualified biologist or ecologist to propose methods to do so. In most cases, the surveying for sensitive natural resources must be conducted by a qualified biologist, but only in a few instances will these qualifications and the biologist explicitly need to gain permission from a governing agency. The following guidelines and standards are those that would be necessary to implement when development and improvements are proposed near documented or suspected sensitive natural resources including wetlands, streams, stock ponds, native grasslands and wildflower fields, special-status plant species, special-status wildlife species and their habitat, nesting birds protected under the Migratory Bird Treaty Act, and/or roosting bats and roosting habitat.

General Biological Survey Guidelines and Standards	
RMP-G53	Park staff, contractors, and volunteers should review the Biological Resources Report (WRA 2013) to become familiar with the various sensitive natural resources within the Park. Any proposed development or improvement that is located near (see Setbacks above) a suspected or documented sensitive natural resource should be avoided the maximum extent feasible.
RMP-S72	Where it is not feasible to avoid the proposed setbacks, qualified biologists, ecologists, and/or wetland scientists will be consulted to determine the extent of the resource and if the proposed activities will pose a direct or indirect impact.
RMP-S73	If the qualified biologist, ecologist, and/or wetland scientist determines that an impact is unavoidable, the appropriate permit application must be submitted to the governing agency. In some cases, it may be necessary to apply for multiple permits to multiple agencies for a singular impact.
RMP-S74	Preconstruction Training: Before the construction, demolition, and/or decommission of trails, roads, fences, buildings, parking areas, and other infrastructural development and improvements, a qualified biologist will conduct a training session for all construction and/or volunteer crews working on the project. The training will include a description of sensitive habitats (e.g., wetlands), special-status species' habitats, and special-status species; basic identification will be part of the training. Protection and avoidance measures will be thoroughly arranged prior to construction and clearly conveyed to all crews working on the project, and contingency/contact information will be provided to all construction crew members to ensure that incidental impacts are swiftly reported and mitigated.
RMP-S75	Preconstruction Wetland Delineation: Prior to construction in areas within or near wetlands, a qualified wetland scientist will perform a wetland delineation sufficient to determine the extent of Waters of the U.S., Waters of the State, and stream and riparian habitat potentially jurisdictional under Section 404 of the Clean Water Act, Porter-Cologne Act, and Section 1600 of the California Fish and Game Code. Should impacts not occur due to the project, it is at the discretion of the Regional Parks to formally submit documentation to the governing resource agencies. Should impacts be unavoidable, formal submission of the delineation along with the necessary permit application. In this situation a Habitat Mitigation and Monitoring Plan will likely be required by the agencies.
RMP-S76	Preconstruction Sensitive Natural Communities and Special-status Plant Surveys: Prior to construction in natural habitats, a protocol-level rare plant and sensitive natural communities will be performed. Although the extent of sensitive natural communities and special-status plants have been documented within the Park, new populations may occur within or near proposed project activities. If these resources are observed, they will be avoided by the project to the greatest extent feasible, and if impacts are unavoidable, then a mitigation and monitoring plant will be developed and implemented.

General Biological Survey Guidelines and Standards	
RMP-S77	Preconstruction Special-status Wildlife Surveys: Prior to construction in all natural habitats, surveys for CRLF and other potentially occurring special-status wildlife will be performed by a qualified biologist. If a wildlife species is observed within or near the proposed project activities, these areas must be avoided until the animal(s) has vacated and/or upon approval from the governing agency, the animal will be relocated away from the potential impact by an approved biologist.
RMP-S78	Preconstruction Breeding Bird Surveys: Construction, demolition, and maintenance that require vegetation removal or ground-breaking will occur outside of the breeding bird season (February 1 through August 31) where feasible. Prior to construction and routine maintenance a qualified avian biologist will conduct a breeding bird survey. If active bird nests are located near the proposed activity, then the activity will be halted until young birds have fledged or upon approval by a qualified biologist. A buffer of 50 feet will be applied to nesting songbirds, and a buffer of 250 for raptors and large birds will be applied. If work areas are left unattended for greater than seven days during the breeding bird season following the initial survey, then a second breeding bird survey will be necessary.
RMP-S79	Preconstruction Roosting Bat Surveys: Prior to construction or demolition in areas with the potential to support bat roosts (e.g., barns, snags, large overhanging rock outcrops, and bridges), a roosting bat survey will be conducted by a qualified bat biologist.
RMP-S80	Exclusionary Fencing: During construction, temporary exclusionary fencing will be installed around sensitive natural resources to prevent construction crews from incidentally entering the natural resource area and its established buffer. Temporary exclusionary wildlife fencing will be erected around work areas to prevent wildlife from entering the work area. Fencing should have one-way routes to allow wildlife to exit the work area and prevent wildlife from entering/re-entering the work area.

Pathogen and Contaminant Control Guidelines and Standards

The use of chemicals is unavoidable in the development and maintenance of the Park. Gasoline, motor oil, herbicides, solvents, paints, and numerous other compounds can pose significant health hazards for humans as well as to prehistoric cultural resources and the natural environment. Proper handling and containment are essential to preventing these from migrating into park soils, waterways and natural habitats. Controlling the spread of pathogens that pose significant threats to habitat and species is critical to maintaining their health. The following guidelines and standards should be followed to minimize the spread contaminants and pathogens within and from outside of the Park.

Pathogen and Contaminant Control Guidelines and Standards	
RMP-G54	Park Staff will be aware of potentially hazardous chemicals and be familiar with their material safety datasheets. Training in spill prevention and containment should be conducted for Park Staff that will handle potential contaminants, particularly near wetlands and other sensitive natural resources.
RMP-G55	Volunteers, and visitors should be educated about the spread of pathogens and prevention measures. Educational materials should be posted at trailheads as well as provided in Park brochures, and should contain information about sudden oak death and chytrid (fungus associated with aquatic environments and amphibians). Emphasis should be placed on the modes of pathogen spread, consequences of infestations, and the role that visitors can play in assisting the prevention of these pathogens.
RMP-G56	Areas of documented or suspected infestation should be closed to the public and any staff, volunteers, and contractors should take preventative measures before entering and upon leaving the infected area. Exclusions may include temporary fencing, signage, brush fences, or other physical barriers.

Pathogen and Contaminant Control Guidelines and Standards	
RMP-S81	Pesticides, herbicides, and other potentially hazardous chemicals will be used by qualified persons, and will be utilized for spot treatments only. Large infestations of invasive plant species will be treated by non-chemical means. Spill prevention measures should be exercised at all times that these products are used.
RMP-S82	Fueling equipment will occur within Park Complex on impermeable surfaces where spill prevention measures can be deployed immediately. Refueling of equipment will occur at least 100 feet away from sensitive cultural and natural resources and will be on tarps, truck beds, or other impermeable surfaces where spill prevention measures can be deployed immediately in the event of a spill.
RMP-S83	Park staff and contractors working within woodlands will be trained about sudden oak death host species, disease transmission, and preventative measures necessary to minimize the spread of the pathogen, Phytophthora ramorum. The following best management practices will be exercised to the greatest extent feasible: ○ Equipment will be cleaned in a 10 percent bleach solution, or similar inoculant, before working in oak woodlands. All equipment that will contact the ground and/or plants will be cleaned, such as boots, tires, saws, shovels, etc. ○ Pruning oaks and other host plants will be avoided or minimized in wet weather, and work within oak woodlands will occur in the dry season to the greatest extent feasible. ○ Infected trees within a broader infected area that are downed or pose a safety hazard can be left on site. Removal of a trees should only occur if it is the only infected individual in an otherwise uninfected area. Removal will occur in dry weather only, personnel will take all preventative measures to prevent the spread within and outside of the Park, and the removed tree will be off-sited to an approved dump site.
RMP-S84	Nursery stock for restoration plantings will be inspected at the point of purchase for symptoms of sudden oak death and other Phytophthora pathogens. Should large-scale restoration efforts be conducted, it may be beneficial to test the nursery stock for a range Phytophthora species that can pose significant risks to the restoration efforts and their surrounding habitats (Natesen et al. 2014).
RMP-S85	Park staff, biologists, and contractors working within aquatic habitat will be trained about chytrid and other fungal diseases impacting amphibian populations to prevent the introduction and/or spread of pathogens throughout the Park. Decontamination protocols in accordance with the California/Nevada Amphibian Populations Task Force will be followed immediately following work within aquatic features in the Park.

Cultural Resources

The Tolay Creek watershed and its surrounding landscape represent a long continuum of significant cultural history and traditional Native American practices, as well asdiverse and numerous archaeological sites within the Park. The following objectives and standards have been developed to manage and protect cultural and tribal resources within the Park.

See previous section for cultural resource avoidance and minimization objectives, guidelines and standards.

Credit: Regional Parks staff

Cultural Resources	
RMP-O46	In coordination of the Tribe protect cultural and tribal resources within the Park to ensure that they are not impacted to the extent feasible during construction of infrastructure, trail building, habitat restoration, and routine maintenance. Under the California Public Resources Code (PRC) 5097.5a it is unlawful to knowingly or willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, or archaeological sites on public lands, except with the express permission of the public agency having jurisdiction over said lands.

