Reserve Classification of
California State Parks Alameda-Tesla Property, Alameda County, California based on an Assessment of Biological Resources and the Effects of Recreational Activities on those Resources

July 1, 2024

EXECUTIVE SUMMARY

Chapter One of this Assessment provides a comprehensive review of the extraordinary and overlapping layers of biodiversity and ecosystem functions that blanket the 3,100 acres of California State Parks' Alameda-Tesla property (referred to as Tesla). Chapter Two summarizes scientific literature that describes the direct, indirect, and cumulative impacts of recreational use and facilities development on the physical and biological environment. Tesla's exceptional biodiversity, uniquely intact ecosystem, and related biological functions in the region warrant application of the precautionary principle when determining future land use for Tesla. Classification by the California Department of Parks and Recreation Commission is the first main step in determining the type and intensity of uses that will be allowed in Tesla. Classification of Tesla as a State Reserve would best protect Tesla's exceptional biodiversity and ecosystem values at a landscape level, meeting key state policy objectives and providing low-intensity recreation, enjoyment, and education for the public.

Tesla has one of the highest levels of biodiversity in the entire State of California, and the Corral Hollow area where Tesla is located, has been known for its biodiversity for nearly a century. Tesla is in the northernmost canyon of the Southern Coast Ranges, a convergence zone between the hot, arid San Joaquin Plain and the cool, mesic Pacific Coast. This unique combination of geographic position and climatic regime supports an unusual and rare assemblage of plants and animals, including 45 special-status rare plant species protected by CEQA (1 of which is a previously undescribed species), 74 additional locally rare watchlist species (either known or expected), and 9 Sensitive Natural Communities. For animals, 53 special-status animal species have been identified at or near Tesla, 32 of which are listed as Species of Greatest Conservation Need in the California State Wildlife Action Plan.

The biodiversity of Tesla is unique within both the region and state. The ecosystem is robust, largely because most of the 3,100 acres of the Tesla wildlands have been relatively protected from human perturbation. Tesla serves as a critical landscape-level linkage among habitat types, and models predict that habitats in Tesla will be resilient to climate change. If kept intact, the site will continue to provide refuge for sensitive species into the future. Tesla has been designated an Important Bird Area, a Botanical Priority Protection Area, and Critical Linkage Habitat Corridor along the northern Diablo Range (for native plants and animals). Tesla is also federally designated as critical habitat for the Alameda Whipsnake and California Red-legged Frog. Tesla's sensitive biological resources occur throughout the entire 3,100-acre site.

A large body of research has documented the ecological impacts and degradation of natural areas that can result from recreational development and activities. Construction of new roads, trails, or recreational facilities (e.g., for driving, mountain biking, camping) would eliminate, fragment, and degrade habitat, harming plant and wildlife populations. Although use of existing infrastructure (e.g., dirt roads) at Tesla would reduce direct impacts to physical habitat for plants and animals, increased traffic, more intensive recreational activities, and facilities development would functionally eliminate and fragment habitat, because many animals alter their behavior to avoid areas with human activity. Depending on a species' spatial ecology and sensitivity, and the types and intensity of recreational use, this functional habitat loss could extend several thousand feet to more than a mile beyond the footprint of the development or impact (e.g., a road, trail, parking area, campground), impairing Tesla's value as critical habitat, a climate refuge, and a landscape-level habitat linkage. Recreational activities (e.g., camping) that would require substantial development of new infrastructure are likely to harm plant and animal communities. Some species, such as Golden Eagle and tule elk, may abandon parts of the area entirely, as has occurred in the Carnegie State Vehicular Recreation Area. Given Tesla's topography and widespread distribution of sensitive resources, it would not be possible to implement high intensity recreational use at Tesla without adversely impacting its biodiversity and jeopardizing the persistence of its unique, healthy ecosystem and landscape.

As identified by California State Parks, classification of a unit of the State Parks system determines the types and intensity of allowed uses. This is the critical land use decision that affects resource impacts, as it sets the foundation and direction for all subsequent planning decisions. Maintaining Tesla's unique array of sensitive species and its healthy ecosystem by classifying it as a California State Parks Reserve under California Public Resources Code (PRC) Section 5019.65, is the choice with the least impact, as it would limit development of facilities and more intensive recreational activities.

Reserve classification would also help achieve the goals of the East Bay Regional Conservation Investment Strategy, East Alameda County Conservation Strategy, California State Wildlife Action Plan, and executive orders to combat the climate and biodiversity crises through the State's Biodiversity and 30 x 30 Initiatives. Classification as a Reserve would allow public access for low-intensity recreation, enjoyment, and education, while also preserving the undisturbed integrity of native ecological associations, unique biotic characteristics, geologic features, and scenic qualities for the East Bay, Central Valley, and beyond. Classification as a Reserve would attract scientists from universities and museums in the Bay Area to use the site as a natural laboratory for research on biodiversity, geology, conservation, and climate change. Classification of Tesla as a Reserve would also protect Tesla's extensive historic and cultural resources. Further, classification of Tesla as a Reserve would support the objectives of Native American leaders who are working to preserve the entire 3,100-acre site of their ancestral homeland, not just areas around specific archeological features and sacred sites.

The application of extreme caution is warranted when considering the types and intensity of future uses at Tesla. The high density and widespread distribution of legally protected species across the 3,100-acre site makes it impossible to avoid impacts from recreational use and development. Reliance on best management practices, user compliance, and rule enforcement would provide inadequate protection; limiting the type and intensity of land uses through

Reserve classification is the most effective means for preserving Tesla's unique ecological values. The uncertainty posed by climate change increases the potential that poor land use and management decisions could severely harm populations of sensitive taxa. The anthropogenic stressors of recreational development and activities would exacerbate the environmental stressors of multi-year droughts, more frequent wildfires, and intense storms.

The precautionary principle underpins the reasons for protecting Tesla from both the predictable and the unintended negative consequences of development for more intensive recreational use. The precautionary principle dictates that when the effects of an action are irreversible, even if they develop over time, decision-makers should adopt precautionary measures to avoid harm. Objective evidence of Tesla's extraordinary biological resource values and the known damaging effects of recreational development and activities support classification of Tesla as a State Reserve.

The California Legislature established the Reserve classification option for units of the State Parks system for a reason – to preserve areas embracing outstanding natural or scenic characteristics or areas containing outstanding cultural resources of statewide significance. Tesla exceeds all requirements for Reserve classification.

Tesla as a Reserve would provide the best classification option to prevent harm to state and federally listed species, conserve needed and irreplaceable biodiversity, protect a vital habitat connectivity corridor, and preserve the intact ecosystem supporting essential onsite and regional biological functions, while also serving public policy objectives and providing low-intensity public access for enjoyment and education.

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ACKNOWLEDGMENTS

This Assessment was prepared for the Friends of Tesla Park coalition by many people who provided expertise, guidance, and support. It is the result of a multi-year collaboration to compile knowledge of the natural resources at the California State Park land known as Tesla and to summarize research from the field of recreation ecology pertinent to the classification decision.

Scott Cashen, M.S., Senior Biologist, developed the framework and content of the biological assessment and recreational activity impacts, compiling and documenting the majority of the scientific information. Nicole Jurjavcic, M.S., Senior Botanist/Plant Ecologist and Megan Keever, M.S., Senior Botanist, further developed and refined identification and discussion of special-status and other unique plant species, and sensitive natural communities, oak-woodlands, wetlands, waters and locally rare land cover types and aided in map preparations. Sarah Kupferberg, Ph.D., Senior Ecologist, reviewed data and reports obtained from Public Records Act Requests, and contributed to literature reviews of animal spatial ecology and recreational impacts. Eric Smith and Kristin Chinn of Vollmar Natural Lands Consulting compiled GIS data and produced maps. Their collective contributions provided the scientific foundation of this document.

We thank the following scientific experts for their peer review of this document:

- Dr. Bruce Baldwin, Curator Emeritus of the Jepson Herbarium and Professor Emeritus in the Department of Integrative Biology, University of California at Berkeley (UCB)
- Dr. Mary Power, Professor Emerita in the Department of Integrative Biology, UCB
- Dr. Brent Mishler, Director of the University and Jepson Herbaria, Professor in the Department of Integrative Biology, UCB
- Dr. Adina Merenlender, Professor Conservation Science, Department of Environmental Science, Policy and Management, UCB
- Patrick Kolar, M.S., United States Geological Survey (USGS)

We also thank:

- William Hoppes, Ohlone Audubon Society, Carin High, Ohlone Audubon Society and Citizens Committee to Complete the Refuge; and Richard Schneider, Friends of Livermore and Alameda County Resource Conservation District Board for their contributions to document preparation.
- Jim Hanson and Beth Wurzburg, East Bay Chapter of the California Native Plant Society, for their guidance and support, including enlisting the help of the expert botanists.
- Save Mount Diablo who coordinated a 2-day Bioblitz at Tesla in 2023 a new breeding population of the protected Western Spadefoot was located and hundreds of other species were identified.
- Sean Burke, Save Mount Diablo, who shared reference materials on the ethnobiology of the region, reinforcing the important Indigenous cultural heritage of Tesla.

We thank them all, and many more, for their help and assistance with this Assessment, which we hope to update as new information and data are available.

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INTRODUCTION

Between 1996 and 1999, California State Parks purchased approximately 3,100 acres of land in eastern Alameda County to expand off-highway vehicle (OHV) recreation opportunities for the Carnegie State Vehicular Recreation Area (CSVRA). California State Parks commonly referred to these 3,100 acres of land as the "Alameda-Tesla Property" or "Alameda-Tesla Expansion Area," while advocates for protection of the land referred to it as "Tesla" and "Tesla Park." Hereafter, the land is simply referred to as "Tesla."

In September 2021, the State enacted SB 155, which requires the California Department of Parks and Recreation (CDPR, also referred to as California State Parks [CSP]) to determine Tesla's classification as a unit of the State Parks system, while also prohibiting use of the area for motorized recreation.

This Assessment is designed to assist CDPR and the California State Parks and Recreation Commission (Commission) in determining the best use and classification of Tesla. The first chapter of the Assessment compiles information on Tesla's extensive biological resources and ecological values. The second chapter discusses how various types of recreational development, facilities, and uses would affect Tesla's biological resources and overall ecosystem. Both chapters incorporate extensive information from scientific studies, analysis, and literature.

The classification of Tesla as a unit within the State Parks system will largely determine the level of long-term protection provided to its unique biological resources and ecological landscape. Given the exceptional and irreplaceable biological resources present, and the documented negative impacts caused by recreational development and activities, classifying Tesla as a State Reserve would provide the most appropriate and highest level of protection available under the statutory classification scheme, while still affording public access for low-intensity recreation, enjoyment, and education.

CHAPTER 1: TESLA'S BIOLOGICAL RESOURCES

1.1 CHAPTER 1 - INTRODUCTION

Tesla has one of the highest levels of biodiversity in the entire State of California. Tesla occurs in the northernmost canyon of the Southern Coast Ranges in a convergence zone between the hot, arid San Joaquin Plain and the cool, mesic Pacific Coast. This unique combination of geographic position and climatic regime supports an unusual and rare assemblage of plants and animals, including 45 special-status rare plant species, one of which may be a previously undescribed species, 74 additional locally rare watchlist species that are known or expected to occur at the site, and 9 Sensitive Natural Communities. Animal diversity documented at or near Tesla includes 53 special-status species, which includes two protected insect species, and three species detected nearby and with suitable habitat in Tesla. Of the special-status wildlife species, 32 have been identified as Species of Greatest Conservation Need by the California State Wildlife Action Plan. Because many of the species at Tesla are at the northern, eastern, or western edge of their respective ranges and do not co-occur elsewhere, Tesla's biological communities are irreplaceable.

Special-status plants and animals are defined as those that have some level of state or federal protection or are recognized by state and federal resource agencies as being of conservation concern. This includes, but is not limited to: taxa protected by the federal Endangered Species Act or California Endangered Species Act (ESA, CESA); taxa listed as rare under the California Native Plant Protection Act; taxa that have been identified as California Species of Special Concern because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction; avian species that have been identified as Birds of Conservation Concern by the U.S. Fish and Wildlife Service (USFWS); and species that are Fully Protected (i.e., may not be taken or possessed at any time) under California Fish and Game Code. Special-status plants are also identified through a ranking system called the California Rare Plant Rank (CRPR), which was developed by the California Department of Fish and Wildlife (CDFW) and the California Native Plant Society (CNPS). In addition, local plant rankings have been developed by local chapters of the CNPS (CDFW 2023). Special-status (rare) plants include CRPR List 1-4 and East Bay Chapter of the California Native Plant Society (EBCNPS) Locally Rare Rank List A (EBCNPS 2022). Sensitive Natural Communities are defined as those with a state ranking of S1, S2, or S3 (critically imperiled, imperiled, or vulnerable; respectively) on the California Department of Fish and Wildlife's California Sensitive Natural Communities List (CDFW 2023). All special-status species are subject to review under the California Environmental Quality Act (CEQA). The CDFW maintains and routinely updates a list of all special-status plants and all special-status animals in California. Our review of special-status species at Tesla is based on CDFW's April 2024 Special Animal List and CDFW's April 2024 Special Vascular Plants, Bryophytes, and Lichens List (CNDDB 2024a, 2024b), which were the most current lists when we finalized this Assessment.

Unlike most other places in the region, the vegetation and wildlife communities at Tesla are healthy and remain intact, largely because most of the 3,100-acres of Tesla have been relatively protected from human perturbation. Tesla also provides a critical landscape-level habitat linkage for wildlife movement and that maintains genetic diversity of plants and wildlife. Models predict that habitats in Tesla will be resilient to climate change and thus the site will continue to provide refuge for sensitive species into the future. Tesla has been recognized as an Important Bird Area, a Botanical Priority Protection Area, and federally designated critical habitat for the Alameda Whipsnake and California Red-legged Frog, among other regional designations of biological importance. Tesla's rare sensitive biological features cover the entire site, as documented by extensive mapping and surveys.

Tesla's exceptional biodiversity and related ecologic values make it irreplaceable.

1.2 ENVIRONMENTAL SETTING

Tesla is located in the Corral Hollow Canyon region of the interior Diablo Range (a component of the South Coast Ranges) south of Tesla Road in eastern Alameda County. Corral Hollow is the northernmost of a series of east-west-trending canyons that extend from the South Coast Ranges to the San Joaquin Plain. The canyon begins near Tracy (San Joaquin County) in the east, to Livermore (Alameda County) in the west. County Road J2, also known as Corral Hollow Road in San Joaquin County and Tesla Road in Alameda County, runs through the canyon.

Figure 1 shows the geographic location of Tesla, relative to the Carnegie State Vehicular Recreation Area, and other adjoining State Parks property.

Elevations at Tesla range from approximately 730 feet (at Corral Hollow Creek) to 2,260 feet (at Tesla's southern border). Tesla is located within the Central Valley Coast Ranges Ecoregion and it encompasses two watersheds (identified at the 10-digit Hydrologic Unit Code level [HUC-10]): Corral Hollow Creek and Arroyo Las Positas. At the sub-watershed level (HUC-12), Tesla spans three units: Upper Corral Hollow Creek, Lower Corral Hollow Creek, and Arroyo Seco (CBI 2019).

Relatively steep hills and ravines (up to 70% slope) and plateau grasslands comprise Tesla's landscape. The stream channels of Tesla include Corral Hollow Creek, Mitchell Ravine (a tributary of Corral Hollow Creek), and Arroyo Seco, as well as ephemeral and intermittent streams (total of 105,662 linear feet or over 20 miles of streams). In addition, Tesla has many lentic aquatic habitats including 15 open water ponds (2.51 acres) and identified areas of wetlands (TRA 2010, Baker 2018). See Section 1.5.1.4 Wetlands and Waters for discussion of aquatic features.

Historically, the Corral Hollow region was a seasonal hunting, gathering, and meeting location for Indigenous People from the East Bay Ohlone and Central Valley Northern Valley Yokuts and other Tribes. After European settlement, the canyon and hills were primarily used for sheep and later cattle ranching, with cattle ranching remaining significant in the region. Given the geologic features of the region, the first limited coal mining operation was established in parts of the canyon in 1855. In the late 1800s the larger historic mining towns of Tesla and Carnegie were formed along part of Corral Hollow Creek where coal, clay, and sand were extracted and brick and other products were manufactured. The towns and mines were largely abandoned after a 1911 flood (Mosier and Williams 2002). In the 1950s, the federal government established Lawrence Livermore National Laboratory (LLNL) Site 300 as an experimental research facility in the northeastern part of the canyon, north of Corral Hollow Road. In the late 1970s, the California Department of Parks and Recreation (CDPR) established the Carnegie State Vehicular Recreation Area (CSVRA) south of Site 300. In the late 1990s to early 2000s, the CDPR purchased the Alameda-Tesla Property and several rural residential parcels along Tesla Road with the intent to expand CSVRA (CSP 2015).

Today, Tesla is primarily surrounded by large cattle ranches and open space to the south, west, and north. CDPR operates the 1,500-acre CSVRA east of Tesla on the south side of Corral Hollow Road. West of CSVRA along Tesla Road are approximately 11 rural residential parcels on about 300 acres owned by the CDPR, and a few remaining inholdings. Hetch Hetchy Water and Power (a department of the San Francisco Public Utilities Commission) has a small facility within the Tesla portion of the Mitchell Ravine that is part of their water conveyance tunnel system. LLNL operates Site 300 north of Corral Hollow Road. Further east in Corral Hollow Canyon are public and private ecological preserves and conservation easements.

Corral Hollow contains one of the healthiest and most intact ecosystems in the East Bay Area (Loeb 2022). Recognizing the biological significance of the region, public agencies have moved toward conservation of the area. On the San Joaquin County side, there is the 125-acre California Department of Fish and Wildlife (CDFW) Corral Hollow Ecological Reserve northwest of Corral Hollow Road which protects riparian and high desert habitats; the 4,000-acre Contra Costa Water District (CCWD) preserve south of Corral Hollow Road for the San Joaquin kit fox and other special-status species; and thousands of acres of privately-owned ranch lands under conservation easements south of Corral Hollow Road (CCWD 2015, SJCOG 2021). However, there are no protected reserves on the Alameda County side of the Canyon where Tesla is located. Further, there are no State Parks Reserves in the entire State Parks Diablo Range District which encompasses Tesla (CSP 2024).

Tesla contains a unique and diverse array of vegetation communities that support numerous special-status plant and animal species (see Section 1.5.2 and Section 1.6.1, respectively). Many of these vegetation communities are considered Sensitive Natural Communities by the State of California (see Section 1.5.1; Table 2). The most dominant upland habitat is oak woodlands. Over half of the rare plant species that have been documented at Tesla are associated with blue oak woodlands (see Section 1.5.2.1; Table 3). Oak woodlands are also known to support the richest abundance of wildlife species of all habitat types in California (see Sec 1.5.1.1) (CalPIF 2002). Additional terrestrial habitats at Tesla include native and non-native grasslands, buckeye groves, ghost pine woodlands, California juniper woodlands, California sagebrush/black sage scrub, choke cherry thickets, desert olive patches, bush mallow scrub, bigberry manzanita chaparral, and poison oak scrub (CSP 2023). Wetland habitats include sycamore woodlands, Fremont cottonwood, valley oak riparian forest, and mule fat thickets (CSP 2023). Aquatic features consist of 3 streams, 15 ponds, 4 wetlands, several seeps, and numerous drainages with ephemeral or intermittent surface flow of water (Baker 2018). In addition to having a diverse array of vegetation communities and aquatic features, Tesla has unique soils and a myriad of habitat elements (e.g., burrows, cliffs, rock outcroppings, and ecotones). This combination of diverse habitat types and habitat elements supports a unique and species-rich assemblage of native plants and animals. These include many of California's most emblematic (and in some cases imperiled) species, such as the California Tiger Salamander, California Red-legged Frog

(State Amphibian), Western Pond Turtle, Golden Eagle, California Quail (State Bird), tule elk, mountain lion, purple needlegrass (State Grass), and California poppy (State Flower).

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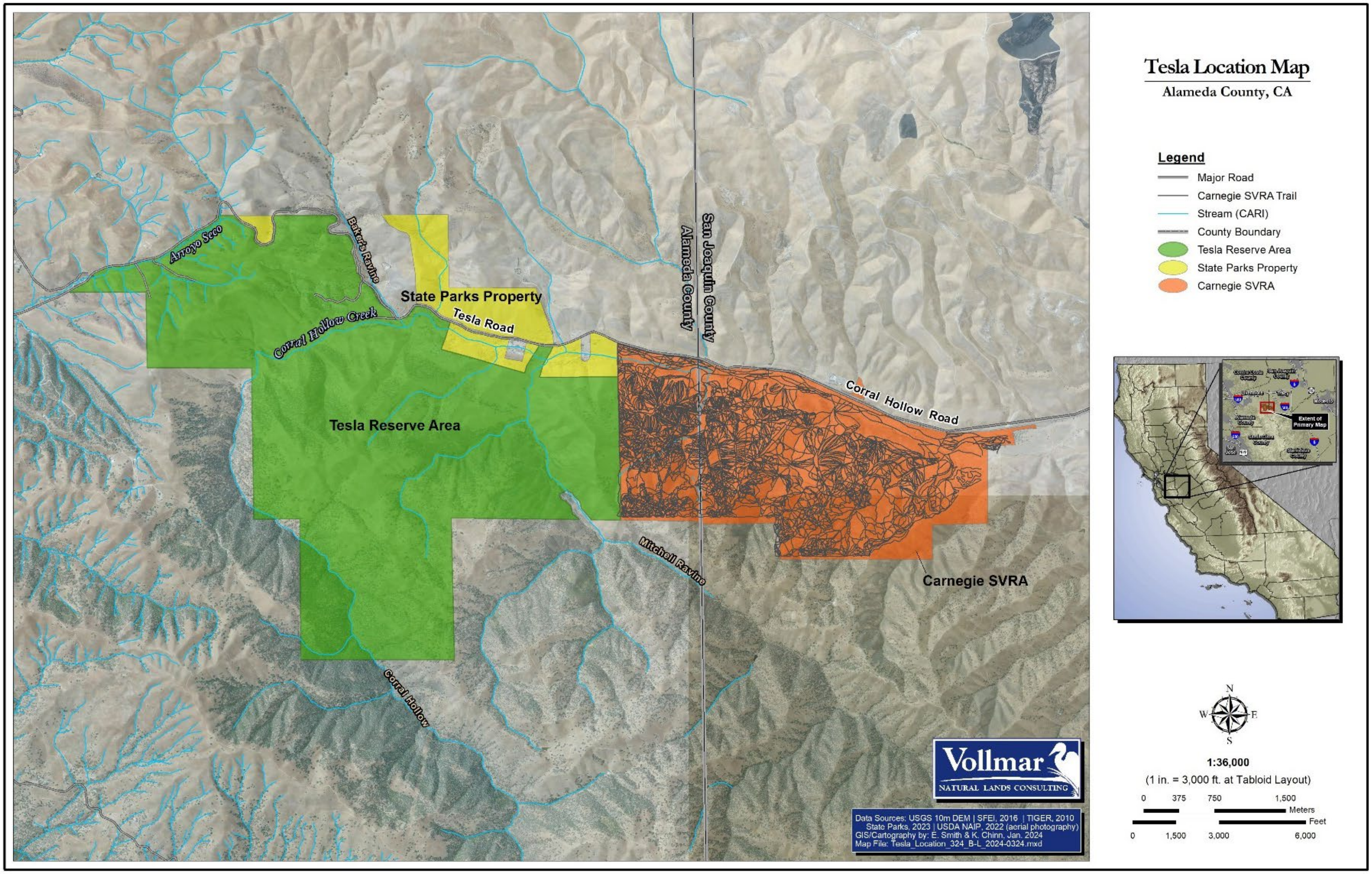

Figure 1. Geographic location of Tesla relative to CSVRA and other adjoining State Parks properties.

1.3 UNIQUENESS AND CONSERVATION IMPLICATIONS - A BIODIVERSITY HOTSPOT

California contains more species of plants and animals than any other state and is considered one of the world's 36 "biodiversity hotspots" because of its high concentration of unique endemic species (State of California 2022). California's rich biodiversity is increasingly threatened by habitat loss, degradation, and fragmentation, spread of invasive species, decreasing water supplies, and increasingly frequent and severe climate impacts.

However, Tesla, as documented herein, is exceptional, even by California's biodiversity standards. Tesla's biodiversity and the totality of its natural resources have statewide significance.[1] Tesla is a "biodiversity hotspot within a hotspot" (Davis et al. 2008, Sullivan 2000, Thornhill et al. 2017), making its full protection even more critical given state policy objectives and increasing climate change impacts on our natural environment.

On October 7, 2020, Governor Newsom established the California Biodiversity Collaborative by Executive Order N-82-20. It built upon the Biodiversity Initiative establish under Governor Brown in 2018 (CDFW 2024c). The order directed the California Natural Resources Agency to work with the California Department of Food and Agriculture, the California Environmental Protection Agency, and other state agencies, to establish the California Biodiversity Collaborative and bring together experts, leaders, and communities from across California to advance a unified, comprehensive approach to protecting the state's biodiversity. The order also directed the agencies to advance strategies to conserve at least 30 percent of California's land and waters by 2030 in a manner that preserves biodiversity and natural resources, expands equitable outdoor lands and recreation for all Californians, and maintains the state's economic prosperity. According to the State of California (2022):

> "We need to move beyond managing endangered species at the brink of extinction to a more holistic approach that keeps our plant and animal communities healthy and resilient to climate change and our world-renowned biodiversity intact. Shifting from ad-hoc crisis management to a broader proactive strategy requires new thinking and partnerships."

As elaborated in this Assessment, multiple lines of evidence document that Tesla has one of the highest levels of biodiversity in the state. Landscape-level analyses, onsite surveys, and independent research demonstrate that Tesla is an ideal candidate for protection under Executive Orders 82-20, with classification as a State Reserve.

Figure 2 depicts a map of the spatial distribution and juxtaposition of *some* of the special-status plant and animal species and sensitive habitat occurrences that have been detected at Tesla. Tables 2 through 5 provide more detailed information about the Sensitive Natural Communities,

[1] California Public Resources Code Section 5019.65 defines elements for State Reserve classification. Tesla meets all criteria having outstanding natural, cultural, and scenic resources of statewide significance.

special-status plants and animals, and the spatial ecology for animals.[2] The lack of complete data (e.g., geographic coordinates) precludes the ability to include in Figure 2 all special-status species identified in Tesla or to depict all occurrences and home ranges. For example, only 14 of 45 special-status plant species (31%) are mapped on Figure 2 because location data were not available from, or provided by, California State Parks. Of the 53 special-status animals, only 23 species (43%) are mapped on Figure 2. For some taxa, location data were not available or not entirely knowable. For example, some special-status species are cryptic and sedentary, such as California tiger salamanders during their terrestrial life stage when they reside below ground. Others, such as mountain lions, are cryptic and highly mobile. Thus, Figure 2 under-represents the actual distribution of special-status species throughout Tesla. Nonetheless, this depiction of a *subset* of the special-status animals, plants, buffer zones, and sensitive habitats, documents the wide distribution, abundance, density and overlapping layers of exceptional biological resources that cover the entire 3,100 acres of the Tesla wildlands.

While the focus is often on biodiversity of rare species, Tesla's value is more complex and multi-dimensional. Its natural resource significance is a function of its overall biodiversity, multitude of rare species, regional biological significance, and identification as a priority protection site by regional conservation plans. The value of Tesla also stems from it being an intact healthy ecosystem that spans a critical habitat corridor linking regional wildlands. Its geographic location at the convergence of biotic zones provides important climate change refugia. It is the entirety of Tesla's 3,100-acre landscape that functions as a whole and which needs to be protected as an iconic and essential part of the Diablo Range.

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[2] A Map and Tabular Synopsis is included at the end of this Assessment for easier reference to all Figures and Tables.

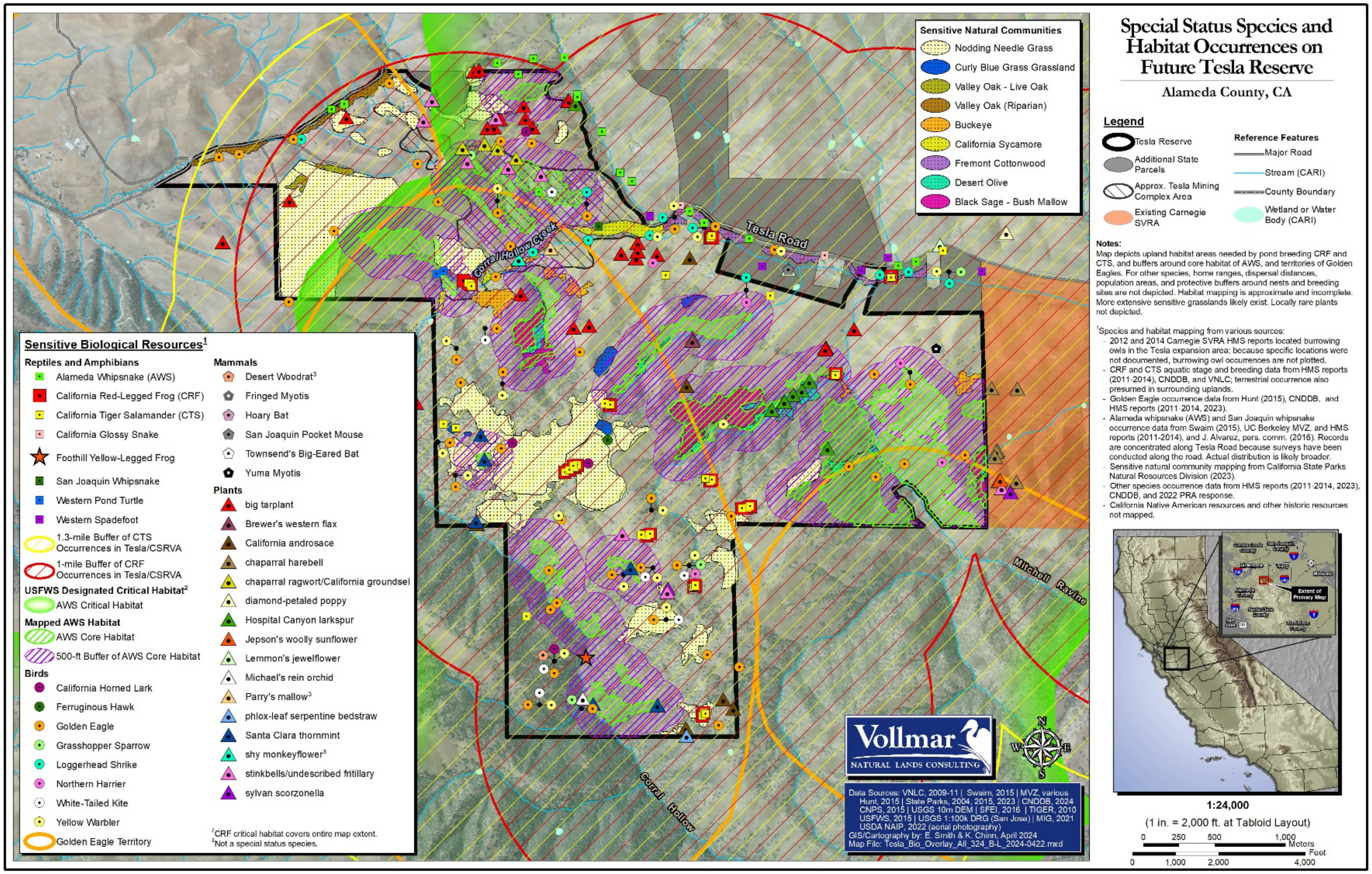

Figure 2. Spatial distribution and juxtaposition of *some* of the special-status species and habitats detected at Tesla. Existing data demonstrate these sensitive resources encompass the entire site.

