# BIOLOGICAL RESOURCES STUDY
# TOLAY CREEK RANCH
## SONOMA COUNTY, CALIFORNIA

Submitted to:

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# 1.0 INTRODUCTION

## 1.1 PURPOSE

Tolay Creek Ranch is 1,657 acres and provides a connection between the Cougar Mountain Open Space Easement and Tolay Lake Regional Park. The Sonoma Land Trust commissioned LSA Associates Inc. (LSA) to provide a description of the biological resources of Tolay Creek Ranch. This report provides a detailed discussion and mapping of the vegetation and wildlife values. Management strategies, including weed removal and restoration, are also discussed. The report begins by discussing the setting of Tolay Creek Ranch including its physical characteristics such as topography, geology, soils, and hydrology. LSA also prepared a parallel study of the cultural resources of Tolay Creek Ranch (LSA 2009).

## 1.2 LOCATION

Tolay Creek Ranch is located on the west side of California State Highway 121, approximately 8 miles south of the city of Sonoma, 7 miles southeast of the city of Petaluma, and 6 miles northeast of the city of Novato, in unincorporated southern Sonoma County, California (Figure 1). Infineon Raceway is immediately to the south of the eastern portion of Tolay Creek Ranch. Direct access to Tolay Creek Ranch is from a gated dirt ranch road (Access Road) intersecting with Highway 121. Other access is available from the Sears Point to Lakeville Road (Mangel Ranch Road) off Highway 121 (Figure 2). Access is also available, with prior permission, through Tolay Lake Regional Park.

## 1.3 BACKGROUND

Tolay Creek Ranch was acquired from the Roche family in 2008 because of its biological and cultural values and because it provides a key connecting parcel among the adjacent protected lands (SCAPOSD 2006, 2007). Tolay Creek Ranch protects natural and cultural resources, provides important open space, public recreational, and educational opportunities, and preserves the scenic viewshed along Highway 121 (John Bouyea & Associates 2007). Acquisition of Tolay Creek Ranch realized goals and recommendations of thirteen local, regional, state, and federal plans (SCAPOSD 2006). It provides connectivity with the recently acquired 1,737-acre Tolay Lake Regional Park and through the Cougar Mountain open space easement, Sonoma Land Trust' Sears Point Restoration Project (Figure 3). Tolay Creek Ranch is part of the interconnected preserved open space that includes the California Department of Fish and Game's (CDFG) lands including the Napa-Sonoma Marshes Wildlife Area and the U.S. Fish and Wildlife Service's San Pablo Bay National Wildlife Refuge. These parcels contribute significantly to the sustainability of adjacent conservation efforts (Sonoma Land Trust 2007). Together, the protected land makes up a mosaic of over 21,000 acres, including the following nearby properties: Flocchini Ranch, Sleepy Hollow Dairy, Dickson Ranch, Cougar Mountain (open space easement held by Sonoma County), Tolay Lake Regional Park, Sonoma Land Trust's 2,327-acre Sears Point Restoration Project, and the San Pablo Bay National Wildlife Refuge. The entire watershed of the lower portion of Tolay Creek downstream of Tolay

Lake Regional Park is protected in one form or another by public agencies or private conservation organizations (Figure 3).

Tolay Creek Ranch is visible from Highway 121 which was designated a scenic corridor in the 1989 Sonoma County General Plan. The viewsheds of the Tolay Creek Ranch property from its 575-foot tall hilltops can be spectacular on clear days, providing views of San Pablo Bay, Mt. Tamalpais, the Petaluma River basin, the lower portion of the Valley of the Moon, San Francisco, Oakland, Mt. Diablo, and Mt. St. Helena.

The adjacent Tolay Lake Regional Park is nationally recognized as an important prehistoric gathering, foraging, and settlement site and contains many important archaeological resources including charmstones, midden mounds, and burial sites (Pulcheon et al 2008).

Tolay Creek Ranch contains approximately 2.5 miles of creek and riparian corridor. Combined with Tolay Lake Regional Park, it comprises over 50 percent of the entire watershed of Tolay Creek. Tolay Creek drains into San Pablo Bay, a part of the San Francisco Bay Estuary.

The Sonoma Land Trust expects to hold fee title for a period of 2-4 years before transferring title to Sonoma County Regional Parks for annexation to the adjacent Tolay Lake Regional Park. The Sonoma County Agricultural Preservation and Open Space District will retain a perpetual conservation easement over the property to preserve its important biotic and scenic values.

## 1.4 LAND USE AND HISTORY

Tolay Creek Ranch lies in the ethnographic territory of the Coast Miwok, who are believed to have entered the region about 3,500 years ago. Prior to Coast Miwok habitation of the area, Yukian and Hokan language groups inhabited the region. The Miwok culture utilized wetland areas and expanded more rapidly than the earlier groups (Archeological Resource Services 2003). Nearby Tolay Lake is also known as “Charmstone Lake” due to the large number of prehistoric artifacts recovered from the lakebed after it was drained for farming in the 1870s. The Tolay lakebed is considered one of the most prolific sources of charmstones in the United States. The charmstones are carved rock objects thought to have served ceremonial and/or practical purposes. The stones may have been used to induce favorable fishing and hunting in various ceremonial activities, they may have been used in slingshots to hunt waterfowl, or they may have served as fishing weights or lures. The presence of thousands of charmstones, three prehistoric village sites, numerous middens and other prehistoric sites indicate short- and long-term occupation of the Tolay Lake basin by humans for at least the past 5000 years (Pulcheon et al. 2008).

In 1996, a total of 19 prehistoric sites were recorded within the Tolay Valley. The plethora of sites, many of which are in relatively undisturbed condition and some of which contain human remains, constitute an area which would qualify for listing on the National Register of Historic Places (Pulcheon et al 2008).

When early European settlers arrived in the area in the early to mid 1800s, the Roche property was immediately adjacent to San Pablo Bay. The setting was ideal for settlers as there was ample fresh water and plentiful food supply from nearby Tolay Lake and the tidal marshes along San Pablo Bay. There may be up to four historic home sites at Tolay Creek Ranch, as well as a historic stone wall (B.

J. Roche, pers. comm., 2007). The remains of an old hunting cabin are located just east of Tolay Creek near the northern boundary of Tolay Creek Ranch. The Sears Point to Lakeville Road provides access to Tolay Creek Ranch and to Tolay Lake Regional Park to the northwest. It was historically lined with eucalyptus (*Eucalyptus* sp.) and cypress (*Cupressus* sp.) trees until an extended freeze in the 1950s killed many of them (B. J. Roche, pers. comm., 2007).

Tolay Creek Ranch was likely originally a part of the Petaluma Rancho, which at its largest covered 66,000 acres between Petaluma River and Sonoma Creek from the edge of the Bay northward to about where Glen Ellen is located today (EBA Engineering 2004). The rancho began to be divided into smaller holdings in the mid 1860s. The Roche family purchased their holding in 1978 and has developed vineyards on the eastern most parcels that remain under their ownership. The Tolay Creek Ranch portion, which was purchased by the Sonoma Land Trust, has been leased for cattle grazing to the same operator for at least 25 years. The Tolay Creek Ranch has probably been grazed since the advent of the European colonists.

## 1.5 REGULATORY CONTEXT

Biological resources on the site may fall under the jurisdiction of various regulatory agencies and be subject to regulations, as described below. In general, the greatest legal protections are provided for formally listed species. Informally listed species and habitats receive lesser legal protection.

### 1.5.1 Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over federally listed threatened and endangered plant and animal species. The Federal Endangered Species Act (FESA) protects listed species from harm or "take," broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Any such activity can be defined as a "take" even if it is unintentional or accidental.

Section 9 of the FESA and its applicable regulations restrict certain activities with respect to endangered and threatened plants. Nevertheless, these restrictions are less stringent than those applicable to animal species. The provisions of the FESA prohibit the removal of, malicious damage to, or destruction of any listed plant species "from areas under federal jurisdiction." Furthermore, listed plants may not be cut, dug up, damaged or destroyed in, or removed from any other area (including private lands) in known violation of a state law or regulation.

An endangered species is one that is considered in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. Federal agencies involved in permitting projects that may result in take of federally listed species (e.g., U.S. Army Corps of Engineers) are required under Section 7 of the FESA to consult with the USFWS prior to issuing such permits. Any activity that could result in the take of a federally listed species and is not authorized as part of a Section 7 consultation, requires an FESA Section 10 take permit from the USFWS.

In addition to endangered and threatened species, which are legally protected under the FESA, the USFWS has a list of proposed and candidate species. Proposed species are those for which a proposed

rule to list them as endangered or threatened has been published in the Federal Register. A candidate species is one for which the USFWS currently has enough information to support a proposal to list it as a threatened or endangered species. Proposed species could be listed at any time, and many federal agencies protect them as if they already are listed. Candidate species are not afforded legal protection under the FESA. A federally-listed plant species occurs and a federally-listed animal species potentially occurs at Tolay Creek Ranch.

### 1.5.2 Clean Water Act

The U.S. Army Corps of Engineers (Corps) is responsible under Section 404 of the Clean Water Act to regulate the discharge of fill material into waters of the United States. Waters of the United States and their lateral limits are defined in 33 CFR Part 328.3(a) and include streams that are tributaries to navigable waters and their adjacent wetlands. The lateral limits of jurisdiction for a non-tidal stream are measured at the line of the Ordinary High Water Mark (OHWM) (33 CFR Part 328.3[e]) or the limit of adjacent wetlands (33 CFR Part 328.3[b]). Any permanent extension of the limits of an existing water of the United States, whether natural or constructed, results in a similar extension of Corps jurisdiction (33 CFR Part 328.5).

Waters of the United States fall into two broad categories: wetlands and other waters. Other waters include waterbodies and watercourses such as rivers, streams, lakes, springs, ponds, coastal waters, and estuaries. Wetlands include marshes, wet meadows, seeps, floodplains, basins, and other areas experiencing extended seasonal or permanent soil saturation. Seasonally or intermittently inundated features, such as seasonal ponds, ephemeral streams, and tidal marshes, are categorized as wetlands if they have hydric soils and support wetland plant communities. Seasonally inundated waterbodies or watercourses that do not exhibit wetland characteristics are classified as other waters of the United States.

Wetlands and other waters that cannot trace a continuous hydrologic connection to a navigable water of the United States are not tributary to waters of the United States. These are termed “isolated” wetlands and waters. Isolated wetlands and waters are jurisdictional when their destruction or degradation can affect interstate or foreign commerce (33 CFR Part 328.3[a]). The Corps may or may not take jurisdiction over isolated wetlands, depending on the specific circumstances.

In general, a Section 404 permit must be obtained from the Corps before filling or grading wetlands or other waters of the United States. Certain projects may qualify for authorization under a Nationwide Permit (NWP). The purpose of the NWP program is to streamline the evaluation and approval process throughout the nation for certain types of activities that have only minimal impacts to the aquatic environment. Many NWPs are only authorized after the applicant has submitted a pre-construction notification (PCN) to the appropriate Corps office. The Corps is required to consult with the USFWS and/or NOAA-Fisheries under Section 7 of the ESA if the permitted activity may result in the take of federally listed species.

All Corps permits require state water quality certification under Section 401 of the Clean Water Act. This regulatory program for the property is administered by the San Francisco Bay Regional Water Quality Control Board (RWQCB). Projects that propose to fill wetlands or other waters of the United States must apply for water quality certification from the RWQCB. The RWQCB has adopted a

policy requiring mitigation for any loss of wetland, streambed, or other waters of the United States. Tolay Creek, its tributaries, and adjacent wetlands would be considered waters of the United States.

### 1.5.3 Porter-Cologne Water Quality Control Act

Under this Act (California Water Code Sections 13000–14920), the RWQCB is authorized to regulate the discharge of waste that could affect the quality of the State's waters. Therefore, even if a project does not require a federal permit, it may still require review and approval by the RWQCB (e.g., for impacts to isolated wetlands and other waters). Most projects in waters of the state require permits. Examples of projects include installation of culverts, check dams, construction of in-stream stock ponds, and repair of eroding banks, etc. When reviewing applications, the RWQCB focuses on ensuring that projects do not adversely affect the "beneficial uses" associated with waters of the State. Such beneficial uses can include maintenance of water quality, ground water recharge, wildlife habitat, etc. In most cases, the RWQCB seeks to protect these beneficial uses by requiring the integration of water quality control measures into projects that will require discharge into waters of the State. For most construction projects, the RWQCB requires the use of construction and post-construction Best Management Practices (BMPs). Tolay Creek, its tributaries, and adjacent wetlands would be considered waters of the State. Isolated waters may not occur at Tolay Creek Ranch, but they would also be considered waters of the State.

### 1.5.4 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) prohibits the taking, hunting, killing, selling, purchasing, etc. of migratory birds, parts of migratory birds, or their eggs and nests. As used in the MBTA, the term "take" is defined as "to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill, unless the context otherwise requires." Most bird species native to North America are covered by this act including those birds that occur at Tolay Creek Ranch with the exception of the non-native European starling, house sparrow, and any other non-native species.

### 1.5.5 California Endangered Species Act

The California Department of Fish and Game (CDFG) has jurisdiction over threatened or endangered species that are formally listed by the State under the California Endangered Species Act (CESA). The CESA is similar to the FESA both in process and substance; it is intended to provide additional protection to threatened and endangered species in California. The CESA does not supersede the FESA, but operates in conjunction with it. Species may be listed as threatened or endangered under both acts (in which case the provisions of both state and federal laws apply) or under only one act. A candidate species is one that the Fish and Game Commission has formally noticed as being under review by CDFG for addition to the State list. Candidate species are protected by the provisions of the CESA.

If a proposed project would result in impacts to a State-listed species, an "incidental take" permit pursuant to section 2081 of the Fish and Game Code would be necessary. CDFG will issue an incidental take permit only if:

1) The authorized take is incidental to an otherwise lawful activity;

2) the impacts of the authorized take are minimized and fully mitigated;
3) the measures required to minimize and fully mitigate the impacts of the authorized take:
a) are roughly proportional in extent to the impact of the taking on the species;
b) maintain the project applicant's objectives to the greatest extent possible; and,
c) capable of successful implementation; and,
4) adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with, and the effectiveness of, the measures. Such a process would be required for effects to the state-listed plant species that occurs occurs at Tolay Creek Ranch.

### 1.5.6 California Fish and Game Code

The CDFG is also responsible for enforcing the California Fish and Game Code, which contains several provisions potentially relevant to construction projects. For example, Section 1602 of the Fish and Game Code governs the issuance of Lake and Streambed Alteration Agreements by the CDFG. Lake and Streambed Alteration Agreements are required whenever project activities substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as such by the CDFG. Tolay Creek and its tributaries would be subject to section 1600 of the Fish and Game Code.

The Fish and Game Code also lists animal species designated as Fully Protected, which may not be taken or possessed. The Fully Protected designation does not allow "incidental take" and is thus more restrictive than the CESA. Fully Protected species are listed in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the Fish and Game Code, and section 500-5002 protects desert tortoise. Fully Protected species occur on Tolay Creek Ranch.

Section 3503 of the Fish and Game Code prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Subsection 3503.5 specifically prohibits the take, possession, or destruction of any birds in the orders Falconiformes (hawks and eagles) or Strigiformes (owls) and their nests. These provisions, along with the federal MBTA, essentially serve to protect nesting native birds. Non-native species, including European starling and house sparrow, are not afforded any protection under the MBTA or California Fish and Game Code. As with the MBTA, the other bird species that occur at Tolay Creek Ranch would be protected by the California Fish and Game code.

### 1.5.7 California Environmental Quality Act

The California Environmental Quality Act (CEQA) applies to "projects" proposed to be undertaken or requiring approval by State or local governmental agencies. Projects are defined as having the potential to have a physical impact on the environment. Such projects that would be undertaken by the Sonoma Land Trust or the Sonoma County Regional Parks Department would be subject to CEQA. Under Section 15380 of CEQA, a species not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown by a local agency to meet the criteria" for listing. With sufficient documentation, a species could be shown to meet the definition of rare or endangered under CEQA, which would lower the threshold of significance for project impacts. Section 15380 of CEQA may apply to some of the species that occur at Tolay Creek Ranch, but are not formally listed. These species are *species of special concern*, species on the *List of Special*

*Animals* or species on the California Native Plant Society's lists.Being on these lists does not automatically qualify a species for coverage under CEQA; they must meet the criteria for listing.

### 1.5.8 State Species of Special Concern

The CDFG maintains an informal list of *species of special concern* (Jennings and Hayes 1994, Shuford and Gardali 2008, Williams 1986), *list of special vascular plants, bryophytes, and lichens* (CDFG 2007a), and *list of special animals* (CDFG 2007b). These are broadly defined as species that are of concern to the CDFG because of population declines and restricted distributions, and/or they are associated with habitats that are declining in California. These species are inventoried in the California Natural Diversity Data Base (CNDDB) regardless of their legal status. Impacts to *Species of special concern* may be considered significant under CEQA. *Species of Special Concern* potentially occur on Tolay Creek Ranch.

### 1.5.9 Special Animals List

The animals on the special animals list are those species that the California Department of Fish and Game considers to be of greatest conservation need and are considered special-status species. These species are either listed or candidates for listing under the federal or state endangered species acts, species that meet the criteria for listing, species that are state species of special concern, taxa that are biologically rare, very restricted in distribution, declining throughout their range, or have a vulnerable stage in their life cycle that warrents monitoring, or taxa that are on the periphery of their range and are threatened with their extirpation in Califoria. This list of special animals is at: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf. Species that are on the List of Special animals and potentially occur at Tolay Creek Ranch are discussed in section 5 *Special-status Species*.

### 1.5.10 California Native Plant Society

The non-governmental California Native Plant Society (CNPS) has developed lists of plants of concern in California (CNPS 2008). A CNPS List 1A plant is a species, subspecies, or variety that is considered to be extinct. A List 1B plant is considered rare, threatened, or endangered in California and elsewhere. A List 2 plant is considered rare, threatened, or endangered in California but is more common elsewhere. A List 3 plant is potentially endangered but additional information on taxonomy, rarity, and endangerment is needed. A List 4 plant has a limited distribution but is presently not endangered. Impacts to List 1B and List 2 plants are frequently considered significant under CEQA, depending on the lead agency. Plants on Lists 3 and 4 may be evaluated on a case-by-case basis to determine significance thresholds under CEQA. A CNPS list 4 species occurs at Tolay Creek Ranch and other species on the CNPS lists may also occur there.

# 2.0 METHODS

LSA reviewed the CDFG's California Natural Diversity Data Base (CNDDB 2008), LSA's draft biological report on Tolay Lake Regional Park (LSA 2008a) and other relevant environmental documents (Parsons 1996) for records of special-status species in the area of Tolay Creek Ranch. The CNDDB query included both plants and animals in the Cotati, Glen Ellen, Novato, Petaluma, Petaluma River, San Geronimo, Sears Point, and Sonoma USGS quadrangles. Based on this review, a list of 34 special-status plant species was compiled for focusing survey efforts. This list was used to help focus survey efforts by documenting blooming periods and habitat affinities of special-status plant species. Aerial photos and global positioning (GPS) technology were used for mapping vegetation types, habitats, and special-status species occurrences.

The survey area encompassed the entire Tolay Creek Ranch site. The surveys were conducted by walking 100 to 200-foot-wide transects in the focus areas of the site and in areas that provided potentially suitable habitat for special-status species. Areas outside of focus areas were less intensively surveyed. These focus areas are the existing ranch roads, the entry points to Tolay Creek Ranch, Roche Domestic Springs, and Lower Tolay Valley.

## 2.1 PLANT SURVEYS

Four LSA botanists (Clint Kellner, Greg Gallaugher, Steve Cochrane, and Zoya Akulova) participated in the botanical surveys of Tolay Creek Ranch. Early season surveys (March 28, April 1, 5, 11, May 10, 16. 19, 21, 22, 23, 26, and 27) were conducted by a team of two or three botanists and late season surveys (June 18, 19, and October 24, 2008) were conducted by one or two botanists. Late season surveys were conducted by checking the habitats of late blooming special-status plant species such pappose tarweed (*Centromadia parryi* ssp. *parryi*) and other species associated with seeps or wetlands.

The special-status fragrant fritillary (*Fritillaria liliacea*) often grows in association with the common Fremont's star lily (*Zigadenus fremontii*), and populations of the star lily were examined for fragrant fritillary.

Plants were identified using dichotomous keys in the Jepson Manual (Hickman 1993), and the Flora of Sonoma County (Best et al.1996). Plants collected in the field were also identified by comparing them to images from Calphotos and Google Images and to pressed specimens housed at the UC Berkeley and Jepson Herbaria. Botanical nomenclature is according to the Jepson Manual (Hickman 1993).

Tolay Creek Ranch is a rich site with respect to biological resources. Emphasis during the surveys was placed on searching for special-status plants and mapping wetland, native grassland, and weeds, especially on serpentine substrates. Because of the large size of the property, the mapping provides an indication of the richness of Tolay Creek Ranch with the focus areas more completely covered than others. Each of the areas of Tolay Creek Ranch was visited but not necessarily thoroughly sampled.

The goal of the sampling was to determine species and vegetation types in sufficient detail to guide the management of Tolay Creek Ranch.

## 2.2 WETLANDS

### 2.2.1 Wetland Identification Methodology

Field investigations of potential wetlands occurring on the property were conducted by surveying areas for hydrophytic vegetation. Hydrophytic plant species are listed by the USFWS in *National List of Plant Species that Occur in Wetlands* (Reed 1988). The *National List* identifies five categories of plants according to their frequency of occurrence in wetlands. The categories are:

| | |
|---|---|
| Obligate wetland plants (OBL) | Plants that occur almost always in wetlands. |
| Facultative wetland plants (FACW) | Plants that usually occur in wetlands. |
| Facultative plants (FAC) | Plants that are equally likely to occur in wetlands or non-wetlands. |
| Facultative upland plants (FACU) | Plants that usually occur in uplands. |
| Obligate upland plants (UPL) | Plants that occur almost always in non-wetlands. |

An area is considered to meet the hydrophytic vegetation criterion when more than 50 percent of the dominant species in each stratum (e.g., tree, shrub, and herb) present are in the obligate wetland, facultative wetland, or facultative categories.

### 2.2.2 Field Methodology

LSA surveyed wetlands in conjunction with conducting the botanical surveys. Potential wetland boundaries were mapped using three different methods: 1) by following vegetation and land forms; 2) tracing features on the aerial ortho-photo; and/or 3) using the GPS. A scale of 1-inch equals 400 feet aerial ortho-photo map of Tolay Creek Ranch and GPS units were used in the field for mapping purposes. Some of the GPS units were accurate to within 1 meter (39 inches) while other GPS units were accurate to within 3-5 meters.

Wetlands and other waters potentially subject to regulation were identified predominantly by the presence of basins, ditches or other depressed topographic features, and by the presence of hydrophytic vegetation. Drainage features were considered to be potentially jurisdictional if they contained water at the time of the survey, exhibited scour, shelving, a low-flow channel, debris deposits at the side of the channel, or otherwise showed evidence of prolonged flow.

## 2.3 ANIMAL SURVEYS

Surveys consisted of traversing selected areas of the site by foot while recording animal observations in field notes and noting areas of particular habitat value on aerial photos. These selected areas included representative examples of the existing habitats (e.g., Tolay Creek, oak woodland, grassland, riparian woodland) of Tolay Creek Ranch. Survey dates are the same as the botanical survey dates. Portions of Tolay Creek were surveyed on April 1and October 24, 2008.

Nomenclature used in this report for amphibians and reptiles conforms to Crother et al. (2000, 2003), while nomenclature for mammals conforms to Baker et al. (2003). Nomenclature for special-status species conforms to the CNDDB (2008). Scientific names of bird species are not provided in the text because English vernacular names are standardized in the American Ornithologists' Union (AOU) *Check-list of North American Birds* and supplements through the 49th (AOU 2008 and Banks et al 2008).

# 3.0 PHYSICAL SETTING

## 3.1 TERRAIN AND HYDROLOGY

Tolay Creek Ranch is comprised of flat, rolling, and moderately steep terrain and is largely bounded by two ridges: the East Ridge and the West Ridge. These ridges separate the Petaluma River Valley and Sonoma Creek. The relatively level areas of Tolay Creek Ranch are located in the Lower Tolay Valley and along Highway 121. Nichols and Wright (1971) have mapped the presumed edge of San Pablo Bay just south of Highway 121 in the vicinity of Tolay Creek Ranch. An examination of the vegetation immediately south of Highway 121 surrounding Tolay Creek and a small watercourse to the east of Tolay Creek indicates that the elevation appears to be too high for salt marsh. Tolay Creek and the other watercourse are not tidal at Highway 121 and the vegetation is not salt marsh at the edges of these watercourses indicating that this portion of Tolay Creek Ranch was most likely grassland and seasonal wetland historically.

Tolay Creek, flowing from northwest to southeast, transects the center of Tolay Creek Ranch, before forming the approximate property boundary in the southeast portion of the Ranch (Figure 2). The majority of Tolay Creek Ranch drains into Tolay Creek, which is primarily a dry creek bed with a few isolated pools by early fall (during dry years). A small area of the northern portion of the West Ridge drains to the Petaluma River. Numerous seasonal creeks, springs and seeps are located on the relatively steep slopes of the Tolay Creek Ranch on either side of Tolay Creek. Elevations range from approximately 20 feet above sea level on the floor of Lower Tolay Valley at the Hwy 121 bridge to approximately 560 feet on the ridges on either side of Tolay Creek. The highest elevation on Tolay Creek Ranch is 575 feet at a rock outcrop along the southwestern property line.