Cultural Resources

RMP-O47	Maintain the cultural landscape of the Park in such a manner that will not degrade the landscape condition or threaten cultural resources, and that, considers impacts from restoration and enhancement activities as part of the management and development of the Park. The cultural landscape of the Tolay Creek watershed represents a breadth of natural and cultural significance and exemplifies the relationship between people and the environment. Paramount is the protection of the prehistoric cultural resources and of their sacred place in the Tolay Creek watershed. Protect and maintain historic ranch structures as feasible and historical aesthetic congruency with new infrastructure within the Park Complex.
RMP-O48	Maintain consultation and collaboration between Park staff and the Tribe to ensure the protection of tribal resources and sacred sites during the construction of buildings and infrastructure, trails; habitat restoration efforts, public use, and routine maintenance. The Tolay Creek watershed is revered by the Tribe as a place of spiritual health, healing, and gathering. Tribal resources within the Park include both tangible and intangible resources. Government-to-government consultation with the Tribe shall be carried out during all phases of Park management and development.
RMP-O49	Actively and adaptively manage through collaboration with the Tribe avoidance guidelines for cultural resources from park activities. This collaboration will guide management and development review of cultural resources within the Park.
RMP-O50	Conduct surveys, or other special studies within the Park when necessary to evaluate, record, and preserve prehistoric and historic archaeological sites and tribal resources within the Park. Based on each specific project activity proposed in the Park, tribal representatives and professional archaeologists will conduct site specific archaeological and ethnographic analysis to assess potential impacts to cultural and tribal resources and address those potential impacts as necessary.
RMP-O51	Enhance public awareness and appreciation of the Parks cultural and tribal resources and highlight preservation activities. The Park will collaborate with the Tribe to develop appropriate interpretive materials and to best adaptively manage established preservation methods.
RMP-O52	Provide information on the use of native plants and habitat by the Tribe and incorporate ethnobotanical and traditional cultural knowledge into park restoration efforts. Archaeological and ethnobotanical studies have been conducted within the Park that have identified culturally significant plant and gathering areas. Possible culturally significant plants that occur, or could be planted include: Sedges, Soaproot, Mugwort, Clovers, Loamtium, Snowberry, Toyon Berry, Currants/Gooseberry, Wild Rose, Blue elderberry, Native Grapes and Willows.
RMP-S86	Park staff will consult regularly with the Tribe to ensure that collaboration and cooperation occurs in the management and development of the Park and its cultural and tribal resources. An advisory committee and Monitoring Plan with park staff and tribal citizens will be created to oversee and monitor park activities especially how they are affecting (or not) sensitive sites, and to identify additional resources and protective measures.
RMP-S87	In collaboration with the Tribe, natural resource management plans regarding grazing, erosion, fire, remediation, and restoration and habitat efforts will be developed. It is often the case that natural management activities pose direct and indirect impacts to cultural and tribal resources.
RMP-S88	Educational materials and interpretive signage will be developed to inform the public of the cultural landscape, archaeological sites, tribal resources, California Public Resource Code (PRC) 5097, and ongoing preservation measures within the Park.

Cultural Resources	
RMP-S89	Areas of documented cultural and tribal resources sensitivity or confidentiality will be closed to the public. New trails, roads, and other infrastructure will be located to avoid sensitive resources by distance, natural physical barriers, exclusionary fencing and capping of the resource. Existing park infrastructure located near archeological resource will be monitored and existing barriers will remain in place or be enhanced to protect the resource as necessary. A sensitive sites Monitoring Plan will be developed in collaboration with the Tribe and additional measures of protection maybe considered as necessary including enhancement of exclusionary fencing, field camera monitoring, and capping (covering with soil or gravel) for protection of sensitive sites.
RMP-S90	Avoidance or setback standards for cultural and tribal resources will be maintained and adapted as necessary to best protect from park activities potential direct and indirect impacts. To protect resources, minimum setback standards shall be adhered to where feasible. The Setback Standards and Guidelines Table on page 164 summarizes the suggested minimum setbacks for the Park's cultural and tribal resources.
RMP-S91	Avoidance measures, such as distance from resource, physical barriers (fencing and signage), capping of archaeological sites, and onsite monitoring including the use of field cameras, will be implemented for cultural and tribal resources and include temporary and long-term measures.
RMP-S92	In collaboration with the Tribe project-specific development will be reviewed and assessed on a case-by-case basis for impacts to cultural and tribal resources. If deemed an impact to resources, avoidance or mitigation measures will be adopted. This review process may include surveys prior to and following construction, vegetation clearance, demolition, and fire in areas with known resources in the vicinity of cultural sensitivity.
RMP-S93	Park staff, volunteers, and contractors will be aware of the potential for encountering cultural and tribal resources within the Park and will be trained on the appropriate communication and discovery protocols.
RMP-S94	Chemicals and contaminants such as gasoline, motor oil, herbicides, solvents, and paints to the greatest extent feasible will not be used within native plant gathering areas or traditional gathering areas.
RMP-S95	Define and provide access for the Tribe to sacred sites, plant gathering areas, and tribal resources within the Park and develop a policy to support native traditional gathering areas and management of those areas for culturally important plants.
RMP-S96	Collection and curation policies shall clearly define procedures for identifying, handling, and storing archaeological materials, artifacts, human remains, and/or items of cultural significance, including final disposition and repatriation.

Proposed Habitat Restoration and Enhancement Activities

Overview

Restoration and enhancement activities will provide increased habitat quality, reduce sediment and nutrient runoff, maintain and increase water quality, and possibly buffer effects from climate change. Additionally, habitat restoration and enhancement activities are intended to meet mitigation requirements for impacts associated with infrastructure development and maintenance. Any park implementation actions affecting stream crossings with require Streambed Alteration Agreements, and will most likely require mitigation actions for approval; restoration and enhancement areas will most likely serve for such mitigation.

Several areas have been targeted within the Park that offer potential restoration and enhancement

opportunities; however, specific restoration and habitat plans will be developed to include localized conditions. Restoration and enhancement activities proposed here focus on wetlands, streams and associated riparian habitats, oak woodlands, and native grasslands and wildflower fields. Table 6-2 summarizes the acreage of restoration areas, which are illustrated in Figure 6-6. Potential impacts vary with habitat type and potential restoration activity and will be analyzed to comply with CEQA.

Table 6-2 Summary of Proposed Habitat Restoration and Enhancement Areas

Restoration and Enhancement Areas	Acreage*
Wetland and Tolay Lake	584
Stream and Riparian Habitat & Oak Woodland Habitat	335
Native Grassland and Wildflower Fields	190

**The restoration and enhancement activities will occur within these areas, but the entire area will not be restored/ enhanced.*

Wetland and Tolay Lake

Restoration and enhancement activities are proposed for Tolay Lake, the dominant aquatic feature of the Park. Several alternative restoration scenarios have been developed for the lake, resulting in 215-foot elevation static water line alternative being the preferred (WRA 2014). The restoration calls for the removal or replacement of four culverts located at the Causeway, Horseshoe, West Causeway, and North Creek Bypass that are undersized, and/or severely damaged and are contributing to flooding. The channel at the Farm Bridge is to be widened with removal and/or replacement of a free span bridge (WRA 2014). To accommodate new culverts, the Causeway will need to be elevated by five feet.

In addition to culvert and channel improvements, the drainage channels within and adjacent to the lake should be filled to more naturally mimic the historic lake system. The grassland east of the lake would be restored to wet meadow (seasonal wetland), largely from the filling of the drainage channel thereby increasing the localized hydrology of the area.

Potential wetland restoration and enhancement activities include reshaping upstream head-cuts, invasive and non-native species control, and native species plantings. Areas targeted for head-cut restoration would include laying back the active cut by mechanical means. For relatively small head-cuts, hand tools can be used to re-contour the cut to more closely match the overall run of the slope, whereas for larger head-cuts heavy equipment will be necessary to re-contouring. Concurrent with the re-contouring could be the inclusion of check dams built of stone and native brush, and/or willow stakes to slow the velocity of flowing water, capture sediment and nutrients, and rebuild soil. Invasive and non-native species would be managed and native species planted in the re-contoured head-cut.

Because the re-contouring of head-cuts would likely occur at the head of wetlands or ephemeral streams, this restoration activity would be considered an impact to potentially jurisdictional features and therefore would require wetland delineation and appropriate permits. Indirect impacts could include increased invasive species, sediment migration, and nutrient runoff; therefore, efforts to establish vegetation and soil stability are critical for success.

Wetland restoration and enhancement plans for specific areas within the Park have not been developed. Developing additional more detailed habitat mitigation and monitoring plans will be necessary to conduct restoration activities that involve direct impacts to wetland habitat.

Stream and Riparian

Potential stream and riparian habitat restoration and enhancement activities will include reshaping the banks of upstream head-cuts, reshaping stream banks, in-stream woody debris, check dams on

ephemeral streams, native riparian species plantings, and invasive species eradication and control. Head-cut restoration and check dams will be the same as that for wetland habitat. In deeply incised channels, particularly along stretches of Tolay Creek, laying back the banks to create floodplain terraces will effectively raise the channel and slow waters. The floodplain terraces would provide surfaces for native riparian species planting. The installation of large woody debris in-channels is intended to reduce the energy of flowing waters and provide pools and shading for aquatic organisms. In areas of dense Himalayan blackberry infestations, concerted efforts to eradicate this invasive species should occur, followed by planting with native riparian species.