1.3.1 UC Berkeley Analysis of Botanical Biodiversity

An independent study conducted by scientists at UC Berkeley identified Tesla as a high priority site for conservation in California (Kling et al. 2018). Researchers examined three different phylogenetic measures of botanical resources, each emphasizing a different evolutionary aspect of biodiversity. The researchers developed a computer model that compared these biodiversity measures with data on land protection status and landscape intactness. The model identified the top 50 priority locations that contain concentrations of taxa that are evolutionarily unique, vulnerable due to small range size, and/or poorly protected across their ranges. The area encompassing Tesla ranked in the highest echelon of all three phylogenetic measures, and thus, it was identified as one of the very top conservation priorities in the entire state in terms of protecting biodiversity (B.D. Mishler, UC Berkeley, personal communication). These findings concur with the results of CDFW's Areas of Conservation Emphasis Project (ACE) (see Section 1.3.4).

Figure 3 depicts the areas throughout the state with the highest ranking for phylogenetic diversity of plants. While species richness considers the number of species present at a site, phylogenetic diversity also considers the evolutionary history and relationships among lineages of species to evaluate how redundant or distinct the taxa and their ecologically functional traits are (Srivastava et al. 2012). The study also included *phylogenetic endemism*, a measure that considers how narrowly restricted lineages are geographically. Mishler (2023) explains these advanced metrics of biodiversity in more detail.

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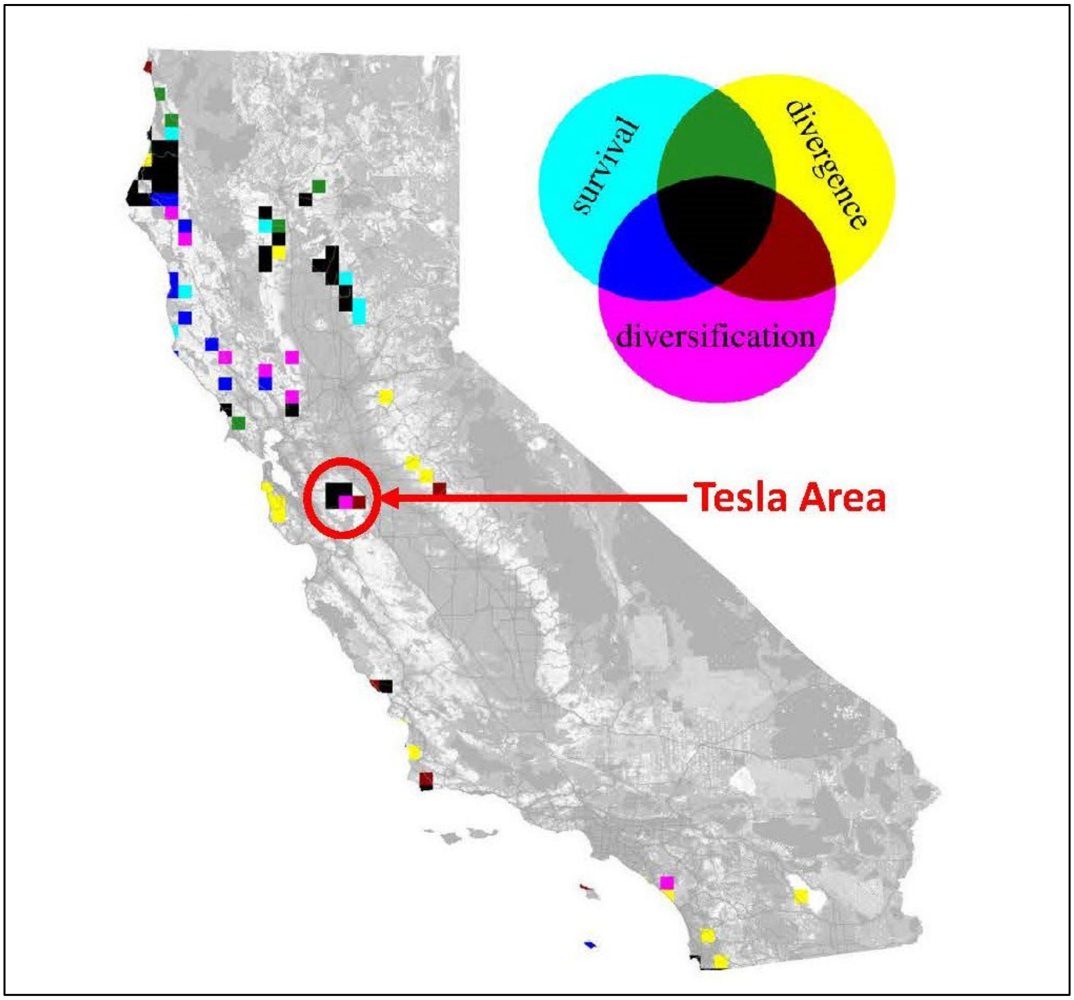

Figure 3. An independent study by UC Berkeley scientists using advanced phylogenetic biodiversity metrics of plants found that the area where Tesla is located is ranked high in all three metrics of phylogenetic diversity, making it a top conservation priority for California. Adapted with permission from Kling et al. (2018).

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1.3.2 Botanical Priority Protection Area (BPPA)

The East Bay Chapter of the California Native Plant Society (EBCNPS) designated Corral Hollow (which encompasses Tesla) as a “Botanical Priority Protection Area” (BPPA) due to its abundance of high-quality habitat and sensitive botanical resources (Bartosh et al. 2010).

Figure 4, which is adapted from the EBCNPS Botanical Priority Protection Area Guidebook, depicts Tesla in relation to the location of the Corral Hollow BPPA. The figure shows that almost all of Tesla is contained within the BPPA.

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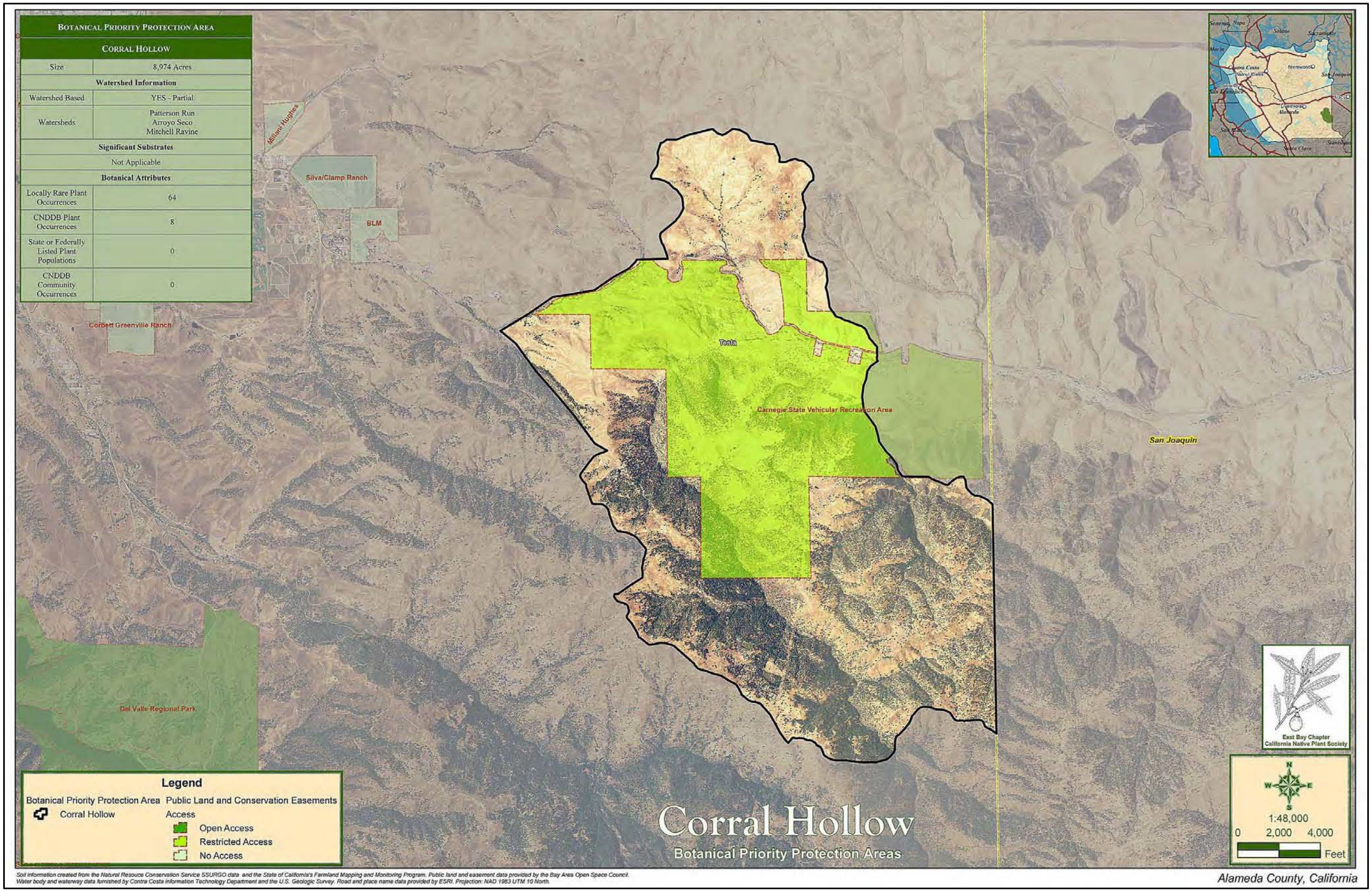

Figure 4. Corral Hollow Botanical Priority Protection Area (BPPA) in relation to Tesla. Almost all of Tesla is contained within the BPPA.

1.3.3 Analyses of Freshwater Conservation Priorities

The Corral Hollow watershed has been identified in statewide analyses by The Nature Conservancy as a hotspot of freshwater biodiversity, particularly with respect to amphibians and reptiles (Howard et al. 2015, 2018). An additional investigation by UC Berkeley researchers has shown that watershed-scale conservation planning with explicit focus on protecting freshwater systems in California will be an effective means of advancing the 30 x 30 mission (Moravek et al. 2023).

1.3.4 Areas of Conservation Emphasis Project (ACE) Ranks

CDFW's Areas of Conservation Emphasis Project (ACE) uses the best available scientific information to assess biodiversity throughout the entire State of California (CDFW 2022a). The ranks range from 1 to 5 for terrestrial ecosystems within each USDA recognized ecoregion of the State using a 2.5 square mile-hexagon grid format. For aquatic ecosystems, biodiversity ranks are assigned at the level of sub-watershed (i.e., HUC-12).

ACE evaluates: (1) native species richness, which represents overall native diversity of all species in the state, both common and rare; (2) rare species richness; and (3) irreplaceability, which is a weighted measure of endemism. The area within Tesla has the highest possible rank in all three of these categories (Gogol-Prokurat 2018, 2019, 2020, 2021). In comparison to other sites within the same ecoregion (or watershed), Tesla ranks highest (i.e., top quantile) in terms of terrestrial biodiversity, aquatic biodiversity, and overall species biodiversity (see Table 1).

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Table 1. CDFW ACE Biodiversity Ranks for Tesla on a scale of 1 (lowest) to 5 (highest).

Metric[a] [BIOS dataset number][b]	Biodiversity Rank
Species Biodiversity [ds2769]	**5**
Terrestrial Biodiversity [ds2739]	5
Terrestrial Native Species Richness [ds2703]	5 (predominately) and 3
Terrestrial Rare Species Richness [ds2709]	5
Terrestrial Irreplaceability [ds2715]	5
Aquatic Biodiversity [ds2768]	5
Aquatic Native Species Richness [ds2743]	4
Aquatic Rare Species Richness [ds2748]	5
Aquatic Irreplaceability [ds2752]	4

[a] *Biodiversity* incorporates three measures of biodiversity: 1) native species richness, 2) rare species richness, and 3) irreplaceability.

Native Species Richness represents a count of the total number of native terrestrial species potentially present in each hexagon based on species range and distribution information.

Rare Species represents a count of the total number of rare terrestrial species potentially present in each hexagon based on documented species occurrence information.

Irreplaceability represents the relative importance of each hexagon based on the uniqueness of habitat areas present for California rare endemic and near-endemic species.

[b] See CDFW 2022b.

The ACE Project also provides the "Ecoregion Biodiversity Weight" of each hexagon. The Ecoregion Biodiversity Weight is defined as the "[a]ggregated total of ecoregionally normalized biodiversity values including native species richness, rare species richness, and rarity weighted index" (CDFW 2018a). For example, a score of 0.77 means that the biodiversity value for the selected hexagon represents 77% of the maximum value in the ecoregion (CDFW 2019a).

Over 93% of Tesla lies within hexagons (or fractions thereof) that have Ecoregion Biodiversity Weights ranging from 0.83 to 0.92. These weights greatly exceed those of nearby public lands, including the Corral Hollow Ecological Reserve (0.69), Lake Del Valle State Recreation Area (range 0.58 to 0.63), Marsh Creek State Park (range 0.43 to 0.72), and Henry W. Coe State Park (range 0.27 to 0.58). Indeed, outside of the Corral Hollow area, there are only three places within the Central Valley Coast Ranges Ecoregion that have weights of at least 0.83: (1) two hexagons south of Hollister (weights 0.88 and 0.90); (2) two partial segments of a hexagon at Fort Hunter Liggett (weights 0.84 and 0.85); and (3) one hexagon near Santa Margarita (weight 0.86). In contrast, most of the hexagons in the Corral Hollow area have weights of at least 0.83 (range 0.83 to 0.92).

Figure 5, which is adapted from the ACE program online application, depicts areas within the Central Valley Coast Ranges Ecoregion that have Ecoregion Biodiversity Weights of at least 0.83. As can be seen in the figure, the Corral Hollow area where Tesla is located represents the largest area of exceptionally high biodiversity throughout the entire ecoregion. Because plants and wildlife within Carnegie SVRA have experienced the negative impacts of OHV use (Kupferberg and Furey 2015), the urgency of classifying Tesla as a State Reserve is amplified in order to preserve the exceptional biodiversity of Tesla and this region.

Figure 5. Hexagons (in yellow) within the CDFW Central Valley Coast Ranges Ecoregion that have Ecoregion Biodiversity Weights of at least 0.83. The abundance of hexagons with very high Ecoregion Biodiversity Weights in the Corral Hollow area where Tesla is located demonstrates it is a top biodiversity hotspot.

1.3.5 Climate Change Resilience and Opportunities for Conservation Translocation

An important element of biodiversity conservation is the protection of places that will be resilient to climate change, provide refuge habitat, and function as a corridor for movement (assisted and otherwise) of species sensitive to loss of habitat, altered thermal and hydrologic regimes, and other factors. The ACE Terrestrial Climate Change Resilience dataset displays the probability that a given location within California may function as a refuge from climate change. The area encompassing Tesla has the highest possible rank of 5. This indicates that Tesla is relatively buffered from the effects of climate change, has conditions that will likely remain suitable for the current array of plants and wildlife, and that ecological functions are more likely to remain intact (CDFW 2018b).

Improving landscape connectivity is a key factor for climate change resilience and adaptation (Heller and Zavaleta 2009) because species must move from areas of declining habitat suitability to areas that remain suitable under future climate scenarios. As a result, the ecological value of Tesla as a climate change refuge is heightened because it provides a corridor for movement and dispersal at the landscape-level. Not only does Tesla provide climate change refugia for its existing resident species, but there is also a high probability that other species will be able to reach Tesla because of its geographic position (see section 1.3.6 below).

Tesla as a State Reserve could also provide opportunities for conservation translocations (as defined by IUCN 2013) in which individuals of at-risk species that are not tolerant of intense human presence are moved to places that become suitable under rapid climate change scenarios and where they would disperse if there was more time and no anthropological barriers to movement.

1.3.6 Critical Landscape-Level Habitat Linkage

Movement and dispersal are essential to faunal and floral survival. Whether it be the day-to-day activities of individuals seeking food, shelter, and mates, or the seasonal migration to find favorable conditions, movement among connected habitats is critical to individual fitness and population persistence. Dispersal (of juvenile animals, seeds, spores, etc.) is needed for gene flow, for recolonizing unoccupied habitat after local extirpation, and for species to shift their geographic range in response to climate change (Penrod et al. 2013).

Tesla supports the critical functions of movement and dispersal by providing a corridor and landscape-level linkage between Mount Diablo (to the northwest), Cedar Mountain (to the southwest), and the Mount Hamilton Range (further to the southwest). Tesla also provides an east-west corridor between the San Joaquin and Livermore valleys. Penrod et al. (2013) identified the area encompassing Tesla as a “Critical Linkage Habitat Corridor” due to its crucial biological value in preserving landscape level processes.

In addition, the ACE Terrestrial Connectivity dataset assigns a rank (range 1 to 5) to all lands within the state based on the land’s conservation importance to connectivity (CDFW 2019b).

All of the land within Tesla has an ACE Rank of 4 or 5 (Gogol-Prokurat 2019):

- ACE Rank 5 areas are defined as *Irreplaceable and Essential Corridors*. These areas encompass channelized areas and priority species movement corridors (CDFW 2019b). Channelized areas may represent the last available connection(s) between two areas, making them high priority for conservation.
- ACE Rank 4 areas are defined as *Conservation Planning Linkages*. These linkages represent the best connections between core natural areas, but have more implementation flexibility than *Irreplaceable and Essential Corridors* (CDFW 2019b).

Figure 6 shows the Critical Linkage Habitat Corridor that runs through Tesla along the Diablo Range connecting Mount Diablo with the greater Diablo Range to the south. Tesla spans the critical habitat linkage corridor within the northern Diablo Range. The damaging impacts from CSVRA on the east edge of the corridor make protecting Tesla all the more critical to maintaining a viable movement corridor.

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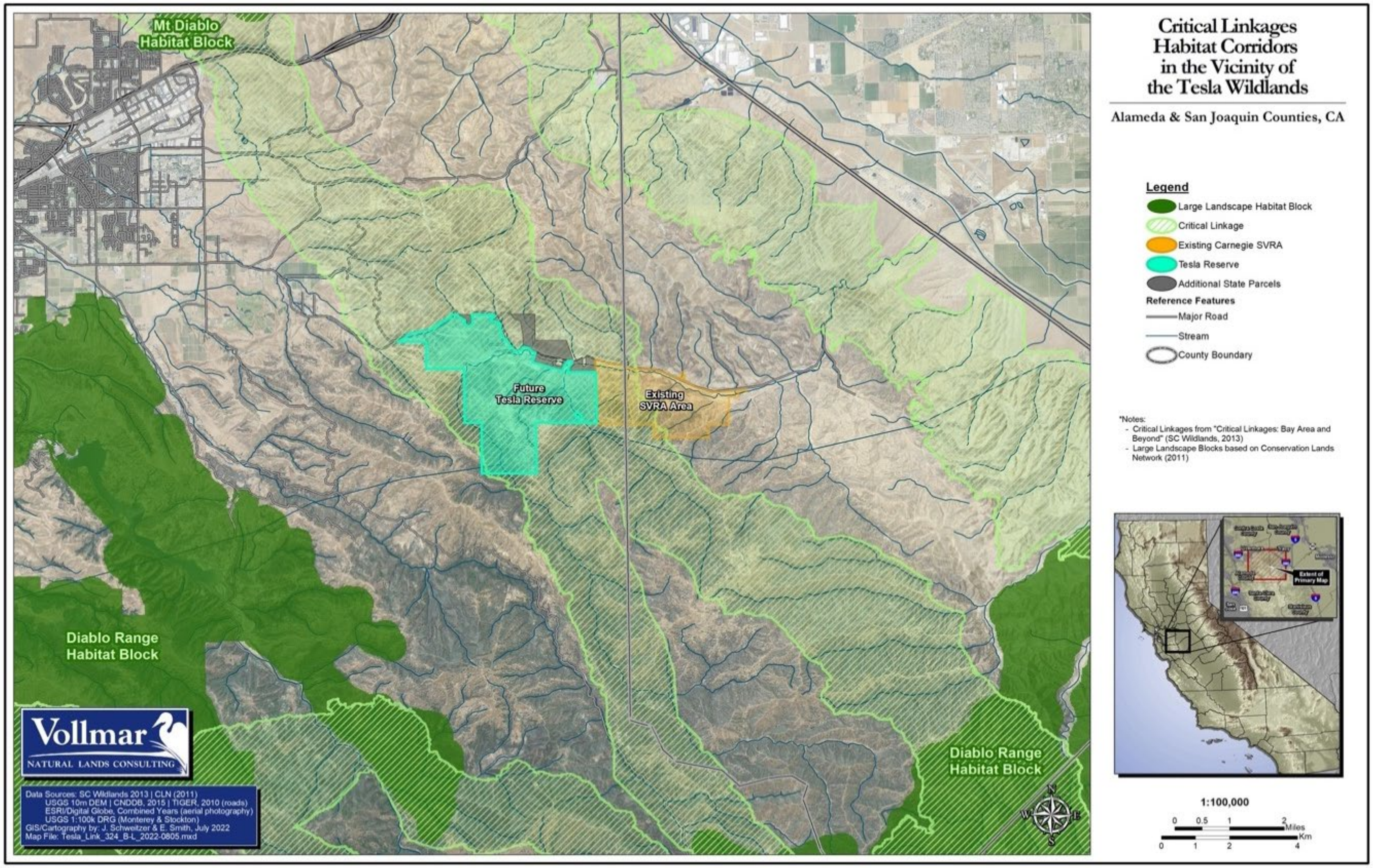

Figure 6. Critical Linkage Habitat Corridor running through Tesla between Mount Diablo and the greater Diablo Range. Damaging impacts from CSVRA make the Tesla Wildlands essential to maintaining a viable movement corridor.

1.4 CONSERVATION PLANNING PRIORITY

1.4.1 East Bay Regional Conservation Investment Strategy (EBRCIS)

The State Coastal Conservancy, the Nature Conservancy, the (Bay Area) Metropolitan Transportation Commission, the consulting firms ICF and AECOM, and numerous stakeholders developed the East Bay Regional Conservation Investment Strategy (EBRCIS), pursuant to legislation and under the direction of the State Department of Fish and Wildlife (CDFW) . The EBRCIS is structured to help guide conservation investments and land use planning in the East Bay and it details specific actions to protect, enhance, and restore conservation values in the region by the year 2031. The recommended actions in the EBRCIS were formulated from the best available scientific data on key species, habitats, and natural communities (ICF 2021).

The EBRCIS identifies conservation priorities for 39 focal species (19 plants and 20 animals), and for "other conservation elements" (i.e., habitat connectivity and landscape linkages, working landscapes, habitat for target taxa such as raptors, bats, amphibians, etc., unique land cover types, and important soil types). A conservation priority is a "conservation or habitat enhancement action (e.g., land acquisition, restoration, habitat enhancement, or management) that is identified based on its importance for benefiting and contributing to the conservation of focal species and their habitats, or other conservation elements within an RCIS area" (ICF 2021).

Fourteen of the EBRCIS focal species have been detected at Tesla.[3] In addition, Tesla contains all of the "other conservation elements" targeted for conservation in the EBRCIS, except for Baylands. Classification of Tesla as a Reserve is consistent with, and directly supports, the conservation priorities for focal species and other conservation elements identified in the EBRCIS, as detailed below:

Goal 5 - California Tiger Salamander: Prioritize permanent protection of large patches of occupied habitat containing at least four breeding ponds in areas not dominated by hybrid or non-native barred salamanders, including the Corral Hollow CPUs.[4]

Goal 6 - Foothill Yellow-legged Frog: Permanently protect occurrence and enhance habitat in streams of the Corral Hollow Creek CPU.

Goal 7 - California Red-legged Frog: Prioritize permanent protection, habitat enhancement actions, and restoration within critical habitat.

Goal 8 - Northern California Legless lizard: Prioritize permanent protection of known occurrences and parcels with suitable habitat adjacent to known occurrences to expand protection for protected occurrences (Thomson et al. 2016).

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[3] California Tiger Salamander, Foothill Yellow-legged Frog, California Red-legged Frog, Northern California Legless Lizard, Alameda Whipsnake, Tricolored Blackbird, Burrowing Owl, Golden Eagle, Swainson's Hawk, San Joaquin kit fox, mountain lion, big tarplant, round-leaved filaree, Brewer's western flax.

[4] Tesla lies within the Corral Hollow and Arroyo Las Positas conservation planning units ("CPUs").

Goal 9 - Alameda Whipsnake: 1) Increase the size of Alameda whipsnake occurrences in designated recovery units, permanently protect all areas where Alameda Whipsnake has been documented and enhance suitable habitat to ensure long-term viability without human intervention. 2) Identify linkages between recovery units and implement actions to improve connectivity and gene flow between recovery units.

Goal 11 - Tricolored Blackbird: Increase the number of nesting colonies and the amount of suitable habitat by permanently protecting and enhancing active (or recently active) nest colony sites and foraging habitat adjacent to and within 3 miles of colony sites.[5]

Goal 12 - Golden Eagle: Maintain or increase the population size and distribution by permanently protecting lands within active and potentially viable historically occupied nesting territories.

Goal 13 - Burrowing Owl: Maintain or increase the population size and distribution by permanently protecting and enhancing known nesting and overwintering locations with a focus on the Arroyo Mocho and Arroyo Las Positas CPUs north of Pleasanton and Livermore.[6]

Goal 14 - Swainson's Hawk: Maintain or increase the number of Swainson's Hawk nesting pairs by permanently protecting foraging habitat or voluntary management of working lands to provide foraging habitat within at least 10 miles of active nest sites.[7]

Goal 16 - San Joaquin kit fox: Maintain or increase the population and geographic distribution of San Joaquin kit fox and improve regional linkages to enhance movement potential in the Kellogg Creek–Big Break, Old River, Arroyo Mocho, Arroyo Valle, and Corral Hollow Creek CPUs. This includes an assessment of roadways and canals that may be barriers to wildlife movement.

Goal 17 - Mountain lion: Support a sustainable population of mountain lion by permanently protecting, through a conservation easement or other approved real estate instrument, lands that are connected to those already protected to improve habitat connectivity. This includes the east Diablo Range between Los Vaqueros Reservoir, through the Altamont Hills, to Corral Hollow Creek, with an emphasis on key connections across Interstate 580 in the Kellogg Creek–Big Break, Old River, and Arroyo Las Positas CPUs.

Goal 18 - Plant species:

Big tarplant (*Blepharizonia plumosa*) -

- Prioritize permanent protection and enhancement of known occurrences (i.e., precise CNDDB occurrences) and any newly discovered occurrences of big tarplant on unprotected land. Protect occurrences of big tarplant in the following CPUs:
  - Arroyo Las Positas CPU

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[5] Tesla is located within 2.5 miles of a colony (CNDDB 2024c, EOndx 63814).

[6] Although Tesla is not north of Livermore, it is a known overwintering location, and possibly a nesting location (CNDDB 2024c, EOndx 97540).

[7] Tesla provides foraging habitat within 10 miles of active nest sites. In 2021, an active nest was located at East Avenue near the Sandia Laboratory Federal Credit Union (Livermore).

- Corral Hollow Creek CPU
- Utilize the Botanical Priority Protection Area Guidebook (Bartosh et al. 2010) to prioritize areas for protection and enhancement in the Corral Hollow Creek CPU.

Round-leaved filaree (*California macrophylla*) -

- Prioritize permanent protection and enhancement of known occurrences (i.e., precise CNDDB occurrence) and any new occurrences of round-leaved filaree on unprotected land. Protect occurrences of round-leaved filaree in the following locations:
  - Arroyo Las Positas CPU
  - Corral Hollow Creek CPU

Brewer's western flax (*Hesperolinon breweri*) -

- Prioritize permanent protection and enhancement of known occurrences (i.e., precise CNDDB occurrences) and any new occurrences of Brewer's western flax on unprotected land. Prioritize protection of occurrences in the following locations:
  - Corral Hollow Creek CPU

Goal 20 - Increase Connectivity: Increase connectivity for native wildlife across the landscape by protecting and/or improving the condition of natural and semi-natural lands to maintain or restore ecological permeability.

- Prioritize wildlife corridor improvements in the East Bay Hills–Diablo Range and Mount Diablo- Diablo Range Critical Linkages (Penrod et al. 2013) where they intersect Interstate 580, Interstate 680, and State Route 24, as shown on Figure 2-23b, with an emphasis on preserving corridors between large habitat blocks and filling in gaps of unprotected areas within large habitat blocks included under *Conservation Priorities* under RCIS Section 3.8.15 (for San Joaquin kitfox; habitat and documented nearby sightings, but not yet detected in Tesla) and Section 3.8.16 (for mountain lions)

Goal 21 - Working lands: Retain economically viable working lands for the benefit of focal species, non-focal species, and other native species, and agricultural uses in the RCIS area.[8]

Goal 23 - Bats: Locate and permanently protect bat roost sites and adjacent foraging habitat.

Goal 24 - Unique land cover types: Protect and enhance land cover types with the lowest percent of the conservation target currently protected in the RCIS area.[9]

[8] "Working lands" include farmland and rangeland. *Rangeland* is defined as "land on which the existing vegetation, whether growing naturally or through management, is suitable for grazing or browsing of domestic livestock for at least a portion of the year. Rangeland includes any natural grasslands, savannas, shrublands (including chaparral), deserts, wetlands, and woodlands (including Eastside ponderosa pine, pinyon, juniper, and oak) which support a vegetative cover of native grasses, grasslike plants, forbs, shrubs, or naturalized species" (ICF 2021).