The Tolay Lake basin is located just upstream of Tolay Creek Ranch to the northwest. The natural hydrology of the lake basin was altered in the mid 1800s by removing the natural dam and constructing drainage ditches for the purpose of farming the lakebed. Historically, the lake was seasonally variable and could have sustained a lake 14 feet deep before spilling over into Tolay Creek (Kamman Hydrology andEngineering 2003). During most years, Tolay Lake likely functioned as a large seasonal, semi-permanent marsh. During years of heavy rainfall, Tolay Lake likely existed as a permanent wetland. The lake was probably an important source of freshwater for human populations and wildlife well into the dry summer months. During the wet season of recent years, Tolay Lake typically reaches 4 to 8 feet in the deepest locations, although much of it ranges from 2 to 3 feet deep. The lake has historically been pumped dry during the spring to accommodate farming operations. Sonoma County Regional Parks is currently developing a master plan for Tolay Lake Regional Park, which will include restoration of Tolay Lake to a portion of its historic extent.

## 3.2 SOILS AND EROSION

The Sonoma County Soil Survey (USDA 1972) classifies soils on Tolay Creek Ranch into four soil map types: Clear Lake Clay Loam (CcA), Diablo Series (DbC, DbD, DbE, and DbE2), Goulding Series (GlD and GoF), Montara loam (MoE), and gullied land (GuF) (Figure 4).

Clear Lake Clay Loam occurs in the relatively level area along Tolay Creek and is formed under poorly drained conditions. It has a clay loam surface layer, 10 –15 inches in depth, underlain by clay. Vegetation is primarily annual and perennial grasses and forbs. The Diablo series occupies most of the slopes at Tolay Creek Ranch. It typically has low permeability, high runoff potential, and high shrink-swell potential.

The Diablo series has high erosion potential that increases with steepness. The Goulding-Toomes Complex soil consists of clay and rocky loam on varying slope with moderate permeability and medium or high runoff and erosion potential.

Land use is primarily rangeland. Gullied land consists of gently sloping to steep, rounded hills that have been damaged by erosion. It typically occurs where excess runoff, caused by overgrazing by livestock or unusually heavy storms, has cut into natural water courses on hillsides (USDA 1972). It is mapped in the southern portion of the West Ridge by the USDA (1972), but LSA also mapped some gullied land on the East Ridge (Figure 4). Gullies occur elsewhere on Tolay Creek Ranch, but are not as large as those mapped on Figure 4.

The Montara cobbly clay loam is located within the southwest portion of Tolay Creek Ranch. These soils are well drained and underlain by weathered serpentine. Some segments of Tolay Creek are severely eroded, with exposed, nearly vertical banks and gullying is occurring on many of the tributaries of Tolay Creek. The New Years Day 2006 flood event in the area caused extensive erosion on the site as well as other watersheds in the area (B. J. Roche, pers. comm., 2007).

## 3.3 GEOLOGY

The geology within the area is complex, consisting of several geologic formations, landslides and faults (California Department of Conservation, California Geologic Survey. 2002). The northeast portion of Tolay Creek Ranch is predominantly made up of Donnell Ranch Volcanics, consisting of rhyolite, basalt and basaltic andesite lava flows, breccias, and scoria. The southeastern portion of Tolay Creek Ranch consists of the Petaluma Formation which is predominantly a lacustrine and fluvial deposit consisting of siltstone, sandstone, shale, and conglomerate with minor amounts of tuff, chert, lignite, and limestone. The southwest portion of Tolay Creek Ranch consists of serpentinized ultramafic rock. The Franciscan Complex mélange makes up the northwestern portion of Tolay Creek Ranch. The Franciscan complex is a tectonic mixture of resistant rock including sandstone, greenstone, chert, gabbro, and exotic metamorphic rock. The Lower Tolay Valley consists primarily of alluvial deposits.

Numerous Quaternary landslides are located on the steeper slopes throughout Tolay Creek Ranch (Koenig 1963). The Roche-Cardoza fault transects the northern portion of Tolay Creek Ranch. The Tolay Fault Zone ia a 600 meter wide area of imbricate thrust faults. The Rogers Creek Fault is roughly parallel to Tolay Creek and is located in the vicinity of the East Ridge through the length of Tolay Creek Ranch.

## 3.4 CLIMATE

Sonoma County has a Mediterranean climate with typically dry summers and mild, wet winters. The climate near San Pablo Bay is heavily influenced by the Pacific Ocean and is characterized by mild seasonal temperatures, prevailing west to northwest winds, and frequent heavy fog. Temperatures tend to be more extreme further away from the mitigating effects of the Bay. Local southerly winds may also develop seasonally due to differential heating between Tolay Lake, Sonoma Creek valley, Petaluma River valley, and San Pablo Bay. Median annual precipitation is approximately 22.5 inches, but this amount varies widely with a maximum of 49.8 inches and a minimum of 9.7 inches over the period from 1914 to 1997 (Kamman Hydrology and Engineering, Inc. 2003).

## 3.5 EXISTING INFRASTRUCTURE

Improvements on Tolay Creek Ranch are primarily associated with ranch operations. Both perimeter and interior fencing are in various states of repair, and a network of unimproved seasonal ranch roads is in various states of condition. There are two at grade crossings of Tolay Creek that are currently used. One crossing is beneath the entrance road and another one is at the gate just south of the former crossing at the old bridge at the boundary with Tolay Lake Regional Park. This former crossing at the Sears Point to Lakeville Road is overgrown with willow trees and is in disrepair. Several culverts are under the Sears Point to Lakeville Road along the northeast side of Tolay Creek. There are no structures on Tolay Creek Ranch with the exception of a small shed near the southern-most Tolay Creek crossing and the remains of a hunting shack constructed by a previous ranch owner near the northern-most Tolay Creek crossing. Numerous developed springs occur throughout Tolay Creek Ranch that provide water for livestock and supply water to the reservoir (through the 6-inch pipe) on the adjoining property retained by the Roche's for vineyard use. The 4-inch pipes serve the water tanks for the house at the Roche's property. There is no power on Tolay Creek Ranch; the water is gravity-fed through pipes to the off-site reservoir.

# 4.0 VEGETATION AND WILDLIFE VALUES

This section describes the vegetation and wildlife values of Tolay Creek Ranch. The characteristics of the vegetation are mentioned such as dominant and associated species, height and cover and size of trees. The animal species that are most likely to occur in those vegetation types are also discussed. Table A provides a list of the plant species observed within Tolay Creek Ranch and Table B provides a list of the animal species observed within Tolay Creek Ranch.

## 4.1 WOODLAND

The native woodland vegetation consists of coast live oak woodland (coast live oak, California bay, California buckeye), valley oak woodland (valley oak), riparian woodland (arroyo willow, sandbar willow, and/or red willow) or quite often, a combination of these vegetation types. Separating these woodland types on Figures 5a and b would be a time-consuming process because of the small size of the stands of these vegetation types and the frequency of their occurrence together. Non-native trees consist of blue gum (*Eucalyptus globulus*), black acacia (*Acacia melanoxylon*), and Monterey cypress (*Cupressus macrocarpa*).

### 4.1.1 Botanical Values

**4.1.1.1 Oak Woodland.** Oak woodland occurs mostly in small stands along Tolay Creek and its tributaries although a relatively large stand occurs along a bench of a slope of the West Ridge (Figure 5a). The West Ridge supports more oak woodland than the East Ridge (Figure 5a). This plant community is dominated by coast live oak (*Quercus agrifolia*) and California bay (*Umbellularia californica*) with scattered California buckeye (*Aesculus californica*). The coast live oak trees are large with trunk diameters averaging or exceeding 2 feet diameter at breast height (dbh) as measured 4.5 feet from the ground surface. Tree height averages 30 feet or less. Many factors can affect the size of trees including amount of water stress, nutrient availability, and disease. Age of similar sized or larger trees at Olompali State Historic Park is less than 70 years.

Shrubby species of the understory of oak woodland include poison oak (*Toxicoendron diversilobum*), snowberry (*Symphoricarpos album*), and occasionally California rose (*Rosa californica*). Herbaceous species of the understory of oak woodland include miner's lettuce (*Claytonia perfoliata*), hedge nettle (*Stachys* sp.), Dutchman's pipe (*Aristilochia californica*), and Pacific sanicle (*Sanicula crassicaule*). Table A provides a comprehensive list of the plant species observed within Tolay Creek Ranch.

Valley oak (*Quercus lobata*) trees grow in small stands along Tolay Creek. These trees are large, 2 – 4 feet dbh, and approximately 40 feet tall. They grow in single species stands or in association with coast live oak and/or willow (*Salix* spp.) trees. Understory is composed of non-native grassland. Mistletoe (*Phoradendron villosum*) occurs on the branches of some trees.

**4.1.1.2 Blue Gum Trees.** Small stands of non-native blue gum grow on the West Ridge and along a tributary to Tolay Creek (Figures 6a and b). A few blue gum trees grow at the southern end of the East Ridge with ornamental shrubs (Figure 6a). These trees are large and provide a complete canopy cover.

**4.1.1.3 Monterey Cypress.** Monterey cypress is only native to the Monterey Peninsula, but has been planted ornamentally throughout California. It grows in a row in one location beside Tolay Creek. These trees are quite large; are greater than 2 feet in diameter and taller than 40 feet (Figure 6a).

### 4.1.2 Wildlife Values

Oak woodlands are one of the most species-rich wildlife habitats in California, primarily due to their production of acorns, which are an important food source for a variety of wildlife (CalPIF 2002). The ecological relationship between birds and oaks can often be reciprocal when species such as western scrub-jay and Steller's jay disperse acorns. Large oak trees also provide cover and nest sites for both cup-nesting and cavity-nesting birds, and are used as caching sites for the storage of acorns by acorn woodpeckers (CalPIF 2002). Such trees also provide nest sites for raptors. Bullock's oriole was observed in a valley oak in the spring and presumably nested on-site.

Mature trees and snags provide potential roost sites for bat species known to occur in the region. Although not detected by LSA, Yuma myotis (*Myotis yumanensis*), little brown myotis (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), and pallid bat (*Antrozous pallidus*) could potentially occur in the oak woodlands on-site. Black-tailed deer (*Odocoileus hemionus*), while not restricted to oak woodlands, browse upon the foliage provided by the lower tree branches and take shelter there. Other mammal species likely to use this habitat include northern raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), gray fox (*Urocyon cinereoargenteus*), Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*).

Oak woodlands typically occur on north-facing and east-facing slopes, where precipitation is concentrated and moisture is lost less rapidly to evaporation. As a result of these relatively dense and moist conditions, salamanders often occur in oak woodlands on north-facing slopes. Although not detected by LSA, salamander species typically observed in oak woodlands within this region include California slender salamander (*Batrachoseps attenuatus*) and arboreal salamander (*Aneides lugubris*). Common reptiles expected within oak woodland include the western skink (*Plastiodon skiltonianus*), southern alligator lizard (*Elgaria multicarinata*), ring-necked snake (*Diadophis punctatus*) and sharp tailed snake (*Contia tenuis*). Down branches and rock outcrops provide cover for the animals inhabiting the oak woodland.

## 4.2 RIPARIAN VEGETATION

### 4.2.1 Botanical Values

Tolay Creek supports small stands of riparian woodland and often the riparian woodland grows adjacent to coast live oak woodland. Both of these types are mapped as woodland on Figures 5a and b. Other watercourses support single willows or small stands composed of a few trees. The riparian woodland is dominated by various combinations of arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), and sandbar willow (*Salix exigua*). Some stands of the riparian woodland are quite mature

with red willow trees exceeding 12 inches in diameter. The larger trees grow at the top of the bank of an incised channel that can be as much as 8 to 10 feet deep. Occasional willow trees that colonize the bottom of the channel are smaller than the willow trees growing at the top of the bank. The absence of large willow trees in the bottom of the channel of Tolay Creek indicates that the channel has recently incised 8 to 10 feet.

Native shrubs are largely absent from the understory of the riparian woodland owing to the bushy nature of the growth of the willow trees and the grazing experienced by Tolay Creek Ranch. Nevertheless, the following shrubs were observed growing in patches either in the open or beneath the canopy of trees: non-native Himalayan blackberry (*Rubus discolor*) and the native California blackberry (*Rubus ursinus*), snowberry, poison oak, and California rose.

### 4.2.2 Wildlife Values

Riparian areas are generally recognized as an important wildlife habitat (Faber 2003) and have been identified as the most important habitats for landbirds in California (Manley and Davidson 1993, cited in RHJV 2004). Several species depend on riparian habitats for their entire breeding cycle (e.g., yellow warbler), while many others use them for roosting and foraging during the winter (e.g. yellow-rumped warblers), or during migration (e.g., western tanager).

The following bird species are likely to use both the riparian and oak woodland at Tolay Creek Ranch: mourning dove, Anna's hummingbird, downy woodpecker, northern flicker, black phoebe, tree swallow, bushtit, Bewick's wren, ruby-crowned kinglet (winter), hermit thrush (winter), American robin, yellow-rumped warbler (winter), spotted towhee, California towhee, white-crowned sparrow (winter), golden-crowned sparrow (winter), and house finch. The dense foliage of these vegetation types provides particularly good habitat. Most of these species are not restricted to the woodland habitats and will forage in the adjacent grassland.

## 4.3 GRASSLANDS AND NATIVE FORBS

### 4.3.1 Botanical Values

**4.3.1.1 Native Grasslands.** Native grasslands are sensitive biological resources because little of the original native California grassland remains in low elevation areas of California, including Tolay Creek Ranch. Communities dominated by native grasses and graminoids that occur at Tolay Creek Ranch (Figures 5a and b) include needlegrass grasslands and creeping wildrye grasslands.

Purple needlegrass (*Nassella pulchra*) grows on slopes where soils are relatively shallow at Tolay Creek Ranch. They occur in relatively small stands and occur with native forbs and non-native grasses (Figures 5a and b). The shallow soils allow the purple needlegrass to compete more favorably with the non-native grass. The sloping areas of the ridges are more likely to support needlegrass dominated grasslands than the deep soils of the Lower Tolay Valley and the West Ridge supports more native grass than does the East Ridge. Hayfield tarweed (*Hemizonia congesta* ssp. *luzulaefolia*) grew in extensive stands throughout the West Ridge of Tolay Creek Ranch and often grew with purple needlegrass.

Creeping wild rye (*Leymus triticoides*) grows in areas of relative deep and moist soil. It spreads rhizomatously and grows in dense or sparse stands. At Tolay Creek Ranch, it grows in patches throughout the level areas and some of the slopes of the West Ridge. When growing in a dense stand it is the dominant species and other species are largely absent. In sparse stands, it occurs with the non-native medusahead (*Taeniantherum caput-medusae*), Italian rye grass (*Lolium multiflorum*), and soft chess (*Bromus hordeaceus*) and the native meadow barley (*Hordeum brachyantherum*) and harvest brodiaea (*Brodiaea elegans*).

**4.3.1.2 Native Forbs.** Native forbs commonly grow in dense stands particularly on the West Ridge and Lower Tolay Valley (Figures 5a and b). These species were the dominant vegetation along with purple needlegrass in some areas. They grow in a variety of combinations with the most common associations mentioned below.

Fremont star lily grows with miniature lupine (*Lupinus bicolor*) and California buttercup (*Rannculus californica*) in patches in the Lower Tolay Valley. Minature lupine is also common in the grassland areas where it also grows with a variety of other plants species. Large stands of narrow-leaved mule ears (*Wyethia angustifolia*) and Kellogg's yampah (*Perideridia kelloggii*) occur in the grassland. Purple needlegrass, hill morning-glory (*Calystegia subacaulis*), and yarrow (*Achillea millefolium*) were also observed growing on the West Ridge.

Large and small stands of Johnny jump-up (*Viola pedunculata*) grow in sparse to dense aggregations on portions of the West Ridge. A large stand of dense blue-eyed grass (*Sisyrinchium bellum*) also grows on the West Ridge. Blue-eyed grass also grows with other species of forbs and grasses such as meadow barley, California buttercup, and lotus (*Lotus wranglianus*).

Figures 5a and b show the location of mapped stands of native forbs on the West Ridge. These stands often form a mosaic with native grassland and non-native grassland. The East Ridge did not appear to support as many and as large of stands of native forb communities. Because of the variety of forb vegetation types and the high frequency of their occurrence with or beside native grasslands, the different forb types were combined into a native forb grouping for mapping purposes.

**4.3.1.3 Non-Native Grasslands.** Non-native grassland grows throughout Tolay Creek Ranch. The cover of this grassland is high and approaches 100 percent. The height of the grassland depends on soil depth and moisture content and averages 1 to 1.5 feet tall. This past year (2008) was very dry and the cattle had consumed the majority of the grass by autumn. Hoof prints pockmarked the entire grassland area at Tolay Creek Ranch such that the ground was difficult to walk over.

The non-native species that are commonly observed include: ripgut brome (*Bromus diandrus*), soft chess, wild oats (*Avena fatua, Avena barbata*), hare barley (*Hordeum murinum* ssp. *leporinum*), which grow in various combinations in dry areas. Relatively moist areas support Mediterranean barley and Italian ryegrass. Medusahead grows in small stands throughout Tolay Creek Ranch.

Non-native grasslands include many other weedy species including broad-leaf filaree (*Erodium botrys*), red-stemmed filaree (*Erodium cicutarium*), common vetch (*Vicia sativa*), geranium (*Geranium molle*), Shepherd's needle (*Scandix pecten-veneris*), rose clover (*Trifolium hirtum*), and subterranean clover (*Trifolium subterraneum*). These species do not form large stands but grow sparsely among the grasses.

Tolay Creek Ranch is notable for the extensive stands of the native hayfield tarweed which grow in the native and non-native grasslands. Other native forbs of the non-native grasslands include Ithuriel's spear (*Triteleia laxa*), Fremont's star lily, blue-eyed grass, California poppy (*Eschscholzia californica*), soap plant (*Chlorogalum pomeridianum*), California checker mallow (*Sidalcea malvaeflora*.), Johnny jump-up, and hill morning-glory.

**4.3.1.4 Invasive Plant Species.** Medusahead, Italian thistle (*Carduus pycnocephalus*), bristly ox-tongue (*Picris echioides*), and yellow star-thistle (*Centaurea solstitialis*) are the most common non-native invasive plants at Tolay Creek Ranch (Figures 6a and b). Yellow star-thistle is particularly common throughout Tolay Creek Ranch in sparse stands. Medusahead and Italian thistle occur in small stands throughout the site and bristly ox-tongue is particularly abundant in the seeps and moist areas. Purple star-thistle (*Centaurea calcitrapa*) and milk thistle (*Silybum marianum*) are less common at Tolay Creek Ranch and occur in a relatively few places. Other non-native weed species that are less invasive and grow relatively sparsely within the study area include bull thistle (*Cirsium vulgare*), jointed charlock (*Raphanus raphanistrum*), black mustard (*Brassica nigra*), and smooth cat's ear (*Hypochaeris radicata*). Narrow-leaved plantain (*Plantago lanceolata*) was a common non-native species in some areas of the grassland.

### 4.3.2 Wildlife Values

Grasslands constitute the most widespread habitat type at Tolay Creek Ranch. In addition to common bird species such as western meadowlark, grasslands on the site are likely to support breeding grasshopper sparrows and horned larks judging by the observation of horned larks and singing or calling grasshopper sparrows at Tolay Creek Ranch. Both of these species are more restricted in their distribution and together indicate high-quality, diverse grasslands with horned larks preferring short grass and bare areas while grasshopper sparrows preferring comparatively tall grass habitats. Grasslands also provide foraging habitat for raptor species such as red-tailed hawk, northern harrier, white-tailed kite, American kestrel, great horned owl, and barn owl, which feed on the small mammals that occur in grasslands (see below). Other local bird species that spend a large portion of their life cycle within or adjacent to grasslands include turkey vulture, loggerhead shrike, western kingbird, Say's phoebe, American crow, Savannah sparrow, and red-winged blackbird

The grasslands of Tolay Creek Ranch are likely to support several species of small mammals such as deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californica*), Botta's pocket gopher (*Thomomys bottae*), and western harvest mouse (*Reithrodontomys megalotis*). Grasslands also provide suitable foraging habitat for bat species, northern raccoon, and striped skunk. Skunks forage in the grasslands, while raccoons forage in the ponds, seeps, streams and other wet areas of Tolay Creek Ranch.

Black-tailed jackrabbit (*Lepus californicus*) and coyote (*Canis latrans*) are known to occur on the site, and spend the majority of their time foraging or resting in grasslands. The jackrabbit comprises a major prey item for the carnivores that occur at Tolay Creek Ranch. Brush rabbits (*Sylvilagus bachmani*) were not observed at the ranch. With additional shrubby cover, rabbits and other small mammals could occur on-site in greater numbers than currently and provide a greater prey base for the carnivores.

California ground squirrel (*Spermophilus beecheyi*) creates burrows that are used by a wide variety of animals including reptiles, amphibians, insects, arachnids, and snails. Because of this and their importance as prey for foxes, coyotes, golden eagles, and other raptors, California ground squirrel has a positive influence on the diversity of animal species in grasslands.

California ground squirrels experience natural fluctuations in their population numbers at Tolay Lake Regional Park and the adjacent ranches according to Jenette Cardoza, the former owner of the Cardoza Ranch (Ehret pers. comm.). California ground squirrels were rarely observed at Tolay Creek Ranch (and Tolay Lake Regional Park). Given the extensive suitable habitat for ground squirrels and the past favorable land management regime of intensive grazing, the scarcity of ground squirrels on the site could be the result of a low point of a natural population fluctuation and/or intense predation by a suite of predators.

Common reptiles typically found in grasslands in this region include western fence lizards (*Sceloporus occidentalis*), gophersnakes (*Pituophis catenifer*), and northern American racers (*Coluber constrictor*). Grassland areas adjacent to seasonal wetlands in this area could also support northern Pacific treefrog (*Pseudacris regilla*) and western toad (*Anaxryus boreas*).

## 4.4 SEEPS AND SPRINGS

### 4.4.1 Botanical Values

Well developed seeps and springs are located on slopes both east and west of Tolay Creek. The larger seeps contained water until summer and dried by November 2008. Species present included Pacific rush (*Juncus effuses*), spreading rush (*Juncus patens*), brown-headed rush (*Juncus phaeocephalus*), California semaphore grass (*Pleuropogon californicum*), and tall fescue (*Festuca arundinacea*). Broad-leaved species that grow in some of these seeps include Bloomer's buttercup (*Ranunculus orthorhynchus* ssp. *bloomei*), prickle-seeded buttercup (*Ranunculus muricatus*), strawberry clover (*Trifolium fragiferum*), and the seep-spring monkey flower (*Mimulus guttatus*). All of these species are native except prickle-seeded buttercup, strawberry clover, and tall fescue.

The Roche Domestic Springs have been altered to provide water to the Roche Farm. Usually a productive spring that supplies water over a long duration occurs in a round or oval configuration with saturation to the surface throughout. The Roche Domestic Springs contain several spring boxes and the topography has been altered to channel the run-off from the springs (Figure 5b). The rainfall of 2008 was much below average. In a wet year the configuration of the wetland vegetation may appear in a more well-developed oval shape, much like an undeveloped spring.

### 4.4.2 Wildlife Values

Birds, mammals, and reptiles would all be expected to frequent the seeps for drinking water. Cover would be provided within the dense growth of rushes and other vegetation. Shrews (*Sorex* spp.) would be expected to occur within the seeps where they would conduct the majority of their foraging. Bird species such as killdeer, great egret, and Wilson’s snipe are more likely to forage within the wet areas of seeps and springs than in the drier adjacent grassland habitats.

The use of seeps and springs by amphibians largely depends on the seasonal duration of the seep. Seasonal seeps that have a relatively short wet season hydrology may aid in the dispersal of adult frogs. Nevertheless, permanent seeps and springs are more useful to amphibians during the summer months and common amphibian species such as northern Pacific treefrogs and western toads are likely to use these areas in the summer. Northern Pacific treefrog tadpoles occurred at a small shallow pond at the Roche Domestic Springs (Figure 5b). The red-sided garter snake (*Thamnophis sirtalis infernalis*.) and the southern alligator lizard were observed there as well.

## 4.5 SEASONAL WETLANDS

### 4.5.1 Botanical Values

Seasonal wetlands occur throughout Tolay Creek Ranch (Figures 5a and b). Hydrology of these features is provided by direct rainfall and run-off. The seasonal wetlands of the Lower Tolay Valley occur on level, dense clay soils. Seasonal wetlands also occur in swales at Tolay Creek Ranch. These seasonal wetlands rarely pond water and are at the drier end of the wetland continuum. Some of these seasonal wetlands, such as the Baltic Rush Meadow, which is described below, may not not be jurisdictional because of the absence of sufficient water to result in observable indicators of the Corps wetland hydrology criterion.

Baltic rush (*Juncus balticus*) and brown-headed rush grow with native and non-native grass in relatively moist patches in grassland. Fremont's star lily and California buttercup are common associates of these rushes. This vegetation occurs in the level areas of the Lower Tolay Valley. Although these features were fairly common in the dense clay, the sparseness of the rush indicates relatively dry conditions and this vegetation may not qualify as jurisdictional waters of the United States.

### 4.5.2 Wildlife Values

The wildlife value of the seasonal wetlands varies with the hydrology. The relatively dry seasonal wetlands would be used the same as grassland habitat by wildlife. The wetter seasonal wetlands would be used for hydration habitat and the values would be similar to those of seeps and springs.