All in-channel work would be considered an impact under the Clean Water Act and California Fish and Game Code, and would therefore require a delineation of wetlands and non-wetland waters along with appropriate permit applications. Other direct and indirect impacts could include increased invasive species, sediment migration, nutrient runoff, and nesting birds.

Stream and riparian habitat restoration and enhancement plans for specific areas within the Park have not been developed. Detailed engineering plans and site specific investigation, along with habitat mitigation and monitoring plans, would be necessary to conduct restoration activities that involve direct impacts to stream and riparian habitat.

Native Grassland and Wildflower Field

Potential native grassland and wildflower field restoration and enhancement activities will include mechanical removal of invasive species, native species seeding and planting, grazing enclosures and exclusions, and possibly prescribed fire. Ground-breaking activities are unforeseeable in restoration activities in these herbaceous habitats. Specific invasive species management depends upon the location, extent, and species of the infestation.

The land will be adaptively managed to best provide native species protection and enhancement. Areas may be targeted for grazing enclosures, where livestock are “penned” in relatively small areas for specified periods in the year for high intensity grazing to reduce invasive and non-native species thatch. Livestock will be excluded as needed from targeted areas to allow for the establishment of native species plantings and seedlings.

Prescribed fire should be considered as a restoration and enhancement tool for these herbaceous communities. Fire can dramatically reduce thatch build up from non-native annual grasses and provide an immediate pulse of macronutrients. The creation of bare ground in post-fire event provides a ready seed bed for native species seeding and planting.

Direct impacts to sensitive resources should be readily avoidable with these enhancement activities. However, indirect impacts may result from restoration of native grasslands and wildflower fields. High intensity grazing can exacerbate soil compaction decreasing soil fertility and increase soil erosion potential. Opening areas of bare ground from prescribed burning can lead to soil erosion and provide a ready site for invasive species infestations.

Adaptive Management

Adaptive Monitoring and Management

Species population, distribution, and the natural communities upon which they depend will change over time with inter-annual variation in climate, wildfire, regional population dynamics, management and use of the Park, among other natural perturbations. Changes in visitor use, livestock management, fiscal constraints, and other human decisions will affect the prehistoric archeological sites and natural resources within the Park. Monitoring will be critical to inform when and how impacts, restoration efforts, and local effects of larger ecological processes are affecting the health and quality of natural

resources; and how public access and park land management uses might adversely be affecting cultural resources. Narrowing the scope of what resources to monitor, when, and how often is necessary to control costs and to accomplish the most critical park management goals. Table 6-3 outlines the monitoring guidelines that are the most informative to Tolay Park managers, allowing them to make crucial decisions. Labor and fiscal resources may dictate which monitoring tasks are prioritized. Schedules and success criteria are included where appropriate. Table 6-4 provides an annual monitoring timeline.

Adaptive Monitoring and Management	
RMP-O53	Monitor park visitation effects on pre-historic archaeological sites and natural communities and adjust management activities to meet new use demands, reinforce cultural resource protections, changes in habitat, discovery of new species, and other unpredictable changes within the Park.
RMP-G57	Monitoring resources should occur at regular intervals, varying by resource type. Monitoring results should be analyzed to determine if management strategies are performing well or if changes are necessary.
RMP-S97	Monitoring schedules for natural and cultural resources are outlined in Table 6-3 and 6-4.

Effects of Climate Change

It is universally accepted throughout the scientific community that climate change is being exacerbated by human activity. Probable effects of climate change include increased heat waves, extended drought, and less frequent, higher intensity storms (Pew 2013). Modeling for California suggests that climate change effects will decrease Sierran and Cascadian snowpacks, cause a rise in sea level, increase the duration and intensity of heat waves, increase critically dry years (annual drought), and increase wildfires (Karl et al. 2009, Luers et al. 2006). Rises in ocean temperature may affect fog and precipitation, but it's unclear if precipitation will increase, decrease, or remain overall the same but with changes in timing.

In addition to changes in the physical environment, changes in species distribution and phenology have been repeatedly reported throughout the world. It is uncertain how climate change will impact Sonoma County's vegetation communities, wildlife species, hydrologic cycle, nutrient cycle, and other elements of the ecosystem. Therefore, it is important for land managers to plan for conservation benefits that will provide habitats with the resiliency to buffer the effects of climate change uncertainty. (Malcolm and Pitelka 2000, Walther et al. 2002)

Today the pace of environmental change may detrimentally affect cultural resources. The soil disturbing effects of erosion, rainfall, droughts, sea level rise, rise in sea temperatures and extreme weather patterns may destroy sacred sites. Traditional ceremonies and ways of interacting with nature may be prevented because of industrial society's intervention in the climate process possibly causing artifacts to become exposed providing additional opportunity for the general public to find, remove sacred items exposed by more extreme 'natural' events. Adaptive management strategies will be employed to protect cultural resources to the greatest extent feasible.

Regional Parks in collaboration with the Tribe understands the importance of these resources to the long-term health of Tribal members and will work to develop policies and methods for their preservation and for future generations of Tribal members. The formation of new public and Tribal policies for the protection of cultural resources from destruction due to climate change is of critical importance to the Tribe.

Due to the uncertainty of climate change, developing monitoring and management strategies to measure and evaluate changes within the Park will provide land managers the ability to respond effectively. Park staff will integrate best management practices, grazing techniques, natural resource

enhancement, and cultural resource protections to cost effectively manage the land. Adaptive management encourages the continual incorporation of the most recent research and strategies for land management, and the general principles of adaptive management should be incorporated into the resource management plan.

Climate Change Objectives, Guidelines, and Standards	
RMP-O54	Preserve and enhance habitat connectivity and wildlife corridors. The Park provides a valuable pathway for the movement of terrestrial wildlife between the Petaluma and Sonoma valleys. Tolay Lake and other large seasonal wetlands and stock ponds provide foraging and cover habitat for migratory birds including several species of waterfowl. The elevation gradient from nearly sea level to over 700 feet may provide available niches for vegetation communities. Riparian areas and woodlands provide shading, cover, and corridors for wildlife movement.
RMP-O55	Protect native biodiversity. Plant and wildlife populations with higher genetic diversity tend to be more resilient to disturbance and habitat modifications. In the face of potential climage chage, protecting the genetic diversity of the park's existing native populations from inbreeding depression and mal-adaptation will maintain or increase tese species' ability to successfully adapt to the effects of a changing climate.
RMP-O56	Protect water resources. Water resources for wildlife, plants, livestock, and human uses will likely be stressed with the projected increase in high temperatures, frequency of drought, and fewer storms to replenish surface and near surface waters. Amphibians, fish, and other aquatic organisms dependent upon cool surface waters for successful completion of their life-cycle may be negatively affected by increased water temperature. The protection and enhancement of riparian vegetation should assist in cooling waters through greater infiltration and direct shading.
RMP-O57	Protect prehistoric archaeological sites. Collaborative with the Tribe to monitor and maintain a developed protection plan to protect the parks sacred sites. Periodically review and evaluate approaches, monitoring and management methods in the protection of cultural resources.
RMP-O58	Manage adaptively and collaboratively. It is impossible to determine the effects that climate change will have on resources, and therefore it will be necessary to periodically review and evaluate the monitoring approaches and management methods including the guidelines and standards. The continued collaboration between Regional Parks and the Tribe and developing partnerships and working relationships with neighbors, resource agencies, and other municipal departments will be essential to effective management of the Park.
RMP-G58	All natural habitats should be preserved and enhanced within the Park to provide potential refugia for native species, maintain the diversity of plant functional groups (i.e., hydrophytes, annuals, perennials), and rely on diverse planting/seeding plants to achieve a higher native diversity and avoid native monocultures.
RMP-G59	Wetlands and their native vegetation should be preserved and enhanced to maintain their water quality, and water and soil retention functions.
RMP-G60	Prehistoric archaeological sites will be protected to the greatest extent feasible. Protection practices and monitoring will be evaluated and assessed at regular intervals and adapted as necessary to most effectively protect sacred cultural resources.
RMP-G61	Native species restoration and enhancement should be from locally sourced seed and plant propagules from a variety of elevations, topographic gradients, and hydrologic regimes to maintain local genetic diversity while providing for robust populations potentially adaptable to changing conditions in the physical environment.
RMP-G62	Natural habitat extent and species composition should be monitored over time to detect changes. The use of LIDAR, aerial imagery, and ground surveys can serve as a useful method to determine these changes. Keystone species such as oaks and native perennial hydrophytes should be a focus of monitoring to determine their regeneration rate and health.

Climate Change Objectives, Guidelines, and Standards	
RMP-G63	The Park will engage with a variety of partners, including: the Tribe, neighboring landowners, other County departments, resource agencies, conservation districts, and the scientific community to share information and develop cooperative management strategies for mitigating effects of climate change at local and regional scales.
RMP-S98	Habitat fragmentation will be minimized to allow for the exchange and migration of species and maintain genetic diversity. Trails and roads will be planned to minimize the impacts of fragmentation on species and habitats.
RMP-S99	Riparian buffers and stream channel integrity will be maintained to ensure water quality, reduce erosion, and water cooling.
RMP-S100	Avoidance and protection measures of sacred sites will be included throughout park development and park operations.