[9] Tesla contains the following unique land cover types, as defined in the EBRCIS: northern coastal scrub/Diablan sage scrub, cismontane juniper woodland, valley oak woodland, mixed riparian forest and scrub, seep/spring (non-serpentine), seasonal wetland, and pond.

<u>Goal 25 - Important soil classes</u>: Retain serpentine soils, alkali soils, sandy soils and clay lenses (i.e., important soils), and the native species supported by those soils (e.g., round-leaved filaree on clay lenses).

1.4.2 East Alameda County Conservation Strategy (EACCS)

The East Alameda County Conservation Strategy (EACCS) is a biologically based, comprehensive conservation strategy that provides guidance for the protection and mitigation of focal special-status species and sensitive habitats (ICF International 2010). The geographic area of the EACCS includes the cities of Livermore, Dublin, and Pleasanton as well as most of Alameda County east of Interstate 680. The goal of developing the EACCS was to streamline the Endangered Species Act and California Endangered Species Act permitting processes by establishing standardized mitigation measures and compensation ratios for 15 focal species. The EACCS was developed in coordination with the Alameda County Resource Conservation District, Natural Resource Conservation Service, U.S. Fish and Wildlife Service (USFWS), CDFW, and the San Francisco Bay Regional Water Quality Control Board.

The 39 focal species in the EBRCIS encompass the 15 focal species in the EACCS. The conservation strategy outlined in the EBRCIS is more comprehensive, incorporates updated information and analyses, and covers a broader geographic area than the EACCS. Because the EBRCIS is consistent with, and builds upon, the conservation strategy (and priorities) outlined in the EACCS, Tesla's ability to achieve the goals of the EBRCIS through classification as a State Reserve would also achieve the goals of the EACCS.

1.4.3 Priority Site for EBRCIS's Permanent Protection

The EBRCIS defines permanent protection as either recording a conservation easement or "providing secure, perpetual funding for management of the land, monitoring, legal enforcement, and defense." In particular, "conservation of natural resources, such as wildlife refuges, wilderness areas, and conservation and mitigation banks" are the most relevant aspects of protection for Tesla.

The EBRCIS provides guidelines for protection:

1. **Prioritize sites with multiple focal species, high quality habitats, robust population sizes, and critical landscape linkages.** *<u>Tesla satisfies these criteria</u>* because it is: (a) occupied by multiple focal species and other conservation elements; (b) within critical linkages important to landscape level connectivity; (c) high quality habitat that supports important phases of the focal species' lifecycles; and (d) occupied by comparatively abundant, robust populations of multiple focal species. Tesla also satisfies this criterion because its 3,100-acres span a critical linkage corridor identified by Penrod et al. (2013).

2. **Prioritize large convex parcels of land**. *<u>Tesla satisfies this criterion</u>* because it: (a) has a low ratio of edge to interior; (b) provides for the ecological needs of the focal species; (c) is large enough to sustain a population, subpopulation, or multiple territories; and (d) has the ecological features necessary for each target focal species to complete its life cycle.

3. Prioritize sites in close proximity to protected habitat. _Tesla satisfies this criterion._ Tesla is near the CDFW Corral Hollow Ecological Reserve, CCWD preserve, and thousands of acres of conservation easements on private ranch lands in the Corral Hollow Canyon east of Tesla. Although the CSVRA is publicly owned, it is managed for intensive off-highway vehicle recreation and most land uses at the CSVRA are incompatible with resource conservation. The significant environmental impacts of CSVRA within the biologically rich Corral Hollow adds to the urgency that Tesla be fully protected as a conservation anchor on the west Alameda side of the Corral Hollow.

4. Prioritize sites that are buffered by adjacent land uses that will serve to buffer existing protected areas from adjacent land uses. _Tesla satisfies this criterion_. Along Tesla Road, north of Tesla, California State Parks owns approximately 300 acres of land that function as a buffer. In addition, large ranches are located to the north, west, and south of Tesla. Because these ranches have Williamson Act contracts and are designated for "Agricultural/Grazing" in the Alameda County General Plan, they support resource conservation at Tesla. Approximately 1.2 miles of Tesla's eastern border are adjacent to the CSVRA. Although the CSVRA is publicly owned, it is managed for intensive off-highway vehicle recreation and is not compatible with resource conservation under this criterion.

The significant environmental impacts of CSVRA within the biologically rich Corral Hollow ecosystem emphasizes the critical need to classify Tesla as a reserve to ensure that its regionally important biological (and cultural) resources will be permanently protected from the effects of more intensive recreation use and development.

5. Prioritize sites that may be resilient to or provide refugia from climate change. _Tesla satisfies this criterion._ The area encompassing Tesla has an ACE Climate Resilience Rank of 5 (the highest possible rank). This indicates that Tesla coincides with an area that is relatively buffered from the effects of climate change, where conditions will likely remain suitable for the current array of plants and wildlife, and where ecological functions are more likely to remain intact (CDFW 2018b, Kling et al. 2018).

6. Prioritize sites vulnerable to development or other conversion from natural habitats. _Tesla satisfies this criterion_ if classified as a State Reserve, because it would preclude conversion of natural habitats at Tesla to more intensive recreational uses and facilities.

7. Prioritize sites with ecosystem service co-benefits. _Tesla satisfies this criterion_ because it provides clean water, flood risk reduction, and carbon sequestration, among other services.

In summary, the classification of Tesla as a Reserve is consistent with the criteria developed in the EBRCIS for lands that should be "protected" and the "light-use" recreation described in the EBRCIS matches the range of activities permitted within State Reserves (e.g., hiking, wildlife viewing).

1.4.4 Altamont Landfill Open Space Program Conservation Prioritization Mapping

The Altamont Landfill Open Space (ALOS) Fund was established to mitigate the loss of habitat for native plants and animals and scenic resources in Eastern Alameda County through the acquisition of sensitive lands in fee or by permanent conservation easements.[10] To identify target lands for conservation, the ALOS Committee engaged scientists at the University of California, Berkeley and the UC Division of Agriculture and Natural Resources to create a parcel-ranking tool for eastern Alameda County. The parcel-ranking tool, which can weight ranking factors such as sensitive species and connectivity, is based on publicly available biological assessments and maps, and it ranks undeveloped parcels of 1 acre or larger that are not already protected (Butsic and Moanga 2019).

Figure 7 is a map from the ALOS online parcel ranking tool (Butsic and Moanga 2019). Using equal weight ranking, the parcel ranking tool illustrates that 7 of the top 10 highest ranked parcels for conservation in eastern Alameda County are within, or in areas surrounding, Tesla. If sensitive species and connectivity are ranked as a "2" instead of a "1," *all* top 10 parcels are in or around Tesla. The ALOS program conservation prioritization mapping tool provides further landscape-level evidence that Tesla should be targeted for conservation based on the presence of sensitive species and habitat connectivity.

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[10] The Altamont Landfill Open Space (ALOS) Fund was created in 1999 under settlement of a lawsuit over expansion of the Altamont Landfill in eastern Alameda County to mitigate the loss of habitat for native plants and animals, and to mitigate the landfill's increased visual impact. The Altamont Landfill Open Space Committee (ALOSC) administers the fund and includes representatives from the County of Alameda, the cities of Livermore and Pleasanton, and the Sierra Club. Funds can be used for acquisition in fee or by permanent conservation easement of properties in eastern Alameda County with the first priority being to protect properties having significant value for preservation of native biological diversity and/or wildlife habitat, and the second priority for properties having significant value for visual character and/or non-motorized recreation.

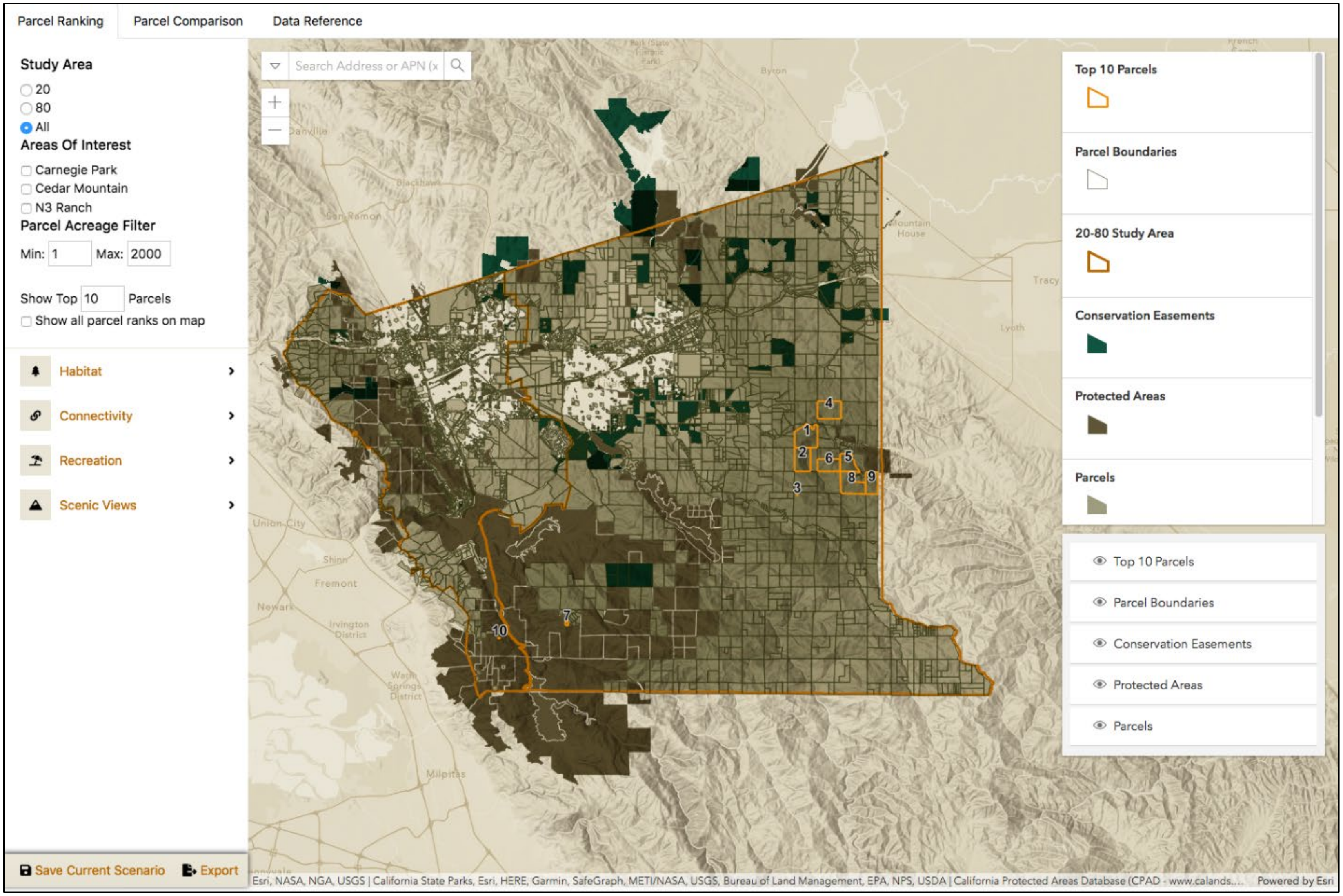

Figure 7. ALOS program conservation prioritization map depicts that using equal weight ranking most of the highest ranked parcels for conservation in eastern Alameda County are within or surrounding Tesla.

1.5 BOTANICAL RESOURCES

1.5.1 Sensitive Natural Communities, Oak Woodlands, Wetlands and Waters, and Locally Rare Land Cover Types

1.5.1.2 Sensitive Natural Communities

Sensitive Natural Communities[11] have been part of the State's conservation triad (along with plants and animals) since the inception of California's natural heritage program in 1979. Vegetation types were initially classified according to *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Since the mid-1990s, CDFW and its partners, including the California Native Plant Society (CNPS), have classified vegetation types according to the state standards embodied in the Survey of California Vegetation, which comply with the National Vegetation Classification Standard (NVCS) (CDFW 2022c). NVCS is a hierarchical classification, with the most granular level being the Association, followed by the Alliance.

As noted by Bruce Baldwin, Curator Emeritus of the Jepson Herbarium and Professor Emeritus in the Department of Integrative Biology, University of California at Berkeley, Tesla contains a unique mix of vegetation communities that remain relatively intact:

> "The Tesla property harbors an unusual array of vegetation types, including rare assemblages such as desert-olive shrubland, and the habitat quality is particularly notable. Grasslands there are highly diverse in native forbs and native grasses, as is the understory of blue oak woodland. Much of California's grassland and blue oak woodland habitat is highly degraded by non-native plants, but that is not the situation on the Tesla property" (Baldwin 2015).

Based on existing information, 9 Sensitive Natural Communities (6 alliances and 3 associations) have been documented at Tesla.

Grasslands

1. Nodding Needle Grass Association (under the Needle grass–Melic Grass Grassland Alliance)
2. One-sided Bluegrass–Mat Muhly–Douglas' Sedge Moist Meadow (Curly Blue Grass Grassland)

Woodlands

3. Valley Oak-Live Oak Association (under Valley Oak Woodland and Forest Alliance)
4. Valley Oak Riparian Forest and Woodland
5. California Sycamore–Coast Live Oak Riparian Woodlands
6. California Buckeye Groves

[11] Sensitive natural communities are defined as those with a state ranking of S1, S2, or S3 (critically imperiled, imperiled, or vulnerable; respectively) on the California Department of Fish and Wildlife's California Sensitive Natural Communities List (CDFW 2023). Sensitive natural communities must be addressed in the environmental review processes of CEQA and its equivalents.

7. Fremont Cottonwood Forest and Woodland

Shrublands

8. Basket bush–River Hawthorn–Desert Olive Patches (Desert Olive Patches)
9. Black sage-Bush mallow Association (under the Black Sage Scrub Alliance)

Vegetation at Tesla has not been fully classified to the association level. Given that some associations are considered sensitive even though the alliances in which they nest are not (e.g., *Pinus sabiniana* [ghost pine or foothill pine] alliance is not a Sensitive Natural Community, however *Pinus sabiniana/Eriogonum fasciculatum* is a Sensitive Natural Community) it is likely there are additional Sensitive Natural Communities at Tesla.

Table 2 details information about the 9 Sensitive Natural Communities documented in Tesla. Additional description is provided for several of the Sensitive Natural Communities, including those linked to Tesla's biodiversity.

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Table 2. Sensitive Natural Communities documented on Tesla.

Vegetation Types based on A Manual of California Vegetation [a]		SNC name in Figures 2 and 8 [b]	State Rank [c]	Data sources [d]	Approximate acres [d]	Mapping source [e]
Common name	**Scientific name**					
Grasslands						
Nodding Needle Grass Association (under the Needle grass–Melic Grass Grassland Alliance)	*Nassella cernua* Association (under the *Nassella* spp.–*Melica* spp. Herbaceous Alliance)	Nodding Needle Grass	S3	MIG 2021 (*Nassella cernua* association), CSP 2023 (*Nassella cernua* Association)	345	MIG 2021 data (Figures 5a-5e, pages 14–16)
One-sided Bluegrass–Mat Muhly–Douglas' Sedge Moist Meadow	*Poa secunda–Muhlenbergia richardsonis–Carex douglasii* Herbaceous Alliance	Curly Blue Grass Grassland	S3	MIG 2021	9	
Woodlands						
Valley Oak–Live Oak Association (under the Valley Oak Woodland and Forest Alliance)	*Quercus lobata–Quercus agrifolia* Woodland Association (under the *Quercus lobata* Woodland Alliance)	Valley Oak –Live Oak	S3	AECOM 2012, CSP 2023	10	CSP 2023 data (Figure 1, Table 1)
Valley Oak Riparian Forest and Woodland	*Quercus lobata* Riparian Forest and Woodland Alliance	Valley Oak (Riparian)	S3	AECOM 2012, CSP 2023	13	
California Sycamore–Coast Live Oak Riparian Woodlands	*Platanus racemosa–Quercus agrifolia* Woodland Alliance	California Sycamore	S3	CSP 2023	17	
California Buckeye Groves	*Aesculus californica* Forest and Woodland Alliance	Buckeye	S3	CSP 2023	20	
Fremont Cottonwood Forest and Woodland	*Populus fremontii–Fraxinus velutina–Salix gooddingii* Forest and Woodland Alliance	Fremont Cottonwood	S3.2	AECOM 2012, CSP 2023	19	
Shrublands						
Basket bush–River Hawthorn–Desert Olive Patches	*Rhus trilobata–Crataegus rivularis–Forestiera pubescens* Shrubland Alliance	Desert Olive	S3.2?	AECOM 2012, CSP 2023	26	CSP 2023 data (Figure 1, Table 1)

Table 2 (continued) **Vegetation Types based on A Manual of California Vegetation [a]**		**SNC name in Figures 2 and 8 [b]**	**State Rank [c]**	**Data sources [d]**	**Approximate acres [d]**	**Mapping source [e]**
Common name	**Scientific name**					
Black sage–Bush mallow Association (under the Black Sage Scrub Alliance)	*Salvia mellifera–Malacothamnus fasciculatus* Shrubland Association (under *Salvia mellifera* Shrubland Alliance)	Black Sage-Bush Mallow	S3	CSP 2023	53	CSP 2023 data (Figure 1, Table 1)

[a] Sensitive Natural Communities are typed to alliance or association level based on the online edition of A Manual of California Vegetation (CNPS 2023).
[b] Name of Sensitive Natural Community (SNC) as mapped on Figures 2 and 8.
[c] State Ranks for Sensitive Natural Communities (CDFW 2023):
S3 = Vulnerable – at moderate risk of extirpation in California due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors. Denoted a sensitive natural community by CDFW.
S#? = Denotes inexact numeric rank due to insufficient samples over the full expected range.
0.2 = Threatened
[d] Data sources used to identify Sensitive Natural Communities, including approximate acreage of SNC.
[e] Data sources utilized for mapping.

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1.5.1.3 Oak Woodlands, including Blue Oak Woodlands

Tesla contains approximately 1,036 acres of oak woodlands. Two sensitive natural community types are dominated by valley oak (*Quercus lobata*): Valley Oak Woodland and Forest, and Valley Oak Riparian Forest and Woodland). Blue oak (*Quercus douglasii*) dominates the remaining oak woodlands at Tesla (CDFW 2022c).

Oak woodlands have the richest wildlife species abundance of any habitat in California, with over 330 species of birds, mammals, reptiles, and amphibians depending on oak woodlands at some stage in their life cycle (CalPIF 2002). Urbanization and agricultural development have eliminated approximately one-third of California's oak woodlands (CalPIF 2002). Of the oak woodlands that remain, only 40% are on public lands or have some level of protection (e.g., conservation easement). However, even those that are not subject to development or intensive use are still susceptible to numerous threats.

In many cases, existing oak woodlands are not regenerating naturally as young trees are not establishing to replace older trees that senesce and die (McCreary 2009, CDFW 2021). In addition, *Phytophthora ramorum*, the pathogen responsible for the plant disease known as Sudden Oak Death, started attacking California oaks in 1995 and became a full-scale epidemic by 1999. Thus, the health and persistence of oak woodlands continue to be threatened, even at sites that are protected from development.

While not a protected species or habitat at present, blue oak woodlands are included in CDFW's Natural Community Conservation Planning (NCCP) program because of their essential role in ecosystem health and wildlife habitat (CDFW 2024a). Blue oak woodlands primarily encircle the Central Valley in the western foothills of the Sierra Nevada and eastern inland Coast Range where Tesla is located (CDFW 2021). Blue oak trees enhance soil fertility beneath their canopy and removal or loss of trees leads to rapid deterioration of soil quality (Dahlgren et al. 2003). Blue oak woodlands are extensive at Tesla and are susceptible to the interactions of climate warming and increasing wildfire intensity. As drought and heat stressed trees die, understory grasses and forbs flourish, thereby increasing combustible biomass and creating a feedback loop between drought and fire risk. After the 2012 through 2016 drought, blue oak woodlands experienced more than 1,200 km^2 tree cover loss statewide (Dwomoh et al. 2021). Notably, the trends in tree cover loss in the ecoregion around Tesla have thus far been less severe than the surges observed in other regions of California (Dwomoh et al. 2023). This contrast speaks to the importance of Tesla as a refuge from climate change for the wildlife inhabiting oak woodlands.

1.5.1.4 Wetlands and Waters

Topography at Tesla consists of relatively steep hills and ravines (up to 70% slope). Three streams and their associated floodplains occur at Tesla: Corral Hollow Creek, Mitchell Ravine (a tributary to Corral Hollow Creek), and Arroyo Seco (Figure 1). In addition, Tesla contains 49 drainages, and 15 ponds (Baker 2018). Collectively, these features provide 23.71 acres of the U.S. Army Corps of Engineers (USACE) Section 404 Clean Water Act (CWA) jurisdiction and Regional Water Quality Control Board (Water Board) Porter-Cologne Act jurisdiction, or approximately 20 miles of streams. For streams, CDFW regulatory jurisdiction encompasses the cross section of the creeks from top-of-bank to top-of-bank or the extent of riparian vegetation, whichever is greater, and, therefore, has a greater acreage of 46.50 acres or 20 miles of streams (Baker 2018).

Two analyses of the extent of wetlands under federal Section 404 CWA and State (CDFW and Water Board) jurisdiction have been conducted for the 3,100-acres of Tesla. A Section 404 CWA Preliminary Jurisdictional Determination was conducted by TRA Environmental Sciences (2010) and the U.S. Army Corps of Engineers provided a letter of concurrence. In that report, TRA documented approximately 11.84 acres of Section 404 CWA wetlands within the boundaries of Tesla. A second Section 404 CWA jurisdictional delineation was performed in 2018 (Baker) with a significantly lower estimate of 0.56 acres of jurisdictional wetlands.

Factors that may contribute to this difference include: sample site locations varied between the two delineations; the drought of 2011-2017 may have influenced the presence/absence of indicators of hydrology (USACE 2008); and whether soils within the streambeds should be considered hydric soils. Future confirmation of the extent of state and federally recognized wetlands (and other jurisdictional waters) is warranted.

Three of the Sensitive Natural Communities at Tesla (Valley Oak Riparian, Sycamore, and Fremont Cottonwood) are associated with riparian and wetland areas, and, therefore, require additional protections, as described below.

1.5.1.4.1 Valley Oak Riparian Forest and Woodland

Valley oak is endemic to California and occurs as a dominant species in riparian woodlands at floodplain elevations higher above stream channels than those dominated by Fremont cottonwoods (Holstein 1984). There are 13 acres of Valley Oak Riparian Forest and Woodland documented at Tesla (AECOM 2012, CSP 2023).

Similar to the other two riparian woodland plant communities, the valley oak community provides a foundation for diverse bird, mammal, and insect communities (Davis et al. 2016). Tesla falls within one of the two regions identified by landscape genetic analysis as being a repository of genotype and allelic richness (i.e., genetic biodiversity) within the wide geographic range of the valley oak (Grivet et al. 2008). Populations in these regions possess climate change adaptive variants of genes, such as those coding for heat-shock proteins that determine a tree's resilience to thermal stress. Researchers have also identified allelic richness in the genes for the plant hormones which control the timing of budburst and flowering in response to environmental cues (Grivet et al. 2008, Sork et al. 2016). Populations, such as those within Tesla, should be a priority in establishing reserves to protect the evolutionary potential of the species to respond to climate change.

1.5.1.4.2 California Sycamore–Coast Live Oak Riparian Woodlands

Central California sycamore alluvial woodlands (CCSAW) are an extremely rare vegetation community (CNDDB 2024c).[12] By 1996, there were only 17 significant stands of CCSAW (totaling approximately 2,000 acres) remaining in the state (Keeler-Wolf et al. 1997). Many of these stands are threatened by development, or are declining primarily due to the adverse effects of water impoundments, hybridization, pathogens (e.g., sycamore anthracnose and *Phytophthora* spp.), gravel mining, and climate change (Keeler-Wolf et al. 1997, SFEI and HT Harvey 2017, CNDDB 2024c).

There are 17 acres of California Sycamore–Coast Live Oak Riparian Woodlands at Tesla (CSP 2023). The presence of California sycamore (*Plantanus racemosa*) at Tesla has tremendous conservation value for the following reasons:

1. Habitat: California sycamores provide substantial nesting and roosting habitat for a variety of bird species, as well as seed and insect food sources, relative to many other riparian trees (Bock and Bock 1984). Mature sycamores often have cavities that provide roosting or denning habitat for a variety of mammals (e.g., bats, squirrels, and ringtails). In addition, sycamores, both as live trees and as downed logs, increase aquatic habitat complexity by: (a) providing significant amounts of woody debris that provide underwater structure and cover for aquatic wildlife; and (b) creating relatively deep scour pools which remain wetted when shallow areas of the stream channel become de-watered during the dry season.

2. Restoration Opportunities: Because the intermittent, alluvial creeks at Tesla (and CSVRA) are unregulated by dams or diversions, they provide a unique opportunity to restore this iconic community, which is emblematic of California's natural heritage. Sycamore alluvial woodlands are associated with coarse sediment (e.g., rocks or cobbles) along intermittent streams that are subject to high-intensity flooding. Maintenance of sycamore stands depends on specific hydrologic processes, and therefore they may not persist in systems that have altered hydrologic regimes (e.g., below dams). Because most sites that historically contained sycamore stands have been severely and negatively affected by dams and other human activities, they may not be viable restoration sites.

3. Genetic Diversity: Hybridization with the non-native London plane tree (*Platanus* × *hispanica*) has significantly impacted the health and regeneration of existing sycamore stands (SFEI and HT Harvey 2017). Introgression of genes from London plane tree has become so prevalent that: (a) unhybridized seed sources are now difficult to find for restoration projects (CDFW 2019c); and (b) the native genotype may become extinct and lead to a loss of habitat values for wildlife provided by the native California sycamore (Byington 2016, Johnson et al. 2016). Although the sycamores at Tesla have not been

[12] CCSAW has a NatureServe rank of G1 S1 (CNDDB 2024c), indicating it is *Critically Imperiled* (at very high risk of extirpation or extinction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors).

genetically tested, they may provide an unhybridized seed source for on-site and off-site sycamore restoration projects.

1.5.1.4.3 Fremont Cottonwood Forest and Woodland

Fremont cottonwoods (*Populus fremontii*) are considered a foundational tree to riparian forests. They were historically abundant and geographically widespread on the floodplains of low gradient streams and rivers in California and the Southwestern USA (Stromberg 1993). Due to the negative effects of water abstraction, upstream flow regulation by dams, livestock use, and drought, there have been widespread declines of Fremont Cottonwood Forests and Woodlands (Stromberg 1993, Smith and Finch 2017).

There are 19 acres of Fremont Cottonwood Forest and Woodland documented in Tesla (AECOM 2012, CSP 2023). In these areas, Fremont cottonwood trees are dominant or co-dominant in the tree canopy with willows *(Salix* spp.) and other trees such as sycamore. The presence of Fremont cottonwood trees at Tesla has tremendous conservation value for the following reasons:

1. Habitat: Stands of the Fremont cottonwood provide important foraging, nesting, and roosting habitat for birds as well as stopping points during migration for a variety of species (Smith and Finch 2017); cavities in larger trees can provide habitat for small mammals. The woody vegetation of species in this alliance creates underwater structure for aquatic organisms. For example, some amphibian species present at Tesla attach their eggs to tree roots. Water flowing over large, downed logs or upturned trees and shrubs generates scour of the stream bed. These depressions remain wetted longer than the rest of the channel allowing aquatic larvae of insects and amphibians sufficient time to reach metamorphosis prior to complete drying of the stream channel.

2. Restoration Opportunities: Restoring riparian woodlands to increase the patch size of habitat and the diversity of understory plants are central elements of the conservation plan to reverse declines in California's riparian birds (RHJV 2004). The creeks at Tesla are free-flowing, and thus suitable for riparian woodland restoration and enhancement projects. Regeneration and maintenance of Fremont cottonwoods depend on specific hydrologic and sediment transport processes to create the moist, unvegetated mineral soil needed for seedling establishment on the banks and floodplain of a stream (Stromberg 1993). Most sites that historically contained Fremont cottonwood stands have been severely and negatively affected by flow regulation, gravel mining, and other human activities so restoration at sites like Tesla is more likely to be successful than elsewhere.

3. Genetic Diversity: Fremont cottonwoods are genetically highly variable across their broad climatic and geographic range with multiple ecotypes and genetic distinctions among populations (Ikeda et al. 2017, Cooper et al. 2022). Some genotypes, especially those from cooler provenances, have proven to be more plastic in their chemical responses to herbivore damage than other genotypes (Eisenring et al. 2022), while others are extremely tolerant of heat stress (Moran et al. 2023). The Fremont cottonwoods at Tesla have not been genetically tested and represent a potentially important resource in

the search for ecotypes resilient to climate change and insect outbreaks given their more northerly location within the species distribution.

1.5.1.5 Locally Rare Land Cover Types

Tesla also contains several locally rare land cover types that are a separate classification scheme from Sensitive Natural Communities (see ICF 2021).[13] These include:

- Northern coastal scrub/Diablan sage scrub
- Cismontane juniper woodland
- Mixed riparian forest and scrub
- Spring/seep and pond

The number and distribution of the Sensitive Natural Communities and locally rare land cover types in Tesla illustrates Tesla's botanical biodiversity and why it is identified as a Botanical Priority Protection Area and a conservation priority area.

Figure 8 depicts the spatial distribution of the vegetation types, including Sensitive Natural Communities, documented at Tesla.

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[13] Land cover types that account for 2% or less of the total land area in Contra Costa and Alameda Counties are classified as "locally rare" in the East Bay Regional Conservation Investment Strategy (ICF 2021).