## 4.6 VERNAL POOLS AND SMALL SEASONAL PONDS

### 4.6.1 Botanical Values

A large shallow vernal pool occurs on a bench on the West Ridge southwest of Tolay Creek and west of a large wetland (Figure 5a). Both the vernal pool and the large wetland drain into tributaries of Tolay Creek. Three shallow seasonal ponds were created by heavy equipment east of the Roche Domestic Springs (Figure 5b). These ponds are located in an area that had slumped, but the steepness of the mounding adjacent to the ponds is gives the impression of creation by heavy equipment. These ponds support small and sparse stands of spikerush (*Eleocharis* sp.). Lobb's aquatic buttercup (*Ranunculus lobbii*), a CNPS list 4 species, also grows in these features. Because of their small size and proximity to each other, they are mapped as a single feature on Figure 5b near 4 small wetland features.

### 4.6.2 Wildlife Values

The wildlife values discussed in the section of *Seeps and Springs* are also relevant for the vernal pool and small seasonal ponds. Although these features provide suitable breeding habitat for northern Pacific treefrogs and western toads, ponding does not last long for these features. Red-sided garter snakes (*Thamnophis sirtalis*) and terrestrial garter snakes (*Thamnophis elegans*) would also be expected to occur in and adjacent to seasonal wetlands. Garter snakes predominantly feed on fish, toads, frogs, salamanders, and their larvae.

## 4.7 CREATED POND

A pond was created near one of the Roache Domestic Springs and is south of a large polygon of native grassland (Figure 5b). This pond is surrounded by fencing to prevent cattle from entering.

### 4.7.1 Botanical Values

This pond supports stands of emergent wetland vegetation (cattails and/or bulrush) and spikerush growing at the edge with open water in the center.

### 4.7.2 Wildlife Values

The wildlife values discussed in the section of *Seeps and Springs* and *Vernal Pools and Small Seasonal Ponds* are also relevant for the the created pond. The created pond provides suitable breeding habitat for the sierran treefrog and western toads. The pond appears perennial and is likely to support breeding habitat for California red-legged frogs and American bullfrogs. Red-sided garter snakes and terrestrial garter snakes would also be expected to occur in and adjacent to seasonal wetlands. Garter snakes predominantly feed on fish, toads, frogs, salamanders, and their larvae.

## 4.8 LARGE SEASONAL POND

A large seasonal pond occurs in the panhandle portion of Tolay Creek Ranch adjacent to Highway 121 (Figure 5b). This pond remains inundated into early May of most years and it was dry on May 21 of 2008 and remained dry through at least mid January of 2009. The pond is formed by an intermittent watercourse that flows beneath Highway 121. The majority of this pond extends upstream and off-site onto the adjacent property.

### 4.8.1 Botanical Values

Vegetation of the seasonal pond consists of native and non-native species. Dominant species include curly dock (*Rumex crispus*) and narrow-leaved bird's-foot trefoil (*Lotus tenuis*), both non-native species, and California semaphore grass, brown-headed rush, and coyote thistle (*Eryngium* sp.) all native species. Other species that occurred in the seasonal pond include popcorn flower (*Plagiobothrys* sp.), common water-plantain (*Alisma lanceolatum*), downingia (*Downingia* sp.), smooth lasthenia (*Lasthenia glaberrima*), and cream sacs (*Castilleja rubicundula* ssp.

*lithospermoides*), all native species. Cocklebur (*Xantium strumarium*) and brass buttons, both non-native species also grow in the pond.

The seasonal pond is slightly alkaline or salty judging from the occurrence of species adapted to salty environments. These species are alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), salt heliotrope (*Heliotropium curassavicum*), alkali mallow (*Malvella leprosa*), all native species, and rabbit's foot grass (*Polypogon monspeliense*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and bird's foot trefoil, all non-native species. The watercourse that forms the pond supports water plantain, water buttercup (*Ranunculus aquatilis*), and prairie bulrush (*Bolboschoenus maritimus*). A CNPS list 4 species Lobb's aquatic buttercup also grows in this seasonal pond in an area next to Highway 121 (Figure 7b).

### 4.8.2 Wildlife Values

This pond is a valuable wildlife feature because it supports a variety of water birds while inundated. Species of waterfowl observed on the pond include Canada goose, mallard, American widgeon, and cinnamon teal. Shore birds present at this pond include killdeer, black-necked stilt, Wilson's snipe, and greater yellowlegs. Great egrets, snowy egrets, and probably great blue herons forage in this pond as well.

This pond is likely to provide breeding habitat for native northern Pacific treefrogs and western toads, which also makes it likely habitat for common garter snakes and terrestrial garter snakes. Habitat for California red-legged frog (*Rana draytonii*) and western pond turtles (*Actinemys marmorata*) also occurs at the pond although they have not been observed there.

## 4.9 STREAMS

### 4.9.1 Tolay Creek

Tolay Creek extends approximately 2.7-2.8 miles downstream of the northern boundary of Tolay Creek Ranch with Tolay Lake Regional Park (Figures 5a and b). Tolay Creek varies from about 8 to 15 feet wide. The channel is incised an estimated 1 to 10 (or perhaps more in places) feet from the top of the bank to the channel bottom throughout much of the site. The deeper portions occur in the middle reaches of Tolay Creek. Terraces indicating the former channel of Tolay Creek occur 1 to 4 feet above portions of the channel of Tolay Creek. The substrate of Tolay Creek consists of silt and sand in low velocity segments of the creek, while gravel and cobbles occur where the current flows faster. The deeper pools within the channel contained standing water into October 2008, while the majority of the creek dried by summer. Presumably the pools that contained water are perennial considering that this is the second dry year in a row.

The vegetation of Tolay Creek consists of both woody and herbaceous species. The woody species were described above in the section on *Riparian Woodland*. The following discussion pertains to the vegetation of the channel of Tolay Creek. Some reaches support cattails (*Typha* sp.), bulrush (*Scirpus* sp.), and spikerush. These species grow within the channel of the creek in small patches 10 to 20 feet long and 3 to 6 feet wide. Smaller stands of the non-native water cress (*Rorippa nasturtium-aquaticum*), cocklebur, and pennyroyle (*Mentha pulegium*) and the native common water-plantain, knotweed (*Polygonum* sp.), and water pennywort (*Hydrocotyle ranunculoides*) also grow in the creek.

The terraces and bank beside the creek support native species including Baltic rush, mugwort (*Artemesia douglansiana*), nettle (*Urtica dioica*), and horsetail (*Equisetum* sp.). Some terraces support saltgrass, a native species adapted to grow in moist salty areas. Non-native species such as teasel (*Dipsacus* sp.), yellow star-thistle, Italian thistle, and non-native grass also grow on the terraces.

Tolay Creek is important for wildlife use due to the presence of year-round water and cover. The occurrence of water in the creek allows wildlife to remain at Tolay Creek Ranch without traveling to the stock ponds that are on adjacent parcels. It is also important for providing breeding habitat for amphibians. The relatively high amount of plant cover allows Tolay Creek and its tributaries to function as movement corridors which allows wildlife to travel unobserved throughout the site and to off-site areas. The combination of cover, water, and dense foliage also provides foraging habitat for wildlife.

### 4.9.2 Tributaries to Tolay Creek

A number of tributaries discharge into Tolay Creek. These tributaries drain both the East and West ridges and are not as wide or deep as Tolay Creek (Figures 5a and b). Most of these tributaries are incised and the banks of some of these tributaries are eroding. Some may contain pools that remain into the summer. The larger tributaries generally support woody vegetation along at least a portion of their reaches while the upper reaches usually support herbaceous vegetation, not woody.

## 4.10 ROCK OUTCROPS

Rock outcrops provide habitat for native plants and animals. Some of the mapped rock outcrops consist of cobble fields in which cobbles and small boulders occur on shallow soil. Other rock outcrops consist of large boulders protruding from either deep or shallow soil. The historic rock walls, although not a natural feature, also provide habitat for small mammals and function as rock outcrops. Figures 5a and b show the location of the rock outcrops.

At Tolay Creek Ranch, rock outcrops occur along the west bank of Tolay Creek and on the East and West ridges. Rock outcrops are often surrounded by shallow soils that support a higher proportion of native plant species than adjacent grasslands. Some of the rock outcrops, however, are heavily used by cattle for rubbing and support ruderal plants typical of disturbed areas. The rock outcrops along Tolay Creek are often located below coast live oak trees and support poison oak, snowberry, California rose, wild cucumber, and Duchman's pipe. Species include the non-native yellow star-thistle and Italian thistle and the native fiddleneck (*Amsinckia menziesii* var. *intermedia*). Wildlife species are likely to use rock outcrops for dens or observation posts. California ground squirrels often construct their burrows at rock outcrops.

# 5.0 SPECIAL-STATUS SPECIES

A variety of special-status species and sensitive habitat types occur at Tolay Creek Ranch. Special-status species observed during field work or otherwise known to occur on-site include Marin western flax (*Hesperolinon congestum*), Lobb's aquatic buttercup, marsh zigadene (*Zigadenus micranthus* var. *fontanus*), California red-legged frog, western pond turtle, golden eagle, burrowing owl, California horned lark, grasshopper sparrow, and Opler' longhorn moth (*Adela oplerella*).

Locations of special-status species and their habitats are mapped on Figures 7a and b. Sensitive habitats that occur at Tolay Creek Ranch are oak woodlands, riparian woodlands, native grasslands including serpentine areas, wetlands, and rock outcrops (Figures 5a and b).

The CNDDB query provides a list of special-status species that are known to occur in the vicinity of Tolay Creek Ranch and therefore could potentially occur on the ranch. The CNDDB query covers a relatively large area surrounding Tolay Creek Ranch and as such includes species that occur in habitats that are not present (such as salt marsh) or species that are restricted to a particular geographic area such as Mt. Tamalpais. Only those species whose known distribution could encompass Tolay Creek Ranch or whose habitats occur on Tolay Creek Ranch are addressed in this report as potentially occurring on the ranch.

## 5.1 PLANTS

### 5.1.1 Known Occurrences of Special-status Plants

Three special-status plant species, Marin western flax, Lobb's aquatic buttercup, and marsh zigadene are described below and have been observed at Tolay Creek Ranch

**5.1.1.1 Marin Western Flax.** Marin western flax, federally and state threatened and CNPS List 1B, occurs in serpentine barrens and serpentine grassland and chaparral at an elevation between 100 and 1,200 feet. Extensive stands were observed growing in the serpentine of the southwestern portion of Tolay Creek Ranch (Figure 7b). This is the only known location of this species in Sonoma County. It grows on shallow rocky soils and on deeper soils. It often grew with the white-flowered hayfield tarweed.

**5.1.1.2 Lobb's Aquatic Buttercup.** Lobb's aquatic buttercup, a CNPS list 4 species, grows in shallow pools in the spring. Their white flowers and leaves float on the surface of the water. It occurs in a vernal pool on the West Ridge, in some ponds that appeared to be created incidentally as part of some former earth-moving activity by heavy equipment, and in the large seasonal pond adjacent to Highway 121 (Figures 7a and b).

**5.1.1.2 Marsh Zigadene.** Marsh zigadene, A CNPS list 4 species, grows in serpentine areas that are usually wet. It can be distinguished from the Fremont's star lily by its summer flowering period and habitat preference for wet serpentine areas although the Fremont's star lily may occasionally occur in

wet areas. A few marsh zigadene plants grow along a tributary to Tolay Creek (Figure 7b) just outside of the serpentine areas mapped on Figure 5b.

### 5.1.2 Potential Occurrences of Special-status Plants

The following plant species are not known to occur within Tolay Creek Ranch, but are known from the vicinity. They were not found during surveys and they are unlikely to occur at Tolay Creek Ranch. Nevertheless, the occurrence of some of these species, especially those of small size, cannot be completely ruled out because small stands could have been overlooked during the surveys.

**5.1.2.1 Franciscan Onion.** Franciscan onion (*Allium peninsulare* var. *franciscanum*), CNPS List 1B, occurs on clay soils, often on serpentine, and on dry hillsides at an elevation between 330 and 1,000 feet. Although not encountered during surveys, small stands of the Franciscan onion potentially occur in the serpentine area of Tolay Creek Ranch.

**5.1.2.2 Sonoma Alopecurus.** Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), CNPS List 1B, occurs in wet areas, vernal pools, marshes and riparian banks. There are a number of wet seeps at Tolay Creek Ranch and although unlikely, small numbers of Sonoma alopecurus growing in a large seep could have been missed during surveys. Although unlikely, the occurrence of Sonoma alopecurus cannot be ruled out from Tolay Creek Ranch.

**5.1.2.3 Napa False Indigo.** Napa false indigo (*Amorpha californica* var. *napensis*), CNPS List 1B, occurs in openings in forest, or woodland, and/or chaparral vegetation at an elevation between 500 and 6,500 feet. It is not likely to occur in the site because it was not found during surveys of openings within woodland habitats.

**5.1.2.4 Bent-flowered Fiddleneck.** Bent-flowered fiddleneck (*Amsinckia lunaris*), CNPS List 1B, occurs in woodland and grassland habitats. Bent-flowered fiddleneck was not encountered during surveys of Tolay Creek Ranch. Although unlikely, small stands of bent-flowered fiddleneck could have been missed during the surveys conducted in the extensive area of grassland. Its occurrence therefore cannot be ruled out from Tolay Creek Ranch.

**5.1.2.5 Alkali Milk-vetch.** Alkali milk-vetch (*Astragalus tener* var. *tener*), CNPS List 1B, occurs on alkali flats, flooded areas of annual grassland, in playas, or in vernal pools at an elevation between 1 and 550 feet. Alkaline or salty soils occur in the seasonally ponded area along Highway 121. Alkali milk-vetch is not likely to occur within Tolay Creek Ranch because it was not found during surveys.

**5.1.2.6 Sonoma Sunshine.** Sonoma sunshine (*Blennosperma bakeri*), CNPS List 1B, occurs in vernal pools and swales at an elevation between 30 and 330 feet. It is not likely to occur at Tolay Creek Ranch because it was not found during surveys.

**5.1.2.7 Narrow-anthered California Brodiaea.** Narrow-anthered California brodiaea (*Brodiaea californica* var. *leptandra*), CNPS List 1B, occurs in broad-leaved upland forest, chaparral, and lower montane coniferous forest at an elevation between 360 and 3,000 feet. Most of the observations were from areas beside scrub or chaparral (CNDDB 2008). Habitat for the narrow-anthered California brodiaea occurs in the rocky area that supports some shrubs at the western border of Tolay Creek

Ranch. It is not likely to occur in the site because it was not found during surveys within suitable habitats.

**5.1.2.8 Round-leaved filaree.** Round-leaved filaree (*California macrophyllum*), CNPS List 2, occurs in grasslands on clay soil between an elevation of 50 and 4,000 feet. Although not encountered during surveys, the grassland habitat is extensive and round-leaved filaree potentially occurs in grassland on Tolay Creek Ranch.

**5.1.2.9 Tiburon Paintbrush.** Tiburon paintbrush (*Castilleja affinis* ssp. *neglicta*), Federally endangered and State threatened, occurs in serpentine grassy areas, mostly in Marin County but has been observed in Napa and Santa Clara counties. It is not likely to occur on Tolay Creek Ranch because it was not observed during surveys.

**5.1.2.10 Pappose tarplant.** Pappose tarplant (*Centromadia parryi* ssp. *parryi*), CNPS List 1B, occurs in vernally mesic, often alkaline sites at an elevation between 6 and 1,400 feet. It is not likely to occur within Tolay Creek Ranch because it was not found during surveys of suitable habitats.

**5.1.2.11 Sonoma spineflower.** Sonoma spineflower (*Chorizanthe valida*), CNPS List 1B, occurs in sandy soil at an elevation between 30 and 160 feet. It is not likely to occur in the site because sandy soils are absent.

**5.1.2.12 Yellow larkspur.** Yellow larkspur (*Delphinium luteum*), CNPS List 1B, occurs on north-facing rocky slopes at an elevation up to 330 feet. It has been observed in western Marin County in moist scrubby and rocky habitats. It is not likely to occur at Tolay Creek Ranch because suitable habitat appears to be missing.

**5.1.2.13 Western leatherwood.** Western leatherwood (*Dirca occidentalis*), CNPS List 1B, occurs on brushy slopes and mesic sites; mostly in mixed evergreen and foothill woodland communities at an elevation between 100 and 1,800 feet. It is not likely to occur in the site because its mesic scrub habitat is absent.

**5.1.2.14 Dwarf downingia.** Dwarf downingia (*Downingia pusilla*), CNPS List 2, occurs in vernal lake and pool margins at an elevation between 1 and 1,600 feet. It is not likely to occur in the site because it was not found during surveys of vernal pools or other seasonally ponded areas.

**5.1.2.15 Tiburon buckwheat.** Tiburon buckwheat (*Eriogonum luteolum* var. *caninum*), CNPS List 1B, occurs on serpentine substrates. It apparently is only known from the Tiburon Peninsula although the other variety (*Eriogonum luteolum* var. *luteolum* occurs widely throughout the San Francisco Bay Area. Tiburon buckwheat is not likely to occur at Tolay Creek Ranch.

**5.1.2.16 Fragrant Fritillary.** Fragrant fritillary, a CNPS list 1B species, occurs to the north in Tolay Lake Regional Park on the east-facing portion of the West Ridge. It grows among Fremont's star lily where they both are one of the first wildflowers to bloom in the spring (February-April). Because soils of the West Ridge of both Tolay Creek Ranch and Tolay Lake Regional Park are largely composed of Diablo Clay, other reasons account for the absence of fragrant fritillary from Tolay Creek Ranch. There were extensive stands of Fremont's star lily at Tolay Creek Ranch growing in Diablo Clay, but the fragrant fritillary was not observed growing among them. It often grows in small

stands and would not be easily observed among the extensive stands of the Fremont's star lily, because they both have white flowers. Although unlikely, fragrant fritillary could occur in small stands at Tolay Creek Ranch.

**5.1.2.17 Burke's Goldfields.** Burke's goldfields (*Lastenia burkei*), CNPS List 1B, occurs in vernal pools and swales at an elevation between 50 and 1,900 feet. It is not likely to occur on the site because it was not found during surveys of ponded areas or the saturated soil of wetlands.

**5.1.2.18 Contra Costa Goldfields.** Contra Costa goldfields (*Lastenia conjugens*), CNPS List 1B, occurs in vernal pools, swales, low depressions, and open grassy areas at an elevation between 1 and 1,500 feet. It is not likely to occur at Tolay Creek Ranch because it was not found during surveys of ponded areas or the saturated soils of wetlands.

**5.1.2.19 Legenere.** Legenere (*Legenere limosa*), CNPS List 1B, occurs in the beds of vernal pools at an elevation between 1 and 3,000 feet. It is not likely to occur in the site because it was not found during surveys of ponded areas.

**5.1.2.20 Jepson's Leptosiphon.** Jepson's leptosiphon (*Leptosiphon jepsonii*), CNPS List 1B, occurs on grassy slopes of volcanic or serpentine substrates at an elevation between 300 and 1,600 feet. It was not observed during the survey of the serpentine areas. If present at Tolay Creek Ranch, Jepson's leptosiphon would occur in small colonies.

**5.1.2.21 Sebastopol meadowfoam.** Sebastopol meadowfoam (*Limnanthes vinculans*), CNPS List 1B, occurs in swales, wet meadows, vernal pools, and marshy areas in valley oak savanna. Soil types include poorly drained soil of clay and sandy loam at an elevation between 50 and 400 feet. It is not likely to occur at Tolay Creek Ranch because it was not observed during surveys of the vernal pools and other wet areas of the site.

**5.1.2.22 Marsh microseris.** Marsh microseris (*Microseris paludosa*), CNPS List 1B, occurs in grassland areas between an elevation of 15 and 1,000 feet. Although not encountered during surveys, the grassland habitat is extensive and the marsh microseris potentially occurs in grassland on Tolay Creek Ranch.

**5.1.2.23 Baker's navarretia.** Baker's navarretia (*Navarretia leucocephala* ssp. *bakeri*), CNPS List 1B, occurs in vernal pools and swales on adobe or alkaline soils at an elevation between 15 and 3,000 feet. It is not likely to occur at Tolay Creek Ranch because it was not found during surveys of vernal pools or other ponded and wet areas.

**5.1.2.24 Marin County navarretia.** Marin County navarretia (*Navarretia rosulata*), CNPS List 1B, occurs in dry open rocky places and sometimes on serpentine at an elevation between 600 and 2,000 feet. It is not likely to occur at Tolay Creek Ranch because it was not observed during surveys of rocky areas. In addition, rocky areas were often trampled by cows and supported a weedy flora. Although unlikely, small stands may occur on the serpentine area at Tolay Creek Ranch.

**5.1.2.25 Yampah.** Extensive stands of Kellogg's yampah (*Perideridia kelloggii*), a common species, were observed on the West Ridge. Plants of the rare Gairdner's yampah, (*Perideridia gairdneri* ssp. *gairdneri*), a CNPS List 4 species could potentially grow among the stands of Kellogg's yampah.

Gairdner's yampah grows in moist grassland areas, adobe flats, and grassland areas beneath pine trees (Best et al. 1996). In Sonoma County, Gairdner's yampah occurs much west and north of Tolay Creek Ranch mostly from the Laguna de Santa Rosa westward to the coast. Kellogg's yampah is common and grows in grassland including adobe flats and serpentine (Best et al. 1996). Gairdner's yampah is therefore not very likely to occur at Tolay Creek Ranch because it was not observed during surveys and grows in the western portion of Sonoma County.

**5.1.2.26 Petaluma popcorn-flower.** Petaluma popcorn-flower (*Plagiobotrys mollis* var. *vestitus*), CNPS List 1A, is known from a single specimen collected in the late 1800s from Petaluma. It is thought to occur in wet sites in grasslands or the edges of coastal marshes at a probable elevation between 30 and 150 feet. It is not likely to occur because it was not found during surveys of wet areas of Tolay Creek Ranch.

**5.1.2.27 North Coast semaphore grass.** North Coast semaphore grass (*Pleuropogon hooverianus*), CNPS List 1B, occurs in wet, grassy, and usually shady areas, and sometimes in freshwater marshes at an elevation between 30 and 4,000 feet. It is not likely to occur on the site because it was not found during surveys of wet and ponded areas. A similar species, California semaphore grass was observed in a number of seeps of Tolay Creek Ranch.

**5.1.2.28 Point Reyes checkerbloom.** Point Reyes checkerbloom (*Sidalcea calycosa* ssp. *rhizomata*), CNPS List 1B, occurs in freshwater marshes near the coast usually at an elevation between 15 and 240 feet. It is not likely to occur in the site because it was not observed during surveys of wet areas.

**5.1.2.29 Marin checkerbloom.** Marin checkerbloom (*Sidalcea hickmanii* ssp. *viridis*), CNPS List 1B, occurs on serpentine or volcanic soils and sometimes appears after burns. Its elevational range varies between sea level and 1,400 feet. It is not likely to occur on the site because it was not observed during surveys.

**5.1.2.30 Two-fork Clover.** Two-fork clover (*Trifolium amoenum*), Federally endangered and CNPS List 1B, occurs on relatively deep and probably slightly moist soils. Its height made it susceptible to loss from grazing and weed maintenance along roads. As a result, it was considered extirpated until it was observed at a site of recent disturbance in the 1990s. Due to the continually heavy grazing at Tolay Creek Ranch, two-fork clover is not likely to occur there.

**5.1.2.31 Saline Clover.** Saline clover (*Trifolium depauperatum* var. *hydrophilum*), CNPS List 1B, occurs in saline or alkaline areas. It was not observed at the edge of the seasonal pond adjacent to Highway 121 and is therefore not likely to occur at Tolay Creek Ranch.

**5.1.2.32 Oval-leaved viburnum.** Oval-leaved viburnum (*Viburnum ellipticum*), CNPS List 2, occurs in chaparral, cismontane woodland, and lower montane coniferous forest at an elevation between 700 and 4,600 feet. It was not found during surveys and is therefore not likely to occur at Tolay Creek Ranch.

## 5.2 INVERTEBRATES

### 5.2.1 Opler's Longhorn Moth

Opler's longhorn moth is on the special animals list and feeds on the flowers of cream cups, and the adult moths are usually observed resting on the petals of cream cups. One individual of Opler's longhorn moth was observed on the serpentine area of Tolay Creek Ranch (Figure 7b). The only information available from the CNDDB (2008) is that a population was observed in serpentine grassland in 1990-91. The serpentine area supported a large number of stands of cream cups. The size of the stands of the cream cups ranged from a few plants to hundreds of plants.

### 5.2.2 Blennosperma Bee

The blennosperma bee (*Andrena blennospermatis*) is on the special animals list and collects pollen from species of blennosperma. It has been recorded on the common blennosperma (*Blennosperma nanum*) and Sonoma sunshine. The common blennosperma was not very abundant at Tolay Creek Ranch. Nevertheless, this was a dry year, and it is possible that the blennosperma would be more abundant during a year of average rainfall. The blennosperma bee may have the ability to remain in a dormant state through dry years and emerge the following year when rainfall and blennosperma populations are more normal. If blennosperma occurs in relatively large stands at Tolay Creek Ranch, then the blennosperma bee could potentially occur there.

### 5.2.3 Rare Arachnids

Rare arachnids are known from serpentine areas where they occur at the interface between serpentine rocks and serpentine soil. They are most often observed during wintertime. Three genera of harvestman (daddy long-legs) occur on serpentine in the San Francisco Bay Area (*Calcina*, *Microcina*, and *Sitalcina*). The Marin blind harvestman (*Calcina dimuna*) occurs only on Mt. Burdell, across the Petaluma River from Tolay Creek Ranch. The Tiburon micro blind harvestman (*Microcina tiburonensis*) only occurs on the Tiburon Peninsula. Another rare arachnid, ubick's gnaphsodid spider (*Talanites ubicki*) also is only known from Mt. Burdell. Because these species appear to be very restricted, other species of rare arachnids could potentially occur in the serpentine of Tolay Creek Ranch. All three of these species are on the special animals list.