Monitoring Methods

Several monitoring tasks will be essential to assessing and measuring the effectiveness of Park management during and following the initial development phase of the Park. Monitoring will allow park staff to detect changes in natural and cultural resources in a period sufficient to adapt management strategies to successfully preserve these resources. Monitoring methods should be developed specifically for the type of resource that is being monitored to cost effectively capture detailed information to make necessary resource management changes. The following are guidelines and standards for the monitoring of the several resources and project activities associated with the Park.

Monitoring Methods Guidelines and Standards	
RMP-G64	A series of photographs from fixed location can be a cost effective and simple method for monitoring phenomena through time such as the progress of restoration efforts, protective strategies, expansion/contraction of invasive species, erosion, or migration of a head-cut. Pre-selected photo-points should be established throughout the Park to document natural and cultural resource sites through time.
RMP-S101	Multiple photo-points will be established throughout the park (e.g., non-native grassland, rare plants). The multiple points will capture different landscape positions, aspects, elevations, etc. for the cultural sites and various natural resource locations (e.g., a point each for non-native grasslands situated on ridgelines, situated on downslopes, and situated on the valley bottom). Each point will have a unique identifier which would summarize the date of establishment, resource type, and direction of photo. For instance, a photo-point representing non-native grassland (NNG), shot in the direction of 90 degrees, and established in 2015 could read, “PP1-NNG-90-2015”. Photo-points will have a GPS point or other survey indicator and placed on a map for future reference.
RMP-S102	Photo-points will be established for new discoveries or management activities, such a new discovery of prehistoric artifacts, special-status plant population, infestation of invasive species, and restoration projects.

NATURAL RESOURCES

Each of the Park’s existing sensitive natural resources should be monitored periodically to evaluate the effectiveness of park management.

Natural Resources Monitoring Guidelines and Standards	
RMP-G65	Monitoring plans for the Park’s natural resources should be developed to evaluate the health of each of the Park’s natural resources. Monitoring should rely on quantitative sampling techniques, but in some cases, qualitative metrics may be sufficient.

Natural Resources Monitoring Guidelines and Standards	
RMP-G66	Monitoring methods should be thorough enough to gather the data necessary to evaluate park management and effects on natural resources, rapid enough to be cost effective, and accessible to trained volunteers.
RMP-G67	Trained volunteers can cost effectively assist park staff with monitoring requirements. Volunteers should be trained by a qualified biologist through a developed training program.
RMP-S103	Monitoring will be repeatable, and, when appropriate, quantitative.
RMP-S104	Monitoring will be performed on a scheduled basis (Table 6-3).
RMP-S105	Monitoring methods will follow or be adapted from published guidelines established by regulatory agencies, land managers, and/or the academic community. Examples include: ○ Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines (Corps 2015). ○ California Native Plant Society Releve Protocol (CNPS 2003). ○ CNPS / CDFW Protocol for Combined Vegetation Rapid Assessment and Releve Sampling Field Form (CDFW 2014). ○ Monitoring Annual Grassland Residual Dry Matter (Guenther and Hayes 2008).
RMP-S106	Monitoring locations will be fixed, documented with GPS or other survey, and placed on maps. Should monitoring locations be moved, the relocation efforts will be documented and assigned a new designation.
RMP-S107	Monitoring will be seasonally appropriate to capture the necessary information (e.g., bloom time, nesting/roosting season) to evaluate management and make adjustments (if necessary).

CULTURAL RESOURCES

Existing cultural resources within the Park should be monitored periodically to evaluate the effectiveness of park management.

Cultural Resources Monitoring Guidelines and Standards	
RMP-O59	Monitor cultural and tribal resources on a regular and/or periodic basis to assess site conditions and prevent impacts to sacred sites within the Park. The Park is a popular attraction for recreationalists and ongoing restoration efforts. Archaeological surveys and studies have been performed in the Park that have identified a rich diversity and quantity of cultural resources situated near waterways, vegetated areas, and existing trails. Updated site observations and detailed documentation will be synthesized into a summary that includes recommendations and further actions, as necessary.
RMP-S108	A monitoring program will be developed and implemented for both the condition assessment of cultural and tribal resources within the Park and the prevention of damage to resources. Depending on the location, sensitivity, and existing conditions, monitoring will occur on an annual or periodic basis and include photo documentation and detailed notes (i.e., monitoring assessment forms and maps). Motion sensor cameras may be used as part of the monitoring program. Adaptive management policy using this tool may be employed. This information will serve as baseline data and continue to be updated by tribal and archaeological monitors and managed by the Park on a regular basis.
RMP-S109	A comprehensive inventory of cultural and tribal resources located within the Park, including maps depicting site boundaries and sensitive areas will be updated and maintained by park staff in collaboration with the Tribe to effectively manage and protect these resources.

HABITAT RESTORATION AND ENHANCEMENT ACTIVITIES

The habitat restoration and enhancement areas should be monitored on a periodic basis to evaluate the success the restoration and enhancement efforts.

Habitat Restoration and Enhancement Activities Monitoring Guidelines and Standards	
RMP-G68	Monitoring methods should be thorough enough to gather the data necessary to evaluate cost effective park management. Because restoration and enhancement monitoring may be tied to performance criteria agreed upon with regulatory agencies, qualified biologists should perform the monitoring.
RMP-S110	Monitoring will be repeatable, and, typically, quantitative.
RMP-S111	Monitoring will be performed on a scheduled basis. If the monitoring is tied to a permitted activity, it is likely that it will be required annually.
RMP-S112	For permitted activities, monitoring methods will follow regulatory guidelines or as set forth in the permit. For instance, wetland mitigation monitoring will likely require the following: ○ Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines (Corps 2015).
RMP-S113	Monitoring locations will be fixed, documented with GPS or other survey, and placed on maps. Should monitoring locations be moved, the relocation efforts will be documented and assigned a new designation.
RMP-S114	Monitoring will be seasonally appropriate to capture the necessary information (e.g., bloom time, nesting/roosting season) to evaluate the success of restoration.

Performance Criteria

Performance or success criteria are metrics through which management effectiveness is evaluated. For non-permitted monitoring activities, performance criteria should be evaluated through the objectives outlined in this plan for the given natural or cultural resource. For permitted monitoring activities (e.g., wetland mitigation), success criteria will likely be written into the conditions of the regulatory permit, and will have a term limit in which the mitigated resource will have to meet an agreed upon threshold of success.

If any of the criteria are not met or are underperforming, in-depth monitoring or studies may be necessary to reevaluate management techniques and contingency measures implemented. It may be determined that the monitoring methods are insufficient to evaluate management effectiveness, and may need to be amended to better evaluate performance. Many of the objectives for resources are overlapping and as such do not require separate monitoring methods and timing; however, performance criteria for given resource may vary.

Reference Sites

Reference sites are areas that contain similar physical site conditions (e.g., elevation, slope, aspect) as the monitoring site, but have higher functionality, more complex structure, and/or greater diversity. To gauge the performance of restoration and enhancement areas as well as provide a template for restoration, reference sites should be established within the Park. Reference sites should be of relatively high quality habitat and be positioned on similar soils, topographic positions, and location within the watershed to be an appropriate indicator of the restoration's success. Reference sites should be established during baseline monitoring for the given restoration and/or enhancement project. Selecting reference sites at the time of restoration activities will allow the monitors to select sites that are relatively close to the restoration area to capture analogous physical conditions and reduce time spent travelling between the reference sites and restoration areas. In the instance of scheduled temporary impacts to a resource, the pre-project condition may serve as the reference site.

Monitoring Schedule

Timing and frequency of monitoring is dependent upon the resource or management. Some resources will be monitored on an annual basis (e.g., effects and effectiveness of livestock grazing), while others may need only be monitored every few years (e.g., blue gum and Monterey cypress seedlings). Table 6-3 is the monitoring schedule for the Park with resource to be monitored, seasonal timing, annual frequency, and responsible parties.

Reporting

An annual report summarizing monitoring results and recommendations will be drafted and recorded with the Sonoma County Regional Parks. Because monitoring of certain resources will not occur each year, reporting may not include information regarding all of the resources in a given year. However, the report should be standardized with chapter headings for each of the resources and management activities monitored irrespective if they were scheduled to be monitored that year. The report should review the resource management plan success criteria outlined for each of that year's monitoring obligation and evaluate if they are being met. Should the results suggest that the success criteria are not being met or if a particular resource is faltering, recommendations for changing the management should be determined and implemented. If the monitoring proves insufficient to properly evaluate a resource with the established success criteria, then the monitoring methods may need to be altered to more effectively assess the health/protection of the resources.

In the instance that monitoring is conducted for permitted activities (e.g., wetland mitigation), annual reporting will be required for the permit-issuing regulatory agency (-ies). Typically, monitoring and reporting will be annual for a five-year term, but may be more or less depending on the condition of approval.