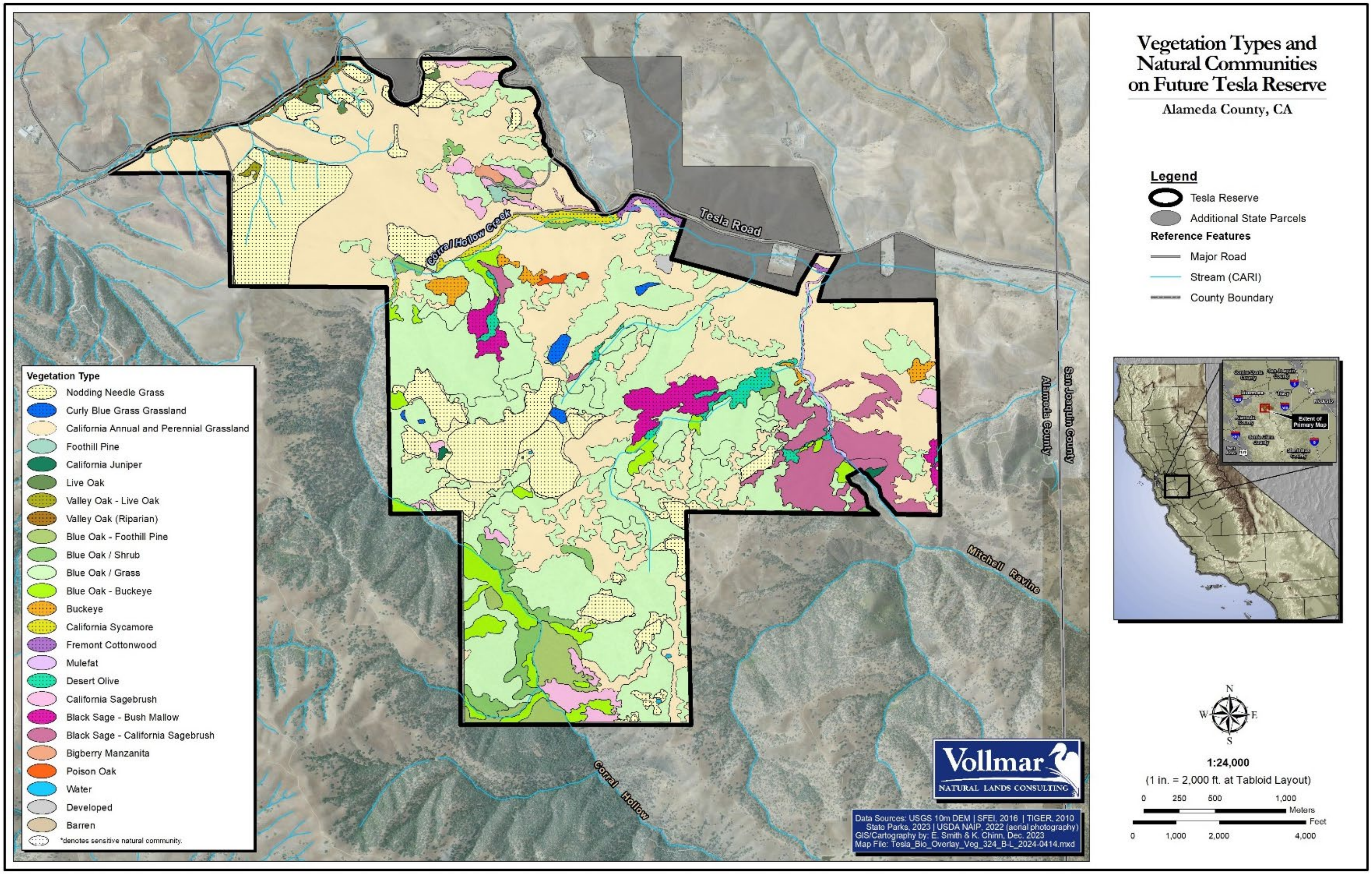

Figure 8. Vegetation Types and Sensitive Natural Communities documented on Tesla.

1.5.2 Special-Status and Other Unique Plant Species

1.5.2.1 Special-Status (Rare) Plants

Tesla is located along the northwestern boundary of the "San Joaquin Desert" (Germano et al. 2011) in the rain shadow of the moist Diablo Range. In addition, it is located in the northernmost major canyon of the South Coast Ranges (*see* Wiseman 2015). This unique combination of geographic position and climatic regime supports an unusual and rare assemblage of flora comprised of South Coast Range stalwarts (e.g., *Blepharizonia plumosa*), species characteristic of the San Joaquin Valley, and species that crept up the west side of the San Joaquin Valley from the Mojave Desert (e.g., *Eremothera boothii* subsp. *decorticans*) (Bartosh et al. 2010). Many of these species are at the limit (i.e., northern, western, and even southern for one species) of their range and have been able to persist at Tesla due to its isolation from urban areas and human activities (which are common vectors of invasive plants and other threats).

There has not been a comprehensive inventory of all special-status plants (including locally rare plant species) occurring at the Tesla property. However, based on existing data, 45 rare plant species (one of which is undescribed) have been documented at some point within Tesla (EcoSystems West 2004, CSP 2015, Kramer 2016, MIG 2021, EBCNPS 2022, CalFlora 2024). These include:

- 5 species that are rare, threatened, or endangered in California and elsewhere (California Rare Plant Rank (CRPR List 1B species).
- 1 species that is rare, threatened, or endangered in California, but common elsewhere (CRPR List 2B species).
- 10 species with limited distribution in California (CRPR List 4 species).
- 28 additional species that are locally rare in the California Native Plant Society, East Bay Chapter's Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties (Locally Rare Rank "A" species).[14]
- An undescribed *Fritillary* species (i.e., potentially a new species).[15]

Table 3 details the 45 special-status (rare) plants thus far detected in Tesla, including their habitat associations. Over half (25 of 45) of the special-status plant species detected at Tesla are associated with blue oak woodlands, which exemplifies the role of blue oak woodlands in supporting plant and animal biodiversity. Appendix 1 details the 74 Locally Rare Watchlist plants identified by the East Bay Chapter of the California Native Plant Society (EBCNPS).

Figure 9 which follows Table 3 shows the distribution of some of the 45 special-status (rare) plants and soil types identified in Tesla. Only 14 of 45 rare plant species (31%) are mapped on Figure 9 (and Figure 2) because location data for mapping was either not available from or provided by California State Parks.

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[14] Locally Rare Rank "A" plants are considered to be rare, threatened, or endangered under CEQA Guidelines Section 15380.

[15] Ecosystems West. 2004. Botanical Survey of the Carnegie State Vehicular Recreation Area, Alameda and San Joaquin Counties, California. Santa Cruz, CA.

In addition to the vegetation types contributing to Tesla's biodiversity, the spatial extent of soil types where rare taxa have been found is greater than the point locations of specific plants. This signifies that additional populations likely occur and opportunities for conservation and translocations abound.

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Table 3. Special-status (Rare) Plants documented on Tesla, associated habitats, and presence/absence in maps (Figures 2 and 9).

Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
CRPR List 1B species						
Blepharizonia plumosa	big tarweed, big tarplant	1B.1	A2 (northern and western edge of range)	Yes	MIG 2021, Ecosystems West 2004	Valley and foothill grassland in dry slopes, usually clay areas
Campanula exigua	chaparral harebell	1B.2	A2 (northern edge of range)	Yes	MIG 2021 (observed 2016)	Rocky, usually serpentinite areas of chaparral
Delphinium californicum subsp. *interius*	Hospital Canyon larkspur	1B.2	A2 (northern edge of range)	Yes	MIG 2021, Ecosystems West 2004	Generally east-facing slopes in open woodland (including oak/blue oak woodland), eastern side of coast ranges, also openings in chaparral and coastal scrub
Hesperolinon breweri	Brewer's western flax	1B.2	A2 (southern edge of range)	Yes	Ecosystems West 2004	Usually serpentinite areas in chaparral, cismontane woodland (including oak/blue oak woodland), and valley and foothill grassland
Lagophylla diabolensis (formerly L. dichotoma)	Diablo Range hare-leaf (formerly forked hareleaf)	1B.2	None (north of known range)	No	Ecosystems West 2004	Cismontane woodland (including oak/blue oak woodland) and valley and foothill grassland, sometimes on clay
CRPR List 2B species						
Senecio aphanactis	chaparral ragwort, rayless ragwort, California groundsel	2B.2	A1x	Yes	Kramer 2016, Ecosystems West 2004	Sometimes alkaline areas in chaparral, cismontane woodland (including oak/blue oak woodland), and coastal scrub
CRPR List 4 species						
Acanthomintha lanceolata	Santa Clara thornmint	4.2	A2 (northern and western edge of range)	Yes	MIG 2021, Ecosystems West 2004	In talus, rocky slopes, or outcrops in chaparral (often serpentinite), cismontane woodland (including oak/blue oak woodland, occasionally serpentine), and coastal scrub

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Amsinckia douglasiana	Douglas' fiddleneck	4.2	A1x	No	Kramer 2016, Ecosystems West 2004	Dry areas, often on Monterey shale, in cismontane woodland (including oak/blue oak woodland) and valley and foothill grassland
Androsace elongata subsp. *acuta*	California androsace	4.2	A2	Yes	MIG 2021 (observed 2016), Ecosystems West 2004	On slopes in chaparral, cismontane woodland (including oak/blue oak woodland), coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland
Clarkia breweri	Brewer's clarkia	4.2	A1	No	EBCNPS 2022	Often serpentinite areas in chaparral, cismontane woodland (including oak/blue oak woodland), and coastal scrub
Eriophyllum jepsonii	Jepson's woolly sunflower	4.3	A2 (northern edge of range)	Yes	MIG 2021, Ecosystems West 2004	Sometimes serpentinite in chaparral, cismontane woodland (including oak/blue oak woodland), and coastal scrub
Fritillaria agrestis	stinkbells	4.2	A2	Yes	MIG 2021, Ecosystems West 2004	Clay, often vertic, occasionally serpentine in chaparral, cismontane woodland (including oak/blue oak woodland), pinyon/juniper woodland, and valley and foothill grassland
Galium andrewsii subsp. *gatense*	phlox-leaf serpentine bedstraw, serpentine bedstraw	4.2	A2	Yes	MIG 2021 (observed 2016)	Rocky or serpentinite areas in chaparral, cismontane woodland (including oak/blue oak woodland), and lower montane coniferous forest
Hesperevax caulescens	hogwallow starfish	4.2	A2	No	Kramer 2016	Sometimes alkaline areas in mesic clay valley and foothill grasslands or shallow vernal pools
Microseris sylvatica	sylvan scorzonella	4.2	A1	Yes	MIG 2021 (observed 2016), Ecosystems West 2004	Rarely serpentinite areas of chaparral, cismontane woodland (including oak/blue oak woodland), Great Basin scrub, pinyon and juniper woodland, and valley and foothill grassland

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Piperia michaelii	Michael's rein orchid	4.2	A2	Yes	MIG 2021 (observed 2016)	Coastal bluff scrub, closed-cone coniferous forest, chaparral, cismontane woodland (including oak/blue oak woodland), coastal scrub, and lower montane coniferous forest
EBCNPS Locally Rare Species (Locally Rare Rank A1)						
Allium crispum	crinkled onion	none	A1	No	MIG 2021, Ecosystems West 2004	Generally, shale slopes in foothill woodland (including oak/blue oak woodland) and valley grassland (Calflora 2024)
Amsinckia vernicosa	waxy fiddleneck	none	A1 (northern edge of range)	No	Ecosystems West 2004	Slopes in foothill woodland (including oak/blue oak woodland) and valley grassland (Calflora 2024)
Astragalus didymocarpus var. *didymocarpus*	two-seeded milkvetch	none	A1	No	Kramer 2016	Grassy areas
Athysanus unilateralis	heterodraba	none	A1	No	Kramer 2016, Ecosystems West 2004	Grassy, open slopes, flats, clay soils, floodplains, gypsum-clay slopes; also foothill woodland (including oak/blue oak woodland) (Calflora 2024)
Elymus elymoides var. *elymoides*	squirreltail	none	A1	No	MIG 2021	Desert shrubland, often in disturbed sites
Epilobium cleistogamum	cleistogamous boisduvalia	none	A1 (western edge of range)	No	Kramer 2016	Vernal pools, clay flats
Eremalche exilis	white mallow	none	A1	No	EBCNPS 2022	Desert scrub
Eremalche parryi subsp. *parryi*	Parry's mallow	none	A1 (western edge of range)	Yes	Calflora 2024	Grassland, scrub, foothill woodland (including oak/blue oak woodland)
Eremothera boothii subsp. *decorticans*	shredding evening primrose	none	A1	No	Ecosystems West 2004	Open, generally steep and rocky, especially shale slopes
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat	none	A1	No	MIG 2021	Gravel on dry slopes, washes and canyons

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Eriogonum fasciculatum var. *polifolium*	Mojave desert California buckwheat	none	A1	No	MIG 2021, Ecosystems West 2004	Sand, gravel or rocks on dry slopes, washes and canyons
Eriogonum nudum var. *pauciflorum*	little-flower wild buckwheat	none	A1	No	MIG 2021, Ecosystems West 2004	Sand in openings
Hesperolinon disjunctum	dwarf flax	none	A1	No	Kramer 2016	Openings in chaparral, serpentine, vertic clay
Heterotheca oregona var. *scaberrima*	Oregon false goldenaster	none	A1	No	MIG 2021	Seasonally dry streambeds on sand, gravel, or rocks
Holozonia filipes	whitecrown	none	A1	No	MIG 2021	Banks, dry streambeds, pools, rocky or alkaline clay, sometimes serpentine
Lasthenia minor	coastal goldfields, woolly goldfields	none	A1	No	Kramer 2016	Grassland
Mentzelia micrantha	small-flowered stick-leaf	none	A1	No	Kramer 2016	Open, generally recent-burned or disturbed chaparral and oak woodland (including blue oak woodland)
Parietaria hespera var. *californica*	California pellitory	none	A1 (northern edge of range)	No	EBCNPS 2022	Rocky slopes, canyons, among boulders, in coastal scrub, chaparral, oak woodland (including blue oak woodland)
Silene antirrhina	sleepy catchfly, snapdragon catchfly	none	A1	No	Kramer 2016, Ecosystems West 2004	Open areas, burns
EBCNPS Locally Rare Species (Locally Rare Rank A2)						
Caulanthus flavescens	yellow-flowered thelypodium	none	A2	No	Ecosystems West 2004	Dry, exposed slopes, open hillsides, vertic clay, often serpentine; valley grassland
Delphinium parryi subsp. *parryi*	Parry's larkspur	none	A2 (northern edge of range)	No	Kramer 2016, Ecosystems West 2004	Chaparral, oak woodland (including blue oak woodland)
Elatine californica	waterwort	none	A2	No	Ecosystems West 2004	Pools, ponds, rice fields, streambanks

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Eriogonum roseum	wand wild buckwheat	none	A2	No	MIG 2021	Sand or gravel in oak woodland (including oak/blue oak woodland), chaparral
Erythranthe nasuta	shy monkeyflower	none	A2	Yes	Calflora 2024	Seeps in rock outcrops, streams and creeks
Lasthenia microglossa	small-ray goldfields	none	A2 (northern edge of range)	No	Kramer 2016, Ecosystems West 2004	Shaded slopes of woodland (including oak/blue oak woodland), chaparral, desert scrub
Nuttallanthus texanus	blue toadflax	none	A2	No	EBCNPS 2022	Sand or gravel in foothill woodland (including oak/blue oak woodland), chaparral, and valley grassland
Perideridia oregana	yampah	none	A2	No	Ecosystems West 2004	Open flats or slopes, pine/oak woodland (including blue oak woodland)
Ribes aureum var. *gracillimum*	golden current	none	A2 (northern edge of range)	No	MIG 2021, Ecosystems West 2004	Alluvial areas, forest edges and riparian forest
Potentially Newly Described Species, Rank Undetermined						
Fritillaria sp. (undescribed)	potentially undescribed fritillary	un-known	unknown	No	Ecosystems West 2004	Clay soils in grasslands and open areas of blue oak woodland (Ecosystems West 2004)

[a] California Rare Plant Ranks (CDFW 2023)

1B = Rare or Endangered in California and elsewhere.
2B = Rare or Endangered in California, but more common elsewhere.
4 = Plants of limited distribution – Watch list

Threat Ranks

.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat).
.2 = Moderately threatened in California (20-80% of occurrences threatened / moderate degree and immediacy of threat).
.3 = Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

[b] EBCNPS Locally Rare Ranks (EBCNPS 2022)

A1 = Species known from 2 or less botanical regions in Alameda and Contra Costa Counties, either currently or historically.
A2 = Species currently known from 3 to 5 regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc.

[c] Documents if location for rare plants is mapped (Yes/No) on Figures 2 and 9. Only 14 of 45 rare plant species are mapped on Figures 2 and 9 because location data for mapping was not available from, or not provided by, California State Parks.

[d] Survey data source for rare plants listed in Table 3.
[e] Habitat Associations for each rare plant based on CNPS 2024, unless other source noted. Twenty-five (25) of 45 rare plants are associated with blue oak woodlands.

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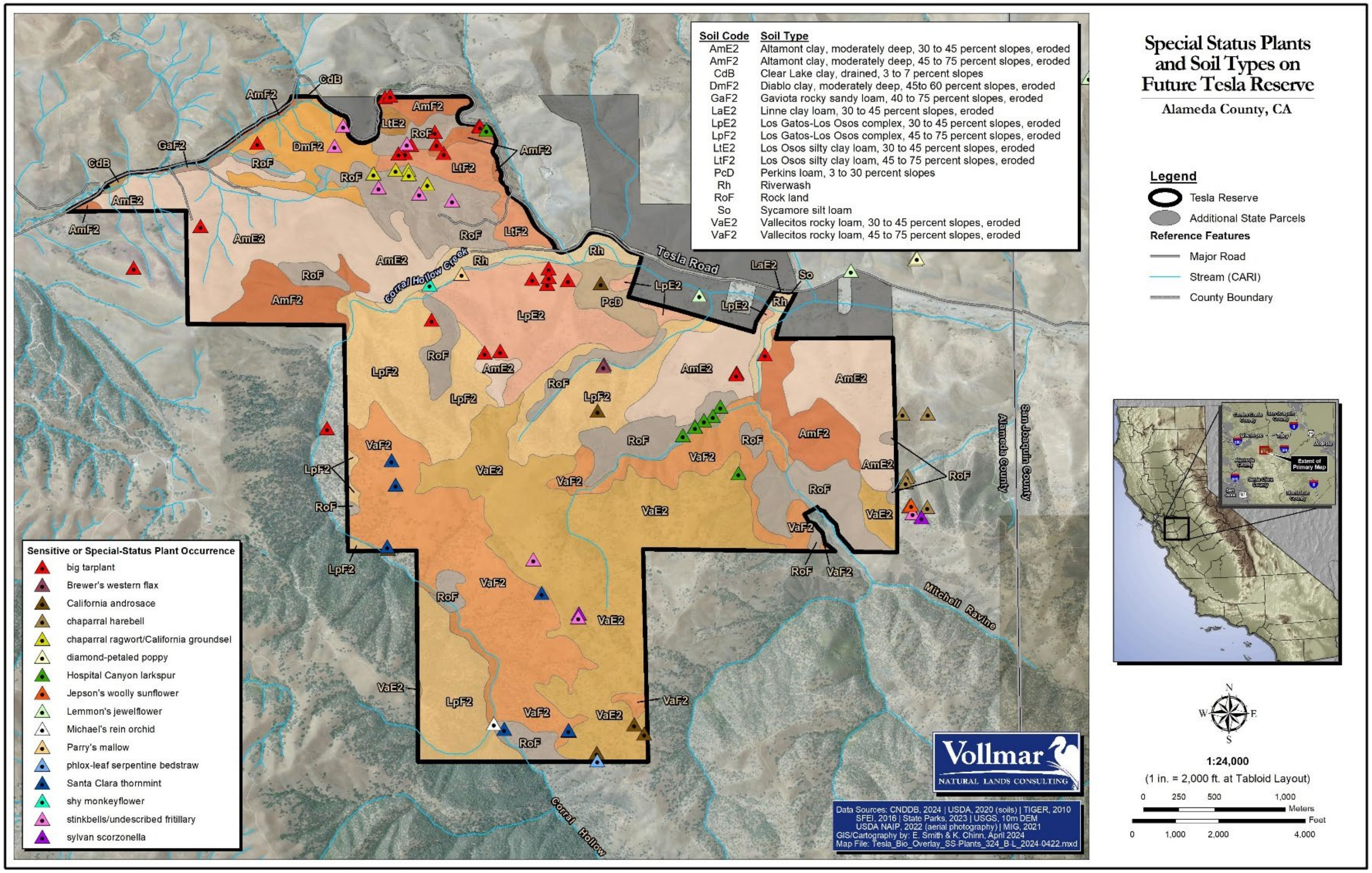

Figure 9. Special-status (Rare) Plants and Soil Types documented on, and immediately adjacent to, Tesla.

1.5.2.2 Reintroduction of Special-Status Plants

Because of Tesla's environmental conditions and location, it provides potential habitat and a place where re-introduction, assisted migration, and establishment of experimental populations could be carried out if the area was protected from more intense recreational development (CSP 2015; CDFW 2022d). The list of additional special-status plant species, several of which have been documented in adjacent properties with similar habitat, are facing threats of climate change and habitat degradation. These plants may be found on Tesla with continued surveying or could be candidates for conservation translocations. Special-status plants that have been found near Tesla, or for which Tesla is suitable habitat and which may be candidates for reintroduction include:

1. Large-flowered fiddleneck (*Amsinckia grandiflora*) – federally and state listed as endangered, CRPR 1B.1; documented nearby
2. Lemmon's jewelflower (*Caulanthus lemmonii*) – CRPR 1B.2; documented nearby
3. Diamond-petaled poppy (*Eschscholzia rhombipetala*) – CRPR 1B.1; documented nearby
4. Diablo helianthella (*Helianthella castanea*) – CRPR 1B.2
5. Mt. Hamilton coreopsis (*Leptosyne hamiltonii*) – CRPR 1B.2
6. Adobe navarretia (*Navarretia nigelliformis* subsp. *radians*) – CRPR 1B.2; documented nearby
7. Showy golden madia (*Madia radiata*) – CRPR 1B.1
8. Big-scale balsamroot (*Balsamorhiza macrolepis*) – CRPR 1B.1
9. Caper-fruited tropidocarpum (*Tropidocarpum capparideum*) – CRPR 1B.1
10. Alkali milk-vetch (*Astragalus tener* var. *tener*) – CRPR 1B.2
11. Loma Prieta hoita (*Hoita strobilina*) – CRPR 1B.1
12. San Joaquin spearscale (*Extriplex joaquinana*) – CRPR 1B.2
13. Talus fritillary (*Fritillaria falcata*) – CRPR 1B.2
14. Santa Clara red ribbons (*Clarkia concinna* subsp. *automixa*) – CRPR 4.3
15. Sharsmith's onion (*Allium sharsmithiae*) – CRPR 1B.3
16. Tehama County western flax (*Hesperolinon tehamense*) – CRPR 1B.3
17. Carlotta Hall's lace fern (*Aspidotis carlotta-halliea*) – CRPR 4.2

1.5.2.3 Imperiled Rare Plants

All Heritage Programs, including the California Natural Diversity Database (CNDDB), use standard criteria and definitions to assign element ranks to taxa within a given region (e.g., state). This standardization makes the ranks comparable across organisms and political boundaries. Plants with a rank of S1 are "Critically Imperiled" in California and are at very high risk of extirpation within the state due to very restricted range, very few populations or occurrences, very steep declines in population size, severe threats, or other factors. Plants with a rank of S2 are "Imperiled" in California and are at high risk of extirpation within the state due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors (CNDDB 2024a).

Four of the plant species that occur at Tesla have a State rank of S2: Brewer's western flax, chaparral harebell, and chaparral ragwort, and forked hareleaf. In addition to being imperiled species, the detection of Brewer's western flax and forked hareleaf at Tesla in 2004, and chaparral harebell in 2016, are ecologically significant because they represent species at the edge of their ranges. At Tesla, Brewer's western flax is at the southernmost extension of the species' range (all other known occurrences are in Napa, Solano, and Contra Costa Counties; CSP 2015), while forked hareleaf is at the western edge of its range and chaparral harebell is at the northern edge of its range. Big tarplant has a rank of S1/S2, which indicates there is uncertainty as to whether it should be ranked "Imperiled" or "Critically Imperiled;" the big tarplant occurrences at Tesla are at the northern and western limit of the species. In addition, several other special-status plant species documented at Tesla are: (1) at the northern edge of their known ranges (e.g., Hospital Canyon larkspur, Jepson's woolly sunflower, waxy fiddleneck, California pellitory, Parry's larkspur, small-rayed goldfields, and golden currant); or (2) at the northern and western edge of their known ranges (e.g., Santa Clara thornmint).

1.5.2.4 Protecting Rare Plants

Tesla as a Reserve could provide the highest levels of resource protection with low intensity public access and would achieve the following conservation objectives of the EBRCIS. Such conservation steps are necessary to preserving plant biodiversity:

- **Objective 18-1:** "Protect the number of occurrences identified in the *Occurrence Protection and Enhancement Targets* column in Table 3-10 for each modeled focal plant species. Measure progress toward achieving this objective in the number of viable or restorable occurrences protected."
- **Objective 18-2:** "Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting the primary habitat in the *Conservation Gap* column in Table 3-4 in the RCIS for the modeled focal plant species, needed to meet the conservation targets. Measure progress toward achieving this objective in the area of habitat protected."
- **Objective 25-2:** "Protect sandy soils and clay lenses in the RCIS area. Measure progress toward achieving this objective in the area of sandy soils and clay lenses protected."
- **Objective 25-3:** "Reduce the edge effects of development on important soil types in the RCIS area. Measure progress toward achieving this objective in the area of land that buffers important soil types on protected lands."

1.5.2.5 Locally Rare/Watchlist Species

In addition to the special-status plant species considered rare, threatened, endangered, or a potential new discovery, 74 locally rare plant species have either been documented or are expected to be found at Tesla and are on a watchlist for Alameda and Contra Costa counties (EBCNPS List B and C plant species). Seventy-one (71) of these watchlist species have already been documented at the Tesla property. Appendix 1 contains a list of these 74 locally rare/watch list species. Eleven of the watchlist species that have been documented at Tesla are also at the edge of their known ranges, 8 watchlist plants are at the northern edge of their range, 2 watchlist plants are at the northern and western edge of their range, and 1 watchlist plant is at the southern edge of its range.

1.5.2.6 Peripheral Population Species

As described above, many of the plant taxa at Tesla occur at the edges of their geographic distributions (EBCNPS 2015), which are referred to as either peripheral or range-edge populations. Because peripheral populations are often adapted to unique environmental conditions (e.g., precipitation and temperature) that are extreme relative to core populations, range-edge genotypes may be fundamental to species persistence under the stresses of rapid climate change (Rehm et al. 2015). Although peripheral populations tend to be smaller, more isolated, and more genetically and ecologically divergent than core populations, those characteristics give them novel evolutionary potential (Leppig and White 2006). Indeed, strong natural selection pressure on peripheral populations may result in new gene combinations, giving rise to narrow endemics such as the undescribed *Fritillary* species detected at Tesla. In addition:

1. Populations at the geographic margins of their ranges are important for the long-term survival and evolution of species, as they are major contributors to evolutionary change (Fraser 2000).
2. Conservation of peripheral populations is one of the "best" ways to conserve genetic diversity (Fraser 2000). Many scientists consider the loss of genetically distinct populations to be as important as the loss of species (Ehrlich 1988, Ledig 1993).
3. Numerous studies suggest peripheral populations will be critical to a species' ability to adapt to long-term environmental perturbations, such as global climate change (e.g., Hunter 1991, Quinn and Karr 1993).
4. Peripheral and core populations have genotypes adapted to different conditions which have fitness consequences. In species that have undergone large range contractions, peripheral populations can persist significantly more often than core populations (Channell 2004). While recovery efforts for core populations may result in positive population gains, reintroductions at range-edges are less likely to be successful (Griffith et al. 1989). As a result, it is especially important to conserve peripheral populations of species that have undergone large range contractions given the poor prospect of recovery if those populations are eliminated.

Tesla contains many locally rare taxa (see Appendix 1), some of which represent peripheral plant populations. Locally rare taxa are important for the preservation of species diversity and ecological processes (Crain and White 2011). They often harbor unique genetic and morphological lineages representing local adaptation that provide the opportunity for divergence along novel evolutionary paths through the processes of natural selection. Maintenance of genetic variation by locally rare plants increases the probability of overall species survival and locales with peripheral populations often act as refugia during catastrophic range contractions. Peripheral plant populations also provide the flexibility required for responding to stochastic environmental events such as global climate change. Tesla's geographic location and ecological characteristics provide essential protection of peripheral population species.

1.6 WILDLIFE RESOURCES

Similar to its plant community, Tesla's community of vertebrate animals is comprised of a unique assemblage of coastal species intermixed with arid or desert habitat species. Many of the reptiles, amphibians, birds, and mammals occur at the northern, eastern, or western edge of their respective ranges (e.g., California Glossy Snake, San Joaquin Coachwhip, Alameda Whipsnake, Western Spadefoot Toad, Greater Roadrunner, Cassin's Kingbird, Phainopepla, and Heermann's kangaroo rat, among others). In addition, Tesla supports several species that occur only in areas with large blocks of relatively undisturbed habitat (e.g., Golden Eagle, American badger, tule elk, mountain lion).

1.6.1 Special-Status Wildlife Species

Fifty-three (53) species included in CDFW's California Special Animal List (CNDDB 2024b) have been identified at Tesla or nearby to Tesla.[16] These 53 special-status species include:

- 4 species that are listed under the federal Endangered Species Act.
- 3 candidate species that are proposed or under review for listing under the federal Endangered Species Act.
- 8 species that are listed under the California Endangered Species Act.
- 1 species that is a candidate for listing under the California Endangered Species Act.
- 17 California Species of Special Concern.
- 11 USFWS Birds of Conservation Concern.
- 3 Fully Protected species.

Table 4 details the 51 vertebrate and 2 invertebrate (insect) special-status taxa on the California Special Animals List (CNDDB 2024b) detected at Tesla. Three of these 53 special-status animals, Valley elderberry longhorn beetle (Federally Threatened), pallid bat (State Species of Special Concern) and San Joaquin kit fox (Federally Endangered, State Threatened), have not yet been detected at Tesla; however, they are included in the table because Tesla provides suitable habitat and they have been detected at nearby properties (AECOM 2024, CNDDB 2024c). Additionally, the USFWS has stated that the kit fox should be assumed to be present at Tesla. Jurisdictional levels of governmental protection, rank, and status codes are included in Table 4 and defined in footnotes.

Figure 2 (see Section 1.3) depicts the spatial distribution of a *subset* of the special-status animals in Tesla. Only 23 (43%) of the 53 special status animals are mapped on Figure 2 given the available data or cryptic nature or pervasiveness of the animals. Although only a *subset* of special-status animals (and buffer zones, plants and sensitive habitats) are mapped, the distribution of special-status species shown in Figure 2 documents that they are present throughout the entire 3,100 acres of the Tesla wildlands and not in isolated areas of the site.

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[16] Occurrence data obtained from CNDDB, HMS reports, and various documents provided by CSP in response to Public Records Act requests.

Table 4. Special-status animals detected at Tesla (or nearby, see footnotes c, d, e) on the California Special Animals List (CNDDB 2024b) and the list of Birds of Conservation Concern (USFWS 2021a).