### 5.2.4 Tomales Isopod

The Tomales isopod (*Caecidotea tomalensis*) is on the list of special animals. It occurs in freshwater pools and is known from a site on Sonoma Mountain east of Rohnert Park. On Sonoma Mountain, it also occurs in a stream adjacent to the pond but otherwise is not known from streams. One of the ponds on Sonoma Mountain frequently dries at the end of the season, indicating that the isopods either remain in mud or otherwise are able to withstand short dry periods. The absence of ponds that retain water for long durations indicates that it is unlikely that Tomales isopods occur at Tolay Creek Ranch. A few ponds in Tolay Creek appear to retain water year round, but the ability of a population of the Tomales isopod to survive in a creek habitat without the presence of a perennial pond is not known. It is unlikely that the Tomales isopod occurs at Tolay Creek Ranch.

### 5.2.5 Zerene Silverspot Subspecies

An un-named subspecies of the zerene silverspot butterfly (*Speyeria zerene*) occurs on the adjacent Cougar Mountain property (Figure 3) and potentially occurs on Tolay Creek Ranch. Because it has not yet been described as a species and named in the taxonomic literature, it is not on any list of special-status species. Once it is taxonomically described, it will most likely be on the list of special animals. The larvae of the zerene silverspot feed upon violets. Large stands of Johnny jump-up grow on the West Ridge of Tolay Creek Ranch and are the likely food plant of the un-named silverspot butterfly. This un-named subspecies of silverspot butterfly is likely to be very restricted in its geographic distribution because it apparently is only known from the Cougar Mountain property and has not been observed nearby in similar habitats. Because the subspecies of the zerene silverspot butterfly appears to be restricted in distribution, it and its food plants should be protected.

### 5.2.6 Ricksecker's Water Scavenger Beetle

Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*) is on the list of special animals. It is an aquatic insect that is known from only a few localities in the San Francisco Bay Area. The closest known locality to Tolay Creek Ranch is approximately12 miles further north on Sonoma Mountain. Ricksecker's water scavenger beetles occur in ponds where their predaceous larvae remain on vegetation near the shore. Little else is known regarding Ricksecker's water scavenger beetles. Habitat for Ricksecker's water scavenger beetles occurs in the seasonal pond adjacent to Highway 121 and potentially in the ponds in Tolay Creek. The other ponds and vernal pool at Tolay Creek Ranch do not pond water long enough for the larvae to mature.

### 5.2.7 Marin Hesperian

The Marin Hesperian (*Vespericola marinensis*) is on the list of special animals and is a terrestrial snail that occurs in moist areas. It is only known from central Marin County. It has been observed under leaves of cow parsnip, in leaf mold, in alder woods and mixed evergreen forest, around springs and seeps, and along streams. The Marin Hesperian is unlikely to occur at Tolay Creek Ranch because it appears to be dryer than within its central Marin County habitats.

## 5.3 AMPHIBIANS

### 5.3.1 California Red-Legged Frog

The California red-legged frog was federally listed as threatened on May 23, 1996 (USFWS 1996) and is currently a CDFG species of special concern[1]. The habitat types that this species occupies are diverse and include ephemeral ponds, intermittent streams, seasonal wetlands, springs, seeps, permanent ponds, perennial creeks, constructed aquatic features, marshes, lagoons, riparian corridors, blackberry thickets, non-native annual grasslands, and oak savannas (USFWS 2002). Breeding occurs within ponds in streams, stock ponds, or other types of ponds that contain water into May at a minimum, but usually June or July..

[1] The state status of the California red-legged frog will likely be elevated to candidate due to recent court decisions.

The USFWS published a recovery plan (USFWS 2002) identifying core areas and priority watersheds for focused recovery efforts. Tolay Creek Ranch falls within the Petaluma Creek-Sonoma Creek Core Recovery Area, which was designated because it currently supports frogs, may serve as a source of frogs that colonize adjacent areas, and provides connectivity to core recovery areas to the east and west. The conservation needs identified for this area include protecting existing populations, reducing impacts of urban development, and protecting, restoring, and creating breeding and dispersal habitat.

California red-legged frogs have been observed on and adjacent to Tolay Creek Ranch (Parsons 1996 and Bacchini pers. comm.). They were observed at the pool in Tolay Creek that formed at the boundary with Tolay Lake Regional Park. This pool appears to be perennial because it contained water during the second of two drought years during a visit on October 24, 2008. California red-legged frogs have also been noted within a stock pond and tributary to Tolay Creek within a half mile up-stream of the northern boundary of Tolay Lake Regional Park (CNDDB 2008) and in a stock pond beyond the western boundary of Tolay Lake Regional Park (Parsons 1996).

Breeding habitat for California red-legged frogs also appears to occur in other locations of Tolay Creek on Tolay Creek Ranch. Large pools (Figures 7a and b), some of which contained water during the October 2008 survey, were observed in Tolay Creek. At least some of these pools should provide potential habitat for breeding. Nevertheless, many of these pools lacked cover and may not be used for breeding for that reason.Mapping shows these pools upstream of the entrance road crossing of Tolay Creek. Suitable deep pools may occur downstream of the crossing, but that area had not been surveyed.

No California red-legged frogs were observed during LSA's field visits. The surveys were conducted during the day when there was less chance of success of encountering California red-legged frogs, as compared to night-time surveys (Fellers and Kleeman 2006). Although California red-legged frogs were not observed during surveys by LSA, they possibly occur at Tolay Creek Ranch at a low density. They have been known from Tolay Creek Ranch in the past and because habitat has not appeared to have changed, they could possibly continue to occur there.

The occurrence of introduced American bullfrogs (*Lithobates catesbiana*) limits the suitability of aquatic habitat for the California red-legged frog. Several researchers have attributed the decline and extirpation of California red-legged frogs throughout their range to the introduction of American bullfrogs and predatory fishes (Hayes and Jennings 1986). The presence of California red-legged frogs has been negatively correlated with the presence of American bullfrogs (Fisher and Shaffer 1996), and American bullfrog adults have been observed preying on tadpole, juvenile, and adult California red-legged frogs.

American bullfrogs were not observed at Tolay Creek Ranch but are likely to occur at low densities or occur temporarily as they travel across the ranch. Large bodies of permanent water are absent from Tolay Creek Ranch and breeding populations of American bullfrogs are probably absent. Large American bullfrog populations occur to the north of Tolay Creek Ranch at Tolay Lake Regional Park and adjacent properties. Because of the tendency of American bullfrogs to disperse long distances and because of the adjacent large population, American bullfrogs probably enter Tolay Creek Ranch on a regular basis. The effect of American bullfrogs on the possibly-occurring California red-legged frog is not known.

### 5.3.2 Foothill Yellow-Legged Frog

Foothill yellow-legged frog (*Rana boylii*) is a California species of special concern. They occur in partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Foothill yellow-legged frogs need at least some cobble-sized stones as a substrate for egg-laying. The tadpoles require at least 15 weeks to metamorphose into the juvenile form.

Foothill yellow-legged frogs were not observed in Tolay Creek despite the occurrence of potentially suitable substrate and the occurrence of water in pools into the summer. Foothill yellow-legged frogs potentially occur in Tolay Creek and its tributaries at Tolay Creek Ranch.

## 5.4 REPTILES

### 5.4.1 Western Pond Turtle

Western pond turtle is a California species of special concern. Western pond turtles have been observed in a pool in Tolay Creek downstream of the northern boundary (LSA observations) and either the same individual or an additional turtle was observed in the pool at the boundary with Tolay Lake Regional Park (Neale pers. comm.). They have also been observed in Tolay Lake (Parsons 1996). They occur along the shore of waterbodies and on floating debris. Egg laying occurs in soft or sandy soil, often a considerable distance from any body of water. The limiting resources for the species are the aquatic and the egg-laying habitats.

## 5.5 BIRDS

### 5.5.1 White-tailed Kite

White-tailed kite is a state fully protected species. This species requires open habitats (e.g., grasslands, agricultural fields, marshes) for foraging and dense trees or shrubs for nesting. The diet of white-tailed kites consists almost entirely of mice and voles (Peeters and Peeters 2005). Although no nests were found during our 2008 surveys, suitable nesting habitat is present and white-tailed kites have been observed foraging to the north on Tolay Lake Regional Park (LSA obs.). White-tailed kite is a likely nesting species at Tolay Creek Ranch.

### 5.5.2 Golden Eagle

Golden eagles are a state fully protected species. They nest in trees or cliffs and forage in grasslands. Major food items consist of the California ground squirrel and a variety of rabbit species. Golden eagles have been observed (Bob Neale and LSA field observations) flying over and perching on the West Ridge, and they are regularly observed at Tolay Creek Ranch (Neale pers. comm.).

Nesting is thought to occur in the large blue gum eucalyptus trees at the homestead near where the Sears Point to Lakeville Road enters Tolay Creek Ranch (Figure 7a). A nest structure was observed in this eucalyptus (Neale pers. comm.), although during field work in April 2008 no eagle was observed at this location. Suitable nesting habitat is also present in the eucalyptus and Monterey cypress growing beside Tolay Creek and perhaps in the coast live oak trees at Tolay Creek Ranch.

Golden eagles usually build or repair a few nests prior to choosing one nest to use (Peeters and Peeters 2005). They may not use the same nest every year and will alternate use of several nests. Some pairs of golden eagles may not nest every year (Peeters and Peeters 2005). Golden eagles are also thought to nest elsewhere in the vicinity (Ehret pers. comm) and this nest may be from the same pair as those on Tolay Creek Ranch.

Golden eagle is a possible nesting species at Tolay Creek Ranch. The ranch also likely encompasses foraging territory of golden eagles nesting elsewhere.

### 5.5.3 Burrowing Owl

Burrowing owls are a state species of special concern and have been observed in a rock outcrop near a ranch road on the West Ridge (Neale pers. comm.) (Figure 5a). They are also known from rock outcrops at Tolay Lake Regional Park (Ehret pers. comm. and LSA obs.) and the Sonoma Land Trust's Sears Point property (Neale pers. comm.). The use of these areas is typically by single individuals during the winter and spring indicating dispersing juvenile or over-wintering birds, although several were observed in concrete rubble on the Sears Point property. The owls prefer short grass and respond well to areas that are regularly grazed. This species is dependent on burrows as nest sites and as year-round shelter. The owls typically use burrows created by small mammals, although the owls may subsequently modify the burrows for their own uses. The owls also readily occupy constructed burrows, debris piles, concrete rubble, and other types of shelter.

Burrowing owls appear to be a transitory species at Tolay Creek Ranch and some may occasionally overwinter on the ranch. Due to a climate of cool spring and summer nights, which probably reduces insect prey, the ranch is not optimal breeding habitat.

### 5.5.4 California Horned Lark

California horned larks are on the list of special animals. They were formerly on the list of state species of special concern but were recently removed form that list (Shuford and Gardali 2008). They were observed on the top of the West Ridge during the spring and they most likely nest in grasslands at Tolay Creek Ranch. Because California horned larks can occur in any portion of the grassland at Tolay Creek Ranch, specific observations are not indicated on Figures 7a and b.

### 5.5.5 Grasshopper Sparrow

Grasshopper sparrows are a state species of special concern (Unitt 2008) and are a rather uncommon sparrow of grasslands. Grasshopper sparrows were heard calling at Tolay Creek Ranch and are presumed to nest in the grasslands supporting dense grass growing taller than 12 or 18 inches. Grasshopper sparrows were also observed at Tolay Lake Regional Park and are presumed to nest there as well.

### 5.5.6 Tricolored Blackbird

Tricolored blackbird is a California species of special concern. They nest in large colonies in cattails and tules, or Himalayan blackberry associated with creeks or ponds, or in grain fields. Their nesting colonies can range from 100 birds to tens of thousands of birds. Himalayan blackberry occurs in the understory of the woodland along Tolay Creek or in small stands in grassland and was therefore not suitable to support colonies of nesting tricolored blackbirds. Tricolored blackbirds are unlikely to occur at Tolay Creek Ranch as a breeding species, although wintering flocks may visit the ranch.

### 5.5.7 Nesting Birds

Although they are not considered special-status species, almost all native birds and their active nests are protected by the federal MBTA and the California Fish and Game Code.

## 5.6 MAMMALS

### 5.6.1 American Badger

American badger is a state species of special concern that occurs in open areas, including dry grasslands. Because of its semifossorial habits, it requires friable soils in open, uncultivated ground suitable for burrowing. It also requires healthy populations of ground squirrels and pocket gophers, its two primary prey items (Jameson and Peeters 2004). Although there are no records of this species in the immediate vicinity of Tolay Creek Ranch, suitable habitat conditions are present along the East and West ridges and in the Lower Tolay Valley.

### 5.6.2 Townsend's Big-Eared Bat

Townsend's big-eared bats (*Corynorhinus townsendii*) are a state species of special concern. Although this species occurs in a wide variety of habitats throughout California (CNDDB 2008), it is extremely sensitive to human disturbance as it roosts in the open (i.e., from walls or ceilings of old buildings). Nursery colonies have been found in caves, mine shafts, and buildings (Jameson and Peeters 2004). No roosts of this species are known from the immediate vicinity of Tolay Creek Ranch, but a shack on the site represents potential habitat. In addition, Townsend's big-eared bats roosting in the region may forage over the site at night.

### 5.6.3 Pallid Bat

Pallid bat (*Antrozous pallidus*) is a state species of special concern. It is somewhat more common than other special-status bats, occurring throughout most of California at elevations below 6,500 feet (Jameson and Peeters 2004). The pallid bat feeds mostly on flightless arthropods. Pallid bats have been observed flying low (6 to 36 inches) to the ground searching for prey. After locating its prey, it will drop to the ground, grab the prey in its mouth, and fly to a feeding roost to consume the prey. (Texas Parks and Wildlife 1997). Roosting occurs in fissures in cliffs, abandoned buildings, bird boxes, and under bridges (Jameson and Peeters 2004). Several roosts of this species are known from the general vicinity of Tolay Lake (CNDDB 2008), and suitable roosting habitat in the shack is present on site. As such, this species has moderate potential to occur within the study area.

# 6.0 POTENTIAL CONSTRAINTS

Tolay Creek Ranch will eventually become part of Tolay Lake Regional Park with trails and potentially other visitor-serving amenities. In addition, existing management activities such as fence installation and road repair, could also affect biological resources. The special-status species and the sensitive plant communities that occur at Tolay Creek Ranch pose constraints for trails, fences, road repair and other infrastructure that may be proposed for the ranch to accommodate the public and existing management activities. There is likely to be flexibility in siting the trails, fences, and other proposed features. Impacts, if any, are likely to be small. Enhancing the sensitive plant communities through management is likely to off-set any impacts.

Recreational facilities should be located to avoid impacts to sensitive habitats such as serpentine areas, wetlands, native grasslands, riparian woodland, buckeye woodland, and oak woodland where possible. Trail crossings of these habitats should be designed to minimize impacts. Picnic and vista areas should be located away from sensitive resources, if possible, or should be reduced in size to lessen impacts. Unavoidable losses of acreage of native grasslands, riparian habitats, woodlands, and wetlands should be replaced at a specified ratio. There is no universally established ratio for impacts to these resources. Mitigation ratios are often based on the sensitivity of a resource with greater ratios applying to the more sensitive resources. Ratios are also based on the ability of the mitigation to replace the functions and values of the affected resource. For example, it may require decades to replace the functions and values of mature trees and thereby justifying a greater mitigation ratio. A minimum mitigation ratio of 1:1 is recommended (with the exception of wetlands) at Tolay Creek Ranch because all habitat is valuable and implementing mitigation will result in conversion of one type of habitat to another. Until we know more about the ecology of Tolay Creek Ranch, it is best to maintain the vegetation in roughly its current state (although enhancement and weed control are recommended). Wetland mitigation ratios are established at 2:1 by the RWQCB.

## 6.1 SENSITIVE PLANT COMMUNITIES AND HABITATS

### 6.1.1 Serpentine Areas

Serpentine occurs in the south western portion of Tolay Creek Ranch (Figure 5b). The serpentine area at Tolay Creek Ranch is a valuable habitat because it is dominated by native species, non-native species are scarce, and it represents vegetation that occurred prior to the colonization of California by the Spanish. The serpentine at Tolay Creek Ranch is dominated by native species including purple needlegrass, California barley, hayfield tarweed, Marin western flax, California goldfields, and other wildflowers. This area should remain intact with as little disturbance as possible. The existing ranch road could also serve as a trail thereby minimizing impacts from trails to this area. This would minimize impacts to the special plant communities that occur on serpentine soils and could reduce impacts to the rare species that occur in the serpentine area (Opler's longhorn moth and Marin western flax). Impacts are not known to Marin western flax from visitors walking the trails at the Ring Mountain Preserve on the Tiburon Peninsula.

### 6.1.2 Native Grasslands

Native grasslands occur mostly on the West Ridge but a few, mostly small, stands also occur on the East Ridge (Figure 5a). Native grasslands are composed of native grass and forbs. This plant community is special because much of the native grassland in lowland California has been developed for urban or cultivated agricultural purposes. Improper grazing has also resulted in the destruction of native grasslands. As with the serpentine area, impacts to the native grasslands should be reduced to the minimum amount possible.

### 6.1.3 Wetlands and Watercourses

Wetlands and watercourses are biologically valuable habitats because 1) they provide hatibat that is required by a large number of wildlife species; 2) their absence can limit the occurrence of wildlife; and 3) they have experienced a tremendous decline due to urban and agricultural development and are not as abundant as formerly. Because of their habitat value, impacts to them are regulated by the Corps, RWQCB, and CDFG. Some of the features discussed below may be jurisdictional and alteration of them may be regulated activities requiring permits. Establishing riparian vegetation along watercourses is a generally beneficial activity if done such that a variety of habitat types remains along the watercourses. Areas dominated by cattails, bulrush, and/or spikerush are valueable and some of these areas should remain along Tolay Creek and its tributaries. Similarly, establishing riparian vegetation in wetlands that support a large diversity of native species would eventually create shade that results in a reduction of species diversity of the wetland, and should be avoided.

**6.1.3.1 Seeps and Seasonal Wetlands.** Seeps and seasonal wetlands occur throughout Tolay Creek Ranch and should be avoided by park infrastructure (Figures 5a and b). Trail crossings of sensitive habitats should be designed to minimize impacts. Infrastructure should be located away from sensitive resources, if possible, or should be reduced in size to lessen impacts. Unavoidable losses of acreage of wetlands should be replaced on a 2:1 basis through habitat creation. The proposed restoration program would most likely result in a large increase in native grasslands and wetlands, which would more than compensate for impacts from park facilities.

**6.1.3.2 Large Seasonal Pond.** A seasonal pond develops during the rainy season at the edge of Highway 121 (Figure 5b). This seasonal pond is a jurisdictional wetland and impacts to it should generally be avoided. Lobb's aquatic buttercup, a CNPS list 4 (watch list) species also grows in the pond. Many non-native species, such as curly dock, bird's foot trefoil, and cocklebur, occur in the seasonal pond and their removal would enhance the biological value of the pond.

**6.1.3.3 Vernal Pool and Seasonal Ponds.** A vernal pool (Figure 5a) and 3 small seasonal ponds (mapped as a single feature) on Figure 5b occur at Tolay Creek Ranch. These ponds support plant species that occur in seasonally ponded areas, including the rare Lobb's aquatic buttercup (Figure 7b). They are likely to be considered to be jurisdictional features. Because they are fairly small, they can be avoided. The seasonal ponds are the result of work by heavy equipment and they could be enhanced by deepening and enlarging. These features are affected by trampling from cattle and fencing should be considered. Prior to fencing, the vegetation should be measured to ensure that any changes to vegetation from the fencing are beneficial.

**6.1.3.4 Tolay Creek and Other Watercourses.** Tolay Creek and the other watercourses at Tolay Creek Ranch are likely to be jurisdictional features and should be avoided to the extent possible by infrastructure with the exception of restoration projects. Any crossing of these features by a trail or road should occur with the least impact. Cattle trample the bed and banks of the watercourses and fencing should be considered.

### 6.1.4 Woodland

Any trails in oak woodlands should be located outside of the root zone in a manner that avoids as much damage as possible. Trails within oak woodlands should also be designed without excavation to the extent possible to avoid damage to roots. Trails should be minimized in riparian woodland in order to reduce impacts to breeding birds by human visitation.

Many species of wildlife are sensitive to the presence of humans. Locating trails and other facilities along riparian areas and other areas where cover is used by wildlife could adversely affect wildlife use of those areas. Repeated use of trails or other park facilities in a particular area may reduce use of those areas by wildlife. Proposed establishment of a dense cover of shrubs would facilitate wildlife movement throughout the ranch, provide additional refuges for wildlife, increase wildlife use of the ranch, and increase the diversity of wildlife.

Riparian areas are known for their habitat value for migratory songbirds including use as nesting areas. Locating a trail within a songbird nesting area may result in disruption of breeding activity, and a reduction of the habitat value of the riparian woodlands. Impacts of trails in riparian habitat could be mitigated by habitat restoration. Widening and lengthening existing riparian habitat containing trails would further mitigate impacts.

## 6.2 SPECIAL-STATUS SPECIES

A number of laws and regulatory agencies protect special-status species. Marin western flax is protected by the federal and state endangered species acts. CEQA addresses other species that can be shown to meet the criteria for listing but are not currently listed. These species could include those listed by the CNPS, those designated as California Species of Special Concern, others that are informally-listed, and those species that are tracked by the CNDDB as special animals. Marin western flax, Lobb's aquatic buttercup, and marsh zigadene are all listed by the CNPS. The golden eagle is protected by the Bald Eagle Protection Act. The California Fish and Game Code and the Migratory Bird Treaty Act protect nesting birds including golden eagle and burrowing owl. The California red-legged frog is federally listed as threatened and is a state species of special concern while the western pond turtle is a state species of special concern. Opler's longhorn moth is on the list of special animals. The zerene silverspot butterfly should be considered in project planning because it is currently only known from the Tolay Creek/Sears Point area.

### 6.2.1 Marin Western Flax

Extensive stands of the Marin western flax occur in the serpentine areas on Tolay Creek Ranch (Figure 7b). These stands should be avoided to the extent possible. A ranch road passes through some

of these stands. Maintenance of this road should occur in a manner that does not substantially affect the adjacent Marin western flax.

### 6.2.2 Lobb's Aquatic Buttercup

Lobb's aquatic buttercup grows in seasonally ponded areas (Figures 7a and b). These seasonal ponds are most likely jurisdictional wetlands and should be avoided.

### 6.2.3 Marsh Zigadene

Marsh zigadene grows in one or two locations near a tributary to Tolay Creek (Figure 7b). The tributary is eroding. Any erosion control measures should avoid the marsh zigadene. If any necessary earth moving is required, where marsh zigadene is present, then marsh zigadine should be established in another area of suitable habitat as mitigation. One manner of implementing the mitigation is to collect marsh zigadine bulbs, propagate them in a nursery, then transplant to suitable habitat.

### 6.2.4 Golden Eagle

Nesting golden eagles can be particularly sensitive to human activity within ¼ mile of the nest. Nesting can occur between February and August but generally occurs some time between March and June or July. A potential nest tree is approximately 1,100 – 1,200 feet from the Sears Point to Lakeville Road (Figure 7a). The sensitivity of the nesting pair of golden eagles to traffic and people in the vicinity of the nest should be examined. If this pair of eagles is sensitive to the presence of people, then a seasonal closure of this road may be appropriate. The specifics of this closure would depend on the distance of humans to the nest, the sensitivity of this particular pair of golden eagles to humans, and the presence of any cover or natural vegetation screen between the nest and humans.

### 6.2.5 Burrowing Owl

The sensitivity of burrowing owls to humans varies; some owls are able to occur in burrows next to a large amount of human activity while others are more sensitive to human presence. Burrowing owls occur in a rock outcrop that is beside an existing ranch road on the West Ridge of Tolay Creek Ranch (Figure 7a). If this ranch road were converted to a trail and if the owls were particularly sensitive, hikers along the trail may disturb them and the burrowing owls may leave. CDFG Guidelines (CDFG 1995) call for buffer widths of 250 feet during the breeding season and 160 feet during the non-breeding season between disturbance and burrowing owl nests. If possible, a hiking trail should avoid this outcrop by 250 feet.

Although no breeding activities by burrowing owls were observed during this season, breeding could occur in the future. Prior to constructing trails, pre-construction surveys would be necessary to preclude impacts to burrowing owls and design mitigation measures. The sensitive period for burrowing owls is between February and September 1.

### 6.2.6 Nesting Birds

California horned larks, grasshopper sparrows, and other ground nesting birds could nest virtually anywhere in the grassland areas of Tolay Creek Ranch. Prior to constructing trails during the nesting season (between February and July 31), preconstruction surveys should be conducted to ensure that nests are not damaged. If nesting birds are observed within 50 to 100 feet of the proposed trail or park feature, then construction should be diverted to areas beyond the buffer until the young birds have fledged. The width of this buffer could vary based on recommendations by a qualified wildlife biologist depending on the circumstances at the nest. These conditions would also apply to trails constructed through woodland and any other habitat occurring at Tolay Creek Ranch.