Table 6-3 Long-Term Monitoring of Natural Resources Tasks

Focus	Monitoring Task	Questions to Address	Monitoring Method	Frequency*	Recommended Response	Notes
Habitats & Native Plants	Erosion and contaminant drift	Is Park infrastructure creating erosion or other deleterious effects? Are herbicides, other chemicals, migrating from storage locations or approved handling?	Qualitative: Routine patrols should be able to capture this information. Particular focus around Park Complex and immediately adjacent habitats, as well as areas of Park maintenance.	Annual	If erosion is posing deleterious effects, remediate erosion source. Permitting may be necessary in wetlands or other sensitive habitats. If habitats are negatively affected by exposure to chemical contaminants, remediate damage and prevent point-source pollution. If not a point-source or source off-site, immediately develop a plan and strategy to evaluate and remediate activities.	
	Head-cut monitoring	Is the head-cut moving? Is sediment migrating into channel? Is it threatening cultural resources, habitat, species, roads, trails, or other park infrastructure? Is it likely to cause deleterious downstream effects?	Qualitative & Quantitative: Install markers on upslope side of head-cuts, measure distance. Visually survey head-cut and immediate downstream channel, repeat photographs and tracking datasheets.	Annual; pre- and post-wet season	If head-cuts are migrating upslope, develop and implement prevent plan with qualified restoration professionals.	
	Fuel-load monitoring & reduction	Does the volume of downed woody debris pose a fire hazard?	Qualitative: Walk-through blue gum groves visually estimating downed woody debris and leaf litter. Removal shall be conducted by hand, hand-mechanized tools, and medium equipment.	Every 5 years	If downed woody debris and leaf litter approach dangerous levels, hand remove debris.	
	Natural regeneration of native plants	Are native species regenerating, particularly oaks and shrub saplings?	Quantitative: Tree counts by age class in selected areas of woodland. Comparison of areas on the basis of factors such as high and low grazing pressure, high and low native species dominance, may be useful. For larger populations, mapping by GPS or aerial photographs to track the extent of regeneration.	Every 5 years	If regeneration is low or non-existent, analysis to understand cause (e.g., SOD, trampling, grazing, browsing, Park use). Develop plan to protect existing regeneration and provide for targeted regeneration areas.	
	Regeneration of native plants integral to Native American traditional cultural practices	Are species significant to traditional Native American practices regenerating	Quantitative: Tree counts, vegetation sampling, GPS mapping and photographic tracking. Compare and contrast species and area regeneration and the pressures of grazing, disease, public access, collection practices, etc.	Every 5 years	If regeneration is low or non-existent, analysis to understand cause (e.g. grazing, browsing, public access, disease). Develop plan to protect existing populations and regeneration and target regeneration areas and land management strategies.	
	Restoration actions of native plants	Are restoration efforts successful? What additional efforts are needed?	Quantitative: As given in specified restoration plans: survival counts, cover estimates, plant health, species composition, and photo monitoring.	Annual; up to 5 years following restoration actions	If success is low, follow with analysis; contingency measures should be built into restoration plans. Implement contingency measures; further actions (e.g., irrigation, change of species plantings) may be warranted.	

Table 6-3 Long-Term Monitoring of Natural Resources Tasks

Focus	Monitoring Task	Questions to Address	Monitoring Method	Frequency*	Recommended Response	Notes
Native Wildlife	Population trend monitoring (Birds)	Are bird populations changing in the Park? Are there previously undocumented species observations? Do management actions need to occur to assist bird populations / habitat?	Qualitative & Quantitative: Update baseline information on bird relative abundance, species composition, habitat use, population size, and breeding status. Standardize area searches and point count protocols can be used for spatial and temporal comparisons. Monitoring efforts should be in coordination with volunteer groups (i.e., PWA, Audubon Society). Monitor trends in habitat condition.	Annual; 3-4 times a year	Inter-annual variations in species composition and populations to be expected. If populations appear to be in decline, analyze to determine if Park use or other management activities are contributing. Alter activities to ensure continued bird use within Park.	Continue collaboration with PWS for bird observations. Collaboration with Point Blue Conservation Science, Audubon Society and/or others for bird monitoring.
	Population trend monitoring (CRLF)	Is CRLF present in the Park? In which locations have they been detected? If so, is the population increasing, decreasing, or static? Do management actions need to occur to assist CRLF populations / habitat?	Qualitative & Quantitative: Baseline information should be collected to determine if species is present. If not, continued absence / presence surveys on regular basis. If located, information on population size, age class, reproductive rates, and survival. Monitor trends, habitat condition, impacts from Park use and livestock grazing. Assess effects of grazing and restoration activities on wetland and surrounding upland vegetation.	Annual; 2 survey windows a year	If CRLF are present, development specified management plan for occupied habitat. Pursue opportunities of reintroduction to Park. 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 high quality frog habitat.	
	Population trend monitoring (Bats)	Are built bat roosts occupied?	Qualitative: Visual surveys of built bat roosts for occupation and use.	Annual	If built roosts are occupied, they should be considered success. If they are not occupied, continued monitoring and/or relocation to encourage occupation.	Only required if bats are impacted during Park infrastructural development.

Table 6-3 Long-Term Monitoring of Natural Resources Tasks

Focus	Monitoring Task	Questions to Address	Monitoring Method	Frequency*	Recommended Response	Notes
Invasive Species & Pathogens	Invasive Plant Monitoring	Are there new populations of invasive plants? Are existing populations expanding, contracting, or static? Do management actions need to occur to control invasive plant spread?	Quantitative: Collect baseline data using GPS and hand-mapping of all target invasive plants' populations. (Alternatively use LSA 2009 mapped invasive plants as a baseline). Repeat annual mapping efforts to determine changes in population.	Annual; spring-summer	If existing populations expand or if new populations are documented, control and/or eradication methods implemented.	Last mapping effort occurred in 2009. Increases in invasive species populations should be accounted for in a new baseline.
	Invasive Plant Control/Eradication	Are invasive control or eradication methods successful? If not, what alternative control methods might be successful?	Quantitative: Focused monitoring in treatment areas pre- and post-treatment including density, abundance, and species composition. Evaluate treatment methods and refine or adapt.	Annual; spring-summer, as needed	If control and/or eradication methods have failed, try alternative methods. For new infestations, implemented new strategies based on best available information.	
	Invasive Aquatic Wildlife	Are invasive aquatic wildlife species occurring or overly abundant in the Park? Do management actions need to occur to control or eradicate invasive aquatic wildlife?	Qualitative: Visual surveys of potential CRLF habitats. Focus on American bullfrog and warm water fishes.	Annual; twice, June & July	In areas of occupied CRLF habitat (if CRLF are detected), removal of American bullfrog egg masses and/or warm water fishes.	
	Invasive Terrestrial Wildlife	Are invasive wildlife species occurring in the Park (e.g., feral pigs) or overly abundant (e.g., wild turkey)? Do management actions need to occur to control or eradicate invasive terrestrial wildlife?	Qualitative: Visual surveys throughout the Park. Documented observations of Park visitors and volunteers. Documented observations of neighbors.	Annual; every available opportunity when engaging with neighbors or Park visitors	If feral pigs enter the Park, apply for depredation permit with CDFW and develop eradication program. If wild turkey is deemed a deleterious to native habitats or species, a depredation permit with CDFW and removal may be warranted. A regional program with participating partner organizations and neighbors may be necessary for complete eradication.	Public relations will be important factor to educate public and ensure public safety should eradication methods be implemented.
	Sudden oak death monitoring	Is SOD present in the Park? If so, is SOD spreading? Is SOD posing a threat to existing oak trees and woodlands? Are there hazard trees from SOD kill?	Quantitative: Map trees with SOD symptoms. If necessary, laboratory analysis of samples to confirm presence of *Phytophthora ramorum*.	Every 5 years	If SOD is present and spreading, stricter sanitation methods may be necessary. "Quarantine" of SOD infected stands may be necessary with livestock and visitor exclusions.	Collaboration with UCANR Oak Woodland Management for recent information and management activities.

Table 6-3 Long-Term Monitoring of Natural Resources Tasks

Focus	Monitoring Task	Questions to Address	Monitoring Method	Frequency*	Recommended Response	Notes
Grazing & Park Use	Grazing effects monitoring	Is forage quality being sustained over time? Is grazing intensity too high or too low in native habitats? Are cultural resources surfacing or being damaged?	Qualitative & Quantitative: Observations by rancher and Park Staff of erosion, heavy use, infrastructure condition, and invasive plant spread. Collection of vegetation data from wetlands and grasslands.	Annual; ongoing	If grazing-tolerant or grazing-resistant species increase, altering grazing regime (i.e., intensity, timing) may be warranted. If native species cover and richness is declining in heavy to moderately grazed areas over those in lightly grazed areas, changes in grazing regime may warranted.	
	Residual Dry Matter (RDM) monitoring	Is RDM value within target range? If not, do management actions need to occur?	Quantitative & Qualitative: Standardized RDM methods, recommended visual estimates with a robel pole (Guenther and Hayes 2008) rather than clip-weigh method.	Annual; end of growing season before first rains (September or October)	If RDM levels are much higher than target, consider increased grazing, conversely for low RDM levels, consider reducing grazing. Pasture rotation and management should be considered to provide discrete management units.	
	Park use effects monitoring	Are park uses negatively affecting cultural and natural resources? If so, do management actions need to occur?	Quantitative & Qualitative: Observations by Park Staff, the Tribe, visitors, and volunteers on an ongoing basis throughout the Park. Methods may vary according to the resource and the Park use effect to be monitored (see Cultural & Natural Resources Guidelines and Standards).	Annual; on-going; in conjunction with other monitoring efforts.	Dependent upon impact type and resources being impacted. Alter Park use, trail decommissioning or realignment. Create potential (temporary) exclusion zones.	