Scientific name	Common name	Special-status [a]	Data source [b]
Insects			
Desmocerus californicus dimorphus [c]	Valley elderberry longhorn beetle	FT	GP, Shepard 2021
Bombus occidentalis	western bumble bee	Candidate SCE, SA (S1): GCN	CNDDB
Amphibians			
Ambystoma californiense	California Tiger Salamander	FT, ST, GCN, C. CA target	HMS, GP, CNDDB
Spea hammondii	Western Spadefoot Toad	SSC, FPT, GCN, C. CA target	HMS, GP, CNDDB
Rana boylii	Foothill Yellow-legged Frog	FT, SE, GCN, C. CA target	CNDDB
R. draytonii	California Red-legged Frog	FT, GCN, C. CA target	HMS, GP
Reptiles			
Emys marmorata	Western Pond Turtle	SSC, FPT, GCN, C. CA target	HMS, GP, CNDDB
Phrynosoma blainvillii	Coast Horned Lizard	SSC, GCN, C. CA target	2000 GPA EIR
Anniella pulchra	No. California Legless Lizard	SSC, GCN, C. CA target	PRA
Arizona elegans occidentalis	California Glossy Snake	SSC, GCN, C. CA target	CNDDB
Masticophis flagellum ruddocki	San Joaquin Coachwhip	SSC, GCN, C. CA target	MVZ
M. lateralis euryxanthus	Alameda Whipsnake	FT, ST, GCN, C. CA target	MVZ, PRA, Alvarez pers. comm., Swaim 2002
Birds			

Table 4 (continued) **Scientific name**	**Common name**	**Special-status** [a]	**Data source** [b]
Larus californicus	California Gull	WL, BCC	PRA
Accipiter cooperii	Cooper's Hawk	WL	PRA
A. striatus	Sharp-shinned Hawk	WL	PRA
Aquila chrysaetos	Golden Eagle	WL, FP, Eagle Act	GP, Hunt and Hunt 2015
Buteo regalis	Ferruginous Hawk	WL	GP
B. swainsoni	Swainson's Hawk	ST	PRA
Circus cyaneus	Northern Harrier	SSC	GP, PRA
Elanus leucurus	White-tailed Kite	FP, BLM: S	GP, PRA
Haliaeetus leucocephalus	Bald Eagle	SE, FP, Eagle Act	PRA
Falco columbarius	Merlin	WL	PRA
F. mexicanus	Prairie Falcon	WL	PRA
Athene cunicularia	Burrowing Owl	SSC, BCC	GP, PRA
Chaetura vauxi	Vaux's Swift	SSC	PRA
Selasphorus sasin	Allen's Hummingbird	BCC	PRA
Contopus cooperi	Olive-sided Flycatcher	SSC, BCC	PRA
Empidonax traillii	Willow Flycatcher	SE	PRA
Lanius ludovicianus	Loggerhead Shrike	SSC	PRA
Pica nuttalli	Yellow-billed Magpie	BCC	PRA

Table 4 (continued) **Scientific name**	**Common name**	**Special-status [a]**	**Data source [b]**
Eremophila alpestris actia	California Horned Lark	WL	CNDDB, PRA
Riparia riparia	Bank Swallow	ST, GCN, C. CA target	PRA
Baeolophus inornatus	Oak Titmouse	BCC	PRA
Chamaea fasciata	Wrentit	BCC	PRA
Icteria virens	Yellow-breasted Chat	SSC, GCN, C. CA target	PRA
Setophaga petechia	Yellow Warbler	SSC, GCN, C. CA target	GP, PRA
Toxostoma redivivum	California Thrasher	BCC	PRA
Ammodramus savannarum	Grasshopper Sparrow	SSC, GCN, C. CA target	GP, PRA
Artemisiospiza belli belli	Bell's Sage Sparrow	WL	PRA
Icterus bullockii	Bullock's Oriole	BCC	PRA
Agelaius tricolor	Tricolored Blackbird	ST, BCC, GCN, C. CA target	PRA
Spinus lawrencei	Lawrence's Goldfinch	BCC	PRA
Mammals			
Myotis yumanensis	Yuma myotis	BLM: S	HMS, Wildlife Project 2014
M. thysanodes	fringed myotis	BLM: S	Wildlife Project 2014
Lasiurus cinereus	hoary bat	SA (S4)	HMS, MIG 2016
Antrozous pallidus [d]	pallid bat	SSC	MIG 2016, Wildlife Project 2014 (CSVRA ponds)
Corynorhinus townsendii	Townsend's big-eared bat	SSC	Wildlife Project 2014

Table 4 (continued) **Scientific name**	**Common name**	**Special-status** [a]	**Data source** [b]
Perognathus inornatus	San Joaquin pocket mouse	BLM: S, GCN	CNDDB 2014, 2021
Dipodomys heermanni heermanni	Heermann's kangaroo rat	SA (S2), GCN	MIG 2020
Puma concolor	mountain lion, So. Cal./Central Coast ESU	Candidate for state listing	MIG 2021
Vulpes macrotis mutica [e]	San Joaquin kit fox	FE, ST, GCN, C. CA target	GP
Taxidea taxus	American badger	SSC, GCN, C. CA target	HMS, CNDDB
Cervus canadensis nannodes	tule elk	SA (S3), GCN, C. CA target	PRA, GPA EIR

[a] Special Status Code Key
BLM (Bureau of Land Management)
S = Sensitive Species
CDFW (California Department of Fish and Wildlife):
SA = Special Animal
S1 = (NatureServe State Rank) = Critically Imperiled: At very high risk of extirpation in the state.
S2 = (NatureServe State Rank) = Imperiled: At high risk of extirpation in the state.
S3 = (NatureServe State Rank) = Vulnerable: At moderate risk of extirpation in the state.
S4 = (NatureServe State Rank) = Apparently Secure: At a fairly low risk of extirpation in the state.
SCE = State candidate for listing as endangered
SE = State listed as endangered
SSC = California Species of Special Concern
ST = State listed as threatened
WL = Watch List
USFWS (U.S. Fish and Wildlife Service)
BCC = Bird of Conservation Concern in Bird Conservation Region 32
Eagle Act = Protected under the Bald and Golden Eagle Protection Act
FE = Federally listed as endangered
FP = Fully protected under CA Fish and Game Code
FPT = Federally proposed for listing as threatened

FT = Federally listed as threatened

California State Wildlife Action Plan

GCN = Species of Greatest Conservation Need

C. CA Target = targeted for conservation in the Central CA Coast Ranges

[b] Data Source Code Key (see also Section 3 Literature Cited)

CNDDB = California Natural Diversity Database

GP = Carnegie SVRA General Plan Revision PGP, April 2015

GPA EIR = CSVRA General Plan Amendment Draft Environmental Impact Report, 2000

HMS = California State Parks Carnegie SVRA 2011-2014 Habitat Monitoring Systems Report, May 2015

MIG 2016 = Acoustic Bat Survey at CSVRA

MIG 2020 = Rodent Diversity and Population Dynamics in an Off-highway Vehicle Area, prepared for CSVRA

MIG 2021 = Habitat Use by Mountain Lions at CSVRA

PRA = Various datasheets, maps, spreadsheets, and reports provided by California Department of Parks and Recreation in response to Public Records Act request 22-077.

MVZ = UC Berkeley Museum of Vertebrate Zoology Records, https://arctos.database.museum; data compiled by Kevin Wiseman of Kleinfelder, San Francisco, CA.

[c] Host plants for the Valley elderberry longhorn beetle have been documented in Corral Hollow Creek; surveys to determine presence in Tesla have not yet been conducted.

[d] Pallid Bat has been detected near two CSVRA ponds, Lime Kiln and Tyson's, according to MIG 2016 bat report and Wildlife Project 2014 report.

[e] A pair of kit foxes were incidentally detected in the CSVRA in 2002; the USFWS has assumed the species also occurs at Tesla (GP, p. 2-90).

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1.6.2 California State Wildlife Action Plan

The California State Wildlife Action Plan (SWAP) provides the state's strategy for conserving California's wildlife resources. To help the state achieve its goal of sustaining floral and faunal biodiversity, SWAP focuses on: (a) "Species of Greatest Conservation Need" (i.e., species deemed to be most rare, imperiled, and in need of conservation); and (b) habitat types with high levels of species richness, high counts of rare and endemic species, and high counts of vulnerable species (CDFW 2015). Of the 53 special-status animal species identified at Tesla, 32 have been identified as Species of Greatest Conservation Need (see Table 4). In addition, the SWAP specifically identifies the grasslands and flower fields at Tesla as a target for conservation in the Central California Coast Ranges Ecoregion.

1.6.3 Mount Hamilton Range Important Bird Area

Tesla is located within the Mount Hamilton Range Important Bird Area (Audubon Society 2022). Important Bird Areas (IBAs) are officially designated places of international significance for the conservation of birds and other biodiversity (BirdLife International 2022). In addition, IBAs are:

- Recognized world-wide as practical tools for conservation.
- Distinct areas amenable to practical conservation action.
- Identified using robust, standardized criteria.
- Sites that together form part of a wider integrated approach to the conservation and sustainable use of the natural environment.

The Mount Hamilton Range IBA encompasses the eastern slopes of the Coast Range separating the eastern San Francisco Bay Area and the Central Valley. At a natural intersection of habitats (the hot, arid valley and the cool, mesic coast) it supports an exceptional diversity of breeding birds that do not co-occur elsewhere (Audubon Society 2022). The Mount Hamilton Range IBA contains:

- One of the highest densities of breeding Golden Eagles in California, with at least 119 territories occupied (but not necessarily nesting) since USGS monitoring began in 2014 (P. Kolar personal communication)
- Sage scrub and arid taxa typically found in southern California, such as Greater Roadrunner, Costa's Hummingbird, Cassin's Kingbird, Bell's Sage Sparrow, Black-chinned Sparrow and Lawrence's Goldfinch
- Riparian obligates such as Yellow-breasted Chat and Yellow Warbler
- Oak savannah birds such as Long-eared Owl and Lewis' Woodpecker
- Coulter Pine forest which supports montane species such as Olive-sided Flycatcher and Yellow-rumped Warbler
- Patches of grassland which support Northern Harrier, White-tailed Kite (including communal winter roosts), Burrowing Owl (one of the few remaining Bay Area locales), Loggerhead Shrike, Grasshopper Sparrow, Tricolored Blackbird and in winter, an abundant population of Ferruginous Hawk.
- Bald Eagles, which breed at Del Valle Reservoir (Alameda County) west of Tesla and at least 11 breeding pairs have been identified during recent years (P. Kolar

personal communication). Because there are a number of bald eagles nesting far from large bodies of water within the Diablo Range, relying on small stock ponds, and eating mammalian prey such as ground squirrels, Tesla may provide habitat for Bald Eagles.

1.6.4 Amphibians

1.6.4.1 Critical Habitat and a Robust Population of California Red-legged Frogs

Tesla supports a robust, well-distributed population of California Red-legged Frogs, a federally threatened species (Kupferberg and Furey 2015). California Red-legged Frogs have been detected in Corral Hollow Creek and in 13 of the 15 ponds at Tesla (CDPR 2022a). State Parks biologists have concluded that Tesla contains at least 7 ponds that function as “source breeding habitat which allows for the population to survive during periods of population contraction,” and that these 7 ponds and the associated upland non-breeding habitat “should be considered for higher levels of protection” (CDPR date unknown). The USFWS (2010) has set protective buffers around aquatic habitat of up to 1 mile with minimum distances around aquatic habitats to be determined by local upland habitat use patterns. However, overland dispersal by California Red-legged Frogs has been observed over distances as great as 2 miles (Bulger et al. 2003).

All the land at Tesla has been designated critical habitat for the California Red-legged Frog. Tesla coincides with critical habitat Unit ALA-2. According to the USFWS (2010):

> “Unit ALA-2 contains the features that are essential for the conservation of the species. The unit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-2 was known to be occupied at the time of listing and is currently occupied. The unit contains permanent and ephemeral aquatic habitats comprised of natural ponds and streams and manmade stock ponds with emergent vegetation, willows (*Salix* spp.) surrounded by riparian vegetation, grasslands and oak forest that provide for breeding, and upland areas for dispersal, shelter, and foraging opportunities. The unit provides for connectivity between populations farther north and south in the interior Coast Range … The physical and biological features essential to the conservation of California Red-legged Frog in the ALA-2 unit may require special management considerations or protection due to urbanization, alteration of aquatic and riparian habitats, and erosion and siltation of ponded habitat, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults.”

Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 7-1.** Protect known breeding locations and allow for expansion of metapopulations by protecting suitable breeding habitat within typical movement distance of known breeding locations (approximately 2 miles).
- **Objective 7-2.** Reduce the threat of habitat loss, and increase opportunities for beneficial habitat management by protecting the habitat needed to meet the conservation targets,

including an additional 8,110 acres of breeding habitat, 18,500 acres of refugia habitat, and 446,180 acres of dispersal habitat.

1.6.4.2 Robust Population of California Tiger Salamanders

Tesla supports a robust, well-distributed population of California Tiger Salamanders (Kupferberg and Furey 2015), a federally and state listed threatened species. California Tiger Salamanders have been detected at 13 ponds at Tesla (CDPR 2022). State Parks biologists have concluded that at least 7 of those ponds function as “source breeding habitat which allows for the population to survive during periods of population contraction,” and that these 7 ponds and the associated upland non-breeding habitat “should be considered for higher levels of protection” (CDPR [date unknown]). This would require protection of the habitat within a 1.15-mile radius of each pond (Brehme et al. 2018).

Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 5-1.** Protect at least 9 preserves, each at least 3,398 acres in size, containing at least four breeding ponds in areas not dominated by hybrid or non-native tiger salamanders, within a matrix of upland habitat (e.g., upland habitat within typical movement distance [1.3 miles] of breeding ponds), distributed across the California Tiger Salamander management units overlapping the RCIS area identified in the Recovery Plan for the Central California Distinct Population Segment (DPS) of the Tiger Salamander (U.S. Fish and Wildlife Service 2017).[17]
- **Objective 5-2**. Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting habitat needed to meet the conservation targets, including 208,490 acres of occupied habitat, 2,730 acres of potential breeding habitat (in addition to occupied breeding habitat), and 232,140 acres of potential upland habitat. Habitat protected to achieve Objective 5-1 also contributes toward achieving Objective 5-2.

1.6.4.3 Foothill Yellow-legged Frog

The Central California clade of the Foothill Yellow-legged Frog is state listed as endangered and this genetic group within the species is listed as threatened under the federal Endangered Species Act (USFWS 2023a). Although there have been scant surveys for Foothill Yellow-legged Frogs at Tesla, Foothill Yellow-legged Frogs were detected in the Tesla portion of Corral Hollow Creek in 1998, 2000, and 2014 (CNDDB 2024c, CDPR 2022a). The Foothill Yellow-legged Frog is a stream-dwelling frog that is infrequently observed far (i.e., more than a few meters) from water (Thomson et al. 2016), but adult migratory movements along water courses to breeding sites can be as long as 7 km (Bourque 2008; Gonsolin 2010). *The occurrence data, which include detection of a juvenile Foothill Yellow-legged Frog in 2014*, strongly suggest that the Tesla portion of Corral Hollow Creek can support a breeding population of Foothill Yellow-

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[17] Although the size of Tesla (3,100 acres) is slightly less than the preserve objective (3,398 acres), Tesla exceeds the objective for breeding ponds.

legged Frogs (Kupferberg and Furey 2015). Physical habitat in Corral Hollow Creek appears similar to other stream reaches in the region with intermittent surface flow that support extant populations (Kupferberg et al. 2022, Kupferberg personal observation). The presence of a breeding population is ecologically significant given the overall decline of the species and the scarcity of occupied streams in the Central Coast management unit (USFWS 2021b, 2021c).

Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 6-1.** Protect known breeding locations of foothill yellow-legged frog and allow for expansion of existing populations by protecting breeding and movement habitat upstream, downstream, and into adjacent watersheds.
- **Objective 6-2.** Reduce the threat of habitat loss, and increase opportunities for beneficial habitat management by protecting the streams and watersheds needed to meet the conservation target for breeding/foraging habitat (10,000 acres) and habitats ancillary to breeding streams which can include riparian woodlands and grasslands as well as perennial and intermittent streams with relatively steep slopes (11-18%).

1.6.4.4 Western Spadefoot

The Western Spadefoot (Toad) is a California Species of Special Concern, and the northern Distinct Population Segment (DPS), which includes the population in the Corral Hollow Creek watershed, has been proposed for protection as Threatened under the federal ESA (USFWS 2023b). Western Spadefoots have been detected at Tesla's "Two-Story Pond" and along Corral Hollow Creek (at both Tesla and CSVRA) (CNDDB 2024c, CDPR 2022a, Kupferberg personal observation of tadpoles during May 2023 Bioblitz). Kupferberg and Furey (2015) stated that the whole length of Corral Hollow Creek should be considered occupied by Western Spadefoots. The major threat to the Western Spadefoot is habitat loss and fragmentation due to agriculture and urban development. Other threats include invasive species and climate change (Thomson et al. 2016). The population that occurs at Tesla is ecologically significant because it is at the western edge of the species' range (Thomson et al. 2016, CNDDB 2024c), and thus, may be essential to the species' ability to adapt to climate change. Furthermore, because Tesla is at the western edge of the species' range, there are scant opportunities in Alameda County to protect habitat for the species (i.e., protecting habitat west of Tesla where they do not occur would not benefit the species) (ICF International 2010). Currently, the only publicly-owned land that provides habitat for the Western Spadefoot in Alameda County is at Tesla and CSVRA, and the habitat at CSVRA has been subject to several types of degradation from OHV activity (e.g., noise, sedimentation, grading, habitat alteration, and direct mortality of spadefoots) (Kupferberg and Furey 2015, CDPR 2022). As a result, preserving Western Spadefoot habitat at Tesla could have tremendous conservation value with respect to persistence of the species and its ability to adapt to climate change.

1.6.5 Reptiles

1.6.5.1 Designated Critical Habitat for the Alameda Whipsnake

The Alameda Whipsnake, a state and federally listed threatened species, is endemic to Contra Costa County, Alameda County, and portions of northern Santa Clara and western San Joaquin counties (USFWS 2020). All but the western-most corner of Tesla lies within critical habitat unit 5A for the Alameda Whipsnake. According to the USFWS (2006):

> "The unit is included in designated critical habitat because it contains features essential to the conservation of the Alameda Whipsnake, is currently occupied by the subspecies, and represents the southernmost and easternmost distribution of Alameda Whipsnake and one of five population centers for the subspecies."

Classification of Tesla as a State Reserve would achieve the following conservation objectives identified in the EBRCIS:

- **Objective 9.1.** Protect existing Alameda Whipsnake populations and allow for expansion of metapopulations in the RCIS area.
- **Objective 9-2.** Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting the habitat needed to meet the conservation target for core habitat (27,080 acres) and perimeter core habitat (48,150 acres) and conservation target for movement habitat (208,400 acres).

1.6.5.2 California Glossy Snake

The California Glossy Snake is a Priority 1 California Species of Special Concern. Priority 1 species are those of greatest concern because they are likely to experience severe future declines and/or extirpation without immediate conservation actions. The California Glossy Snake has a moderately small range, a moderate degree of ecological specialization and endemism, has declined or been extirpated from much of its historic range, and is projected to suffer (additional) severe declines over the next 15 years due to continued habitat loss (Thomson et al. 2016). As a result, Thomson et al. (2016) concluded: "[h]abitat protection is currently the most important management priority for *Arizona elegans occidentalis* [California Glossy Snake]." Tesla would have tremendous conservation value for the California Glossy Snake because it coincides with the northern limit of established, viable populations of the taxon (see Wiseman 2015).

1.6.5.3 San Joaquin Coachwhip

The San Joaquin Coachwhip is a California endemic species that is restricted to a small range within a heavily disturbed part of the state, i.e., primarily the San Joaquin Valley and west into the inner South Coast Ranges (Thomson et al. 2016). Tesla is located near the northwest limit of the San Joaquin Coachwhip's range (Thomson et al. 2016, CNDDB 2022c). Loss and fragmentation of the Coachwhip's remaining habitat are major threats to the species; vehicle strikes also are a significant threat (Thomson et al. 2016, Brehme et al. 2018). Thomson et al. (2016) concluded: "[a]t a minimum, remaining large habitat fragments and connectivity among fragments must be protected if the species is to persist." Tesla achieves these criteria because it contains large patches of habitat and provides habitat connectivity for the species (Penrod et al. 2013).

1.6.5.4 Northern California Legless Lizard

The Northern California Legless Lizard is a California Species of Special Concern. Tesla is located near the northern limit of the species' range (Thomson et al. 2016, CNDDB 2022c). The greatest threats to the species are habitat loss and degradation; climate change is also a potential emerging threat (Thomson et al. 2016). Anthropogenic impacts that disturb soil moisture levels or result in soil compaction likely degrade habitat suitability for the species (Thomson et al. 2016). Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 8-1.** Permanently protect, through a conservation easement or other approved real estate instrument, occurrences of Northern California Legless Lizard in the RCIS area.
- **Objective 8-2.** Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting the habitat (2,110 acres) needed to meet the conservation target for Northern California Legless Lizard.

1.6.5.5 Coast Horned Lizard

The Coast Horned Lizard is a California Species of Special Concern. Major threats to the species include urbanization, agriculture, off-highway vehicles, flood control structures, energy development, and non-native Argentine ants (Thomson et al. 2016). Tesla provides core habitat for the Coast Horned Lizard (Penrod et al. 2013) near the western edge of the species' range.

1.6.5.6 Western Pond Turtle

The Western Pond Turtle is a California Species of Special Concern and is currently under review by the US Fish and Wildlife Service for listing under the federal Endangered Species Act (USFWS 2023c). Western Pond Turtles have been detected at 3 of Tesla's ponds and along the portion of Corral Hollow Creek at Tesla (CDPR 2022a). The largest threats to the species are land use changes and fragmentation of existing habitat, as well as the impacts of competition, predation, and pathogens vectored by introduced species (Thomson et al. 2016). In particular, Western Pond Turtles are negatively affected by Red-eared Sliders (*Trachemys scripta elegans*), a common turtle in the pet trade (Spinks et al. 2003). Increased recreational access by people to aquatic habitats at Tesla would increase the likelihood of park visitors discarding unwanted pet turtles by releasing them into ponds or streams as occurs elsewhere at publicly accessible sites in California (Thomson et al. 2010). Road mortality of females when migrating to and from upland nesting sites (Nicholson et al. 2020) is another cause of decline and is a stressor that would increase with increasing traffic on roads in Tesla.

1.6.6 High Population Viability for Listed and Special-Status Species

Population viability is defined as the likelihood of continued persistence of well-distributed population(s)[18] to a specified future time (Morrison et al. 2006). A population with "high viability" has a high likelihood of continued persistence with a well-distributed population over a long time (e.g., a century). The terms "source" and "sink" are used to describe habitats, or wildlife populations that occur in those habitats. A "source" is an area where reproductive success is greater than mortality, whereas a "sink" is an area where mortality is greater than reproductive success (Meffe and Carroll 1994). Monitoring data collected by California State Parks and others indicate that most of the special-status animal populations at Tesla have high population viability, and that many of these populations function as sources that maintain nearby sinks (e.g., at CSVRA). Of the 15 ponds found on Tesla, State Parks biologists have concluded that at least 7 of the ponds are "source breeding habitat which allows for the (California Tiger Salamander and California Red-legged Frog) population to survive during periods of population contraction" (CDPR [date unknown]).

1.6.7 Known for Diverse Reptiles and Amphibians

The area surrounding Tesla is well known for having an exceptionally high diversity of native reptiles and amphibians compared to other nearby regions (e.g., Sullivan 1981, 2000). This diverse assemblage of reptiles and amphibians includes up to 16 species of snakes, 9 species of lizards, 3 species of frogs, 2 species of toads, 1 newt, 1 salamander, and 1 turtle (Wiseman 2015, CDPR 2022a). Ten (10) of these are special-status species (see Table 4). In addition, Tesla contains an intergradation zone between the two subspecies of the California whipsnake: the Alameda Whipsnake (*Masticophis lateralis euryxanthus*) and the Chaparral Whipsnake (*M. lateralis lateralis*). As a result, Wiseman (2015) opined that Tesla's role in facilitating genetic exchange and connectivity with nearby snake populations further amplified Tesla's high conservation value.

1.6.8 Significant Aquatic Resources

Tesla contains 3 intermittent streams: Corral Hollow Creek, Mitchell Ravine, and Arroyo Seco. Small headwater tributaries converge in the upper Corral Hollow Watershed to form the mainstem of Corral Hollow Creek, which traverses approximately 5 miles through the Tesla property and 2.5 miles through the CSVRA. It then exits the Coast Ranges approximately 5 miles east of the CSVRA, flows past a former gravel mining area south of Tracy, and finally through agricultural ditches to the lower San Joaquin River, within the boundaries of the Sacramento-San Joaquin River Delta.

The creek that flows through Mitchell Ravine is the largest tributary to Corral Hollow Creek. The drainage originates at the southeastern boundary of the Corral Hollow Watershed and travels north approximately 1.1 miles through Tesla's interior before converging with the main stem of Corral Hollow Creek.

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[18] A "well-distributed population" is one with individuals that interact freely where natural conditions exist.

The Arroyo Seco originates in the hills north of Tesla Road (in the Arroyo Las Positas Watershed, a sub-watershed of the Alameda Creek Watershed). Arroyo Seco flows south, crosses Tesla Road, and then flows southeast for approximately one mile along the inside of Tesla's northwestern boundary. Upon entering the City of Livermore, Arroyo Seco travels through an engineered channel that flows into Arroyo Las Positas, and ultimately the San Francisco Bay.

Tesla's significant aquatic features, which include ponds, wetland areas and streams, are described above in Section 1.5.1.4. These aquatic features provide habitat for a variety of plants and animals, including special-status amphibians, reptiles, and birds, that depend on Tesla's aquatic or riparian and wetland habitats for at least a portion of their life cycle. Some of these special-status animals include:

- California Tiger Salamander
- Western Spadefoot Toad
- Foothill Yellow-legged Frog
- California Red-legged Frog
- Western Pond Turtle
- Bank Swallow
- Yellow-breasted Chat
- Yellow Warbler
- Tricolored Blackbird

The diversity of aquatic and riparian habitat types at Tesla enhances its ecological value and biodiversity. For example, the streams provide habitat for species that are dependent on flowing water (e.g., Foothill Yellow-legged Frog), whereas the ponds provide habitat for species that are dependent on ephemeral pools (e.g., California Tiger Salamander and California Red-legged Frog). The riparian vegetation associated with these aquatic resources provides habitat for riparian-obligate bird species (e.g., Yellow-breasted Chat), and it provides various taxa with essential habitat for dispersal, gene flow, and other wildlife corridor functions (Lowe 1989; Brode and Bury 1984, RHJV 2004). In addition to being a substantial source of biodiversity, the wetlands at Tesla provide numerous ecological services such as nutrient cycling, atmospheric maintenance (carbon storage), water quality improvements, and flood control.

The EBRCIS classifies ponds, seeps, seasonal wetlands, and mixed riparian forest and scrub as "unique land cover types." Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 24-1.** Protect, enhance, and restore unique land cover types in amounts needed to meet the conservation targets in Table 3-3.
- **Objective 11-2.** Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting the habitat needed to meet the conservation target for Tricolored Blackbird core breeding habitat (4,280 acres) and primary foraging habitat (323,420 acres).[19]

[19] The EBRCIS classifies Tesla as primary foraging habitat for the Tricolored Blackbird.

1.6.9 Important Habitat for Bats

Bats are among the most imperiled terrestrial vertebrates in North America (Hammerson et al. 2017). Although species-wide populations and trends are poorly quantified for nearly all bat species, available information indicates that most North American bat species have declined in distribution and abundance (Hammerson et al. 2017). Nearly half (22 of 45 species) of the North American bat fauna faces substantial threats from one or more sources (Hammerson et al. 2017), and the severity of these threats (e.g., disease, wind turbine strikes, extreme weather events associated with climate change) is projected to increase (Frick et al. 2017, Hammerson et al. 2017; Festa et al. 2023).

Efforts to inventory bat fauna at Tesla primarily have been limited to sampling at 4 sites (Mitchell Ravine Pond, Hidden Pond, Tara's Trough, and Tesla Mine) in 2014 and 2 sites (Hidden Pond and Tesla Mine) in 2016. Despite these limited sampling efforts, 7 bat species have been detected at Tesla (The Wildlife Project 2014, 2016, CSP 2015), 5 of which are special-status species (see Table 4).

The availability of suitable roost sites is the limiting factor for most bat populations (WBWG 2017). Some of the special-status bats at Tesla (e.g., Townsend's big-eared bat, Yuma myotis) roost in colonies that can contain thousands of individuals. As a result, the loss of a roost site can have severe impacts on the overall population.

The Townsend's big-eared bat, canyon bat, and potentially other bat species are known to roost at the Tesla Mine site (The Wildlife Project 2014 and 2016, CSP 2015). Roosting habitat for the Townsend's big-eared bat is rare in the region (The Wildlife Project 2014); only 4 communal roost sites have been detected in Alameda, Contra Costa, and San Joaquin Counties (CNDDB 2022c). As a result, The Wildlife Project (2014, 2016) concluded that "any available roosting site that is used by this species should be maintained and protected."

Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 23-1.** Protect bat maternity roosts and hibernacula (hibernation sites) and adjacent foraging habitats in the RCIS area.
- **Objective 23-2.** Preserve, create, restore, and enhance habitat for bats in the RCIS area.

1.6.10 Core Breeding Habitat and Critical Linkage for the Mountain lion (Southern California/Central Coast ESU)

Mountain lions are classified as a 'specially protected' species under The California Wildlife Protection Act of 1990. The Southern California/Central Coast Evolutionarily Significant Unit (ESU) of mountain lions is a candidate for listing under the California Endangered Species Act, and CDFW is currently conducting a status review (CDFW 2024b). Mountain lions are present in Tesla and are part of this ESU.

Mountain lions have large home ranges that include heterogenous habitats including riparian, chaparral, oak woodlands, coniferous forests, grasslands, and occasionally rocky desert uplands (CDFW 2020). In addition, mountain lions require large areas of relatively undisturbed habitat with adequate prey abundance, and with habitat connectivity to allow for successful dispersal and gene flow (CDFW 2020). Dickson and Beier (2002) advised that protection of riparian areas from development, road building, and habitat alteration is crucially important to the mountain lion population. They added that habitat adjacent to the riparian zone should also be maintained to help support native prey for mountain lions.

Mountain lions require a habitat mosaic that provides sufficient space to move away from human-disturbed areas, and that connects to expansive, intact, heterogeneous environments. Lack of adequate habitat and functional connectivity between mountain lion subpopulations is the primary driver of declining mountain lion populations (CDFW 2020). Habitat loss and fragmentation due to development, roads, and highways has resulted in low effective population size, low genetic diversity, extreme levels of isolation, and high mortality rates, which collectively drive the genetic subpopulations within the ESU toward extinction (CDFW 2020).