Nesting raptors would require greater buffers than the 50- to 100-foot buffers often recommended for song birds. Construction and use of trails, roads, or other facilities within 300 feet of a raptor nest could potentially cause stress and nest abandonment. An appropriate buffer should be established around raptor nests and once young have fledged, construction can begin within the boundary of the buffer.

### 6.2.7 California Red-Legged Frog and Western Pond Turtle

California red-legged frogs and western pond turtles potentially use the deeper ponds in Tolay Creek (Figures 7a and b). Trails should avoid the vicinity of these ponds by at least 25 feet, or these ponds should be screened from view by shrubby vegetation, such as California rose, California blackberry, snowberry or taller vegetation such as trees depending on the visibility of the pond from a proposed trail or other feature. Avoidance of wetlands, to the extent possible, elsewhere in Tolay Creek Ranch is also recommended to protect potential frog and turtle habitat. Turtles are more likely to occur in ponded areas, than wetlands where ponding is absent. California red-legged frogs could potentially occur in any wetland while moist or wet. Trail crossings should be designed to minimize disturbance to wetlands and watercourses. Enhancement activities planned for the habitat of the California red-legged frog should occur given the general procedures mentioned below.

Preconstruction surveys, by a qualified biologist, should be conducted prior to trail construction in suitable California red-legged frog and western pond turtle habitat. Depending on the regulatory context and the potential for impacts to California red-legged frogs, consultation with the USFWS may be advised. Additional mitigation may require buffers, monitoring, fencing, and/or replacement of affected habitat.

### 6.2.8 Opler's Longhorn Moth and the Zerene Silverspot Butterfly

Cream cups (food plant of Opler’s longhorn moth) and the Johnny jump-up (food plant of a rare subspecies of zerene fritillary butterfly) could also be affected by the installation of park facilities. Trails and other park facilities should be planned to avoid occurrences of cream cups and Johnny jump-up to the extent possible to avoid impacts to the caterpillars of these two lepidopteran species.

## 6.3 EARTH-MOVING ACTIVITY

Any earth-moving activity would remove vegetation and expose the surface of the soil, which could result in an increase of sediment entering Tolay Creek or its tributaries. This would create a temporary adverse impact until vegetation covers the exposed soil surface. Best management practices should be implemented to reduce the amount of sediment generated. If more than a minor amount of sediment would be generated, based on the size and location of the construction, appropriate erosion control BMPs should be utilized to contain the sediment within the construction area.

## 6.4 PUBLIC USE

Tolay Creek Ranch is a relatively large property with a number of sensitive resources. In general, the sensitive biological resources would not be affected by public use because the large size of the ranch allows for flexibility in placement of facilities and public use. The stands of Marin western flax are extensive and are not likely to be harmed by visitation during guided tours and scientific study. The stands of Johnny jump-up food plant of the zerene silverspot butterfly are numerous and similarly are not likely to be affected by visitation. The Lobb's aquatic buttercup grows in ponded areas that are not likely to be directly affected by human visitation. Scientists interesting in studying the ponds should be made aware of the occurrence of Lobb's aquatic buttercup in order for effects to be avoided. The marsh zigadene grows in a small area that should be avoided by any facilities.

The serpentine areas are valuable due to high plant and insect diversity and the sensitivity of small species to a large amount of trampling. This area has withstood the trampling of cattle since the arrival of the Spanish. The occasional group of 30 hikers participating on a guided hike is unlikely to damage the serpentine flora. Unrestricted visitation should be relegated to established trails through the serpentine areas. The existing ranch road through the serpentine area should also serve as a trail, if possible. Nevertheless, if a more appropriate alignment for the road/trail is determined, the existing road should be decommissioned and restored.

Sensitive resources that should be avoided are nesting burrowing owls and the pools of Tolay Creek that provide habitat for the California red-legged frog and western pond turtle. Visitation is likely to have substantial effects on these resources. If burrowing owls were to nest at Tolay Creek Ranch, any scientific study could be safely carried out from a distance to avoid stressing the owls. Approaching the nest burrow, in order to collect pellets or for other reasons, should be done to minimize stressing the owls such as when the owls are within their burrow or are away from the burrow.

There are relatively few pools that are sufficiently deep in Tolay Creek that are suitable for California red-legged frogs and western pond turtles (Figure 7a and b). Some of these pools may support breeding of the California red-legged frog. Frequent visitation to these pools is likely to drive away these species. Study of these pools, if at all should be controlled.

A dilapidated bridge on the Sears Point to Lakeville Road occurs at the boundary with Tolay Lake Regional Park. California red-legged frogs and a western pond turtle were observed within the pool beneath the bridge. This bridge is located at one of the access points that connect Tolay Creek Ranch with Tolay Lake Regional Park. If this area is to be developed as a major connector and trail, then habitat for the California red-legged frog and western pond turtle should be enhanced in Tolay Creek

and other areas of Tolay Creek Ranch. Although greater opportunities may occur for mitigation at Tolay Lake Regional Park, the apparent absence of breeding American bullfrogs at Tolay Creek Ranch makes Tolay Creek Ranch a superior habitat area.

# 7.0 MANAGEMENT GUIDELINES AND RESTORATION RECOMMENDATIONS

The specific condition of the vegetation present at Tolay Creek Ranch prior to the arrival of Europeans is not known. Kuchler (1977) depicts the study area as grassland on the map of the *Natural Vegetation of California*. The current limited shrub and tree cover and the absence of stumps or logs in the study area supports Kuchler (1977). In addition, Diablo Clay (underlain by calcareous fine-grained sandstone, clayey shale, and weathered siltstone) and Clearlake Clay (underlain by alluvium) are common soils of Tolay Creek Ranch and primarily support grassland vegetation (USDA 1972). The Goulding-Toomes complex (underlain by metamorphosed basic igneous and weathered andesitic basalt for Goulding and andesitic basalt and volcanic breccia for Toomes) is less common than the Diablo soils, but also supports grassland (USDA 1972).

The woodland at Tolay Creek Ranch was probably never well developed and primarily, but not entirely, restricted to the drainages and rocky outcrop areas. For areas in the vicinity of Tolay Creek Ranch that formerly supported woodland, the loss of trees is likely the result of cutting and the subsequent grazing that reduce recruitment of new trees. Upon cessation of grazing, portions of the grasslands of Tolay Creek Ranch may become woodland as have portions of the East Bay hills.

Shrub cover in particular was most likely higher before the introcuction of cattle. Likewise, the breath of the riparian corridors were likely to have been substantially broader and with a more developed multi-layered canopy. The locations and extent of wetlands, native grassland, oak woodland and other native plant communities were highly altered by historic ranching and farming operations, and opportunities thus exist for ecological restoration. In particular, woody vegetation is restricted to portions of watercourses perhaps due to the historic land use practices of grazing or due to incompatible soils where woodland is absent.

Some of the restoration actions that are discussed below involve ground-disturbing activities be they use of earth-moving equipment to fix head-cuts of erosional areas or use of a trowel to plant acorns. Any ground-disturbing activity could potentially affect cultural resources and the cultural resource study (LSA 2009) provides recommendations to avoid or minimize impacts. Ground-disturbing activities should be avoided on sites known to contain sensitive cultural resources.

Ground-disturbing activities may also promote the colonization of an area by non-native plant species. A challenge for the success of restoration is maintaining non-natives at a low density. Control of invasive species should be a part of the restoration activities.

## 7.1 RESTORATION OF SELECTED HABITATS

### 7.1.1 Oak Woodland

Oak woodland currently provides cover along Tolay Creek and its tributaries on the East and West ridges. A variety of age classes of oak trees were observed on site and the role that wildlife and cattle

play in reducing oak regeneration is not clear at Tolay Creek Ranch. Coast live oak has been documented as not adequately regenerating in some areas because of a combination of factors including livestock and wildlife herbivory and competition with dense stands of non-native grasses (McCreary 2001). In addition, oaks may establish seedlings and saplings only during years with unusual weather conditions of summer moisture.

It is likely that oak woodland was never very abundant at Tolay Creek Ranch based on the the presence of Diablo, Clear Lake, and Goulding-Toomes complex soil types that usually support grassland. The Langier soils are underlain by rhyolite or rhyolitic tuff and often support oak woodlands just east of Tolay Creek Ranch and on the East Ridge of Tolay Lake Regional Park. Establishing oak woodland at Tolay Creek Ranch should therefore be done on a very limited scale.

The shrubby understory of the oak woodland provides cover for wildlife. At Tolay Creek Ranch, the understory of oak woodland is patchy with the most well developed understory beneath coast live oak trees. The understory of the deciduous valley oak trees is usually dominated by grassland.

The coast live oak and valley oak woodland could be slightly expanded along selected tributaries to form a more complete movement corridor for the larger species of wildlife (Figure 8a). A combination of fencing cattle from the selected drainages and planting oak trees could be used to accomplish this goal.

Regeneration of oak woodland, including the shrubby understory, should be monitored in fenced areas and oaks planted if monitoring shows an absence of natural regeneration. Oak trees may be planted on slopes above watercourses, such as the upper reaches of the major tributary flowing from the east (Figure 8a). Establishing woody vegetation on the over-steepened slopes of this watercourse would reduce slope failure and reduce sedimentation. The entire reaches of other watercourses were not selected for oak woodland restoration in order to provide open creek side habitat or to avoid adjacent grassland or serpentine habitat, which is also valuable. Seeps occur at some of the upper reaches of the watercourses and these should be preserved as herbaceous vegetation as opposed to converting them to woody vegetation.

Planting could be done using container plants or acorns. The grazing of livestock should be managed to encourage oak regeneration and the establishment of a shrubby understory. The grazing concept applied at Tolay Lake Regional Park (LSA 2008b) is to graze the areas with watercourses and seeps in the winter and spring, when water is not limiting and thereby reduce degradation of these valuable habitats. Nevertheless, cattle use of these areas should be monitored to ensure that damage remains at an acceptable level. The cattle would be moved to other pastures not supporting watercourses and seeps for late spring, summer, and fall grazing.

Sudden oak death (*Phytophthora ramorum*) is known from southern Sonoma County. Two dead coast live oak trees along Tolay Creek appeared to have sudden oak death. If the coast live oaks were to become infected by sudden oak death, restoration should include establishing single-species stands of coast live oak, without an understory. Current research indicates that coast live oaks acquire sudden oak death from other species of plants (M. Garbelletto, pers. comm.). Sudden oak death may result in woodlands dominated by California bay trees because the bay trees are more resistant and they also serve as a vector for the pathogen to infect oaks. The sudden oak death pathogen does not appear to

be able to infect coast live oak trees from nearby coast live oak trees. Other species of nearby trees and shrubs are required for the pathogen to infect coast live oak.

### 7.1.2 Watercourses and Riparian Woodlands

Willow, coast live oak, valley oak, California buckeye, blue elderberry, and big-leaf maple currently grow along Tolay Creek. Prior to the arrival of Europeans, the woodland along Tolay Creek probably supported a greater number of trees and a more complete cover over the creek. Large patches of willow trees, consisting of hundreds of trees, were likely to have grown along the channel of Tolay Creek based on the occurrence of old willow trees currently growing at the top of the bank. Since Tolay Creek has incised, smaller willow trees have occasionally colonized the bed of Tolay Creek.

Where Tolay Creek flows through rolling topography in the Tolay Creek Canyon, big-leaf maples grow among the coast live oaks in the oak woodland that occurs on the banks. In the Lower Tolay Valley (Figure 8b), Tolay Creek is fairly deeply incised for much of its length. Here valley oaks grow at the top of the bank above the incised channel and an occasional willow tree grows in the bed of Tolay Creek.

Restoration of the woodland along Tolay Creek should mimic the existing pattern of vegetation along its banks. The upstream portion of Tolay Creek could support a mosaic of willow and oak trees growing along the bank. Selected areas of the creek bed could support willow vegetation and some areas should be left bare for herbaceous habitat. The coast live oak – big-leaf maple vegetation should be expanded along the middle portions of Tolay Creek in areas where there are large sloping banks above the creek. In the Lower Tolay Valley, clumps of valley oak should be planted on the terrace above the bank and willows should be added to selected areas of the creek bed that retain water for a long duration. Portions of the creek bed should also remain open for herbaceous habitat.

The entire length of Tolay Creek should be fenced. Cattle enter the creek and feed upon the herbaceous vegetation and create hoof prints in the substrate and trample the vegetation. Fencing would preclude this damage of the vegetation of Tolay Creek. Monitoring of the vegetation within Tolay Creek may indicate that cattails and bulrush may become so dense as to grow throughout the pools within the creek. Occassional short-term grazing may be necessary to maintain the habitat diversity of Tolay Creek.

This fencing could occur in phases because of the expense in involved in fencing the several miles of of Tolay Creek within the study area. The first phase of this fencing should include both downstream reaches and upstream reaches of Tolay Creek. It is important to fence the downstream reaches because of the reduced amount of woody vegetation. Such fencing should result in an increase in woody vegetation. Selected upstream areas that contain deep pools or are otherwise habitat of the California red-legged frog and western pond turtle should also be fenced to increase the cover surrounding potential breeding habitat.

### 7.1.3 Native Bunchgrass Grassland

Purple needlegrass and California barley are the most common native bunchgrasses at Tolay Creek Ranch. Purple needlegrass grows in stands on and off of serpentine substrates. The year 2008 was a

very dry year and in some areas the native grass was difficult to observe because the intense grazing kept it at a low stature. Selected stands on and off of serpentine should be fenced to see the effect of grazing on purple needlegrass and associated species. Figures 8a and 8b map candidate areas for fencing. These areas are selected such that native grassland, non-native grassland, and native forbs are chosen to be near each other to reduce the variability among the fenced areas. California barley was mostly observed on the serpentine substrates. Stands of California barley should also be fenced to determine the effect of grazing on it and its associated species.

### 7.1.4 Fragrant Fritillary

Fragrant fritillary grows from a bulb that forms lobes. Each lobe when separated from the bulb, will produce a new fragrant fritillary plant. The fragrant fritillary can be propagated in a nursery setting and then out-planted at selected locations of Tolay Creek Ranch. This propagation for establishment of the fragrant fritillary on Tolay Creek Ranch should only be implemented after exhaustive surveys have been completed. It may be detrimental to a scientific study of fragrant fritillary at Tolay Creek Ranch if genetic stock from a different population were mixed with the genetic stock that naturally occurred at Tolay Creek Ranch.

Such a program to establish fragrant fritillary should not be taken lightly because it results in the "alteration" or human manipulation of an aspect of the ecology of Tolay Creek Ranch. Fragrant fritillary may never have occurred at Tolay Creek Ranch or if not occurring as a population of plants, it may occur as seeds lying dormant in the soil. Nevertheless, undertaking a program to translocate a small number of fragrant fritillary plants to a small area of Tolay Creek Ranch, may provide a great deal of scientific information with minimal detrimental ecolocial ramifications.

### 7.1.5 Seeps

A number of very wet seeps occur at Tolay Creek Ranch. These include the Roche Developed Springs, well developed springs or seeps north of the Roche Developed Springs, and other springs on the East and West ridges (Figure 5b). These wet springs support stands of Pacific rush that can provide cover for wildlife if not grazed. In 2008 they were grazed to a short height. These seeps also support a number of non-native species including tall fescue and bristly ox-tongue.

The effects of grazing should be examined by establishing fenced grazing enclosures in selected areas. It appears that the cattle are having a profound effect on the seeps. Cattle are trampling the vegetation and consuming virtually all the above ground foliage of the plants growing in the seeps. Each selected seep could be partially fenced to compare grazed areas with ungrazed areas of the same seep. The vegetation of each area should be sampled in plots prior to fencing. In this manner, the change in the vegetation of grazed and ungrazed plots can be compared. Monitoring of the grazing regime will help inform management strategies. Grassland monitoring and adaptive management concepts are described in greater detail in the Rangeland Resources Study for Tolay Lake Regional Park (LSA 2008b). If cattle are having a deleterious effect on the vegetation of the seeps, then the seeps can be fenced and water piped to a trough for use by cattle outside of the fence.

If restoration of any seep is needed, the wettest areas could be restored to semaphore grass, rushes, and sedges. Drier areas could be restored to creeping wildrye, meadow barley, and California oat

grass. The non-native species should be removed from these seeps, although it will be very difficult to remove the tall fescue, bristly ox-tongue, and other established weeds because they are growing among the native plants.

### 7.1.6 Rocky Knoll

A rocky knoll is located on the western property line near the serpentine area. This knoll is conical shaped and supports a small tree at the summit (Figure 8b). The plant species that grow here are a combination of scrub and grassland resulting in a diverse assemblage of plants consisting of ocean spray (*Holodiscus discolor*), poison oak, bush monkey flower (*Mimulus aurantiacus*), Chinese houses (*Collinsia heterophylla*), phacelia (*Phacelia* sp.), foothill needlegrass (*Nassella lepida*), Ithuriel's spear, sweet pea (*Lathrys vestitus*), and lomatium (*Lomatium* sp.). Cattle have access to this area and it was heavily grazed in 2008.

This area should be monitored to determine the intensity of grazing and it should be fenced if intense grazing continues. Intense grazing is probably beneficial in some years to prevent the shrubs from increasing in density and out-competing the grassland species.

## 7.2 WILDLIFE ENHANCEMENT

### 7.2.1 California Red-legged Frog

**7.2.1.1 Habitat Enhancement.** California red-legged frogs can breed in seasonal or perennial waterbodies whereas American bullfrogs require perennial waterbodies. Ideal breeding ponds for California red-legged frogs should be deep enough to contain water through June or July but dry by the end of the year to prevent colonization by American bullfrogs. The existing perennial ponds at Tolay Creek Ranch are small and lack cover. California red-legged frogs and their tadpoles would be subjected to predation in these ponds, nevertheless, these ponds may support breeding.

Fencing reaches of Tolay Creek that support breeding habitat for California red-legged frogs is likely to result in increased cover and a resulting increase in suitability for breeding. This would be the most rapid enhancement measure that could be implemented for the California red-legged frog. Surveys should probably be conducted for the California red-legged frog to assess the effectiveness of the enhancement measures.

If fencing does not result in an increase in suitability of habitat for the California red-legged frog, then surveys should be conducted to determine reasons for the absence of successful breeding. Additional enhancement measures could be implemented depending on the results of the surveys.

If the studies indicate that Tolay Creek does not provide good breeding habitat and California red-legged frogs occur on Tolay Creek Ranch, then ponds outside of the channel could be considered to enhance breeding. The drawback of creating ponds is that they are a created habitat that is not natural to Tolay Creek Ranch and they often support dominance of non-native plant species. These non-native species could include curly dock, bird's foot trefoil, Italian ryegrass, rabbit's foot grass, and swamp timothy (*Crypsis schoenoides*). American bullfrogs, may also use these ponds while they contain water. Nevertheless, a special-status species, Lobb's aquatic buttercup, CNPS List 4, has

colonized un-natural seasonal ponds at Tolay Creek Ranch and is likely to colonize additional created ponds.

Ponds could be created by constructing small dams in suitable areas of some of the smaller tributaries to Tolay Creek, by excavating depressions in the floor of the Lower Tolay Valley and/or by diverting a small amount of water from one of the large seeps to a created depression at the edge of the seep. If these ponds were to be created, then spike rush and other shoreline vegetation should be established within any created pond to provide cover for the frogs and their larvae.

Once cover has been established at the breeding ponds, grazing could be used to manage the extent of the cover. Year-round heavy grazing can virtually eliminate freshwater marsh and riparian vegetation reducing cover for frogs and increasing the likelihood of predation. Elimination of grazing, on the other hand, can result in dense stands of cattails that reduce habitat diversity. The optimal condition for red-legged frogs is a mosaic of open water, freshwater marsh, and riparian vegetation. This condition can be created by managing the timing and intensity of livestock grazing. Fencing portions of the ponds could also accomplish this objective.

**7.2.1.2 Control of American Bullfrogs.** Because permanent ponds within Tolay Creek are small, suitability for breeding American bullfrogs is low and the need for control of American bullfrogs is likely to be low in any given year.

### 7.2.2 Western Pond Turtle

Western pond turtles occur in Tolay Creek. Providing habitat for the California red-legged frog would also provide habitat for the western pond turtle.

### 7.2.3 Burrowing Owl

A few burrowing owls are regularly observed at Tolay Creek Ranch in the vicinity of rock outcrops suitable for refuge. The site is probably not optimal breeding habitat due to climatic factors. Burrows suitable for nesting by burrowing owls are limited in extent at the park, in part due to the small numbers of California ground squirrels. Burrowing owls can use the burrows of other types of animals besides ground squirrels (such as foxes), and they have been observed using holes in rock outcrops at Tolay Creek Ranch. Creation of artificial burrows suitable for nesting by burrowing owls could be considered in the short-term. In the long-term, proper range management may encourage an increase in the number of ground squirrels, which would create burrows that could be used by burrowing owls.

### 7.2.4 Mammals

Woody cover for mammals could be expanded at Tolay Creek Ranch as discussed in the section on *Restoration of Selected Habitats*. This would allow mammals to utilize a greater portion of Tolay Creek Ranch and provide cover for mammals traveling through the ranch. Increasing cover would likely increase mammalian diversity and the abundance of northern raccoon, striped skunk, Virginia opossum, gray fox, and coyote. An increase of rabbits could also increase the numbers and diversity of predators at Tolay Creek Ranch.

Tolay Creek Ranch should also be managed to allow the colonies of California ground squirrels to expand. This will increase the diversity of the grassland fauna that uses the squirrel burrows for refuge. California ground squirrels are also important prey species and, as such, may be important in maintaining predator diversity.

## 7.3 NON-NATIVE PLANT SPECIES CONTROL

A number of invasive non-native species occur in sufficient density at Tolay Creek Ranch to warrant control (Figures 6a and b). The most numerous weeds are yellow star-thistle and Medusahead. Other species present in lesser numbers are bristly ox-tongue, purple star-thistle, Italian thistle, milk thistle, black mustard, wild radish, teasel, and Himalayan blackberry. Curly dock and cocklebur should be removed from the large seasonal pond next to Highway 121. In addition, acacia, tamarisk (*Tamarisk* sp.), Monterey Cypress, and blue gum should be managed.

Invasive plants are defined as those that can spread into wildland ecosystems and displace desirable native species, hybridize with native plants, and alter biological communities and ecosystem processes (Cal-IPC 2006). Without control, invasive plants can spread to encompass areas much larger than several acres and become the dominate plant species. This is of particular concern at Tolay Creek Ranch because of the large areas of grassland that are dominated be native species, including the serpentine area. These native grasslands are a very valuable resource because of their scarcity in California. Furthermore, the grasslands support cream cups, the food plant of Opler's longhorn moth (on serpentine soil) and Johnny jump-up, the food plant of an un-named subspecies of zerene silverspot butterfly. Invasive weeds could out-compete these species and threaten these rare insect species. These invasive species correspond with those species listed in Table A of the California Invasive Plant Inventory (Cal-IPC 2006).

The extent and location of weedy species within Tolay Creek Ranch should be monitored annually and appropriate control activities should be implemented. Control/eradication activities such as through physical means (grazing, mowing, hand-pulling), chemical/herbicide means, and/or controlled burning should be implemented in an integrated pest management approach as deemed appropriate for the species and circumstances of the infestation,. Such work should be monitored for effectiveness.

Herbicides should be applied by a Licensed Applicator in accordance with recommendations by the manufacturer to control some weedy plant species. Timing of application would depend on the phenology of the weeds and any restrictions due to seasonal grazing activity or other constraints posed by wildlife on a seasonal basis.

Mowing should be timed carefully to remove weed flowers prior to seed ripening. After initial treatments during the first 2 years, mowing schedules should be adjusted using adaptive management based on the results of monitoring. Mowing height should typically not exceed 3-4 inches. To minimize build-up of thatch and to remove non-native seed-heads before they shatter, the mowing regime should use a haying and baling approach with the bales removed from the property to an appropriate location where weed introduction would not pose a threat.

Weed management through training goats and cows to select invasive species should be evaluated for use on this site (Voth 2006). Depending on the density of weeds, areas where weeds have been controlled may need to be seeded or planted with native perennial grasses to discourage re-establishment of the weeds.

Controlled burning can be an effective manner to reduce weed infestations and enhance grassland areas by reducing thatch and increasing wildflowers. The local fire department may support controlled burning for practice purposes. Timing should occur after rare plants have dropped their seed.

Specific treatments for target invasive species are discussed below in order of perceived threat to native species. It should be noted that as target species prioritized for control become less abundant, other species may fill the void. Additionally, new introductions of invasive species could occur in the future. For these reasons, the invasive plant control program should maintain flexibility based on monitoring to adapt to new challenges and opportunities.

### 7.3.1 Medusahead

Medusahead is one of the most common weeds at Tolay Creek Ranch. It occurs in patches mostly in the lower Tolay Valley with a few small stands on the West Ridge. It does not appear to dominate extensive areas at Tolay Creek Ranch (Figures 6a and b). Medusahead is of concern because it grows very densely and over time can exclude other species including native grasses and forbs. Medusahead has the ability to spread to other areas in the fur of animals and without some type of control, has the ability to grow throughout large areas of Tolay Creek Ranch. It is ranked highly because of its ability to exclude other species and its ability to spread.

A carefully managed combination of prescribed fire, grazing, herbicide treatments, and reseeding with native perennial grasses may be the most effective combination of treatments of medusahead (McKell et al. 1962) and should be considered if feasible. In addition to the intensive grazing program discussed above, the following treatments should be implemented. Mowing during the boot stage is an option, but the straw would have to be baled and removed to prevent seed-heads from shattering and avoid thatch build-up. Treatment with glyphosate between mid-March and mid-May may also be effective in controlling medusahead. Care must be used to avoid herbicide drift onto native species.