**Refer to Table 6-4 for Monitoring Frequency*

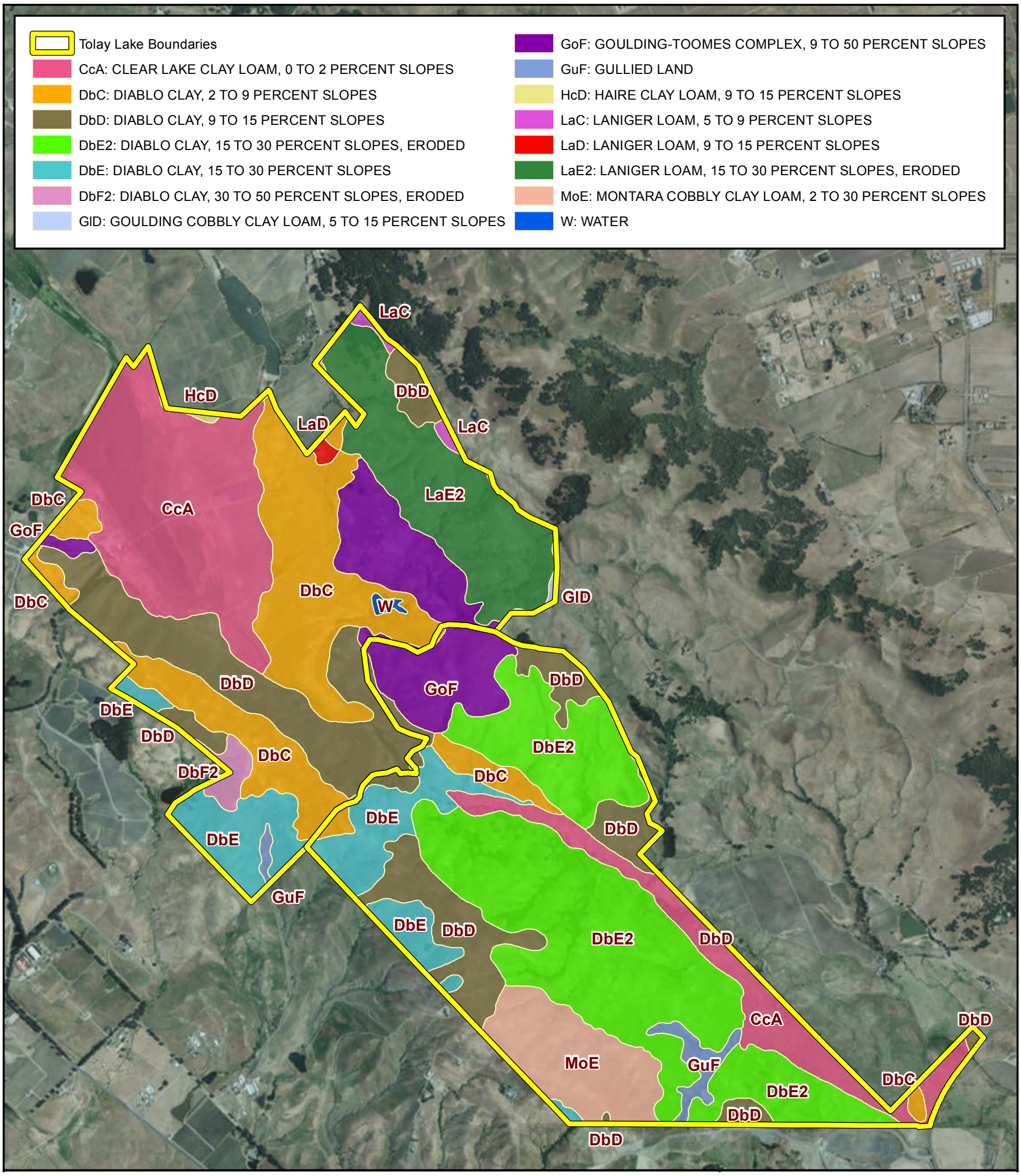
Table 6-4 Schedule for Long-Term Natural Resources Monitoring

Focus	Monitoring Task	Resource Type	Timing	Month (X's denote recommended monitoring)											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Habitats & Native Plants	Erosion, contaminant drift, litter, other anthropogenic effects	Developed & Disturbed Areas; areas of infrastructure improvements	Annual; as appropriate per management activity	X	X	X	X	X	X	X	X	X	X	X	X
	Head-cut monitoring	Streams & Riparian; Tolay Lake & Wetlands	Annual; beginning & end of wet season						X			X			
	Fuel-load monitoring & reduction	Blue Gum & Monterey Cypress Groves	Every 5 years									X	X		
	Natural regeneration of native plants	Woodlands; wetlands; native grasslands; wildflower fields	Every 5 years; during growing season				X	X	X	X					
	Restoration actions of native plants	All habitats where restoration activities have occurred	Annual; for 5 years (or more) following planting				X	X	X	X					
Native Wildlife	Population trend monitoring	Birds	Annual, 3-4 times; incorporative of volunteer efforts				X		X			X			X
		CRLF	Annual; 2-4 week intervals December-March; larval survey in May; evaluate after 5 years	X	X	X			X	X					X
		Bats	Annual					X	X	X	X				
Invasive Species & Pathogens	Invasive Plant Monitoring	All habitats	Annual; during appropriate blooming period			X	X	X	X	X					
	Invasive Plant Control/ Eradication	All habitats; areas of control efforts	Annual			X	X	X	X	X					
	Invasive Aquatic Wildlife	All aquatic habitats	Annual						X	X					
	Invasive Terrestrial Wildlife	All terrestrial habitats	Annual	X	X	X	X	X	X	X	X	X	X	X	X
	Sudden oak death monitoring	Woodlands	Every 5 years						X	X	X				
	Grazing effects monitoring	All habitats	Annual; ongoing	X	X	X	X	X	X	X	X	X	X	X	X
Grazing & Park Use	RDM monitoring	Grasslands, Wetlands	Annual; end of the growing season before the onset of rains									X	X		
	Park use effects monitoring	All habitats; areas of infrastructure improvements & maintenance	Annual; with other monitoring efforts and during routine patrols; ongoing	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-5 Schedule for Long-Term Cultural Resource Monitoring

Focus	Monitoring Task	Resource Type	Timing	Month (X's denote recommended monitoring)											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Erosion, contaminant drift, litter, other anthropogenic effects	Project level Developed & Disturbance; areas of infrastructure improvements	as appropriate per management activity	X	X	X	X	X	X	X	X	X	X	X	X
Known Prehistoric Archaeol-ogical Sites	Erosion and 'naturally' caused exposure of cultural resources	At sites near drainages, streams & riparian areas; Tolay Lake, Creek & Wetlands	Annual; end of wet season				X								
	Grazing practice caused exposure and damage of cultural resources	Site specific monitoring	Bi-annually				X					X			
	Public park use and access and possible collecting, damage, or exposure of cultural resources	Site specific monitoring	Bi-annually				X					X			

Tolay Lake Boundaries
CcA: CLEAR LAKE CLAY LOAM, 0 TO 2 PERCENT SLOPES
DbC: DIABLO CLAY, 2 TO 9 PERCENT SLOPES
DbD: DIABLO CLAY, 9 TO 15 PERCENT SLOPES
DbE2: DIABLO CLAY, 15 TO 30 PERCENT SLOPES, ERODED
DbE: DIABLO CLAY, 15 TO 30 PERCENT SLOPES
DbF2: DIABLO CLAY, 30 TO 50 PERCENT SLOPES, ERODED
GlD: GOULDING COBBLY CLAY LOAM, 5 TO 15 PERCENT SLOPES
GoF: GOULDING-TOOMES COMPLEX, 9 TO 50 PERCENT SLOPES
GuF: GULLIED LAND
HcD: HAIRE CLAY LOAM, 9 TO 15 PERCENT SLOPES
LaC: LANIGER LOAM, 5 TO 9 PERCENT SLOPES
LaD: LANIGER LOAM, 9 TO 15 PERCENT SLOPES
LaE2: LANIGER LOAM, 15 TO 30 PERCENT SLOPES, ERODED
MoE: MONTARA COBBLY CLAY LOAM, 2 TO 30 PERCENT SLOPES
W: WATER