Mountain lions are present in Tesla (MIG 2021). Tesla coincides with the Central Coast North (CC-N) subpopulation of mountain lions (CDFW 2020). The CC-N mountain lion population has low genetic diversity, and its effective population size (approximately 17 individuals) is well below the threshold needed to avoid extinction (CDFW 2020). In addition to its low population size, the geographic range of the CC-N subpopulation is being constricted by development and highways in the Santa Cruz Mountains and the southern San Francisco Bay Area (CDFW 2020). Threats to the mountain lion population are:

- intraspecific strife (due to insufficient habitat and connectivity)
- vehicle strikes
- depredation
- poaching
- increased frequency of wildfire (due to human ignitions)
- poisoning from anticoagulant rodenticides (which are used to suppress pest populations in agricultural or urban settings); and
- climate change

In summary, habitat loss, habitat fragmentation, and lack of habitat connectivity have led to small, isolated genetic subpopulations of mountain lions with evidence of inbreeding and a lack of adequate gene flow between the subpopulations. Mountain lions also face human-caused mortality factors. Conservation and recovery of mountain lion populations requires large areas of relatively undisturbed habitat with functional connectivity to other suitable habitat areas. These habitat areas must be free of anthropogenic pressures, especially vehicle strikes, depredation, and other human-caused mortality factors (CDFW 2020). *The Tesla wildlands currently satisfy all of these criteria*. In addition to providing a large block of core breeding habitat, Tesla provides a critical north-south movement corridor for mountain lions (Penrod et al. 2013, CDPR 2022b).

Classification of Tesla as a State Reserve and protection of the north-south habitat linkage corridor would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 17-1.** Improve habitat connectivity for mountain lion. Measure progress toward achieving this objective in the area of corridor habitat protected, number of barriers to movement modified, removed, or otherwise ameliorated, and number of [highway] crossings constructed.
- **Objective 20-1.** Protect multiple, alternative pathways for movement within important habitat linkages for the focal species, non-focal species, and other native species in the RCIS area.

1.6.11 Tule Elk

The tule elk is a subspecies of elk endemic to California. In 1870, there were only 3 tule elk remaining in California (CDFW 2018c). Due to conservation efforts, the tule elk population has increased to an estimated 4,000 individuals (CDFW 2018c). Approximately 100 elk are estimated to be in the Alameda-San Joaquin Tule Elk Management Unit, which consists of those portions of Alameda and San Joaquin counties south of Interstate 580 and east of Interstate 680 (CDFW 2018c). The majority of those individuals are within a distinct sub-herd that occupy Tesla and the surrounding ranches, but not CSVRA (CDFW 2018c, Kupferberg and Furey 2015). See Table 5 and section 2.3.3 Modification of Animal Behavior and Habitat Fragmentation for a discussion of how disturbance impacts tule elk occurrence.

The tule elk's ecological niche and historic range covers a large portion of California's landscape (Phillips 2013). As a result, tule elk are essential to the long-term restoration of California's native landscape, and they serve a vital role as an umbrella species for California's native grasslands, oak woodlands, and landscape connectivity.

1.6.12 Birds

1.6.12.1 Core Nesting and Foraging Area for Golden Eagles

Best available scientific evidence suggests that the Golden Eagle population is declining in California and in many other portions of the species' range (USFWS 2016). As a result, the USFWS has determined that the Golden Eagle population cannot withstand any additive mortality (USFWS 2016).

The Diablo Range of west-central California is hypothesized to support one of the densest known breeding populations of Golden Eagles in the world (Wiens et al. 2015; Hunt et al. 2017, Wiens and Kolar 2021). Due to the high abundance of Golden Eagle nesting territories in the Southern Coast Ranges (which includes the Diablo Range), and the productivity (i.e., reproductive success) of those territories, the South Coast Ranges serve as the stronghold for eagle conservation in California (USFWS 2009 Wiens et al. 2015, Wiens and Kolar 2021).

The primary threats to persistence of the local-area population are the loss of historical nesting territories and reduced reproduction (i.e., due to habitat loss, disturbance, mortality associated with wind turbine strikes and other human activities) because territories are the ultimate source of recruitment (i.e., addition of new individuals to the population). In the Diablo Range, much of the suitable breeding habitat is fully saturated by territorial pairs (Hunt et al. 2017). Therefore, under most circumstances the eagle pair cannot simply establish a new territory elsewhere when its territory is eliminated by development or other types of anthropogenic disturbance.

A long-term demographic study found that mortality of Golden Eagles from collisions with wind power turbines at the nearby Altamont Pass Wind Resource Area (APWRA) during the 1990's to early 2010's would necessitate annual reproduction by 216 to 255 breeding pairs to maintain stability of the population (Hunt et al. 2017). While the number of collisions has decreased during recent years with repowering of the turbines (P. Kolar personal communication), reproduction in this region has been highly variable, and overall, is much lower than historical averages (Weins et al. 2015, Wiens et al. 2017, Wiens and Kolar 2021, Wiens et al. 2022). As a result, preservation of high-quality breeding habitats, such as the habitat available within Tesla, (i.e., contain moderate levels of open grassland and mixed oak-woodland vegetation, have high occupancy, and support reproduction by territorial pairs) is vital to maintaining population persistence (Wiens et al. 2017).

Previous surveys identified three Golden Eagle breeding territories (Hunt and Hunt 2015) within the 3,100-acres of the Tesla wildlands and immediately adjacent properties. A fourth territory overlaps the California State Park property on the north side of Tesla Road and may extend into Tesla (P. Kolar personal communication). These territories have been occupied by Golden Eagles for several decades and they support several primary and alternate nests, one of which is located on Tesla and the others on neighboring properties. No Golden Eagle nests or territories occur at the existing CSVRA due to the high level of anthropogenic disturbance (Fratanduono 2014, Hunt and Hunt 2015, Wiens and Kolar 2021).

The Golden Eagle territories at Tesla are critical to maintenance of the local-area eagle population,[20] especially given that the APWRA functions as a regional population sink (Hunt et al. 2017, Katzner et al. 2017) due to wind turbine related mortality. After surveying the property in 1998, CDFW concluded that the Tesla property is “very valuable habitat for Golden Eagles” (CDFG 1998).

Classification of Tesla as a State Park Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 12-1.** Protect and monitor all current or historical, but potentially viable, Golden Eagle nest sites in the RCIS area.
- **Objective 12-2.** Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting the habitat needed to meet the conservation targets for Golden Eagle nesting/foraging habitat (440,990 acres).

[20] The local-area population is a geographic scale used for management of eagles. It is defined as the 90^{th} quantile of the natal dispersal distance for Golden Eagles (109 mi), and the median female natal dispersal distance for Bald Eagles (86 mi). See USFWS 2016.

1.6.12.2 Potentially Ecologically Significant Breeding Population of Bank Swallows

There have been several detections of Bank Swallows at Tesla (CDPR 2022a); however, it appears the nesting status of those individuals has not been investigated. Bank Swallows were observed nesting along Arroyo Mocho (approximately 1.75 miles south of Tesla) in 1971 (eBird 2022). Therefore, it is possible that Tesla contains an undiscovered nesting colony of Bank Swallows.

Available information suggests that 70% to 90% of the current known Bank Swallow population in California nests in colonies along the Sacramento and Feather Rivers, with the remaining colonies along the central coast and in northeastern California (Bank Swallow Technical Advisory Committee 2013). The presence of a breeding colony of Bank Swallows at Tesla would be extremely significant given: (a) further decline of the species since it was first listed (in 1989) as a threatened species under the California Endangered Species Act; and (b) isolation of the remaining Bank Swallow population (Bank Swallow Technical Advisory Committee 2013).

1.6.12.3 Burrowing Owl

Burrowing Owls have been detected at Tesla, but the surveys needed to establish the distribution, abundance, and seasonal use patterns of Burrowing Owls at Tesla have not been conducted. Burrowing Owl populations have declined dramatically in the greater San Francisco Bay Area (SFBA) over the past several decades (Townsend and Lenihan 2003, Wilkerson and Siegel 2010). The species has been extirpated, or nearly extirpated, from 6 SFBA counties (Napa, Marin, San Francisco, Santa Cruz, Sonoma, and San Mateo). If population declines continue, the Burrowing Owl may become extirpated from the entire SFBA. By 2003, only 2 “large” breeding colonies of Burrowing Owls remained in Alameda County: 1 in the Camp Parks area of Dublin and 1 in the Altamont Pass/Hills (Townsend and Lenihan 2003). However, the colony that occurred at Camp Parks is now on the verge of extirpation due to ongoing development authorized by the City of Dublin. While a large colony remains in the Altamont Hills, Burrowing Owls associated with that colony are subject to high fatality rates due to wind turbine strikes (Smallwood et al. 2018).

“Essential Habitat” for Burrowing Owls includes nesting, foraging, wintering, and dispersal habitat (CDFG 2012). Habitat loss caused by development is the most immediate threat to Burrowing Owls that reside in high growth areas of the SFBA (Townsend and Lenihan 2003). Tesla provides foraging, wintering, and dispersal habitat for Burrowing Owls, and it may provide nesting habitat (CSP 2015). Classification of Tesla as a State Reserve would achieve the following conservation objectives identified within the EBRCIS:

- **Objective 13-1.** Protect unprotected occurrences of Burrowing Owl.
- **Objective 13-2.** Reduce the threat of habitat loss and increase opportunities for beneficial habitat management by protecting the habitat needed to meet the conservation target for Burrowing Owl breeding/foraging habitat (225,410 acres) and low-use habitat (41,690 acres).

1.6.12.4 Swainson's Hawk

Classification of Tesla as a State Park Reserve would achieve the following conservation objective identified within the EBRCIS:

- **Objective 14-2.** Reduce the threat of habitat loss, and increase opportunities for beneficial habitat management by protecting the habitat needed to meet the conservation target for Swainson's Hawk nesting habitat (1,700 acres) and conservation targets for natural foraging habitat (24,420 acres) and agricultural foraging habitat (43,900 acres).

1.6.13 Buffer Zones and Spatial Ecology of Protected Species

The spatial and habitat requirements of wildlife are highly variable. Mobile taxa, such as birds of prey, forage over large areas daily. Other species, such as salamanders, can be largely stationary and dormant for periods, and then have episodes of long-distance movements. For bats, home range is highly variable as some species routinely move among roost sites and will fly considerable distances to forage on insects emerging from ponds and streams. Among birds, territory and foraging area can expand and contract depending on factors such as sex and breeding status, season and time of day, quality and patch size of habitat, quantity and quality of prey, interactions with neighbors, and predation risk (Adams 2001). Many reptiles and amphibians travel between ponds and streams to dispersed upland residences and are at risk of population decline when roads or other incompatible land uses separate terrestrial and aquatic habitats (Brehme et al. 2018). For animals with both terrestrial and aquatic phases in their life cycles, the uplands surrounding breeding ponds and streams are more accurately part of their core habitat and not a buffer. Semi-aquatic species may only be observed in or near water, but they depend on terrestrial habitats (Semlitsch and Jensen 2001). Establishing buffer zones around point locations, such as breeding ponds or nest trees, is based on the premise that protecting habitats required during all phases of a species' life cycle and maintaining movement corridors will be effective at maintaining viable populations.

Table 5 summarizes the spatial ecology and protective buffer zones established for *some* protected wildlife taxa detailed in previous sections. The known spatial requirements of just *a few* of Tesla's special-status species cover all of the 3,100 acres (see Figure 2 above). For other less well-studied species, home range sizes are not known. Such uncertainty combined with the known spatial extent and ecology of Tesla's rare biodiversity and regional biological importance illustrates the need for caution and proactive protection.

Buffer zones, consideration of movement, and animal home ranges are just one set of factors for determining natural resource protection. Federal critical habitat designations for California Red-legged Frog and Alameda Whipsnake and protection of Sensitive Natural Communities, rare and locally rare plants, as well as other factors, create overlapping layers of areas that require special protections at Tesla. The fact that these areas constitute most of Tesla's 3,100 acres (as depicted in Figure 2) confirms Tesla's importance for natural resource conservation.

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Table 5. Movement, home range, and protective buffer zones (i.e., spatial ecology) for *some* special-status animals on Tesla.

Scientific name	Common name	Spatial ecology	References [a]
Amphibians			
Ambystoma californiense	California Tiger Salamander	• Migration distances up to 1.3 mi between aquatic and upland habitats • Maximum distance serves as basis for USFWS minimum preserve size and protective buffer radius around ponds	Orloff 2011, Searcy and Shaffer 2011, Searcy et al. 2013, USFWS 2017
Spea hammondii	Western Spadefoot	• home ranges up to 15 acres • 95% of a pond's breeding population occurs up to 0.3 mi radius from water's edge with site-to-site variation • Buffer of 1,207 ft from suitable breeding pools may provide protection	Semlitsch and Brodie 2003, Baumberger et al. 2019, Halstead et al. 2021
Rana boylii	Foothill Yellow-legged Frog	• breeding migrations up to 4.3 mi among tributaries and mainstems, usually along stream courses • upland dispersal of juveniles documented	Twitty 1967, Bourque 2008, Gonsolin 2010
Rana draytonii	California Red-legged Frog	• Maximum protective buffer limit of 1 mi set by USFWS. • Dispersal can be up to 2 mi overland	Bulger et al. 2003, USFWS 2010
Reptiles			
Emys marmorata	Western Pond Turtle	• Overwinters in uplands • Excavates nests for eggs up to 0.3 mi from ponds and streams • In arid sites like Tesla, radio-tagged turtles left ponds as water receded, moved 837 to 3,596 feet overland, on land 10–30 wks • Buffer zone should encompass the uplands around aquatic habitat	Rosenberg et al. 2009, Bury et al. 2012, Pilliod et al. 2013
Arizona elegans occidentalis	California Glossy Snake	• Home range size not known • Habitat includes chaparral, sage-scrub, alluvial soils	Richmond et al. 2016
Masticophis flagellum ruddocki[†]	San Joaquin Coachwhip	• Home range size not known • Occurs in open dry areas embedded within mosaic of scrub, chaparral, oaks, and grass • Uses burrows for refuge and oviposition	Stebbins and McGinnis 2012

Table 5 (continued) Scientific name	Common name	Spatial ecology	References [a]
Masticophis lateralis euryxanthus	Alameda Whipsnake	• Radiotelemetry and visual encounters confirm use of atypical sites up to 500 ft away from suitable scrub habitat (e.g., grassland, oak woodland, and basking on trails, roads, parking areas) • Habitat patches can be connected by rock outcrops or stream corridors	Swaim and McGinnis 1992, USFWS 2003, Alvarez 2005, 2006, 2021, Miller and Alvarez 2016
Birds			
All species		• Minimum no disturbance buffer of 250 ft around active nests • 500-ft buffer around active nests of non-listed raptors	Chappell 2022
Aquila chrysaetos	Golden Eagle	• 1 mi buffer around nests with no ground-based human activities.	USFWS 2021d
Buteo regalis	Ferruginous Hawk	• Winters in Alameda Co., so no breeding / nesting • Winter territoriality not reported	Ng et al. 2020
Buteo swainsoni	Swainson's Hawk	• Buffer = no disturbance within 0.25 mi (up to 0.5 mi depending on site conditions) March 1 to September 15	Chappell 2022
Circus cyaneus	Northern Harrier	• Nests on ground in tall grass or clumps of vegetation, thus easily disturbed by humans and dogs • Territory area highly variable, mean = 83 acres, range 9.6–308.6 • Territory size varies inversely with rodent prey abundance	Temeles 1987, 1989
Elanus leucurus	White-tailed Kite	• Territory area decreases as California voles (*Microtus californicus*) increase • Range of territory sizes = 4.0–53.1 acres (n = 25) • In Bay Area, nests in trees and willows near streams	Waian 1973, Faanes and Howard 1987, Dunk and Cooper 1994, Niemela 2007
Athene cunicularia	Burrowing owl	• Setback distances vary by level of disturbance and season • 50 to 500 m buffers from burrow complexes	Scobie and Faminow 2000
Lanius ludovicianus	Loggerhead Shrike	• Highly territorial, occurs in open habitats with sparse shrubs, trees • Mean territory size = 21 acres, range = 10.9–39.5 acres (n =10)	Miller 1931
Eremophila alpestris actia	Ca. Horned Lark	• Other sub-species, territory size ranges from 1.5–7.7 acres (mean = 4.0) in agricultural lands of the Midwest; 0.74–3.5 acres reported in shortgrass prairie of CO • territory size not known in CA	Beason and Franks 1974, Boyd 1976

Table 5 (continued) Scientific name	Common name	Spatial ecology	References [a]
Ammodramus savannarum	Grasshopper Sparrow	• Territory size depends on grassland qualities • In So. CA territory = 0.91 ± 0.4 (SD) acre (n = 41) • Mowing can lead to nest failure; grazing effects detrimental in southern CA and AZ	Ruth 2017, Vickery 2020
Setophaga petechia	Yellow Warbler	• Nests in riparian zones, territory area varies with tree density. • No. CA, mean territory = 1.1 ± 0.37 acres (n = 215)	Stephens and Rockwell 2019
Mammals			
Corynorhinus townsendii	Townsend's big-eared bat	• Highly sensitive to disturbance at roosts, human activity near roosts should not occur • Travels up to 6.5 mi from day roosts to foraging areas • Center of activity for females = 2.0 ± 0.3 mi from roost • Mean center for males was 0.81 ± 0.1 mi	Fellers et al. 2002, Gruver and Keinath 2006
Lasiurus cinereus	hoary bat	• Roost in foliage of trees • GPS tracking recorded winter season flights between 10's to 100's of kms with extended roosting/ torpor periods in between	Weller et al. 2016
Myotis thysanodes	fringed myotis	• Roosts in crevices, decadent trees, and snags • Distance between successive roosts = 0.34 ± 0.07 mi. • Distance between roost and closest perennial stream where the bats forage =0.87 ± 0.22 mi • Distance between successive captures = 1.0 ± 0.21 mi	Lacki and Baker 2007, WBWG 2017
Myotis yumanensis	Yuma myotis	• Moves between roost and water bodies to forage • Roosts in bridges, buildings, cliff crevices, caves, mines, and trees	Brigham et al. 1992, WBWG 2017
Perognathus inornatus	San Joaquin pocket mouse	• Occurs in dry, open grasslands or scrub on fine-textured soils • Density, home range on sites grazed by cattle = 7.3/ha, 148 m^2 (range 0–333m^2) • Density, home range 5/ha and 258 m^2 (0–385m^2) at ungrazed sites	Best 1993

Table 5 (continued) Scientific name	Common name	Spatial ecology	References [a]
Cervus canadensis nannodes	tule elk	• San Luis Reservoir Tule Elk Management Unit, home range area = 6,175 acres (N = 44 radio collared individuals, SD = 3,632) • proximity to water sources, avoidance of roads predict habitat use • present at Tesla, absent from CSVRA	Dziegiel 2021, Mohr et al. 2022, Kupferberg and Furey 2015

[a] Sources in Section 3 Literature Cited.

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1.7 CONSERVATION TRANSLOCATION STRATEGIES

Conservation translocation is the deliberate movement of organisms from one location to another to enhance or recover dwindling populations, reduce the risk of species extinction, and reestablish ecological functions. Because Tesla's terrestrial and aquatic environments are intact, and because the botanical resources at the base of food webs are diverse and healthy, opportunities to translocate at-risk consumer species exist at Tesla. Translocation methods relevant to Tesla include: (1) re-establishing locally extirpated species; (2) augmenting existing populations; (3) introducing species in need of a climate refuge; and (4) head-starting (rearing and releasing young individuals in a protected environment). Classification of Tesla as a State Reserve would be consistent with using its diverse habitats as receiving sites for the translocation of imperiled flora and fauna and would help minimize administrative hurdles.

1.8 CULTURALLY SIGNIFICANT PLANTS AND ANIMALS

Many species, including those that are relatively common and not highlighted in the special-status species lists presented elsewhere in this Assessment, are considered culturally significant by Indigenous People from East Bay and Central Valley tribes (Anderson 2005, Moerman 2009a, 2009b). Cultural value exists in addition to the biological importance of common and species to the functioning of the ecosystem, A *limited set* of examples of common plants or parts of plants used by Indigenous People are included below (not all uses are listed). For a more complete treatment of this subject see Anderson (2005).

- Soaproot (*Chlorogalum pomeridianum*) – soap, adhesive, food.
- Milkweed (*Asclepias* spp.) – food, medicine.
- Pines (*Pinus* spp.) – food.
- Oaks (*Quercus* spp.) – food, dye, medicine.
- Willows and sedges (*Salix and Carex* spp.) – basketry.

Finding areas where these species are present in high enough abundance to allow for protection, and managed collections for traditional uses has become increasingly difficult. The objective of Native American groups is to protect all of Tesla, part of their ancestral lands, as a Reserve so its management and public access can ensure the highest level of protection.

1.9 CHAPTER 1 - SUMMARY

Unlike most other places in the region, the vegetation and wildlife communities at Tesla are healthy and remain intact, largely because most of the 3,100-acres of Tesla have been relatively protected from human perturbation. Numerous studies show that Tesla has one of the highest levels of botanical and wildlife biodiversity in the entire state. Tesla's specific geographic location, topography and physical characteristics support its biodiversity, which includes:

- 45 rare special-status plant species, including one potential new plant species.
- 74 additional locally rare watchlist plant species.
- 9 Sensitive Natural Communities.
- 53 special-status animal species; 32 of which have been identified as Species of Greatest Conservation Need by the California State Wildlife Action Plan.

Multiple landscape level plans and assessments document Tesla’s significant biological values for the multitude of special-status species and sensitive habitats, its regional significance as a critical linkage habitat corridor, and its ability to provide refugia habitat capable of ameliorating the impacts of climate change. Many of the species at Tesla are at the northern, eastern, or western edge of their respective ranges and do not co-occur elsewhere in the area.

Tesla’s exceptional biodiversity and related ecologic values make it an irreplaceable biological resource for our region and state. Here the adage “do no harm” is particularly important. Special care should be taken to provide this irreplaceable natural landscape with the highest level of long-term protection.

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CHAPTER 2: EFFECTS OF RECREATIONAL DEVELOPMENT ON TESLA'S BIOLOGICAL RESOURCES

2.1 CHAPTER 2 - INTRODUCTION

Chapter One provided detailed information on the extensive and irreplaceable biological resources and ecological values that exist at Tesla and across its interconnected landscape. Chapter Two reviews the consequences of recreational development and activities that may be considered for Tesla, and the impacts of such activities on Tesla's irreplaceable biodiversity and ecosystem.

This assessment of impacts is necessary because the California Department of Parks and Recreation has initiated the process to establish the "classification" of the Tesla property as a unit of the State Parks system. In 2021, SB 155 was passed and provided for the CDPR to undertake a planning process pursuant to Section 5002.2 and 5019.50 of the California Public Resources Code (PRC) to determine the best use of the approximate 3,100-acre Tesla site. "Classification" as a unit of the State Parks system by the CDPR Commission is the major land use decision in this planning process as it determines the type and intensity of uses that can occur within the 3,100 acres of the Tesla wildlands (CDPR 2024a). It is the foundational decision from which all subsequent planning decisions for the project flow.

Of the classification options under the PRC that would be applicable, Tesla meets the statutory elements for Reserve classification:

> State reserves consist of areas embracing outstanding natural or scenic characteristics or areas containing outstanding cultural resources of statewide significance. (PRC 5019.65)

Reserve classification would best protect Tesla's exceptional biological resources and ecological landscape because, as provided for in PRC 5019.65, it restricts "resource manipulation to a minimum" while providing for low-intensity recreation for public enjoyment and education that preserves its natural features:[21]

> State natural reserves, consisting of areas selected and managed for the purpose of preserving their native ecological associations, unique faunal or floral characteristics, geological features, and scenic qualities in a condition of undisturbed integrity. Resource manipulation shall be restricted to the minimum required to negate the deleterious influence of man.

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[21] Other classification options in the PRC are not available or appropriate for Tesla. Tesla is not 5,000 acres and therefore cannot be classified as a "Wilderness Area." Classification as a "State Recreation Area (SRA)" would create intolerable impacts for Tesla and the specification that SRAs have "terrain capable of withstanding extensive human impact" could not be met. "State Park" classification would allow more "improvements" and "modifications" to provide for high-intensity recreational activities and development (such as driving, camping and mountain biking) than is allowed in a State Reserve. A "Historical Unit" would not cover the entire 3,100-acre site. Similarly, a "Preserve" sub-classification would not protect all of Tesla, which is necessary given its layered integrated ecosystem and presence of special-status species and critical biological features across the entire 3,100-acre site. (PRC 5019.50 - 5019.80)

> Improvements undertaken shall be for the purpose of making the areas available, on a day use basis, for public enjoyment and education in a manner consistent with the preservation of their natural features. Living and nonliving resources contained within state natural reserves shall not be disturbed or removed for other than scientific or management purposes. (PRC 5019.65(a))[22]

2.2 RECREATION IMPACTS ON NATURAL RESOURCES

While all anthropogenic uses have effects on the environment, not all uses have the same detrimental impacts. To ensure that environmental harm is minimized, the significant adverse impacts to the biological and physical environment caused by the various types and intensity of uses as well as by construction and maintenance of facilities and infrastructure must be assessed at the outset of the classification process.

The empirical evidence published in peer-reviewed scientific journals documents the ways in which recreational use and associated development of natural areas inevitably results in ecological impacts. Impacts span from the physical footprint of facilities that change the landscape to the effects caused by the presence of people in wildlife habitats (Reilly et al. 2017; D'Antonio 2020, Nickel et al. 2020). A global systematic review of 274 peer reviewed studies that investigated the effects of recreation on wildlife found that 93.1% of the papers documented at least one effect of recreation on populations, individuals, or communities of vertebrate animals. Definitively negative impacts were noted in 59.4% of the papers and behavioral changes in which the impacts were ambiguous were reported in 25.9% of the studies (Larson et al. 2016). The severity of impacts on the natural environment and degree of exposure to harm depends on many factors, including the type of recreation (i.e., type of use or user group), intensity of use, geographic location(s) of recreation activities, and the development, construction, and maintenance of facilities, e.g., trails, roads, campgrounds, buildings, etc. (Larson et al. 2018). Disturbance associated with non-consumptive recreational development may individually or cumulatively affect the physical environment, sensitive species, population structure, and various ecological processes (Baas et al. 2020). For example, in northern California, paired comparisons of neighboring protected areas with and without recreation revealed that dispersed, nonmotorized recreation led to a five-fold decline in the density of native mammalian carnivores and caused a marked shift from native to non-native species (Reed and Merenlender 2008).

Types of use refers to the kinds of activities and intensity of use (e.g., hiking, biking, mountain biking, e-bikes, driving, camping) that can occur within the different classification categories. Most recreational activities require development, maintenance, and management of infrastructure and facilities. Infrastructure needed to support recreational development generally includes development of roads, parking lots, trails, bathrooms, septic systems, utility lines, utility vaults, campgrounds, visitor/interpretive centers, fences, and garbage collection facilities, among others.

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[22] This Assessment focuses on natural resources which cover the entire 3,100-acre Tesla site. Under the PRC there is a Natural Reserve classification (PRC 5019.65(a) and a Cultural Reserve classification, PRC 5019.65(b). Reserve classification would provide the maximum protection for natural and cultural resources (CDPR 2024a).

Development of these features would have direct, indirect, and cumulative impacts on the environment.

The following assessment considers the impacts of recreation and associated infrastructure development on the physical environment, vegetation, and wildlife. Given the documented impacts, the classification that will lead to the least environmental impacts should be selected given Tesla's extraordinary biological resources and ecological values.

2.3 ROAD IMPACTS

Roads of all kinds have multiple effects on the biotic integrity of both terrestrial and aquatic ecosystems (Forman and Alexander 1998; Trombulak and Frissell 2000, Langen et al. 2015) and generally fall into the eight categories reviewed below.

2.3.1 Mortality from Road Construction and Maintenance

Road construction and ongoing maintenance kills sessile and slow-moving organisms, injures organisms adjacent to roads, and alters physical conditions beneath and adjacent to the road. Tesla contains many sessile or slow-moving animals with protected status (e.g., California Tiger Salamander, California Red-legged Frog, Western Spadefoot Toad, Northern California Legless Lizard, Coast Horned Lizard, and western bumble bee, among others). Road construction at Tesla is likely to directly result in the death or injury of these and other sessile or slow-moving organisms because most of them: (a) are elusive or evade capture; (b) cannot be successfully translocated (i.e., most plants); or (c) maladaptively use roads for thermoregulation (i.e., most snakes).

2.3.2 Mortality from Collision with Vehicles and Road/Post Construction Barrier Effects

Vehicle collisions with wildlife affect the demography of many species, both vertebrates and invertebrates, and mitigation measures to reduce roadkill have been only partly successful. Almost all of the wildlife species at Tesla would be susceptible to vehicle collisions.

Amphibians and reptiles may be especially vulnerable to roadkill and habitat fragmentation caused by roads because their life histories often involve migrations between wetland and upland habitats and because individuals are inconspicuous and sometimes slow-moving or still. Species at Tesla that migrate between wetland and upland habitats include the California Tiger Salamander, California Red-legged Frog, Western Spadefoot Toad, and western Pond Turtle. Road mortality is implicated in the decline of western pond turtle populations, in particular, due to the female's breeding migrations from ponds to the uplands to build nests and lay eggs (Nicholson et al. 2020). Other reptiles that occur at Tesla often use roads for thermoregulation to bask in the sun or absorb re-radiated heat after dark. This makes them highly susceptible to being run over by motor vehicles and bicycles. The local herpetofauna, especially snakes, have a well-documented history of "road" mortality in the vicinity of Tesla on Corral Hollow Road (Sullivan 1981, 2000). Brehme et al. (2018) developed an objective risk assessment to identify reptiles and amphibians in California most susceptible to road impacts caused by barrier effects (i.e., animals avoid crossing roads) and depletion effects (i.e., road mortality). Population persistence of most of the special-status reptiles and amphibians that occur at Tesla were ranked at "*very-high risk*" due to negative road impacts. Specifically, these are the Western Pond Turtle, San Joaquin Coachwhip, Alameda Whipsnake, California Tiger Salamander, California Red-legged Frog, and California Glossy Snake. Golden Eagle, mountain lion, badger, and kit fox populations are among the birds and mammals also highly susceptible to negative impacts from roads (Phillips 1986, CDFW 2020)

Brehme et al. (2018) also analyzed movement distances that would encompass 95% of the population studied to develop recommendations for road buffer distances that would minimize the direct effects of roads as barriers and mortality from vehicle strikes. Assessment of buffer distances did not include impacts from road construction and maintenance, or indirect effects from increased human use of the landscape once a road is in place. Brehme et al. estimated that California Red-legged Frog populations would require a no-road buffer distance of 1.47 miles. California Tiger Salamanders would require a 1.15-mile road-free buffer around breeding sites. The abundance and distribution of breeding ponds at Tesla, renders it impossible to install (or use existing) roads that adhere to these buffer distances.