Control can be attained through intensive grazing to force livestock to graze medusahead. This high density grazing results in severe competition for forage between animals, forcing them to graze less selectively and more uniformly. Medusahead can be reduced by up to 90% in 2 years of carefully timed grazing treatments (George 1992, George et al. 1989, Wildland Solutions 2005). In addition, Doran (2007) found that over 95% control of medusahead can be attained by very high intensity, short-duration (from a few days to two weeks) livestock grazing in the late spring.

This treatment is successful only when intensive grazing coincides with the period when medusahead is in the “boot” stage (before the seed head emerges from the uppermost leaf). This intensive grazing treatment should be timed (based on frequent observations) to coincide with the boot-stage of the phenology of medusahead, which can vary from late April to early May depending on yearly weather fluctuations (Young et al. 1970). This timing is critical because if livestock grazing ceases prior to the boot stage, the plants will re-grow and produce new seed heads. If grazing occurs after the seed head

emerges from the boot, the livestock will avoid it because of the sharp awns, and there is a high risk of spreading the infestation by livestock after the seed is ripe. Livestock should be removed when grazing has reached the "heavy" level of use, with residual dry matter levels below 500 pounds per acre. Residual dry matter is the amount of vegetation remaining in an area.

### 7.3.2 Yellow Star-thistle

Yellow star-thistle, along with medusahead, is a common weed at Tolay Creek Ranch. It grows throughout Tolay Creek Ranch in patches (Figures 6a and b). A large mapped polygon on the East Ridge consists of a mosaic of smaller patches of yellow star-thistle and grassland (Figure 6).

Yellow star-thistle forms a rosette in late spring and begins to flower in fall. A dense growth of rosettes has the potential to exclude native forbs that grow in the late spring and summer because of shading by the rosette or competition for water. Yellow star-thistle is ranked highly because of its ability to dominate large areas.

Yellow star-thistle is rated as a high priority invasive species by the Cal-IPC (2006). A combination of techniques is most effective in controlling this annual invasive species, including grazing, mowing, burning, herbicide use, and biological controls. Mid to late- spring grazing (May-June), before the plant has produced spines but after bolting, may control seed production and spread to a limited degree (Thomsen et al. 1996).

The following approach may be used to control yellow star-thistle where infestations are extremely dense and other methods cannot be used for some reason. Under this approach, grazing would be initiated within a temporarily fenced enclosure after the growth and elongation of the grasses and yellow star-thistle occurred. High intensity grazing would be applied during the period when yellow star-thistle begins to emerge from the rosette and flower. Repeated treatments would be required to maintain that control. Extra livestock management would be required to keep animals at the site past the normal grazing period, maintain the fencing, and manage the animals. If the resource manager deems it appropriate, sheep or goats may be used instead of cattle for intensively managed grazing treatment of invasive species. In small areas where grazing is not feasible, mowing or herbicides during the same period should be used to control yellow star-thistle.

### 7.3.3 Purple Star-thistle

Purple star-thistle is rated as a moderate priority invasive weed (List B) by the Cal-IPC (2006). This species, unlike yellow star-thistle, is unpalatable to livestock at all life stages and dense stands of this weed can preclude cattle from grazing (Witham 2006). Therefore, this species causes significant losses of forage and is not effectively controlled by grazing. It is often a biennial or perennial species, with rosettes forming the first year followed by flowering the second and subsequent years. It was observed in one area at Tolay Creek Ranch (Figure 6b).

Purple star-thistle has the ability to spread to disturbed areas, including the ranch roads, at Tolay Creek Ranch. A dense growth of purple star-thistle excludes all other species, native or non-native. Purple star-thistle is of a moderate priority for control because it is not very abundant at Tolay Creek Ranch. Nevertheless, it should be monitored to ensure that it does not increase in abundance.

Application of glyphosate in the late spring-early summer on the rosettes and early blooming plants after adjacent desirable annual species have set seed is an effective control (Amme 1985). Care must be taken to limit this treatment to areas devoid of native perennials because this herbicide is non-selective. Selective herbicides that are effective in these cases include 2,4,D; Dicamba; or Garlon 3A. Areas to be treated should be mowed in the early spring prior to seed set to remove standing purple star-thistle flowers and to open the treated areas to grazing (DiTomaso pers. com., reported in Witham 2006). Hand pulling or using a shovel to cut off the purple star-thistle plant, an inch or more below the soil surface, is effective for small patches and individuals of purple star-thistle.

### 7.3.4 Italian Thistle

Italian thistle grows in mostly small stands above the bank of Tolay Creek and in disturbed areas of the non-native grassland and woodland. Its occurrence is spotty throughout Tolay Creek Ranch and is therefore of moderate priority for control. Dense stands of Italian thistle often occur in the same area year after year and they can exclude all other species. It is rated statewide as a moderate threat (Cal-IPC 2006). It reproduces only by seed, which have a high germination rate and can remain viable in the soil as long as 8 years.

Grazing by sheep, goats, and horses can be effective in controlling Italian thistle, but cattle need to be trained to graze it (Voth 2006). Application of selective herbicides (Picloram and 2,4,-D) have shown limited success in controlling this species (ESNERS 2000).

### 7.3.5 Bristly Ox-tongue

Bristly ox-tongue is considered a limited threat throughout California (Cal-IPC 2006). Precise locations were not mapped because it grows in many of the seeps and moist areas and occasionally in grassland at Tolay Creek Ranch. Small infestations may be controlled by hand pulling or hoeing 2-inches below the surface when soils are moist (ESNERS 2000) or by spot spraying. Livestock can also be trained to eat bristly ox-tongue.

Bristly ox-tongue grows in disturbed areas and in moist areas where it is a domint species of the seeps. The rosettes of bristly ox-tongue are quite dense in the seeps and can exclude native plants. Bristly ox-tongue is also a dominant weed at Tolay Lake Regional Park in the fallow fields. This weed is extremely dense in these fields and its wind-blown seeds disperse widely throughout the area. Bristly ox-tongue is of moderate priority for control because it is very abundant and control would necessitate considerable effort.

### 7.3.6 Black Mustard

This species is rated as a moderate invasive species by the Cal-IPC (2008). It grows in localized areas on Tolay Creek Ranch (Figures 6b) and should be at least monitored if it is not controlled. Some ungrazed grasslands support large stands of black mustard that have out-competed the grassland species. These stands of black mustard return in the same location in succeeding years and support few, if any, native species. Black mustard is of moderate priority for control because it is not abundant at Tolay Creek Ranch.

Control methods have not been specifically developed for black mustard, but Cal-IPC suggests hand removal of small stands. Their research indicates that mowing does not result in control. Spot spraying of herbicide (1% solution of glyphosate was suggested for wild radish (*Raphanus sativus*) which is applicable to black mustard (Cal-IPC 2008). Experimental treatments could include intensive grazing followed up by hand control or herbicides.

### 7.3.7 Curly Dock, Bird's Foot Trefoil, and Cocklebur

Curly dock, bird's foot trefoil, and cocklebur grow in the large seasonal pond beside Highway 121 (Figure 8b). They are present throughout the entire seasonal pond both within and outside the boundaries of the Tolay Creek Ranch property. The cocklebur is an annual species while bird's foot trefoil and curly dock are perennial species.

Any control measures should be instituted throughout the entire pond necessitating cooperation with the adjacent landowner. Control would be a large effort and would necessitate much hand weeding or herbicide use. If herbicides are used during the dry season, they should avoid the native species growing among the curly dock, bird's foot trefoil, and cocklebur.

The pond continues to provide wildlife habitat and the non-natives do not appear to be excluding any native wildlife species. Nevertheless, removal experiments may be interesting to implement to determine if the density of native species increases upon removal of these non-native species. Considering the effort necessary to remove these non-native species and considering that they also grow in the off-site portion of the pond, control efforts should be a lower priority. Nevertheless, these species should be monitored to ensure that native plant species continue to persist in the large seasonal pond.

### 7.3.8 Teasel

Teasel is rated as a moderate invasive species by the Cal-IPC (2008). It tends to grow in disturbed areas and at Tolay Creek Ranch it grows along the banks of Tolay Creek in moist areas. Teasel currently grows in a relatively few small stands but has the potential to grow over a much larger area. The rosettes of teasel form a siginificant amount of cover in these moist areas and are likely to exclude native species. Control of teasel would be low priority because it is not very abundant and control efforts would likely require a significant amount of time if done by hand.

Control options are not addressed in Cal-IPC (2008) but could include hand removal using tools and/or herbicide. It is a biennial species indicating that usually requires 2 years to grow to flowering and then it dies after flowering. Removal of seed stalks late in the season prior to dispersing seed may be tried on an experimental basis to determine whether teasel will grow another flowering stalk prior to dying.

### 7.3.9 Himalayan Blackberry

Himalayan blackberry grows most often in the understory of riparian areas where it forms an impenetrable stand among the lower branches and trunks of willow and oak trees (Figure 6b). It also

grows as compact stands in a few grassland areas, and at the head of unvegetated watercourses. When in riparian situations, it dominates the understory, appears to spread, and may exclude other species. Himalayan blackberry, however, provides excellent cover for wildlife such as California quail.

Control could be by either hand removal or use of goats. Control should be phased such that alternative understory plant species would be established nearby prior to removal of a stand or portion of a stand of Himalayan blackberry. In this manner, cover would be maintained for wildlife. We recommend that control of Himalayan blackberry be given a low priority.

### 7.3.10 Blue Gum Eucalyptus, Tamarisk, and Black Acacia

Blue gum eucalyptus and black acacia grow in a few small clumps at Tolay Creek Ranch (Figures 6a and b). These trees should be monitored and seedlings and saplings removed to ensure that these trees do not expand and colonize native habitat. A potential golden eagle nest occurs in the blue gum at the former homestead near the crossing of Tolay Creek by the Sears Point to Lakeville Road (Figure 6a). Tamarisk, a species that is highly invasive to watercourses, also occurs at this historic homestead. Tamarisk should be monitored to ensure that it does not colonize the adjacent seep and tributary to Tolay Creek. If left unchecked, these three species have the potential to cover significant areas of the seeps, watercourses, and grasslands of Tolay Creek Ranch. Valuable wetland and watercourse habitat could be converted to a non-native woodland with a resulting reduction in species diversity. Control of these species would be low priority but removal of seedlings and saplings would be a high priority to prevent spreading.

### 7.3.11 Water Primrose

A speciesof water primrose (*Ludwegia* sp.) occurs within a couple of ponds at Tolay Lake Regional Park. The potential exists for the water primrose to disperse to Tolay Creek or other waterbodies within the general area. If it were to colonize Tolay Creek, it would be very difficult to eradicate because it would have the opportunity to colonize the entire downstream reach of Tolay Creek from Tolay Lake. Tolay Creek and other semi-pemanent waterbodies should be monitored for the occurrence of water primrose.

## 7.4 EROSION

Many of the slopes of Tolay Creek Ranch, especially those on the West Ridge contain landslides that occurred during the Quaternary period. In addition, the East Ridge is susceptible to debris flows (Florsheim 2009). Erosion is occurring at Tolay Creek Ranch in areas where head-cuts occur in watercourses and swales (Figures 8a and b). These head-cuts result in channel incision and the deposition of sediment downstream. They can also result in unstable slopes due to slope steepness. Particularly steep slopes are located along a tributary to Tolay Creek that flows through the “blue soil” area” of the East Ridge which is mapped as gullied land on Figure 4. This unstable “blue soil” also occurs in the West Ridge along a tributary to Tolay Creek (gullied land of Figure 4). Although mapped over an extensive area by the USDA (1972) the erosion occurs within a smaller area than that on the East Ridge.

A slumping and eroding area, slightly less than 0.5 acre, occurs on the northern part of the West Ridge in the Petaluma River watershed (Figure 8a). This area consists of several adjoining large gullies that appear to be expanding. The actively eroding portions of the head-cuts and any actively eroding portions at the top of the slope of the gullies should be smoothed and some type of geotextile applied to prevent further erosion.

Most of the other head-cuts occur in small watercourses or swales and are small themselves. The need to treat head-cuts in watercourses would depend on the size of the head-cut, the amount of sediment deposited by the continuing erosion, and the reduction of slope stability as the head-cut progresses upstream or upslope. Figures 8a and b show the location of some of the head-cuts at Tolay Creek Ranch. Not all of the head-cuts were mapped because they are fairly numerous in each of the watercourses and swales.

Portions of some of the ranch roads are rutted. These portions will continue to erode without repair and could create deep gullies. Many of these rutted areas are located at quite some distance from Tolay Creek and would not appear to directly affect sedimentation of the creek. Nevertheless, there is a fair amount of erosion directly adjacent to the Mengels Ranch road where it runs right next to Tolay Creek, in the upper watershed. These eroded portions of the roads should be repaired.

Erosion at Tolay Creek Ranch can potentially degrade large areas of upland due to the formation of large rills within ranch roads, head-cuts in swales, and the down-cutting of tributaries to Tolay Creek. Furthermore, this erosion may contribute sediment to Tolay Creek. In addition, the Florsheim (2009) study indicates that Tolay Creek has experienced periodic erosion and down-cutting since 1990.

Additional thought and additional study are required to develop priorities in a systematic fashion to address the repair of erosion at Tolay Creek Ranch. To develop these priorities, the Sonoma Land Trust may consider the importance of the deposition of sediment within Tolay Creek, formation of gullies within swales, down-cutting of tributaries to Tolay Creek, and down-cutting of Tolay Creek. Studies may need to occur for each of the topics mentioned above in order to quantify the need for erosion control. Each of these topic areas is briefly addressed below.

Determining the significance of sediment entering Tolay Creek is important since salmonid fish do not spawn in Tolay Creek. Neverthesless there would be the need to determine if there is a significant adverse impact to other aquatic life from sediment. Addressing those areas that contribute the most sediment, may be considered a high priority for erosion control. Areas of swales and tributaries that are experiencing down-cutting may be considered a high priority for erosion control if they are likely to become unstable over time because of the formation of steep slopes and the result of continued erosion and generation of sediment.

Tolay Creek experienced a tremendous amount of down-cutting since `1990 (Florsheim 2009). This down-cutting has left riparian vegetation at the top of the bank, 10 feet or more in some cases. This reduces the ability to develop large areas of riparian vegetation because the water table has likely dropped with the downcutting. For this reason, preventing further down-cutting of Tolay Creek and restoring its riparian vegetation may be the highest priority.

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## 8.3 PERSONAL COMMUNICATIONS

Sam Bacchini, Biological Consultant, EIP Associates, Sacramento, Conducted field work for Parson (1996)

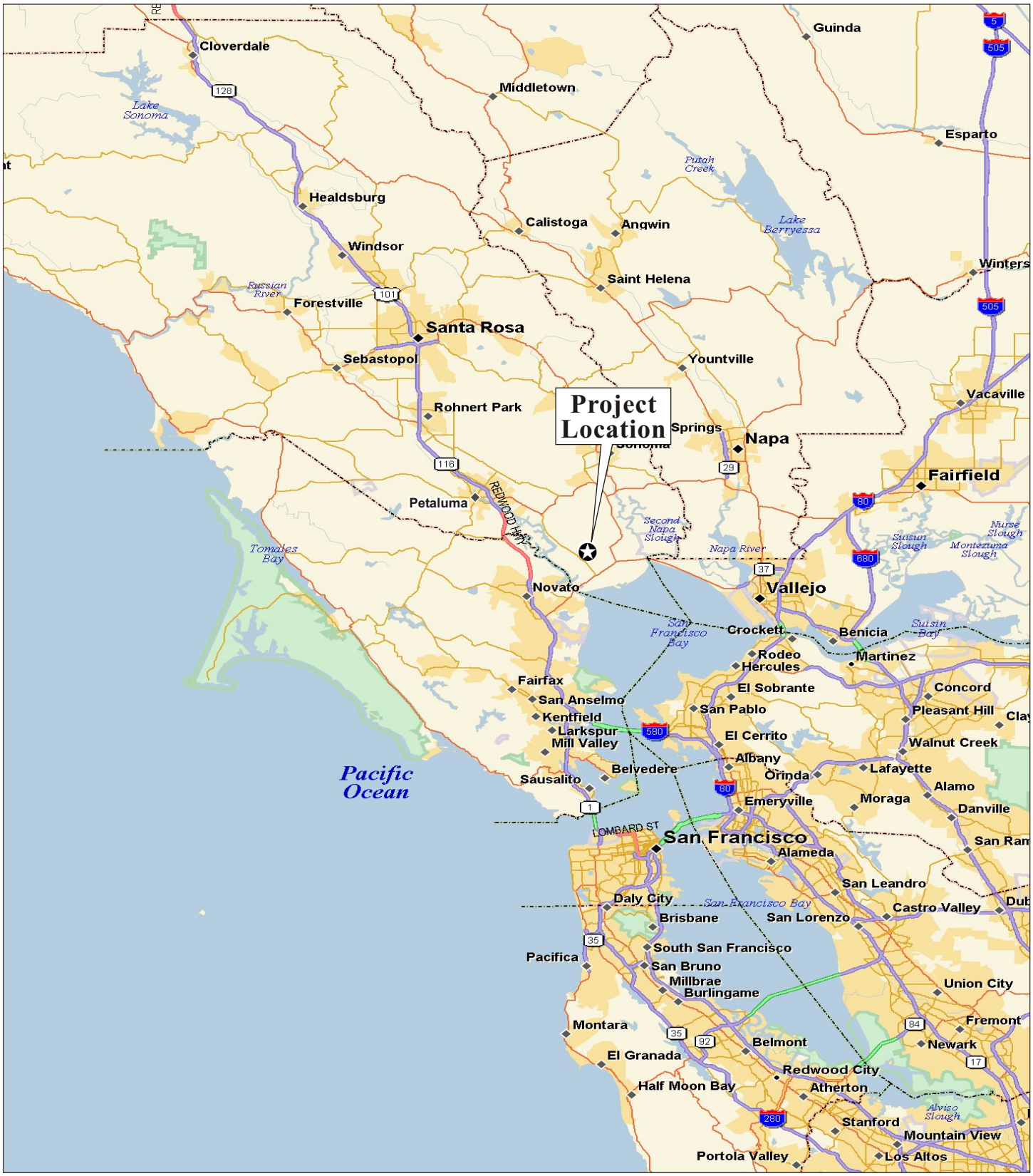
Steve Ehret, Park Planner, Sonoma County Regional Parks, Santa Rosa, California

Matteo Garbelotto, Plant Pathologist, expert on Sudden Oak Death, University of California, Berkeley

Robert Neale, Stewardship Director, Sonoma Land Trust, Santa Rosa, California

B.J. Roche, 2007. Roche Ranch Representative

# FIGURES

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SOURCE: ©2006 DeLORME. STREET ATLAS USA®2006.

FIGURE 1

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Project Location and Vicinity

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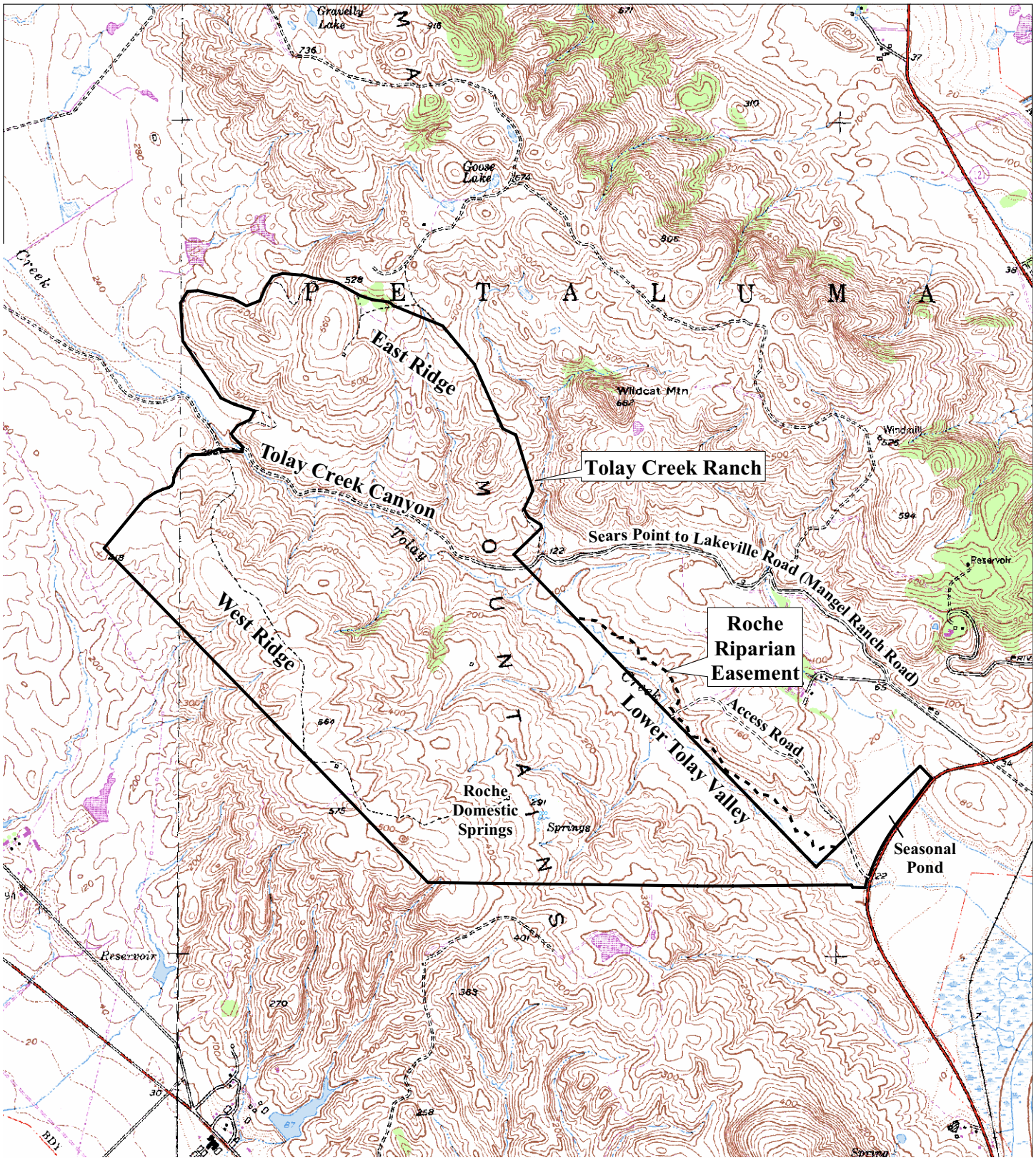


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Feet

— Tolay Creek Ranch Boundary

- - - Roche Riparian Easement Boundary

Study Area Includes Both Tolay Creek Ranch and the Roche Riparian Easement

FIGURE 2

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Study Area

Source: USGS 7.5' topographic quadrangles: *Petaluma River, Calif.* 1980; *Sears Point, Calif.* 1968

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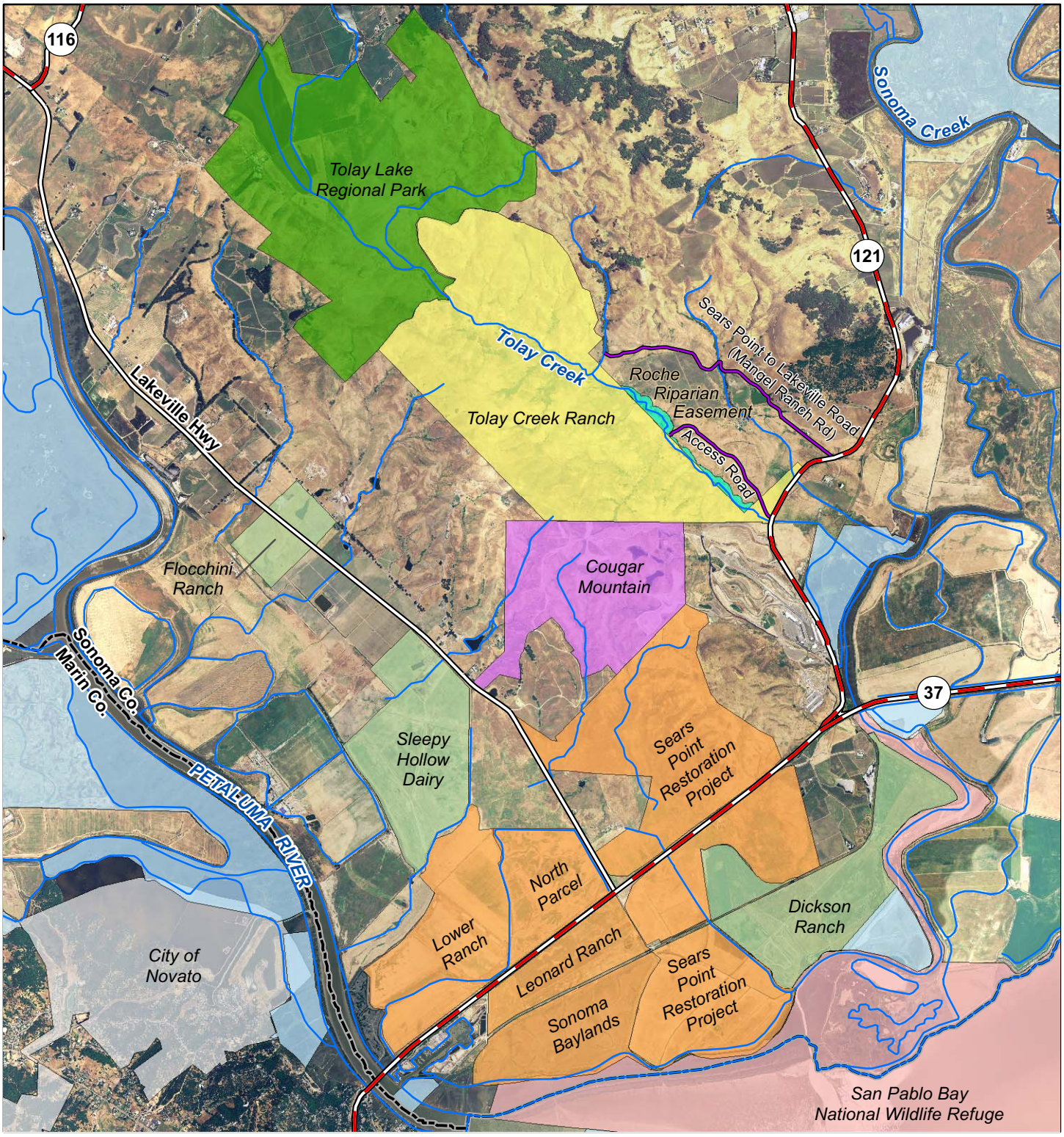


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- Highways
- Major Roads
- Roche Access Roads
- Streams

- Tolay Creek Ranch Property
- Roche Riparian Easement
- Sonoma County Regional Park Dept.
- Sonoma County Ag. Preservation and Open Space District
- Sonoma County Open Space Easement
- Sonoma Land Trust Protected Lands
- Calif. Dept. of Fish and Game Lands
- Other Public Lands

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Source: Ray Carlson & Assoc.; Sonoma County Ag Pres. & OS District; Sonoma Land Trust. USDA NAIP 2005.
Adapted from Circuit Rider Productions, Inc.