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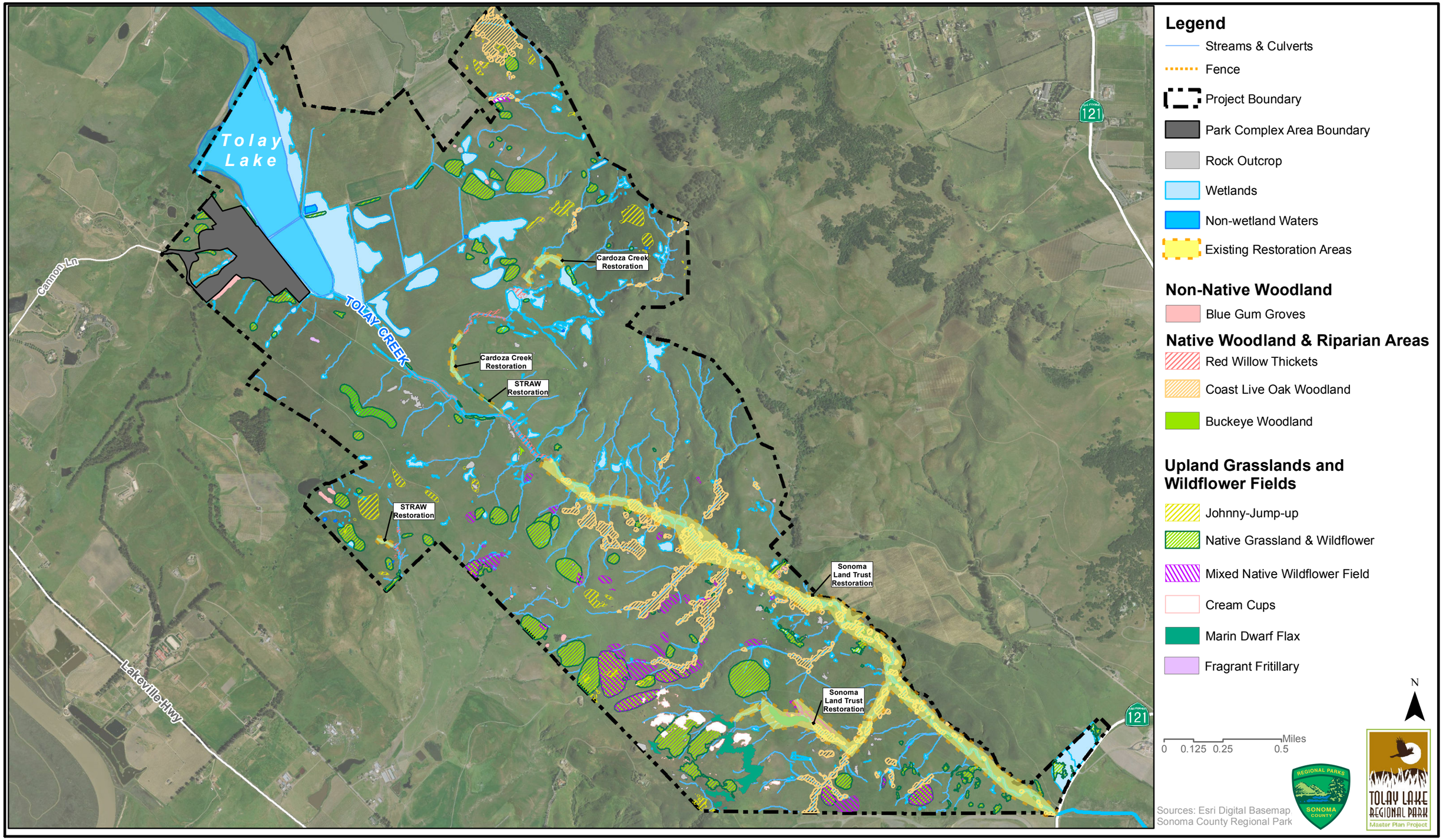
TOLAY LAKE REGIONAL PARK Master Plan Project

Figure 6-1
Soils



M I G Tolay Lake Regional Park Master Plan
Sonoma County, CA

Figure 6-2
Existing Restoration Areas and Biological Communities

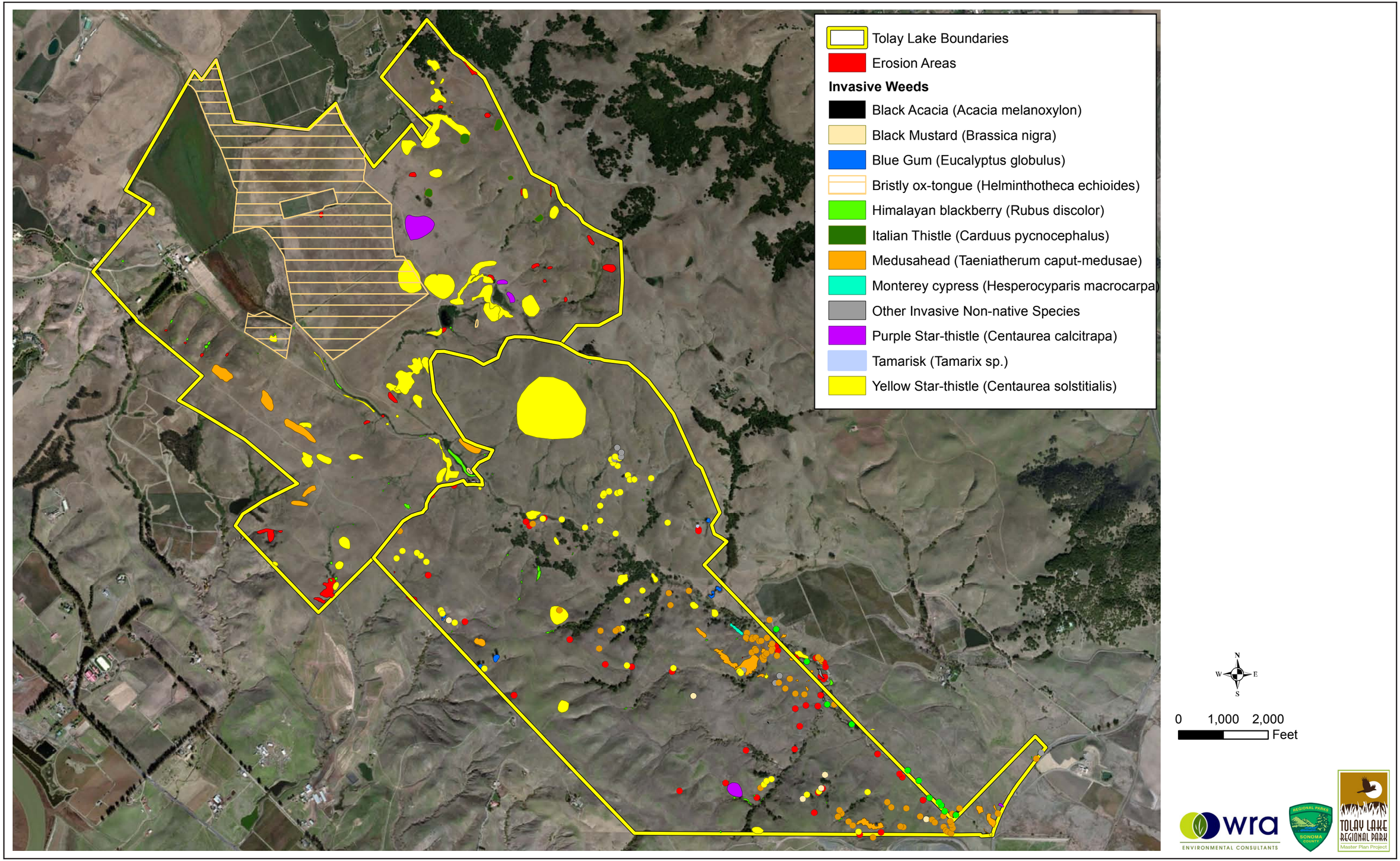
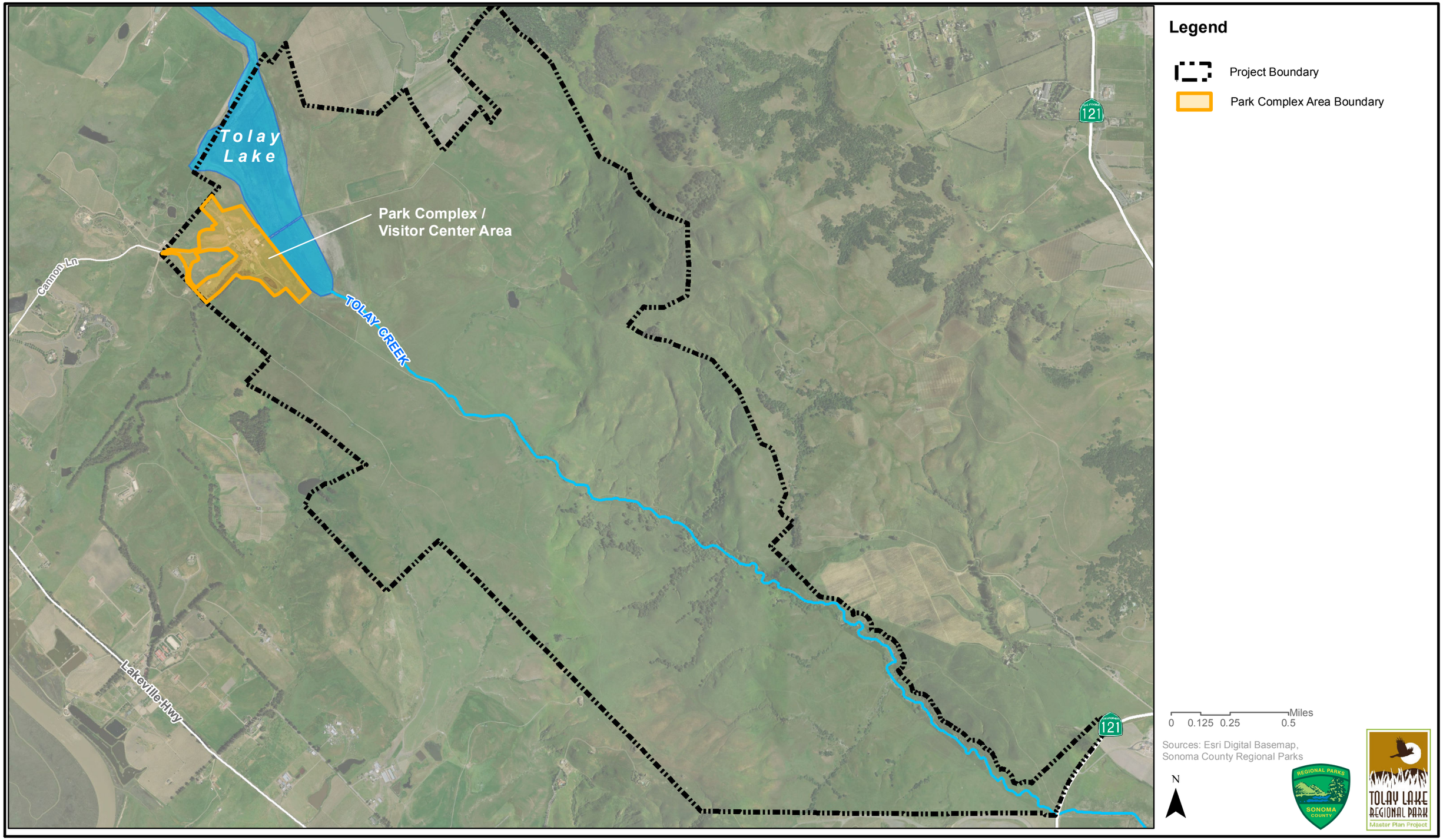
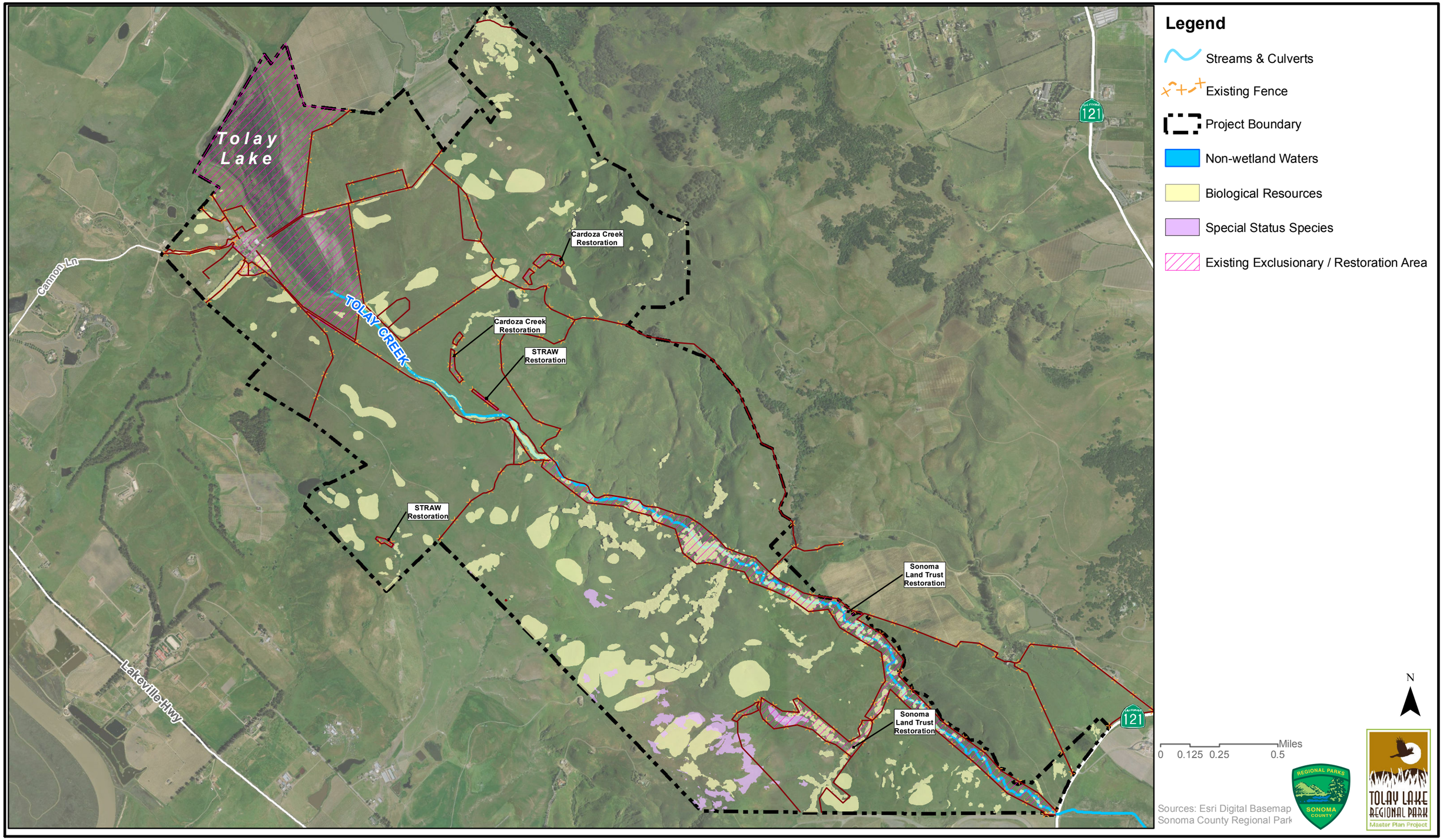