2.3.3 Modification of Animal Behavior and Habitat Fragmentation

Roads fragment habitat and disrupt the spatial ecology of plants and animals (e.g., separating areas of uplands from essential sources of water for terrestrial wildlife). Avoidance of roads results in alteration of animal behavior and causes changes in home ranges, movement, reproductive success, escape response, and physiological condition. Roads eliminate, degrade, and fragment habitat (Forman and Alexander 1998; Trombulak and Frissell 2000). Habitat fragmentation can heighten the risk of extirpation by a fixed-area mechanism in which species decline because they have inflexible habitat patch size requirements (Henle et al. 2004) or because fragmentation increases the amount of habitat edge per unit land area. Edge-sensitive taxa decline from factors such as exposure to edge-tolerant predators, or due to changes in vegetation and habitat at edges (Woodroffe and Ginsburg 1998, Kristan et al. 2003). Both mechanisms have significant consequences on species that require large areas of contiguous, undisturbed habitat.

At Tesla, these include the Golden Eagle, tule elk, and mountain lion. Mountain lion avoidance of vehicle use at Carnegie State Vehicular Recreation Area (CSVRA) has been documented by a camera trap study that compared high occupancy of habitat at Tesla with low occupancy at CSVRA (CSVRA 2020). Similarly, tule elk are present at Tesla and absent from CSVRA. Radio-telemetry of elk at other sites in Central California has demonstrated that avoidance of roads and human disturbance is a significant predictor of habitat use (Mohr et al. 2022). Radio-telemetry studies show that even small-bodied animals that are wide-ranging, such as Coachwhip snakes, display negative consequences of fragmentation such as increased crowding and shrinking home range sizes (Mitrovich et al. 2009).

2.3.4 Alteration of Terrestrial and Aquatic Physical Environments

Roads change soil density, temperature, soil water content, light levels, dust, surface waters, patterns of runoff, and sedimentation. Alteration to hydrology and slope erosion are inevitable consequences of road construction. This impact can be especially severe when roads are constructed on steep slopes (Spellerberg 1998, Trombulak and Frissell 2000). Almost all (87%) of Tesla contains steep slopes (> 20% grade). Sediment yields to streams from dirt roads after a precipitation event is a function of use level as well as hillslope (Reid and Dunne 1984). Even if no new roads are constructed at Tesla, increases in traffic on existing roads will likely increase the input of fine sediment into downslope creeks and drainage basins. Fine sediment has a number of negative effects on aquatic biota including the primary producers (i.e. diatoms and algae) and the macroinvertebrate consumers that emerge from streams and ponds and serve as a food supply for bats and birds. Impacts on stream biota include abrasion, scour, burial, and clogging the gills or feeding appendages (reviewed in Bilotta and Brazier 2008).

2.3.5 Alteration of the Chemical Environment

Roads and motor vehicles (via brake and tire wear and tailpipe emissions) add heavy metals (especially lead), salts, organic molecules, ozone, and nutrients to roadside environments (Chow et al. 2003). The alteration of the chemical environment along roads results in a number of consequences for living organisms, especially plants (Khalid et al. 2018).

2.3.6 Spread of Non-native and Invasive Plant Species

Construction of roads (and trails) can result in the introduction of non-native, invasive plant species that opportunistically establish on areas of freshly disturbed soils along road edges, and then spread into adjacent areas (McDougall et al. 2018, Fusco et al. 2022). Studies conducted in protected areas of California confirm that roadsides are a source of propagules for invasive plants (Harrison et al. 2002, Stohlgren et al. 2013).

2.3.7 Dispersal of Invasive Species

Roads promote dispersal and colonization of non-native invasive species via three mechanisms: (1) providing habitat by altering existing conditions; (2) by stressing or removing native species; and (3) allowing easier movement by wild or human vectors. Non-native invasive species are one of the greatest threats to Tesla's biodiversity. This threat would be especially severe to the native species that remain in Tesla's grasslands. Gelbard and Harrison (2003) showed that in non-serpentine grasslands, the percentage cover by native species, the percentage of species that were native, and the number of native grass species increased with distance from roads, while the cover by exotic species and number of exotic forb species decreased. The authors reported:

> "Roadless grasslands are a scarce habitat that appears to provide a significant refuge for native Californian species on nonserpentine soils. It was surprising to find such clear evidence for the importance of distance from roads given the 200-yr history and severity of invasion in the grasslands of the California floristic province.

> Roadless areas are significant refuges for native species. However, to protect these habitats from the continued threat of invasion, land managers should consider means of preventing construction of new roads, limiting off-highway vehicle access into grasslands with low road densities, identifying a regime of livestock grazing that favors the persistence of natives over the spread of exotics, and monitoring recreational trails and grazing allotments within roadless areas to detect and eradicate new infestations"

2.3.8 Increased Use and Alteration of Habitats by Humans

Roads facilitate human access to remote areas, leading to diverse and persistent ecological effects (Lucas 2020a, 2020b, Nickel et al. 2020). The consequences of human presence include passive harassment of animals (Price 2008, Spaul and Heath 2016, 2017, Reilly et al. 2017), damage to plant communities (Marion et al. 2016), release of non-native species (Spinks et al. 2003), and vectoring of pathogens (Riley et al. 2004). High levels of biodiversity have persisted at Tesla due to its isolation from human activities. Facilitating human access (via roads or trails) to Tesla's wildlands would degrade its biodiversity and habitats.

Not all species and ecosystems are equally affected by roads, but overall, the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian systems (Trombulak and Frissell 2000).

2.4 CAMPSITE AND PICNIC AREA IMPACTS

Most campsites at California State Parks fall into one of two distinct categories: (1) developed campsites; or (2) environmental campsites. Developed campsites are clustered in campgrounds, are accessible to motorized vehicles, and are designed to accommodate either families (up to 8 people) or groups (10 to 100 people). The amenities at developed campsites vary from park to park, and may include fire pits or fire rings, picnic tables, a water supply, showers, restrooms with flush toilets, garbage collection, cleared areas for tents, or RV hookups. Environmental campsites are located in relatively undisturbed natural settings and are not accessible by motorized vehicle. Each environmental campsite may have a table, a clearing for a tent, and a primitive toilet nearby.

Development of campsites causes habitat loss, fragmentation, and degradation. It also can have negative effects on soils and hydrology. These impacts tend to be most severe at campsites where use is highly concentrated, both spatially and temporally (e.g., developed campgrounds) (Cole 1982). However, research has demonstrated that the following impacts occur at both developed campsites and environmental (backcountry) campsites:

- Loss of vegetative cover and increase in bare ground.
- Mechanical damage to trees and other vegetation.
- Almost complete elimination of tree seedlings.
- Pronounced changes in plant and animal species composition.
- Soil compaction, reduced infiltration rates, loss of organic surface horizons, and erosion.

- Increase in soil pH.

For example, Cole (1982) examined impacts associated with 26 backcountry campsites in the Eagle Cap Wilderness in northeastern Oregon. The median value of vegetative cover at campsites was one-tenth of the level at control sites and there was 30 times as much bare ground. Most (87%) of the original vegetation had been lost.

Visitors spend considerable time at campsites and their presence can disrupt normal wildlife activities (Anderson et al. 2023), attract nuisance species (Hammitt et al. 2015), or alter wildlife habitat through impacts such as compacted soil and loss of vegetated cover (Cole 2004). Wildlife that avoids areas with campsites can be displaced from vital resources (Leung and Marion 2000). If visitor waste is treated with on-site water treatment systems such as septic tanks and drain fields, there can be plumes of effluent extending tens to hundreds of yards downslope. Such plumes can release pharmaceutically active compounds, hormones, and other organic wastewater compounds into the environment with ill effects on aquatic organisms and ecosystems (reviewed by Schaider et al. 2017). Intentional or unintentional wildlife feeding is also common at campsites, leading to attraction behavior, unhealthy food dependencies, and collisions with vehicles (Green and Giese 2004).

Camp sites can disrupt community structure by supporting opportunistic species that can co-exist with human disturbance, to the detriment of native species (Marzluff and Neatherlin 2006). As an example, in Steven et al.'s (2011) review of 69 peer-reviewed articles of original research on the effects on birds from non-motorized nature-based recreation, 61 investigations reported recreation as having negative effects (i.e., detrimental changes in physiology, behavior, abundance, and reproductive success). The only taxonomic group that benefited was the corvids (i.e., crows, ravens, and jays), which are well adapted to human presence. They increased in abundance at campgrounds due to anthropogenic subsidies (e.g., supplemental food and water resources). Increases in corvid populations can affect important ecosystem functions, including carrion decomposition, seed dispersal, and predation (Walker and Marzluff 2015). For example, because American Crows and Common Ravens prey on small animals such as young birds, herpetofauna, rodents, and insects, increases in corvid populations can cause population declines of prey species (e.g., Kristan and Boarman 2003, Thomson et al. 2016). Indeed, American Crows and Common Ravens have been shown to be the most important predators on several threatened or endangered species in California (Liebezeit and George 2002, Brinkman et al. 2018, Holcomb et al. 2021, Coates et al. 2021).

Adverse impacts of human disturbance on bird behavior, nest desertion, and vulnerability to predators extend beyond campgrounds to picnic areas (Piper and Catterall 2006). In addition to the negative effects of even small-scale clearing of habitat for construction of picnic areas (Piper and Catterall 2006), the inadvertent or intentional feeding of mammals and birds that are also predators of eggs and chicks decreases reproductive success in proximity to picnic areas (Michaud et al. 2004). This study assessed whether picnic areas had impacts on birds in adjacent eucalyptus forests in Australia. They concluded that "*picnic areas exert strong localized edge effects on forest bird assemblages, and are likely to cause reduced reproductive success for small-bodied forest bird species which attempt to nest nearby*." [emphasis added] (Michaud et al. 2004).

2.5 TRAIL IMPACTS

Trails are almost a universal feature in terrestrial recreation areas. The following assessment describes three general categories of impacts caused by trails: (1) physical habitat and environment (soil, water, and fragmentation issues); (2) vegetation communities and non-native, invasive plants; and (3) wildlife. However, in ecological systems these impacts are almost always interrelated. For example, impacts on soil often affect hydrology and water quality, which can impact habitat for aquatic plants and wildlife. Therefore, the impacts cannot be viewed in isolation, but rather as components of the overall impact to the ecosystem. Because Tesla contains an intertwined network of rare biotic resources and ecological functions, impacts on one category would likely have cascading effects on the entire ecosystem, with some impacts seen in the short-term and some developing over the longer-term.

Some of the impacts of trails and roads are generally similar, such as mortality from collision or trampling, habitat fragmentation, and vegetation loss. The differences in impacts between roads and trails are a function of the type and intensity of use, which will largely be determined by the classification established for the park unit.

2.5.1 Impacts on Physical Habitat and Environment

Trails directly remove habitat for plants and animals. Initially, habitat loss occurs when vegetation and habitat elements (e.g., burrows, logs) are removed to construct the trail. After the trail is constructed, additional habitat loss occurs due to trail users who purposely or inadvertently step (or ride) off the trail and crush or otherwise damage plants and soils. This results in trail widening. Trail widening often occurs when the trail has not been properly designed or is improperly used. For example, trails that do not have proper drainage structures will develop wet or muddy spots that trail users will step (or ride) around. Indeed, Evju and others (2021) found that soil moisture was the most significant predictor for trail widening, and that trail widening was greater when a large proportion of the trail users were mountain bikers.

Another way in which trail users can cause habitat loss is through creation of shortcuts or other unauthorized trail routes. Over time, unauthorized trails can cause more habitat loss, degradation, and fragmentation than designated trails (Ballantyne et al. 2014, Lucas 2020b). Even where unauthorized trails occupy a relatively small proportion of a landscape, they can be very detrimental to wildlife and their habitat. For example, research has shown that wildlife has stronger reactions to off-trail activities because on-trail activities are more predictable (Taylor and Knight 2003, Mitrovich et al. 2020, Lucas 2020a). All user groups tend to go off-trail, or create and use unauthorized trails (Hennings 2017). However, research indicates mountain bikers increasingly create unauthorized trails because they seek more challenging, wider-ranging, or free-riding opportunities (Davies and Newsome 2009).

2.5.1.1 Soils

Trail construction and usage degrades soil conditions and can cause erosion, which in turn can degrade water quality and habitat for aquatic species. Erosion that changes how water flows across the landscape can also result in changes to the hydrological regime of habitats (see below). From a conservation perspective, the loss of soil is perhaps the most significant form of impact to the physical environment because it is long-term or irreversible (Marion and Wimpey 2017).

Trail grade and slope alignment angle have the greatest influence on soil loss from recreational trails (Marion and Wimpey 2017). Numerous studies have shown that soil erosion rates become exponentially greater with increasing trail grades, especially when grades exceed 10% (Dissmeyer and Foster 1984, White et al. 2006, Olive and Marion 2009, Marion and Wimpey 2017). These findings can be explained by the greater velocity and erosivity of running water on steep slopes, and by increased slippage or gouging of feet, hooves, and wheels that displace soil down-hill. Almost all of Tesla contains highly erosive soils on steep slopes (CSP 2015). As a result, reducing the potential for severe soil loss at Tesla would require construction of trails with numerous grade reversals and sinuous alignments (i.e., to maintain grades < 10%), thereby increasing the amount of habitat loss and fragmentation.

All trail user groups (i.e., hikers, bikers, mountain bikers, and equestrians) damage trails through trampling, which loosens the top layer of soils while simultaneously compacting soils below. Both phenomena increase the potential for soil erosion (Hennings 2017). Despite this overall commonality, each user group can have unique effects on a trail's soils and the subsequent erosion. For example, horses tend to be most damaging to trails even at low levels of use due to the concentrated weight of the horse and rider on a relatively small area (i.e., below hooves). This damage, similar to the effects of hikers, tends to be dispersed relatively evenly across the trail bed. In contrast, mountain bikers tend to cause trail incision due to the "cutting" action of the bike's tires, especially when the tires slip on uphill slopes or skid on downhill slopes (White et al. 2006, Davies and Newsome 2009, Evju et al. 2021). Incisions caused by mountain bikes collect surface runoff and funnel it downhill at high velocity in what are effectively "chutes." Because each user group tends to have unique influences on soil stability, multi-use trails often suffer the greatest amounts of soil erosion.

2.5.1.2 Water/Hydrology

Similar to roads, trails alter a site's natural hydrology. For example, trails can re-direct overland sheet flow and runoff of water into undesirable areas or cause new channels to form (Hennings 2017). In their 2007 review of the environmental impacts of mountain biking, Marion and Wimpey commented: "[p]oorly designed trails can also alter hydrologic functions – for instance, trails can intercept and divert water from seeps or springs, which serve important ecological functions. In those situations, water can sometimes flow along the tread, leading to muddiness or erosion and in the case of cupped and eroded treads, the water may flow some distance before it is diverted off the trail, changing the ecology of small wetland or riparian areas."

Trail watercourse crossings can have direct effects on aquatic organisms and their habitat. Wet crossings (i.e., trail crossing without a bridge that spans the watercourse) in particular increase the potential for: (a) crushing of aquatic plants and animals; (b) adverse modifications to stream geomorphology (e.g., degradation of the streambank); and (c) sediment transfer into and within the stream.

Tesla provides habitat for several special-status semi-aquatic animals (e.g., California Tiger Salamander, California Red-legged Frog, Foothill Yellow-legged Frog) that depend on good water quality and unimpaired hydrology (USFWS 2002, 2014, Thomson et al. 2016) as well as special-status terrestrial animals that rely on the macroinvertebrates emerging from streams and ponds for food (e.g., various birds and bats). Sedimentation from trails would degrade (or eliminate) habitat, can adversely alter the hydroperiod of breeding ponds, and impair the productivity of aquatic food webs (Bilotta and Brazier 2008, Henley et al. 2000) that supply food for these species. For example, sedimentation degrades (or eliminates) habitat for the Foothill Yellow-legged Frog because it reduces the availability of important habitat features including coarse rocky substrates, geomorphic heterogeneity, and interstitial spaces (USFWS 2021b). In addition, increased sedimentation can increase turbidity, impact food resources, or impede Foothill Yellow-legged Frog egg mass attachment to substrate (USFWS 2021b). Fine sediments can also fill interstitial spaces between rocks, which provide shelter from high velocity flows, cover from predators, and sources of aquatic invertebrate prey (USFWS 2021b).

Changes to the hydroperiod of aquatic habitats resulting from sedimentation (from erosion) or the redirection of runoff (both surface and sub-surface flows) can have significant, adverse impacts to the survival of aquatic dependent species. Species at Tesla that use ponds to complete their reproductive cycles (e.g., the federal and state listed California Tiger Salamander and the federal listed California Red-legged Frog) would be susceptible to recruitment failure and population decline if shallower sediment-filled ponds dried prior to the metamorphosis of aquatic larvae to terrestrial adults (D'Amore et al. 2010, Searcy et al. 2015, Riensche et al. 2019, Cooper and Shaffer 2024).

2.5.1.3 Habitat Fragmentation

Habitat fragmentation occurs when large habitat areas or "patches" are broken up into smaller pieces. Trail construction causes habitat fragmentation through the physical removal of vegetation and other habitat elements. This impact is exacerbated by behavioral avoidance of otherwise suitable habitat near the trail (i.e., functional habitat loss). Many species, including most large mammals and birds, cannot maintain viable populations in small habitat patches, which leads to local extinction and loss of biodiversity. In addition, fragmentation commonly disrupts ecosystem processes and can interact with other forms of human disturbance in ways that cause significant landscape transformations. For example, trails can promote invasion of non-native species that outcompete natives and cause further losses of habitat and biodiversity. Although the effects of fragmentation vary among species, fragmentation generally favors exotic and generalist species at the expense of native species that have narrow habitat requirements (i.e., "specialists").

Trails act as a barrier to some species (Clark et al. 2001, Marsh et al. 2005, Burgin and Hardiman 2012). In some instances, wildlife cannot cross the trail due to a physical barrier, such as a berm or verge that was created when a trail was constructed across a steep slope. However, just because an animal can physically cross the trail does not mean it will do so. Most trails lack vegetation and other structural elements (e.g., logs) that provide cover. Therefore, many prey species will avoid crossing trails because it exposes them to predators (including humans, which are perceived as apex predators).

Access to water sources is critical to many wildlife taxa. In addition to posing a direct threat to aquatic reptiles and amphibians, trails that are constructed near water can create a functional barrier to water access, decrease vegetative cover at the water source, impact water quality through erosion and sedimentation, and potentially extirpate some species. For example, Anderson (2019) showed that proximity to trails was the best predictor for the absence of California Red-legged Frogs at ponds on public lands (parks and other reserves) in central California.

2.5.2 Impacts on Vegetation and Vegetation Communities

Trail construction can cause the following impacts on vegetation (Hennings 2017):

- Vegetation loss and habitat degradation.
- Loss of leaf litter and organic material.
- Changes in microclimate due to more sun and wind exposure, causing dryer, warmer conditions that favor invasive plant species (Harper et al. 2005, Keeley et al. 2011).
- Introduction of invasive plant seeds (e.g., via boots and bike tires), with germination facilitated by ground disturbance.
- Tree damage or root exposure.

In addition to these initial consequences, vegetation adjacent to trails is frequently damaged when trail users: (a) depart the trail to avoid muddy conditions or let other users pass; (b) walk or ride side-by-side; or (c) cut corners or try to take short cuts or create entirely new unsanctioned rogue trails. Trailside vegetation is important because plants intercept rainwater and their roots help soils absorb water, thereby slowing surface water flow, protecting water quality, and reducing trail-damaging runoff and erosion.

2.5.2.1 Riparian and Aquatic Resources

Trails are often constructed near riparian and aquatic resources, which are aesthetically appealing to recreationalists. Riparian ecosystems harbor the most diverse bird, amphibian, and reptile communities in the arid and semiarid portions of the western United States (Abell 1989, RHJV 2004). Within the state of California, 90% to 95% of the historic riparian habitat has been lost, and much that remains is highly fragmented by development and infrastructure, making protection of the remaining riparian habitat critically important. Riparian vegetation is critical to the quality of in-stream habitat and aids significantly in maintaining aquatic life by providing shade (thereby reducing water temperatures), food, and nutrients that form the basis of the food chain (Jensen et al. 1993). California’s riparian habitats provide important breeding and over-wintering grounds, migration stopover areas, and corridors for dispersal (RHJV 2004). DeSante and George (1994) concluded that the loss of riparian habitats may be the most important cause of population decline among landbird species in western North America. The National Research Council (2002) concluded that riparian areas perform a disproportionate number of biological and physical functions on a unit area basis and that the restoration of riparian functions along America’s waterbodies should be a national goal.

Trails can damage riparian habitat and impair water quality to varying degrees through trampling, alterations to drainage patterns, and the introduction of excess runoff and sediments to streams (Hennings 2017). Because humans are attracted to water features, they frequently damage riparian vegetation by creating their own trails to directly access those features (Marion and Olive 2006, Van Winkle 2014). When heavily used trails are located adjacent to streams, there is often excessive damage to riparian vegetation unless it is protected by a fence or steep slope (Van Winkle 2014). All of these disturbance factors adversely impact riparian vegetation and habitat function. The disturbance can also result in a cascade of bank destabilization both upstream and downstream of the impacts. While fences may protect vegetation, they are not without impacts, and can have unintended negative consequences. For example, fences provide artificial hunting perches for birds and can thus alter predator-prey dynamics (Withey and Marzluff 2009).

Horseback riding can also have negative consequences. In a literature review, Pickering (2008) summarized the potential direct and indirect effects of equestrian use on riparian areas and water quality, which with one noted exception, apply to other user groups as well:

- Defoliation of riparian vegetation.
- Introduction of invasive species (aquatic and terrestrial).
- Soil loss and compaction (which can also prevent re-establishment of native plants).
- Increased turbidity associated with soil erosion and eroded streambanks.
- Degraded water quality.
- Altered composition of instream and streambank biota.
- Increased input of sediments.
- Increased input of nutrients (associated with horse manure and urine) with potential for excessive algal growth and potential lowering of dissolved oxygen.
- Impaired aquatic ecosystem health.

Tesla's aquatic and riparian resources are critical components of its exceptionally high levels of biodiversity. Installation of trails through or near Tesla's aquatic and riparian resources would degrade those resources and their associated habitat values.

2.5.2.2 Invasive Species

Invasive plants, pathogens, and animals (especially non-native predators) threaten biodiversity (Kats et al. 2003, Nicholson et al. 2020). They alter ecosystem processes (Vitousek 1990, Theoharides and Dukes 2007), change disturbance regimes such as the invasive grass-fire cycle in which non-native grasses make vegetation more flammable and escalate fire frequency (Underwood et al. 2019, Fusco et al. 2022), cause poor recovery of native species after disturbance (Larios et al. 2013), and eventually cause extinctions (Gurevitch and Padilla 2004). Indeed, next to habitat loss, invasive species pose the greatest threat to the nation's biodiversity and natural resources (U.S. Department of the Interior 2013).

Three things are required for an invasive plant to become established in an area:

- A vector for transporting the plant or its propagules from one place to another. Recreational trails are vectors for invasive plants because trail users transport invasive plant seeds via clothing, boots, gear and vehicles (e.g., tires).
- Suitable conditions for invasive plant colonization. Soil and vegetation disturbance associated with trails and other recreational facilities creates suitable conditions for the establishment of invasive plants.
- A suitable environment for the invasive plant to survive, reproduce, and spread. The best defense against invasive plants is maintenance of native plant cover (CDFA 2005). Perpetual disturbance to soils and vegetation along the shoulders of trails (e.g., when users step off the trail) facilitates the spread of invasive plants, often exponentially across large blocks of land due to the linear nature of trails.

Multi-use trails may have more invasive species cover than single-use trails because they involve multiple user groups, and each user group can distribute invasive plant seeds, animal and fungal propagules in unique ways. Esby (2011) examined native and non-native plant distribution along hiker-only and multi-use trails in the Santa Monica Mountains National Recreation Area. Multi-use trails exhibited a significantly higher proportion of exotic (invasive) species than hiker-only trails. Examples of harmful non-native species relevant to Tesla include New Zealand mudsnails (*Potamopyrgus antipodarum*) and pathogens like the fungus implicated in many amphibian declines, *Batrachochytrium dendrobatidis* (Richards et al. 2004, Robinson et al. 2018).

2.5.3 Direct and Indirect Effects on Wildlife

Similar to roads, recreational trail users can cause direct mortality of animals due to trampling or collisions with bicycles. Although trampling by hikers or horses can occur, wildlife injuries or fatalities are more likely to occur due to collisions with bicycles, which travel much faster than hikers or horses. Reptiles are especially vulnerable to collisions with mountain bikes because reptiles often use open conditions created by trails for thermoregulation, and because they may not be capable of moving fast enough to avoid the collision (Rochester et al. 2001, Miller and Alvarez 2016).

2.5.4 Behavioral Changes Leading to Functional Habitat Loss

Although recreational activities can directly cause mortality of wildlife, the majority of impacts occur due to anthropogenic (human caused) disturbance. Anthropogenic disturbance affects wildlife in ways comparable to predation, via: (a) increased vigilance, fleeing behavior, and energy expenditure; (b) reduced time spent on essential brooding, sheltering, and acquiring resources; (c) changes in habitat selection; and (d) attraction of nuisance species that prey on individuals or adversely impact nesting success (Frid and Dill 2002, Price 2008, Lucas 2020a, Marion et al. 2020). Although these effects usually occur at the individual level, they can amount to population-level effects if numerous individuals are affected over space and time (Marion et al. 2020).

Many wildlife species are intolerant of humans and thus avoid using habitats near trails, (Gump and Thornton 2023). Behavioral avoidance of habitat is termed “functional habitat loss.” The extent of functional habitat loss caused by recreational trail users depends on several variables (e.g., species, topography, and intensity of trail use), but may extend several thousand feet beyond the trail itself (Dertien et al. 2018, USFWS 2021d). If alternate habitat is available, most species will move to areas farther from trails to avoid humans and recreation-related disturbance. Consequently, *trail density is one of the main factors affecting wildlife in open space recreation areas*, because the greater the trail density, the fewer options there are for wildlife to find suitable habitat away from the trails and their corresponding zones of influence (Lucas 2020a). If alternate habitat away from trails is not available, animals are forced to use habitat within the trail's zone of influence. This often results in negative behavioral or physiological reactions, which in turn affect reproductive or survival rates, and ultimately, persistence of wildlife populations and communities (Purdy et al. 1987, Richardson and Miller 1997, Lucas 2020a).

Outdoor recreation often causes wildlife to shift the timing of their activity patterns or completely avoid otherwise suitable habitat (Price 2008, Nickel et al. 2019). Such negative effects of recreation on wildlife occur in response to chronic disturbance (e.g., deer are repeatedly flushed from habitat near trails) as well as episodic disturbance. Reed et al. (2019) found that bobcat, gray fox, mule deer, and northern raccoon were less active in areas with higher levels of human recreation. Bobcat habitat use was more strongly negatively associated with human recreation than urban development, which also decreased the probability of habitat use. The collective results of several studies suggest that some species, including the mule deer, may disappear altogether if human (recreation) activity is too high (Reed et al. 2019, Lucas 2020a). In addition to altering habitat use and wildlife abundance, human activities can change animal activity patterns. For example, studies have shown that some species (e.g., mountain lion, bobcat, deer, and coyote) avoid recreationalists by switching to more nocturnal activities, which can disrupt predator-prey dynamics and hence community structure (Nickel et al. 2019, Lucas 2020a).

Among the special status animals at Tesla, tule elk are one of the species known to be sensitive to human disturbance. At Pt. Reyes National Seashore, off-trail hiker presence explained a doubling of disturbance response behaviors, and the elk were more prone to react and forego fitness-enhancing activities (feeding, mating, etc.) when there were fewer than 15 individuals in a herd (Becker et al. 2012).

For birds, Fletcher et al. (1999) reported, "[o]ur study suggests both that riparian corridors are important areas for wintering raptors and that trails may displace raptor perch use away from riparian habitat." Rösner et al. (2014) found that anthropogenic disturbance caused by recreation had a negative impact on habitat use by Capercaillie, an umbrella species. Similarly, Bötsch et al. (2017) found that even low-intensity recreational disturbance events over a short time period had substantial effects on the number of avian territories and species in a forested environment.

Even low levels of disturbance can have significant population-level effects on some species. For example, Golden Eagles are known to be highly sensitive to many types of human activities (e.g., Ruddock and Whitfield 2007, Steenhof et al. 2014), including pedestrian and other non-motorized forms of recreation (USFWS 2021d). Studies on Golden Eagle nest success have found that between 46 and 85 percent of nesting failures were due to human disturbance (Suter and Joness 1981). Although many Golden Eagle nest sites experience some level of intermittent and on-going low levels of disturbance from human activities, and although the resident pair of eagles may have acclimated to these existing levels of disturbance, the eagles may not tolerate *increases* in human activity (USFWS 2021d). As a result, the USFWS (2021d) recommends a one-mile no-disturbance buffer surrounding Golden Eagle nesting sites in California. Due to the abundance and distribution of Golden Eagle nesting sites in and around Tesla (Wiens and Kolar 2021), adherence to the USFWS's recommendation would require no-disturbance buffers that encompass at least 50% of the Tesla property (see Fratanduono 2014 , Hunt and Hunt 2015, Wiens and Kolar 2021).

With respect to the tolerance (through habitat imprinting, genetic inheritance, or habituation) of Golden Eagles to recreational disturbance, Pauli et al. (2017) used an individual-based model to assess the effects of walkers and off-highway vehicles on Golden Eagle populations. The primary modeling results indicated that, while Golden Eagles can develop tolerance for recreational disturbance, tolerance for even moderate levels of disturbance may not develop within a population at a sufficient rate to offset the effects of increased recreation on breeding Golden Eagles, particularly because this is a long-lived species with low recruitment. Pauli et al. (2017) concluded that, taken together, the simulation results suggest that recreation-related disturbance has a substantial effect on Golden Eagle populations and that increased recreation activity will exacerbate such effects. Given the results and the fact that even non-motorized recreation decreases the probability of egg-laying in Golden Eagles (Spaul and Heath 2016, 2017), the authors asserted that trail management and a reduction in recreation activity within eagle territories are necessary to maintain Golden Eagle populations in locations where levels of recreation are increasing.