FIGURE 3

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Adjacent Properties

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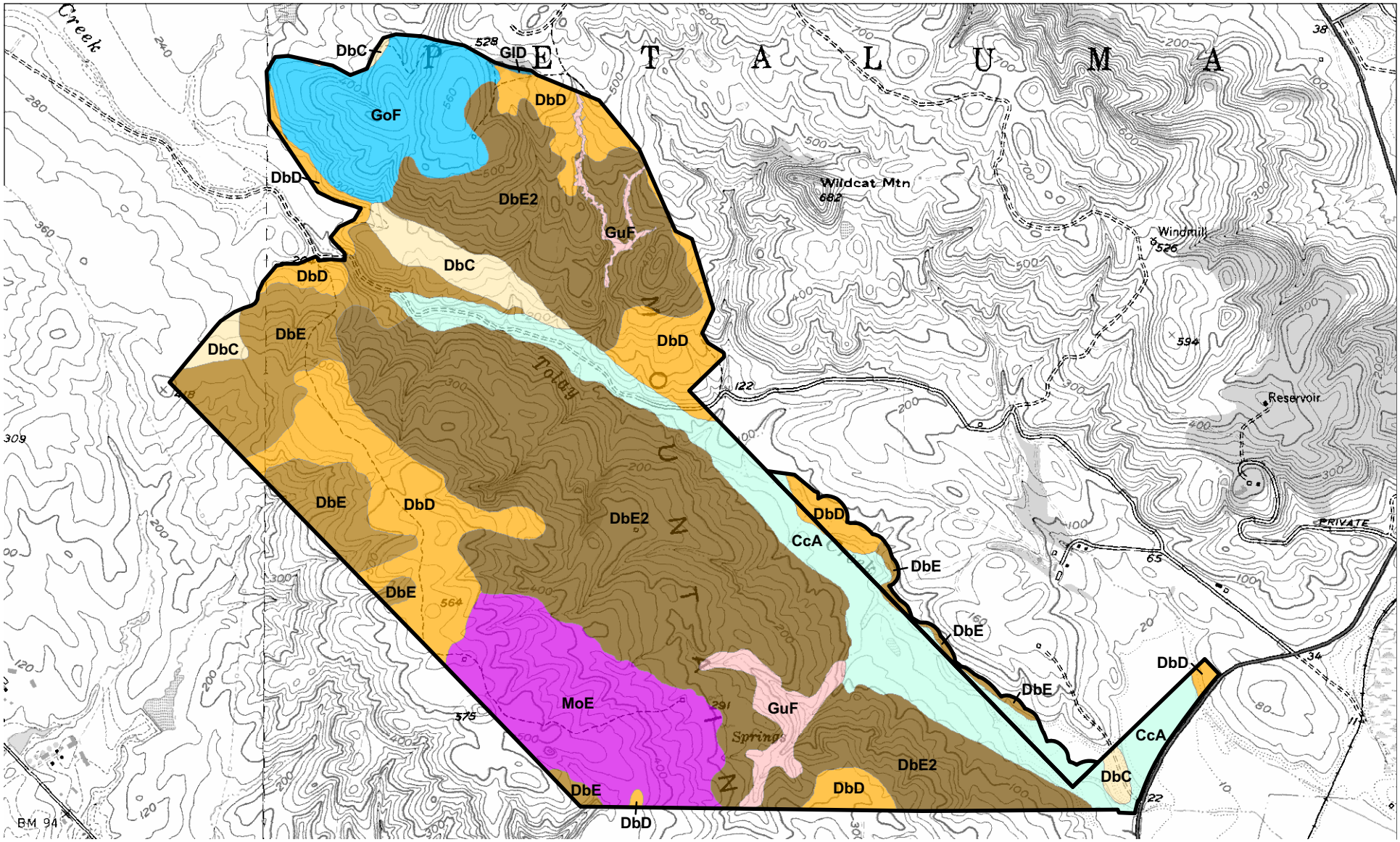


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| | | | |
|---|---|---|---|
| CcA | Clear Lake Clay Loam, 0-2% Slopes | GID | Goulding Cobbly Clay Loam, 5-15% Slopes |
| DbC | Diablo Clay, 2-9% Slopes | GoF | Goulding-Toomes Complex, 9-40% Slopes |
| DbD | Diablo Clay, 9-15% Slopes | GuF | Gullied Lands |
| DbE | Diablo Clay, 15-30% Slopes | MoE | Montara Cobbly Clay Loam, 2-30% Slopes |
| DbE2 | Diablo Clay, 15-30% Slopes, Eroded | | |

FIGURE 4

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Soils

Source: USDA, NRCS 2000; USGS 7.5' topographic quadrangles: *Petaluma River, Calif.* 1980; *Sears Point, Calif.* 1968

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Match Line

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FEET

- Grassland with Native Forbs
- Native Grassland
- Non-Native Grassland
- Woodland
- Rock Outcrops
- Rock Wall
- Serpentine Soils (Montara Cobbly Clay Loam)
- Vernal Pool and Large Seasonal Pond
- Small Seasonal Ponds and Created Pond
- Wetland
- Roche Domestic Springs
- Drainage
- Study Area Boundary

FIGURE 5a

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Vegetation and Habitat Map

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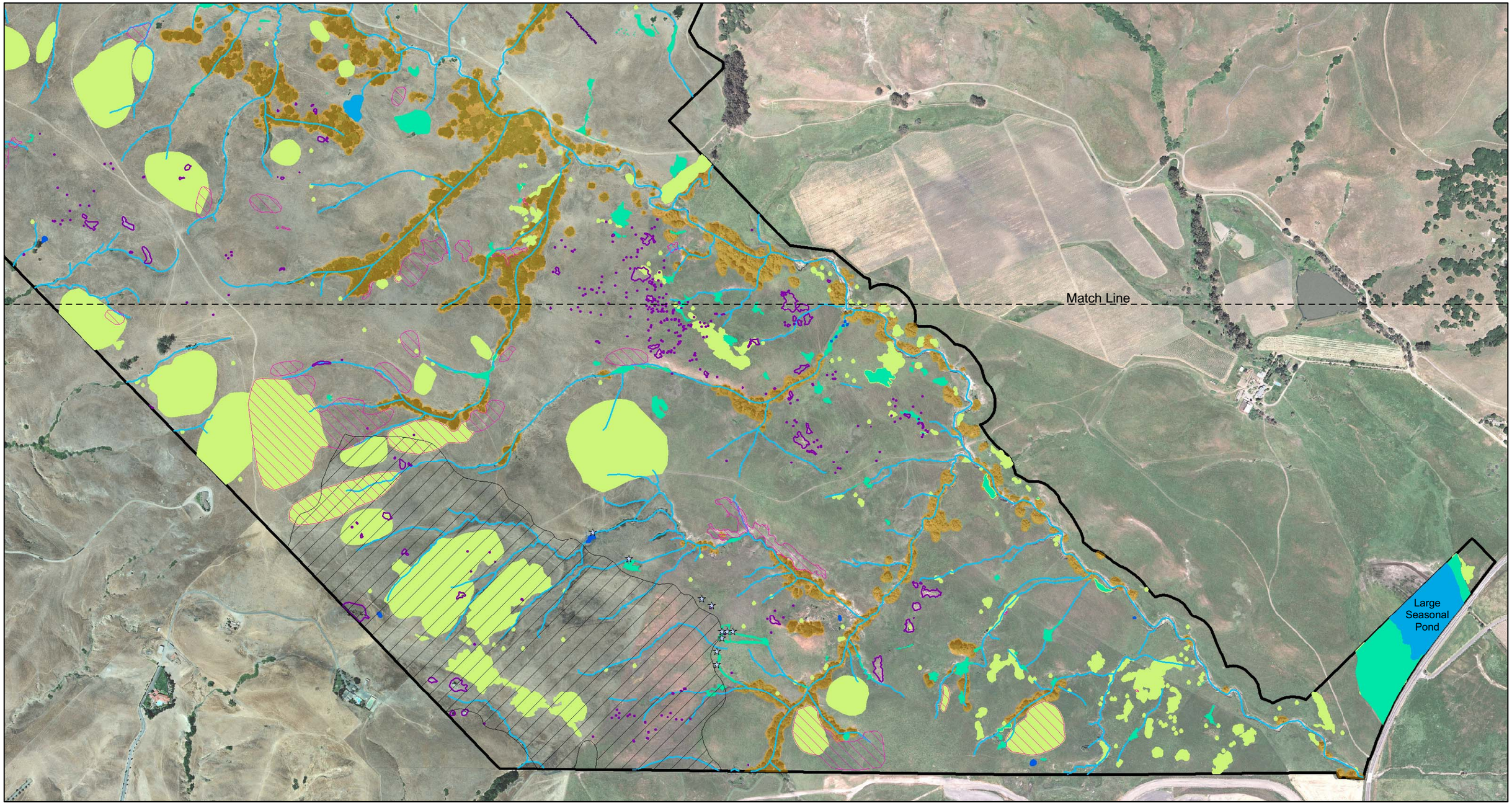


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- Grassland with Native Forbs
- Native Grassland
- Non-Native Grassland
- Woodland
- Rock Outcrops
- Rock Wall
- Serpentine Soils (Montara Cobbly Clay Loam)
- Vernal Pool and Large Seasonal Pond
- Small Seasonal Ponds and Created Pond
- Wetland
- Roche Domestic Springs
- Drainage
- Study Area Boundary

FIGURE 5b

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Vegetation and Habitat Map

I:\SOZ0801\GIS\Maps\Biological Resources Study\Figure5_Vegetation and Habitat Map.mxd (04/22/2009)

Match Line

LSA

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FEET

- Yellow Star-Thistle (*Centaurea solstitialis*)
- Medusahead (*Taeniatherum caput-medusae*)
- Medusahead (*Taeniatherum caput-medusae*) and Yellow Star-Thistle (*Centaurea solstitialis*)
- Himalayan Blackberry (*Rubus discolor*)
- Purple Star-Thistle (*Centaurea calcitrapa*)
- Black Mustard (*Brassica nigra*)
- Blue Gum (*Eucalyptus globulus*)
- Tamarisk (*Tamarix sp.*)
- Black Acacia (*Acacia melanoxylon*)
- Monterey Cypress (*Cupressus macrocarpa*)
- Other Invasive Non-native Species
- Drainage
- Study Area Boundary

FIGURE 6a

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Non-native Species

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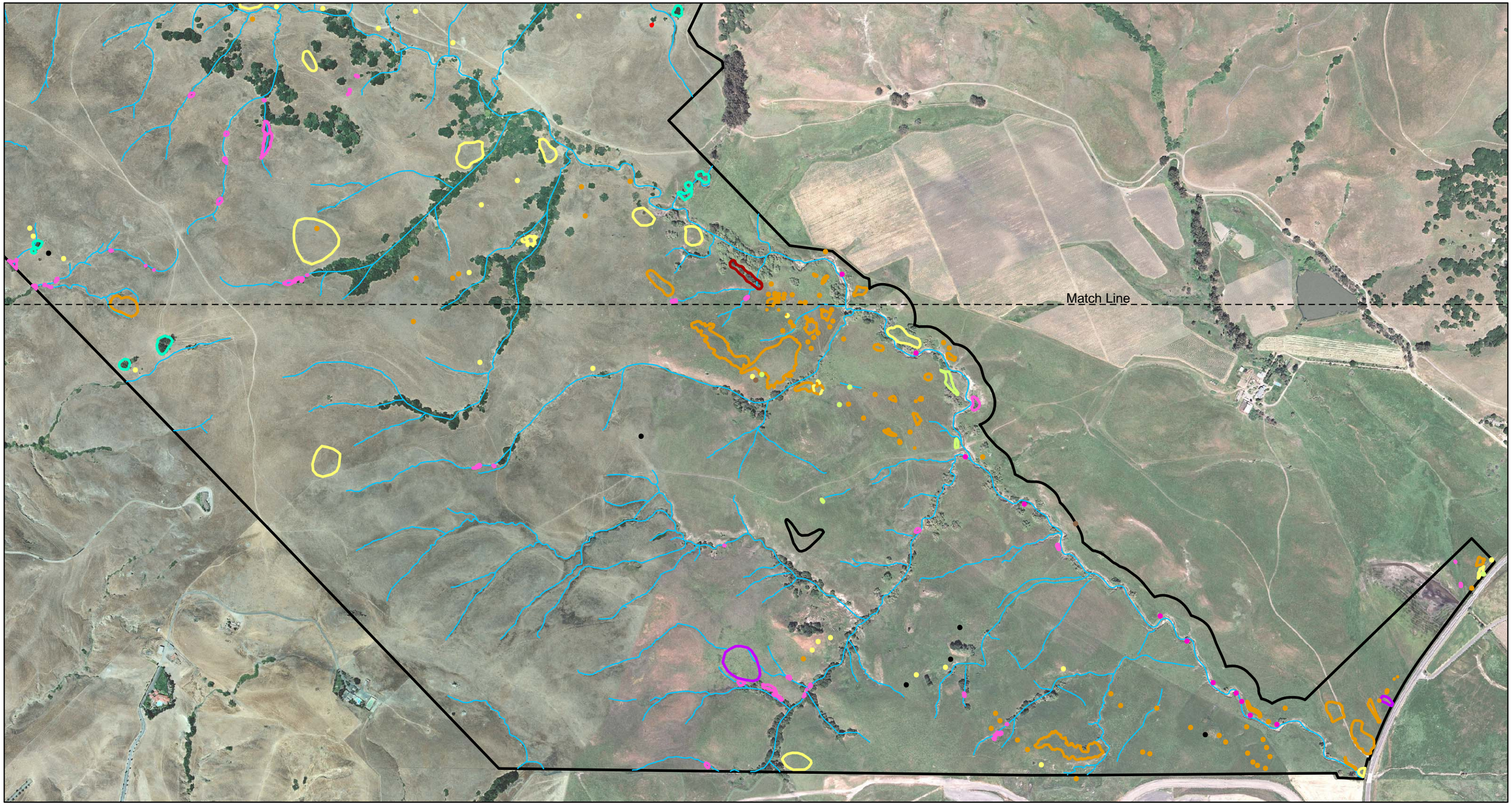


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- Yellow Star-Thistle (*Centaurea solstitialis*)
- Medusahead (*Taeniatherum caput-medusae*)
- Medusahead (*Taeniatherum caput-medusae*) and Yellow Star-Thistle (*Centaurea solstitialis*)
- Himalayan Blackberry (*Rubus discolor*)
- Purple Star-Thistle (*Centaurea calcitrapa*)
- Black Mustard (*Brassica nigra*)
- Blue Gum (*Eucalyptus globulus*)
- Tamarisk (*Tamarix* sp.)
- Black Acacia (*Acacia melanoxylon*)
- Monterey Cypress (*Cupressus macrocarpa*)
- Other Invasive Non-native Species
- Drainage
- Study Area Boundary

FIGURE 6b

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Non-native Species

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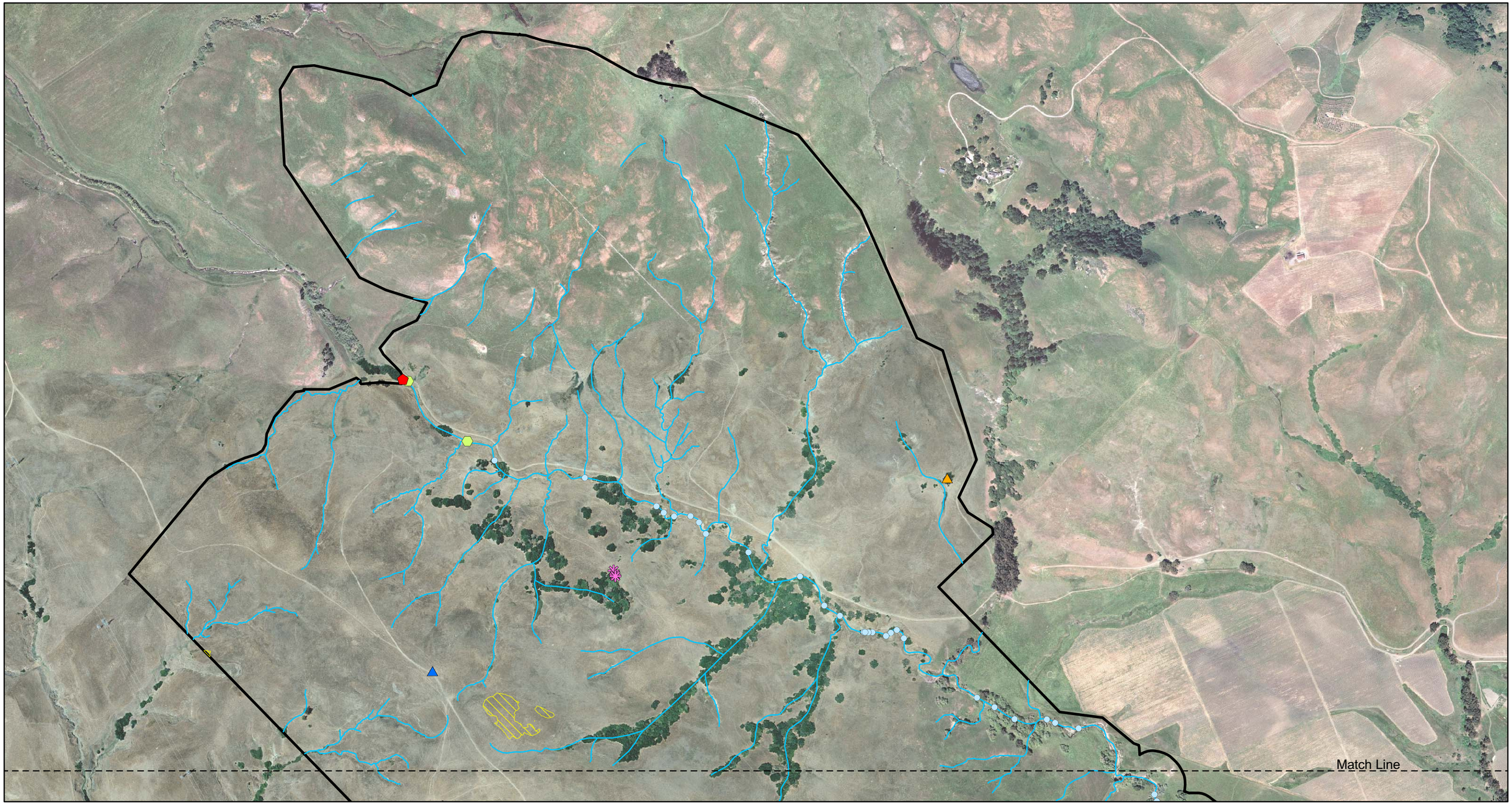


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- Marin Western Flax (*Hesperolinon congestum*)
- Lobb's Aquatic Buttercup (*Ranunculus lobbii*)
- Marsh Zigadene (*Zigadenus micranthus* var. *fontanus*)
- Cream Cups (*Platystemon californicus*), Larval Food Plant for Opler's Longhorn Moth
- Johnny Jump-up (*Viola pedunculata*), Larval Food Plant for Zerene Silverspot Butterfly
- Potential Golden Eagle Nest Tree
- Burrowing Owl
- California Red-legged Frog
- Western Pond Turtle
- Pools in Tolay Creek (field work only completed in upper reaches of Tolay Creek)
- Drainage
- Study Area Boundary

FIGURE 7a

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Location of Special-status Species and Habitat

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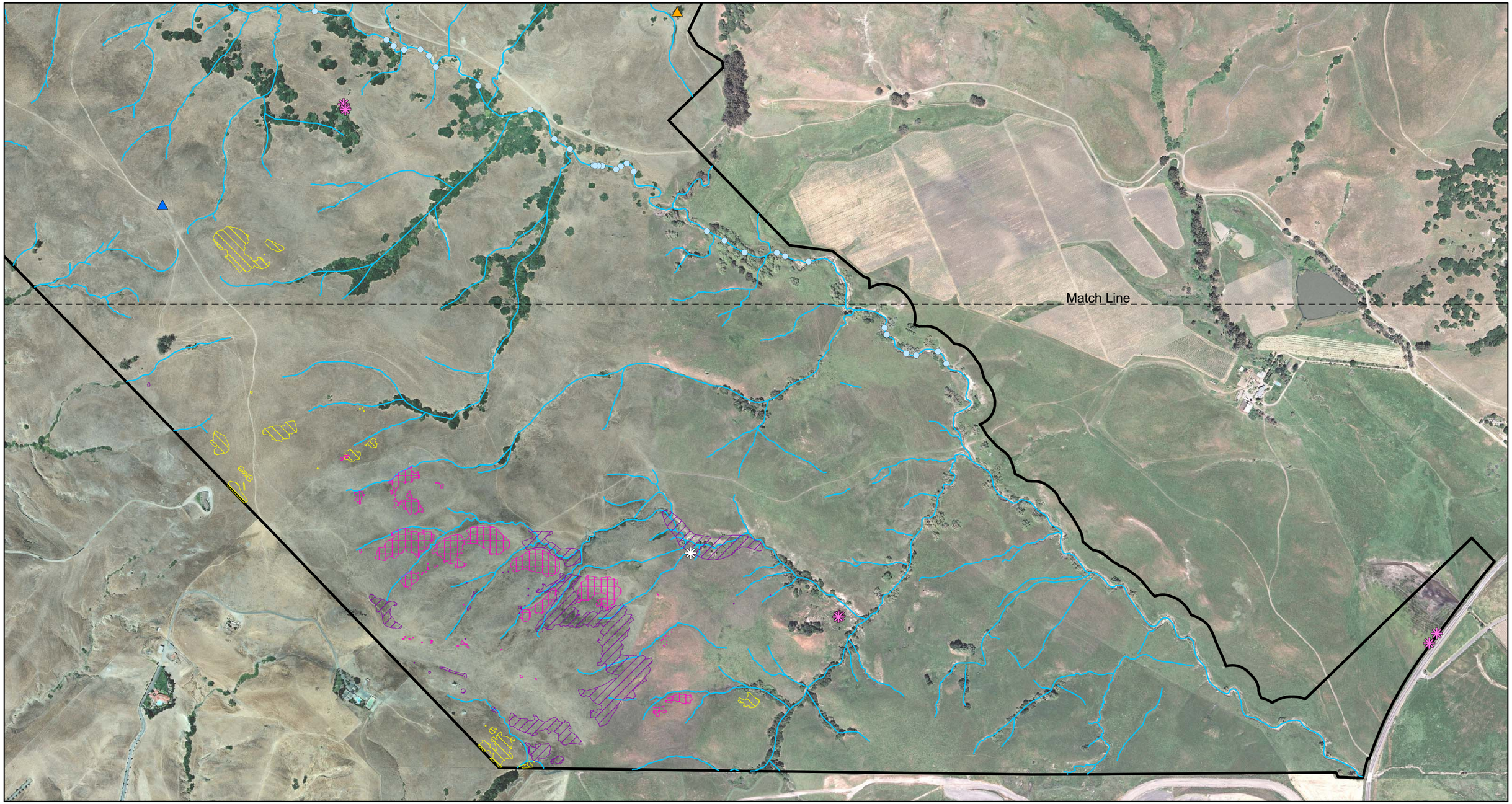


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- Johnny Jump-up (*Viola pedunculata*), Larval Food Plant for Zerene Silverspot Butterfly
- Potential Golden Eagle Nest Tree
- Burrowing Owl
- California Red-legged Frog
- Western Pond Turtle
- Pools in Tolay Creek (field work only completed in upper reaches of Tolay Creek)
- Drainage
- Study Area Boundary

FIGURE 7b

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Location of Special-status Species and Habitat

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LSA

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FEET

Candidate Oak Woodland Restoration Area
Grazing Management Area
Erosion Management Area
Seasonal Pond Management Area

Grazing Exclusion Areas
Native Forbs
Native Grassland
Native Grassland/Forbs
Non-native Grassland

Drainage
Study Area Boundary

FIGURE 8a

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Restoration and Management Areas