Figure 6-3
Invasive Species Occurrences



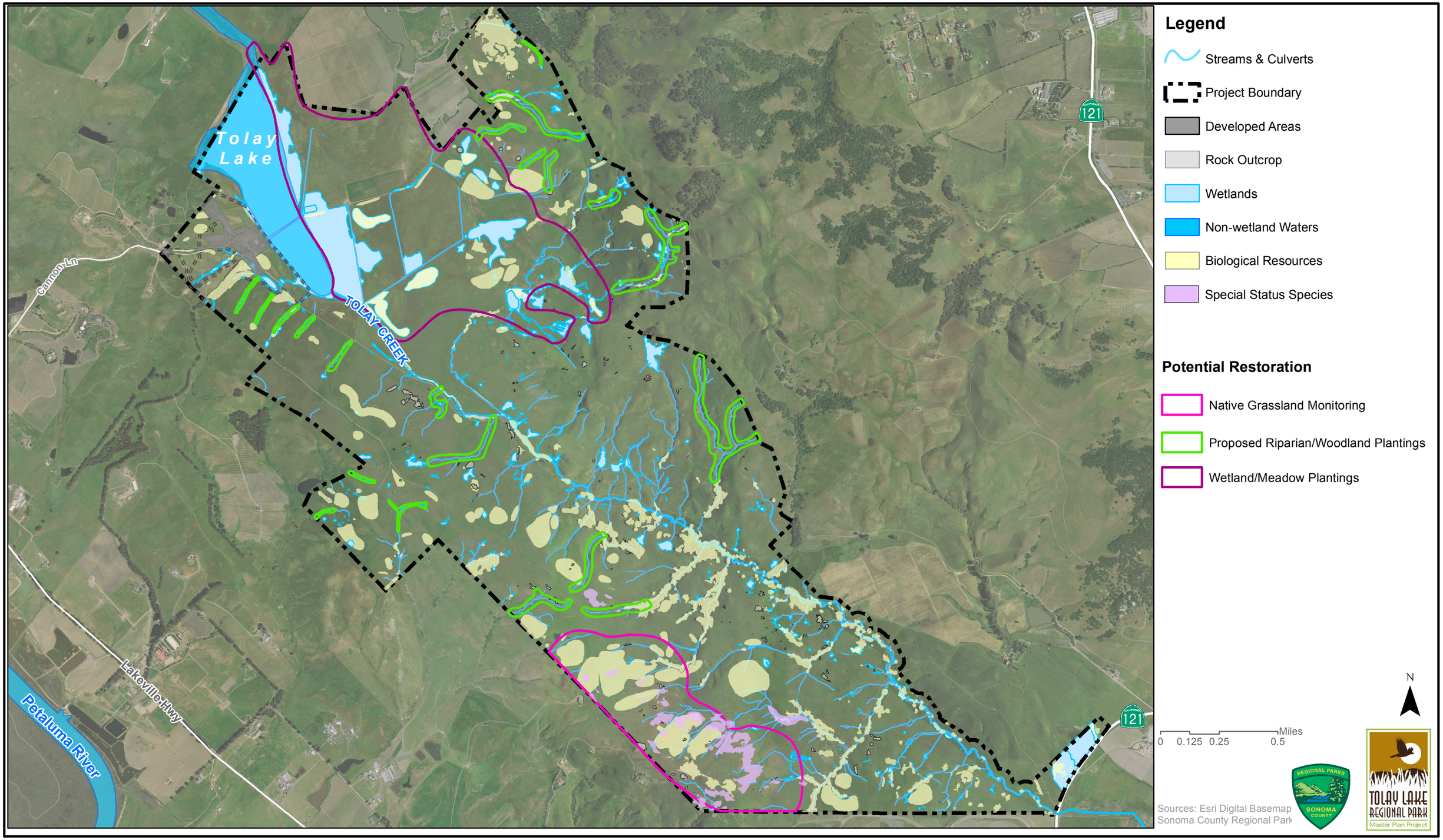
M I G Tolay Lake Regional Park Master Plan
Sonoma County, CA

Figure 6-4
Park Complex/Visitor Center Area



M I G Tolay Lake Regional Park Master Plan
Sonoma County, CA

Figure 6-5
Existing Grazing Infrastructure



MIG

Tolay Lake Regional Park Master Plan
Sonoma County, CA

Figure 6-6

Proposed Restoration Areas and Existing Biological Communities

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