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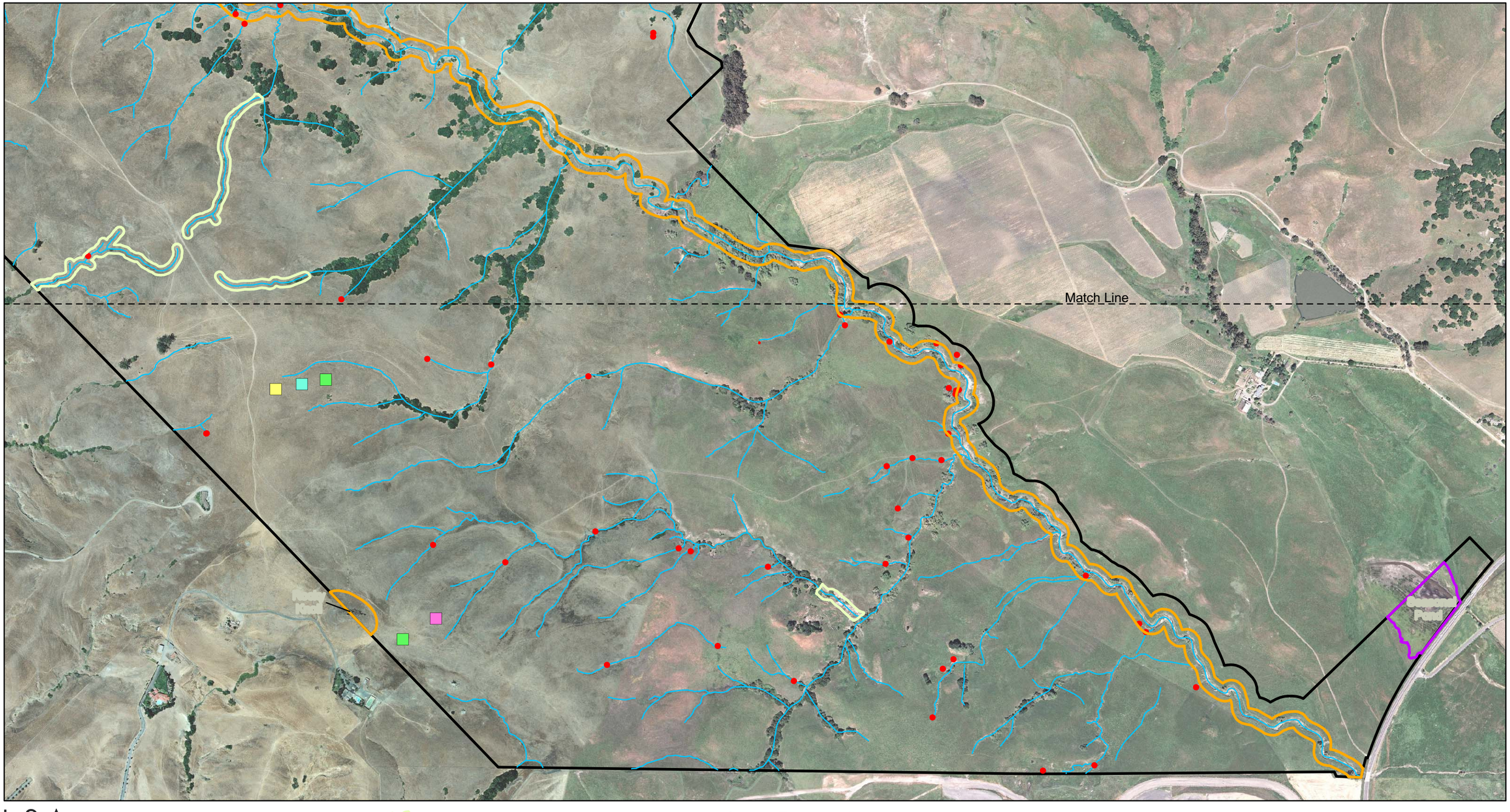


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Candidate Oak Woodland Restoration Area
Grazing Management Area
Erosion Management Area
Seasonal Pond Management Area

Grazing Exclusion Areas
Native Forbs
Native Grassland
Native Grassland/Forbs
Non-native Grassland

Drainage
Study Area Boundary

FIGURE 8b

*Biological Resources Study*

*Tolay Creek Ranch*
*Sonoma County, California*

Restoration and Management Areas

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# TABLES

## Table A: Plant Species Observed, Tolay Creek Ranch 2008

| Family | Scientific Name | Common Name | Native |
|---|---|---|---|
| Aceraceae | *Acer macrophyllum* | big-leaf maple | yes |
| Alismataceae | *Alisma lanceolatum* | water plantain | no |
| Anacardiaceae | *Toxicodendron diversilobum* | poison oak | yes |
| Apiaceae | *Conium maculatum* | poison hemlock | no |
| | *Daucus pusillus* | American wild carrot | yes |
| | *Eryngium aristulatum* | coyote thistle | yes |
| | *Foeniculum vulgare* | sweet fennel | no |
| | *Hydrocotyle ranunculoides* | water pennywort | yes |
| | *Lomatium utriculatum* | spring-gold | yes |
| | *Perideridia kelloggii*. | yampah | yes |
| | *Sanicula bipinnata* | poison sanicle | yes |
| | *Sanicula bipinnatifida* | purple sanicle | yes |
| | *Sanicula crassicaulis* | Pacific sanicle | yes |
| | *Scandix pectin-veneris* | Venus needle | no |
| | *Torilis arvensis* | field hedge parsley | no |
| | *Torilis nodosa* | knotted hedge parsley | no |
| Aristolochiaceae | *Aristolochia californica* | Dutchman's pipe | yes |
| Asclepiadaceae | *Asclepias fascicularis* | narrowleaf milkweed | yes |
| Asteraceae | *Achillea millefolium* | yarrow | yes |
| | *Agoseris grandiflora* | grand mountain dandelion | yes |
| | *Artemisia douglasiana* | mugwort | yes |
| | *Aster radulinus* | broad leaf aster | yes |
| | *Baccharis pilularis* | coyote brush | yes |
| | *Baccharis salicifolia* | mule fat | yes |
| | *Blennosperma nanum* var. *nanum* | common blennosperma | yes |
| | *Carduus pycnocephalus* | Italian thistle | no |
| | *Centaurea calcitrapa* | purple star-thistle | no |
| | *Centaurea melitensis* | Maltese star-thistle | no |
| | *Centaurea solstitialis* | yellow star-thistle | no |
| | *Cirsium vulgare* | bull thistle | no |
| | *Cotula coronopifolia* | brass buttons | yes |
| | *Erigeron philadelphicus* | Philadelphia daisy | yes |
| | *Gnaphalium stramineum* | cotton-batting plant | yes |
| | *Hemizonia congesta* ssp. *congesta* | hayfield tarweed | yes |
| | *Hemizonia congesta* ssp. *luzulaefolia* | hayfield tarweed | yes |
| | *Hesperevax sparsiflora* var. *sparsiflora* | erect hespserevax | yes |
| | *Hypochaeris glabra* | smooth cat's ears | no |
| | *Lactuca saligna* | willowleaf lettuce | no |
| | *Lactuca serriola* | prickly lettuce | no |
| | *Lasthenia californica* | California goldfields | yes |
| | *Lasthenia glaberrima* | rayless goldfields | yes |
| | *Layia chrysanthemoides* ssp. *chrysanthemoides* | tidy-tips | yes |
| | *Layia platyglossa* | tidy tips | yes |
| | *Madia gracilis* | slender tarweed | yes |
| | *Madia sativa* | coast tarweed | yes |
| | *Microseris douglasii* ssp. *tenella* | Douglas microseris | yes |

| Family | Scientific Name | Common Name | Native |
|---|---|---|---|
| | *Picris echioides* | bristly ox-tongue | no |
| | *Senecio vulgaris* | common groundsel | no |
| | *Silybum marianum* | milk thistle | no |
| | *Sonchus asper* | prickly sow-thistle | no |
| | *Taraxacum officinale* | dandelion | no |
| | *Tragopogon porrifolius* | oyster plant | no |
| | *Wyethia angustifolia* | mule's ears | yes |
| | *Xanthium spinosum* | spiny cochlebur | no |
| | *Xanthium strumarium* | cochlebur | no |
| Boraginaceae | *Amsinskia menziesii* var. *menziesii* | Menzies' fiddleneck | yes |
| | *Amsinckia menziesii* var. *intermedia* | intermediate fiddleneck | yes |
| | *Heliotropium curassavicum* | heliotrope | yes |
| | *Plagiobotrys notofulvus* | common popcorn flower | yes |
| | *Plagiobotrys stipitatus* | valley popcorn flower | yes |
| Brassicaceae | *Brassica nigra* | black mustard | no |
| | *Capsella bursa-pastoris* | shepherd's purse | no |
| | *Cardamine californica* | California toothwort | yes |
| | *Cardamine oligosperma* | little western bitter-cress | yes |
| | *Guillenia lasiophylla* | California mustard | yes |
| | *Lepidium nitidum* | peppergrass | yes |
| | *Raphanus raphanistrum* | jointed charlock | no |
| | *Raphanus sativus* | wild radish | no |
| | *Rorippa nasturtium-aquaticum* | water cress | yes |
| | *Sisymbrium officinale* | hedge mustard | no |
| | *Sinapis arvensis* | charlock | no |
| Campanulaceae | *Downingia pulchella* | valley downingia | yes |
| Caprifoliaceae | *Symphoricarpos albus* var. *laevigatus* | common snowberry | yes |
| Caryophyllaceae | *Cerastium glomeratum* | mouse ear chickweed | no |
| | *Minuartia douglasii* | Douglas sandwort | yes |
| | *Sagina* sp. | pearlwort | yes |
| | *Silene gallica* | windmill pinks | no |
| | *Stellaria media* | common chickweed | no |
| Chenopodiaceae | *Atriplex triangularis* | spearscale | yes |
| Convolvulaceae | *Calystegia subacaulis* | stemless morning glory | yes |
| | *Convolvulus arvensis* | bindweed | no |
| | *Cressa truxillensis* | alkali weed | yes |
| Crassulaceae | *Crassula connata* | sand pygmyweed | yes |
| Cucurbitaceae | *Marah fabaceus* | California man-root | yes |
| Cyperaceae | *Bolboschoenus maritimus* | prairie bulrush | yes |
| | *Carex* sp1 | sedge | yes |
| | *Carex* sp2 | sedge | yes |
| | *Cyperus eragrostis* | nutsedge | yes |
| | *Eleocharis macrostachya* | spikerush | yes |
| | *Scirpus acutus* var. *occidentalis* | bulrush | yes |
| | *Scirpus americanus* | three square | yes |
| Dipsacaceae | *Dipsacus* sp. | wild teasel | no |
| Dryopteridaceae | *Dryopterus arguta* | wood fern | yes |
| Equisetaceae | *Equisetum laevigatum* | smooth scouring rush | yes |
| | *Equisetum telmateia* ssp. *braunii* | giant horsetail | yes |

| Family | Scientific Name | Common Name | Native |
|---|---|---|---|
| Euphorbiaceae | *Chamaesyce* sp. | sandmat | ? |
| | *Euphorbia crenulata* | Chinese cups | yes |
| Fabaceae | *Acacia melanoxylon* | blackwood acacia | no |
| | *Astragalus gambellianus* | Gambel's milk-vetch | yes |
| | *Glycyrrhiza lepidota* | American licorice | yes |
| | *Lathyrus vestitus* | sweet pea | yes |
| | *Lotus purshianus* var. *purshianus* | Spanish clover | yes |
| | *Lotus tenuis* | narrow-leaf bird's-foot trefoil | no |
| | *Lotus wrangelianus* | California lotus | yes |
| | *Lupinus bicolor* | miniature lupine | yes |
| | *Lupinus formosus* var. *formosus* | summer lupine | yes |
| | *Lupinus microcarpus* var. *densiflorus* | chick lupine | yes |
| | *Lupinus succulentus* | arroyo lupine | yes |
| | *Medicago polymorpha* | California burclover | no |
| | *Melilotus indica* | yellow sweetclover | no |
| | *Thermopsis macrophylla* | false lupine | yes |
| | *Trifolium albopurpureum* | rancheria clover | yes |
| | *Trifolium bifidum* | notchleaf clover | yes |
| | *Trifolium campestre* | hop clover | no |
| | *Trifolium dubium* | little hop clover | no |
| | *Trifolium fragiferum* | strawberry clover | no |
| | *Trifolium fucatum* | bull clover | yes |
| | *Trifolium gracilentum* | pinpoint clover | yes |
| | *Trifolium hirtum* | rose clover | no |
| | *Trifolium incarnatum* | crimson clover | no |
| | *Trifolium microdon* | thimble clover | yes |
| | *Trifolium olyganthum* | fewflower clover | yes |
| | *Trifolium subterraneum* | subterraneum clover | no |
| | *Trifolium variegatum* | whitetip clover | yes |
| | *Vicia benghalensis* | reddish tufted vetch | no |
| | *Vicia sativa* | common vetch | no |
| Fagaceae | *Quercus agrifolia* | coast live oak | yes |
| | *Quercus lobata* | valley oak | yes |
| Frankeniaceae | *Frankenia salina* | alkali heath | yes |
| Gentianaceae | *Centaurium muehlenbergii* | Muelenberg's centaury | yes |
| Geranicaeae | *Erodium botrys* | long beaked filaree | no |
| | *Erodium cicutarium* | redstem filaree | no |
| | *Erodium moschatum* | white-stem filaree | no |
| | *Geranium dissectum* | geranium | no |
| | *Geranium molle* | dove's foot geranium | no |
| Hyppocastanaceae | *Aesculus californica* | California buckeye | yes |
| Hydrophyllaceae | *Nemophila heterophylla* | variable-leaf baby-blue-eyes | yes |
| | *Phacelia* sp. | phacelia | yes |
| Iridaceae | *Sisyrinchium bellum* | blue-eyed grass | yes |
| Juncaceae | *Juncus balticus* | Baltic rush | yes |
| | *Juncus bufonius* | toad rush | yes |
| | *Juncus effusus* | common rush | yes |
| | *Juncus patens* | spreading rush | yes |
| | *Juncus phaeocephalus* | brown-headed rush | yes |

| Family | Scientific Name | Common Name | Native |
|---|---|---|---|
| Lamiaceae | *Mentha pulegium* | pennyroyal | no |
| | *Stachys ajugoides* | ajuga hedge nettle | yes |
| Lauraceae | *Umbellularia californica* | California bay | yes |
| Liliaceae | *Brodiaea elegans* | harvest brodiaea | yes |
| | *Calochortus luteus* | gold nuggets | yes |
| | *Calochortus venustus* | butterfly mariposa lily | yes |
| | *Chlorogalum pomeridianum* var. *pomeridianum* | soap plant | yes |
| | *Dichelostemma capitatum* | blue dicks | yes |
| | *Triteleja laxa* | Ithuriel's spear | yes |
| | *Zigadenus fremontii* | death camas | yes |
| | *Zigadenus micranthus* var. *fontanus* | death camas | yes |
| Linaceae | *Hesperolinon congestum* | Marin western flax | yes |
| Lythraceae | *Lythrum hyssopifolia* | loosestrife | no |
| Malvaceae | *Malvella leprosa* | alkali mallow | yes |
| | *Sidalcea malvaeflora* | California checker bloom | yes |
| Myrtaceae | *Eucalyptus globulus* | blue gum eucalyptus | no |
| Onagraceae | *Camissonia ovata* | suncups | yes |
| | *Clarkia purpurea* | winecup clarkia | yes |
| | *Epilobium brachycarpum* | willowherb | yes |
| Papaveraceae | *Eschscholzia californica* | California poppy | yes |
| | *Platystemon californicus* | creamcups | yes |
| Plantaginaceae | *Plantago erecta* | California plantain | yes |
| | *Plantago lanceolata* | English plantain | no |
| | *Plantago major* | common plantain | no |
| | *Plantago subnuda* | coast plantain | yes |
| Poaceae | *Agrostis exarata* | spike bentgrass | yes |
| | *Agrostis viridis var. scabrida* | water bent grass | no |
| | *Avena barbata* | slender wildoats | no |
| | *Avena fatua* | wild oats | no |
| | *Brachypodium distachyon* | false brome | no |
| | *Bromus diandrus* | ripgut brome | no |
| | *Bromus hordeaceus* | soft chess | no |
| | *Crypsis schoenoides* | swamp-timothy | no |
| | *Cynodon dactylon* | Bermuda grass | no |
| | *Cynosurus echinatus* | hedgehog dogtail | no |
| | *Danthonia californica* | California oatgrass | yes |
| | *Distichlis spicata* | saltgrass | yes |
| | *Elymus multisetus* | big squirreltail grass | yes |
| | *Elymus glaucus* | blue wildrye | yes |
| | *Festuca arundinacea* | tall fesque | no |
| | *Glyceria* sp. | glyceria | no |
| | *Holcus lanatus* | velvet grass | no |
| | *Hordeum brachyantherum* ssp. *brachyantherum* | meadow barley | yes |
| | *Hordeum brachyantherum* ssp. *californicum* | California barley | yes |
| | *Hordeum murinum* ssp. *leporinum* | hare barley | no |
| | *Hordeum marinum* ssp. *gussoneanum* | Mediterranean barley | no |
| | *Lolium multiflorum* | Itaian ryegrass | no |
| | *Melica californica* | California melic | yes |
| | *Nassella lepida* | foothill needle grass | yes |

| Family | Scientific Name | Common Name | Native |
|---|---|---|---|
| | *Nassella pulchra* | purple needle grass | yes |
| | *Phalaris aquatica* | harding grass | no |
| | *Phalaris paradoxa* | hood canarygrass | no |
| | *Pleuropogon californicus* | California semaphore grass | yes |
| | *Poa annua* | annual bluegrass | no |
| | *Polypogon australis* | Chilean rabbitfoot grass | no |
| | *Polypogon monspeliensis* | rabbitfoot grass | no |
| | *Taeniatherum caput-medusae* | medusahead | no |
| | *Vulpia myuros* | annual fescue | no |
| Polemoniaceae | *Gilia capitata* | globe gilia | yes |
| | *Linanthus bicolor* | bi-colored linanthus | yes |
| | *Linanthus parviflorus* | common linanthus | yes |
| Polygonaceae | *Polygonum arenastrum* | common knotweed | no |
| | *Polygonum* sp. | aquatic knotweed | ? |
| | *Rumex acetosella* | sheep sorrel | no |
| | *Rumex crispus* | curly dock | no |
| | *Rumex pulcher* | fiddle dock | no |
| Polypodiaceae | *Polypodium californicum* | California polypody | yes |
| Portulacaceae | *Calandrinia ciliata* | red maids | yes |
| | *Claytonia perfoliata* | miner's lettuce | yes |
| Primulaceae | *Anagallis arvensis* | scarlet pimpernel | no |
| | *Dodecatheon hendersonii* | shooting star | yes |
| Pteridiaceae | *Adiantum jordanii* | California maidenhair fern | yes |
| | *Pellaea andromedifolia* | coffee fern | yes |
| | *Pentagramma triangularis* | goldback fern | yes |
| Ranunculaceae | *Delphinium variagatum* | royal larkspur | yes |
| | *Ranunculus aquatilis* | water buttercup | yes |
| | *Ranunculus californicus* | California buttercup | yes |
| | *Ranunculus lobbii* | Lobb's aquatic buttercup | yes |
| | *Ranunculus muricatus* | prickly-fruited buttercup | no |
| | *Ranunculus occidentalis* | western buttercup | yes |
| | *Ranunculus orthorhynchus* var. *bloomeri* | straight-beaked buttercup | yes |
| Rhamnaceae | *Rhamnus californica* | California coffeeberry | yes |
| Rosaceae | *Aphanes occidentalis* | western lady's mantle | yes |
| | *Holodiscus discolor* | ocean spray | yes |
| | *Rosa californica* | California rose | yes |
| | *Rubus discolor* | Himalayan blackberry | no |
| | *Rubus ursinus* | California blackberry | yes |
| Rubiaceae | *Galium aparine* | goose-grass | no |
| | *Galium* sp. | bedstraw | yes |
| Salicaceae | *Populus fremontii* ssp. *fremontii* | Fremont cottonwood | yes |
| | *Salix exigua* | narrowleaf willow | yes |
| | *Salix laevigatus* | red willow | yes |
| | *Salix lasiolepis* | arroyo willow | yes |
| Saxifragaceae | *Lithophragma affine* | woodland star | yes |
| Scrophulariaceae | *Bellardia trixago* | bellardia | no |
| | *Castilleja densiflora* | Purple owl's clover | yes |
| | *Castilleja exserta* | Purple owl's clover | yes |
| | *Castilleja rubicunda ssp. lithospermoides* | cream sacs | yes |

| Family | Scientific Name | Common Name | Native |
|---|---|---|---|
| | *Collinsia heterophylla* | Chinese houses | yes |
| | *Mimulus auraniacus* | bush monkey flower | yes |
| | *Mimulus guttatus* | common monkey flower | yes |
| | *Parentucellia viscosa* | yellow parentucellia | no |
| | *Scrophularia californica* ssp. *californica* | California figwort | yes |
| | *Triphysaria pusilla* | dwarf owl's clover | yes |
| Solanaceae | *Solanum americanum* | small-flowered nightshade | yes |
| Tamaricaceae | *Tamarix* sp. | tamarisk | no |
| Typhaceae | *Typha angustifolia* | narrow-leaved cattail | yes |
| Urticaceae | *Urtica dioica* | stinging nettle | yes |
| Valerianaceae | *Plectritis macrocera* | long-spur plectritis | yes |
| Verbenaceae | *Phyla nodiflora* | common lippia | yes |
| | *Verbena lasiostachys* | western vervain | yes |
| Violaceae | *Viola pedunculata* | Johnny jump-up | yes |
| Viscaceae | *Phoradendron macrophyllum* | big-leaf mistletoe | yes |

? Native status cannot be determined because species unknown

## Table B: Animal Species Observed at Tolay Creek Ranch in 2008

| Common Name | Scientific Name |
|---|---|
| **AMPHIBIANS** | |
| sierran treefrog | *Pseudacris sierra* |
| **REPTILES** | |
| western fence lizard | *Sceloporus occidentalis* |
| southern alligator lizard | *Elgaria multicarinata* |
| red-sided garter snake | *Thamnophis sirtalis* |
| common king snake | *Lampropeltis getula californiae* |
| gopher snake | *Pituophiscatenifer* |
| **BIRDS** | |
| Canada goose | *Branta canadensis* |
| American wigeon | *Anas americana* |
| mallard | *Anas platyrhynchos* |
| cinnamon teal | *Anas cyanoptera* |
| northern shoveler | *Anas clypeata* |
| green-winged teal | *Anas crecca* |
| wild turkey | *Meleagris gallopavo* |
| California quail | *Callipepla californica* |
| great egret | *Ardea alba* |
| snowy egret | *Egretta thula* |
| turkey vulture | *Cathartes aura* |
| white-tailed kite | *Elanus leucurus* |
| northern harrier | *Circus cyaneus* |
| red-shouldered hawk | *Accipiter striatus* |
| red-tailed hawk | *Buteo jamaicensis* |
| golden eagle | *Aquila chrysaetos* |
| American kestrel | *Falco sparverius* |
| killdeer | *Charadrius vociferus* |
| black-necked stilt | *Himantropus mexicanus* |
| greater yellowlegs | *Tringa melanoleuca* |
| Wilson's snipe | *Gallinago delicata* |
| mourning dove | *Zenaida macroura* |
| Nuttall's woodpecker | *Picoides nuttallii* |
| acorn woodpecker | *Melanerpes formicivorus* |
| northern flicker | *Colaptes auratus* |
| black phoebe | *Sayornis nigricans* |
| Say's phoebe | *Sayornis saya* |

| Common Name | Scientific Name |
|---|---|
| western scrub-jay | *Aphelocoma californica* |
| American crow | *Corvus brachyrhynchos* |
| common raven | *Corvus corax* |
| horned lark | *Eremophila alpestris* |
| violet-green swallow | *Tachycineta thalassina* |
| white-breasted nuthatch | *Sitta carolinensis* |
| rock wren | *Salpinctes obsoletus* |
| western bluebird | *Sialia mexicana* |
| American robin | *Turdus migratorius* |
| northern mockingbird | *Mimus polyglottos* |
| spotted towhee | *Pipilo maculatus* |
| California towhee | *Pipilo crissalis* |
| lark sparrow | *Chondestes grammacus* |
| Savannah sparrow | *Passerculus sandwichensis* |
| grasshopper sparrow | *Ammodramus savannarum* |
| song sparrow | *Melospiza melodia* |
| golden-crowned sparrow | *Zonotrichia atricapilla* |
| dark-eyed junco | *Junco hyemalis* |
| red-winged blackbird | *Agelaius phoeniceus* |
| western meadowlark | *Sturnella neglecta* |
| Brewer's blackbird | *Euphagus cyanocephalus* |
| Bullock's oriole | *Icterus bullockii* |
| house finch | *Carpodacus mexicanus* |
| American goldfinch | *Carduelis tristis* |
| **MAMMALS** | |
| skunk (sp.) | *Mephitis* or *Spilogale* |
| coyote | *Canis latrans* |
| black-tailed deer | *Odocoileus hemionus* |
| California ground squirrel | *Spermophilis beecheyi* |
| California vole | *Microtus californicus* |
| deer mouse (sp.) | *Peromyscus* sp. |
| Botta's pocket gopher | *Thomomys bottae* |
| black-tailed jackrabbit | *Lepus californicus* |