2.5.5 Population and Community Level Changes Specific to Trail Associated Recreation

Species of conservation concern are negatively affected by trails and human presence on trails (Lucas 2020a). The few species that benefit from trails tend to be habitat generalists, non-native species, or disturbance-adapted mesopredators, i.e., smaller carnivores such as crows, ravens, jays, opossums, skunks, foxes, and domestic cats (Jordan 2000). These species can amplify the negative effects of recreational trails and cause further shifts in wildlife community composition. For example, Crooks and Soulé (1999) provided evidence that even modest increases in predation pressure from mesopredators, in conjunction with habitat fragmentation effects, may quickly drive native prey species to extinction. Miller and others (1998) concluded that recreational trails as narrow as one meter wide had negative impacts on breeding bird communities. Negative impacts included decreased nesting and nestling survival rates near trails, altered bird species composition near trails, and increased nest predation by skunks, raccoons and foxes using the trails as movement corridors. In addition to bird nests, turtle nests are vulnerable to skunk and raccoon predation (Spinks et al. 2003). Bird species that are likely to be negatively affected by an increase in non-consumptive recreation include those that require specialized resources, ground nesters, rare species, and those that require large contiguous home ranges (Walker and Marzluff 2015). Tesla supports numerous special-status bird populations that possess these characteristics, including the Burrowing Owl, Golden Eagle, Northern Harrier, California Horned Lark, Yellow Warbler, Grasshopper Sparrow, and Bell's Sage Sparrow (among others).

Blair and Launer (1997) conducted a study focusing on 10 native oak woodland species of butterflies near Palo Alto. They concluded that even small perturbations by hikers and joggers in a recreational area led to: (1) a loss in the number of butterfly species (species richness) of the original oak-woodland community compared to the number of these species in a biological preserve with no recreation; and (2) a lower number of butterflies (abundance) in the recreational area compared to the biological preserve. The authors further concluded that multi-use areas may not adequately preserve butterfly species diversity. The assemblage of butterflies using Tesla has not been systematically surveyed, but has the potential to be very diverse.

In a study to systematically assess trail recreationists' direct and indirect effects on sensitive wildlife species in 14 protected areas in San Diego County, Reed et al. (2019) integrated monitoring of both wildlife species and recreationists (e.g., hikers, mountain biker, horseback riders). The authors found that recreation was associated with declines in reptilian species richness, occupancy, habitat use, and relative activity in the protected areas. Of the 3 species (all lizards) for which statistical analyses were feasible, 2 exhibited negative relationships between occupancy and human recreation.

Studies have shown that mammal detections are negatively correlated with all types of recreation. The overall trend is sharply negative: (a) as human activity increased, mammalian activity decreased, regardless of species or type of human activity; (b) mammals were nearly four times as likely to be recorded on days with no human activity than on days with human activity at the same site; (c) detections of mammals decreased incrementally as the number of humans increased within a day, and fell to near zero probability at > 60 humans per day; and (d) some mammals species (e.g., mule deer) may stop using areas altogether if human recreation is too high (Lucas 2020a). Suraci et al. (2019) demonstrated that mammalian carnivores' responses to human voices alone can result in landscape-scale effects across wildlife communities, including cascading effects on the behavior of lower trophic level animals.

Collectively, scientific studies across various plant and animal taxa have shown that, over time, recreational trails generally have the following effects on the ecological community (see Lucas 2020a, 2020b):

- Decline in native species presence and abundance, potentially to the point of extirpation of some species.
- Shift in community composition: common species, generalists or invasive species increase, while uncommon species or specialists decrease.
- Vegetation becomes less abundant (reduced density and cover) and has reduced stature.
- Overall decline in species richness, biodiversity, and ecosystem functions.

2.6 DOG IMPACTS

Dogs negatively affect wildlife in terrestrial recreation areas or parks by: (a) causing direct mortality of wildlife through predatory action; (b) disrupting normal behavior, which can affect population parameters (e.g., reproductive success); and (c) transmitting pathogens and diseases (Riley et al. 2004, Weston et al. 2014). These impacts can be significant, especially to special-status species, which are generally more prone to population decline (Weston et al. 2014).

Because many wildlife species view dogs as a threat, even leashed dogs can have adverse effects on wildlife. The scent of dogs repels wildlife and thus the negative effects persist even after the dogs have gone (Kats and Dill 1988). Banks and Bryant (2007) showed that dog walking in woodland caused a 35% reduction in bird diversity and a 41% reduction in bird abundance. Based on their review of 133 publications, Weston et al. (2014) reported: "[s]tudies presenting results on how wildlife reacts to dogs report that flushing behavior of mammals and birds is usually greater when pedestrians are accompanied by a dog compared to pedestrians walking alone." Amphibians, especially during the breeding season, are susceptible to mortality caused when dogs run through the water at egg deposition sites. A pertinent local example of one of the special-status amphibians present at Tesla is the Foothill Yellow-legged Frog in the Mt. Tamalpais watershed. The Marin Municipal Water District found it necessary to implement an extensive protection program involving docents and fencing to restrict access by dogs and dogwalkers to the creeks where the frogs reproduce (Garcia and Associates 2020). Given the diffuse and numerous locations of ponds and streams where protected species of amphibians lay eggs at Tesla, a similar program would be unwieldy and create its own impacts.

2.7 PRECAUTIONARY APPROACH TO CLASSIFICATION DECISION

The precautionary principle counsels that when there is scientific uncertainty about the effects of an action or when the effects are irreversible, decision-makers adopt precautionary measures to avoid harm (Persson 2003). The precautionary principle has a history of articulation and acceptance in the fields of biodiversity, conservation, and climate change science since the early 1990's (O'Riordan and Cameron 1994, Cooney and Dickson 2005, Geiling 2020). As reviewed above, the scientific literature documents the mechanisms by which recreational activities along with maintenance of associated facilities create significant adverse impacts to the biological and physical environment.

Commonly used management approaches to address impacts from more intensive recreational uses and development are insufficient in themselves as the research presented in this chapter shows[23]:

- Best Management Practices (BMPs) during design, construction, maintenance, and park use, although aimed at mitigation, do not sufficiently protect sensitive species and cultural resources from facilities and visitor impacts (Marion et al. 2016, Lucas 2020a).

[23] Under §9 (a)(1)(B), of the Federal Endangered Species Act. (7 U.S.C. §136, 16 U.S.C. 1531 et seq.), "it is unlawful for any person subject to the jurisdiction of the United States to "take" any such species [i.e., federally listed species]." Avoiding "take" associated with more intensive recreation activities and infrastructure would be difficult, if not impossible, at Tesla given the wide distribution of listed species.

- Visitor compliance with authorized use restrictions requires ongoing and consistent public education and extensive agency enforcement and staffing (Greer et al. 2017).
- Remediation efforts or adaptive management post-impact requires sophisticated monitoring of use patterns and impacts (Hadwen and Pickering 2007). Remediation after damage has taken place is often temporary or incomplete and impactful in itself (Lucas 2020a, Trombulak and Frissell 2000).
- Creation of no-use buffer zones around point locations of species occurrences, nests, breeding ponds, special status plants, and plant communities, would not be compatible with high-intensity uses because the distribution of sensitive taxa at Tesla spans the entire 3,100 acres, often in overlapping layers (see Figures 2, 6, 8, 9 and Appendix 1).

The extent and timeliness to which BMPs, compliance and remediation steps can be implemented depend on budgets and staffing. State Parks' relies in part on General Fund allocations, and funding support is subject to the state budget, which varies based on demands and the economy. In March 2024, the Santa Monica Daily Press reported "the California Department of State Parks and Recreation is grappling with a deferred maintenance backlog totaling more than $1 billion" (SMDP 2024).

Because classification directs the types and intensity of allowed uses, which in turn lead to environmental impacts, the classification decision is the critical decision step. This is demonstrated by California State Parks' reclassification of Armstrong Redwoods State Natural Reserve from a State Park to a Reserve after a "greater understanding of its ecological significance prompted a more protective management of the resource" (CDPR 2024b). Following the precepts of the precautionary principle, and given the classification options available, classification of Tesla as a State Reserve would afford the highest level of protection for Tesla's biological resources, while still providing opportunities for low-intensity recreation, education, and enjoyment.

Given the potential impacts to special-status species and ecosystem functions, known environmental impacts from recreational activities and facilities, development and maintenance, and limitations of mitigation measures, classification as a State Reserve offers the best option to minimize impacts to Tesla's exceptional biological resources and ecological landscape.

2.8 CHAPTER 2 - SUMMARY

Chapter Two summarizes the documented impacts to physical and biological resources resulting from recreational activities, facilities development, and human disturbance. These impacts range from:

- Alteration of the physical environment.
- Degradation of water quality.
- Changes in the hydrological regime of creeks, ponds and wetlands.
- Erosion and mobilization of soils.
- Introduction of diseases and non-native invasive species.
- Disruptions of animal behavior and mortality.
- Alteration of plant and wildlife communities.

- Extirpation of local populations of rare or listed species.

These impacts can and do result in irreversible, damaging impacts to the physical environment, that will in turn result in alteration and degradation of biological resources. Commonly used management strategies are not sufficient to mitigate the direct, indirect, and cumulative adverse impacts of recreational activities and development.

Typically, the identification and analysis of impacts resulting from proposed types of recreation and infrastructure in the State Park system are left to the later planning phases when a general plan and specific projects are developed. For Tesla, review of biologic resource impacts from potential uses should not be deferred because classification determines the types and intensity of allowed uses from which subsequent specific planning follows.

The Reserve classification under California Public Resources Code Section 5019.65 exists to provide a higher level of protection to exemplary natural lands within the state, such as Tesla. Tesla's exceptional biological resources and integrated ecosystem warrant applying precaution to the classification decision and choosing the option that will cause the least harm.

Given Tesla's exceptional biological resources presented in Chapter One, and empirical evidence of the adverse effects of recreation and recreational development on those resources presented in this Chapter, classification of Tesla as a State Reserve pursuant to the California Public Resources Code Section 5019.65 would be most appropriate.

CONCLUSION

Tesla has been identified as a top biodiversity hotspot for plants and wildlife within the State. Numerous studies and planning assessments identify the Tesla area and the biological resources found in Tesla as top conservation priorities. Tesla has an abundance of rare, candidate, federal and state listed species, and sensitive habitats. It spans a critical linkage habitat corridor in the Northern Diablo Range, is a botanical priority protection area, and provides essential refuge for climate change impacts. These features make Tesla an irreplaceable natural resource.

Studies document that recreational development and activities have significant negative impacts on wildlife, plants and physical resources. The mechanisms by which sensitive taxa and the ecological environment can be harmed by recreational development and activities are numerous. The multiple stressors from more intensive recreational activities and development would amplify the environmental stressors of severe droughts, fire, and intense storms as climate change continues. The abundance and diversity of sensitive biological resources and ecosystem features on Tesla's 3,100-acre natural landscape make best management practices (BMPs), user compliance, enforcement, and even spatial avoidance in itself, insufficient strategies to mitigate the adverse direct, indirect, and cumulative impacts of recreational development.

The classification determined for Tesla by the California Department of Parks and Recreation Commission directs the types and intensity of allowed uses. Classification is, therefore, a critical decision relative to protecting — or harming — Tesla's natural environment. The precautionary principle of conservation underpins the reasons for protecting Tesla from the predictable, as well as the unpredictable, negative consequences of more intensive recreational uses and development. The classification that will lead to the least environmental harm should be selected given Tesla's extraordinary biological resources and ecological values.

Unlike other established state park lands where protective actions are limited by historical or existing uses, Tesla has not had public use and will be a new unit of the State Parks system. The legacy uses that constrain planning decisions in other units of the State Park system do not apply here.

Given the statutory classification options available for Tesla, classification as a State Reserve is the best option to protect Tesla's irreplaceable biological (and cultural) resources. Reserve classification minimizes the impacts of recreational development and use, while also providing for low-intensity recreation, enjoyment and education for the public.

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APPENDIX

Appendix 1. EBCNPS Locally Rare Watchlist (List B and C) Species in Tesla

MAP AND TABULAR SYNOPSIS

Appendix 1.

EBCNPS Locally Rare Watchlist (List B and C) Species in Tesla

Appendix 1. East Bay Chapter California Native Plant Society (EBCNPS) Locally Rare Watchlist (List B and C) Plant Species detected in Tesla and nearby.

Scientific Name	Common Name	Locally Rare Rank[a]	Source of Location Data
Amaranthus blitoides	procumbent pigweed	C	MIG 2021
Amaranthus californicus	Californian amaranth	B	not documented, but potential to occur
Ancistrocarphus filagineus	woolly fishhooks	B	Kramer 2016
Aphyllon purpureum	naked broomrape	C	Ecosystems West 2004
Apiastrum angustifolium	wild celery	B	Ecosystems West 2004
Arctostaphylos glauca	bigberry manzanita	C	MIG 2021, Ecosystems West 2004
Astragalus asymmetricus	San Joaquin milkvetch	C	MIG 2021, Ecosystems West 2004
Atriplex fruticulosa	ballscale	B	Kramer 2016, Ecosystems West 2004
Blepharizonia laxa	big tarplant	B	Ecosystems West 2004
Brickellia californica	California brickellbush	C	MIG 2021, Ecosystems West 2004
California macrophylla	round-leaved filaree	B	Kramer 2016, Ecosystems West 2004
Chorizanthe membranacea	pink spineflower	C	MIG 2021
Cirsium cymosum var. *cymosum*	peregrine thistle	B	Kramer 2016
Collinsia sparsiflora var. *collina*	spinster's blue eyed Mary	C	MIG 2021, Ecosystems West 2004
Deinandra lobbii	threeray tarweed	C	MIG 2021
Delphinium decorum subsp. *decorum*	coast larkspur	B	Kramer 2016, Ecosystems West 2004
Delphinium hesperium subsp. *hesperium*	western larkspur	B	MIG 2021, Ecosystems West 2004
Delphinium nudicaule	red or orange larkspur	C	MIG 2021
Dudleya cymosa subsp. *paniculata*	spreading dudleya	C	Kramer 2016
Elymus multisetus	big squirreltail	C	MIG 2021
Eriogonum angulosum	angle-stem wild buckwheat	B	Ecosystems West 2004
Eriogonum gracile var. *gracile*	slender woolly wild buckwheat	C	MIG 2021, Ecosystems West 2004
Eriogonum wrightii var. *trachygonum*	rough-node bastard-sage	B	Calflora 2024
Euphorbia serpillifolia subsp. *serpillifolia*	thyme-leaved spurge	B	not documented, but potential to occur
Forestiera pubescens	desert olive	B	MIG 2021, Ecosystems West 2004
Gilia achilleifolia subsp. *achilleifolia*	California gilia	C	MIG 2021, Ecosystems West 2004
Gilia capitata subsp. *staminea*	bluehead gilia	B	MIG 2021, Ecosystems West 2004

Scientific Name	Common Name	Locally Rare Rank[a]	Source of Location Data
Gilia tricolor subsp. *diffusa*	bird's-eye gilia	B	MIG 2021, Ecosystems West 2004
Gruvelia pusilla	little pectocarya	B	Kramer 2016, Ecosystems West 2004
Gutierrezia californica	California matchweed	C	MIG 2021, Ecosystems West 2004
Helianthus californicus	California sunflower	C	MIG 2021, Ecosystems West 2004
Hesperolinon californicum	California dwarf flax	B	Kramer 2016, Ecosystems West 2004
Heterotheca sessiliflora subsp. *bolanderi*	sessileflower false goldenaster	C	MIG 2021
Holocarpha obconica	San Joaquin tarweed	B	MIG 2021, Ecosystems West 2004
Juniperus californica	California juniper	C	MIG 2021, Ecosystems West 2004
Koeleria macrantha	June grass	C	MIG 2021, Ecosystems West 2004
Lepidium dictyotum	alkali pepper-grass	B	Ecosystems West 2004
Leptosiphon androsaceus	false babystars	C	Kramer 2016, Ecosystems West 2004
Lithophragma parviflorum var. *parviflorum*	prairie star	B	Kramer 2016, Ecosystems West 2004
Lomatium californicum	California lomatium	C	MIG 2021, Ecosystems West 2004
Lomatium nudicaule	pestle lomatium	C	Kramer 2016
Lonicera subspicata var. *denudata*	Santa Barbara honeysuckle	C	MIG 2021, Ecosystems West 2004
Malacothamnus fremontii	Fremont's bushmallow	C	MIG 2021, Ecosystems West 2004
Melica californica	California melic	C	Kramer 2016, Ecosystems West 2004
Monolopia major	cupped monolopia	B	Kramer 2016, Ecosystems West 2004
Montia fontana	water chickweed	C	Kramer 2016, Ecosystems West 2004
Myriopteris intertexta	coastal lip fern	B	Kramer 2016, Ecosystems West 2004
Navarretia mellita	honey-scented navarretia	C	not documented, but potential to occur
Navarretia pubescens	downy pincushionplant	C	MIG 2021, Ecosystems West 2004
Packera breweri	Brewer's ragwort	C	MIG 2021, Ecosystems West 2004
Pellaea mucronata var. *mucronata*	birdfoot cliffbrake	C	MIG 2021
Perideridia californica	California yampah	C	MIG 2021, Ecosystems West 2004
Phacelia ciliata	Great Valley phacelia	B	MIG 2021, Ecosystems West 2004
Phacelia tanacetifolia	lacy phacelia	B	MIG 2021, Ecosystems West 2004
Plagiobothrys canescens var. *canescens*	valley popcornflower	C	MIG 2021
Plagiobothrys trachycarpus	rough-nutlet popcornflower	C	Kramer 2016, Ecosystems West 2004
Platanus racemosa	western sycamore	C	MIG 2021, Ecosystems West 2004
Plectritis ciliosa	longspur seablush	C	MIG 2021, Ecosystems West 2004
Quercus lobata	valley oak	B	MIG 2021, Ecosystems West 2004

Scientific Name	Common Name	Locally Rare Rank[a]	Source of Location Data
Rhamnus crocea	spiny redberry	C	MIG 2021
Ribes malvaceum var. *malvaceum*	chaparral currant	C	MIG 2021, Ecosystems West 2004
Ribes quercetorum	oakwoods gooseberry	B	MIG 2021, Ecosystems West 2004
Rumex californicus	toothed willow dock	B	MIG 2021, Ecosystems West 2004
Salvia columbariae	chia	C	MIG 2021, Ecosystems West 2004
Scutellaria tuberosa	Danny's skullcap	C	MIG 2021, Ecosystems West 2004
Stachys albens	whitestem hedgenettle	B	MIG 2021, Ecosystems West 2004
Stebbinsoseris heterocarpa	grassland silverpuffs	B	MIG 2021, Ecosystems West 2004
Stipa cernua	nodding needle grass	C	MIG 2021, Ecosystems West 2004
Stipa pulchra	purple needle grass	C	MIG 2021, Ecosystems West 2004
Trifolium albopurpureum	rancheria clover	C	MIG 2021, Ecosystems West 2004
Trifolium depauperatum var. *depauperatum*	dwarf sack clover	B	MIG 2021, Ecosystems West 2004
Trifolium oliganthum	few-flowered clover	C	Kramer 2016, Ecosystems West 2004
Tropidocarpum gracile	slender tropidocarpum	B	Kramer 2016, Ecosystems West 2004
Yabea microcarpa	false carrot	B	MIG 2021, Ecosystems West 2004

[a] EBCNPS Locally Rare Ranks

B = Species known from 7 to 12 current populations in Alameda and Contra Costa counties (or up to 16 if meet other multiple criteria, have aging populations with minimal regeneration).

C = Species known from 10 to 25 current populations in Alameda and Contra Costa counties, but potential threats (or, if more than 25 populations, still have potential threats).

MAP AND TABULAR SYNOPSIS

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

This Map and Tabular Synopsis is an extract of Maps (Figures) and Tables from the *Reserve Classification of California State Parks Alameda-Tesla Property based on an Assessment of Biological Resources and the Effects of Recreational Activities on those Resources - July 1, 2024.*

These Maps (Figures) and Tables document just *some* of the exceptional and rare biodiversity present in Tesla. For example, Figure 2 depicts *less than half* of all rare plants and special-status animals; even so Figure 2 shows that the sensitive resources which must be protected cover the entire 3,100 acre site in dense, overlapping layers. Tesla's biological resources include, in part:

- 51 vertebrate and 2 invertebrate special-status plants and animals (threatened, endangered, candiate, or other protected status). Of these 53 special-status plants and animals, 3 have suitable habitat in Tesla and documented occurances nearby, although not yet documented on Tesla.
- 45 special-status (rare) plants, with an additional 74 locally rare watchlist plants detected, or expected in Tesla based on nearby occurrances.
- 9 sensitive natural communities.
- Critical Linakge Habitat Corridor for wildlife and plants that spans the entire width of Tesla.
- Federally Designated Critical Habitat for Alameda Whipsnake (state and federally threatened) and California Red-legged Frog (federally threatened) which covers almost all of the 3,100-acre site.
- Corral Hollow Botanical Priority Protection Area designated by the East Bay Chapter of the California Native Plant Society which overlays almost all of Tesla.
- Audubon Important Bird Area which encompasses Tesla, and includes Golden Eagle nesting and forgaging territories.
- Tule elk satellite herd which occupies Tesla and mountain lions that roam its natural landscape.
- Identification of Tesla area as a Top Conservation Priority area in the entire state based on independent research of botanical phylogentic traits and the CDFW biodiversity assessment.

Tesla classified as a Reserve pursuant to PRC 5019.65 would provide the best classification option to prevent and minimize harm to state and federally listed species and other special-status species, conserve needed and irreplaceable biodiversity, protect a vital habitat connectivity corridor, and preserve the intact ecosystem supporting essential onsite and regional biological functions. Tesla classified as a Reserve would also strongly serve public policy objectives for 30 x 30, biodiversity and climate resiliency protection, and for Native American equity and restorative justice. A Tesla Reserve would best meet the full range of regional and state priority objectives while also providing low-intensity public access for all, for enjoyment and education around its natural and cultural landscape.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

The Maps (Figures) and Tables in this Synopsis are listed below. Figure and Table numbers in this Synopsis correspond to identification numbers in full Assessment and are in the order presented in the Assessment.

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Figure 2. Special-status Species and Habitat Occurances on Tesla
Figure 3. Tesla Area Phylogenetic Biodiversity
Figure 4. Corral Hollow Botanical Priority Protection Area (BPPA)
Figure 5. CDFW ACE Ecoregion Biodiversity Weights
Figure 6. Critical Linkage Habitat Corridor running through Tesla
Figure 7. ALOSC Conservation Prioritization Map
Figure 8. Vegetation Types and Sensitive Natural Communities on Tesla
Figure 9. Special-status (Rare) Plants and Soil Types on Tesla

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Table 3. Special-status (Rare) Plants documented on Tesla
Table 4. Special-status Animals detected on Tesla
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MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

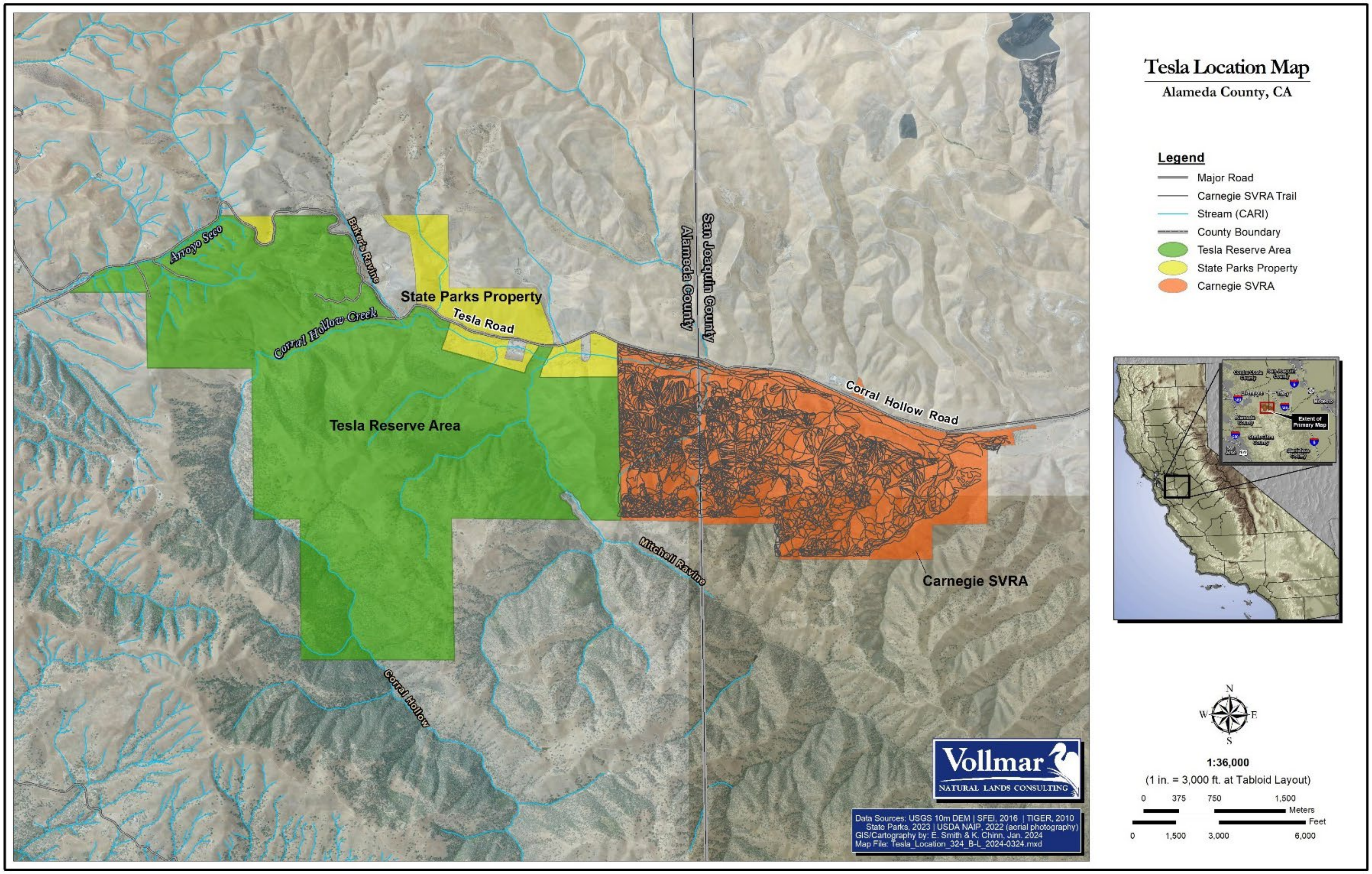

Figure 1. Geographic location of Tesla relative to CSVRA and other adjoining State Parks properties.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

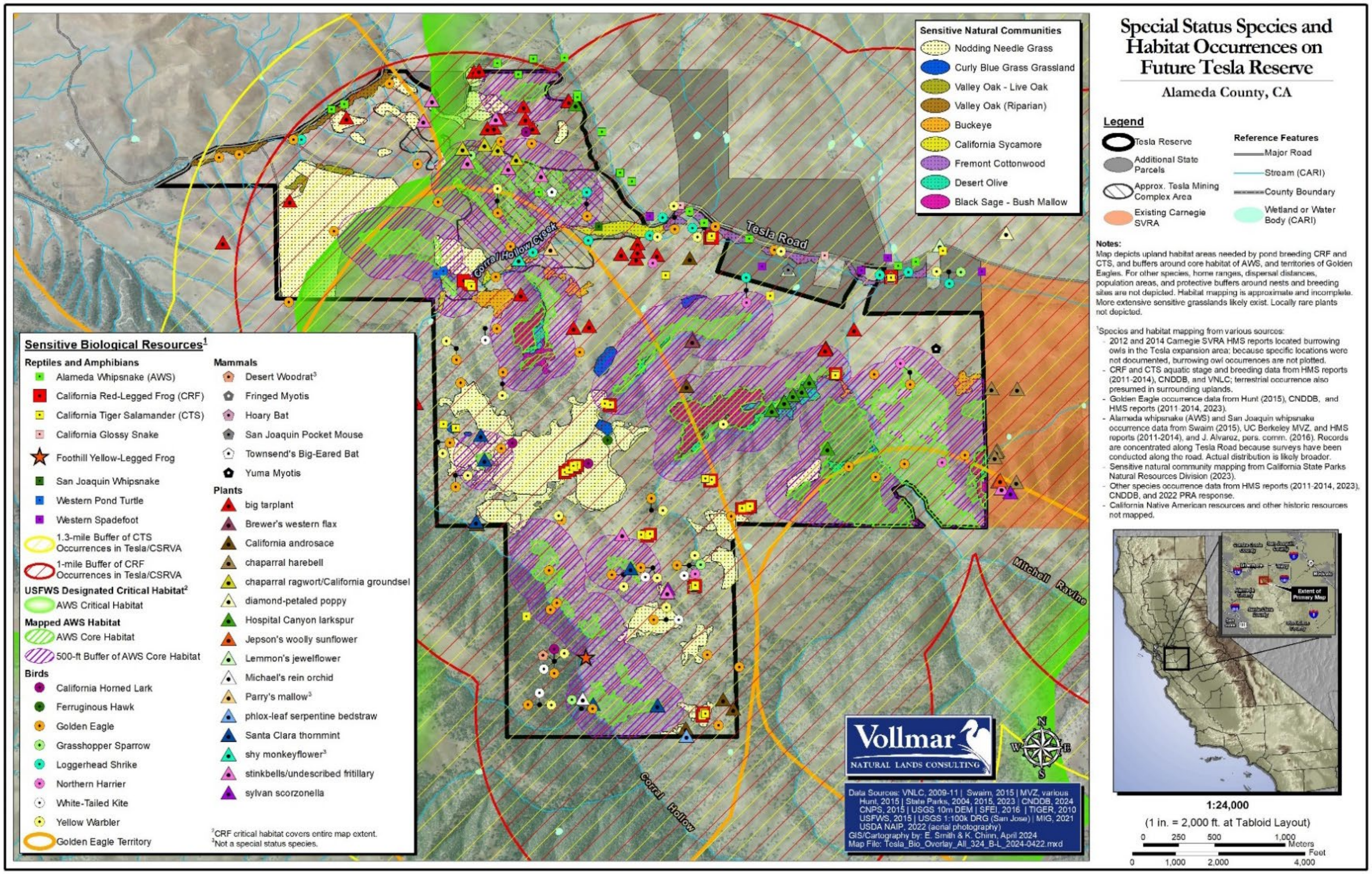

Figure 2. Spatial distribution and juxtaposition of *some* of the special-status species and habitats detected at Tesla. Existing data demonstrate these sensitive resources encompass the entire site.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

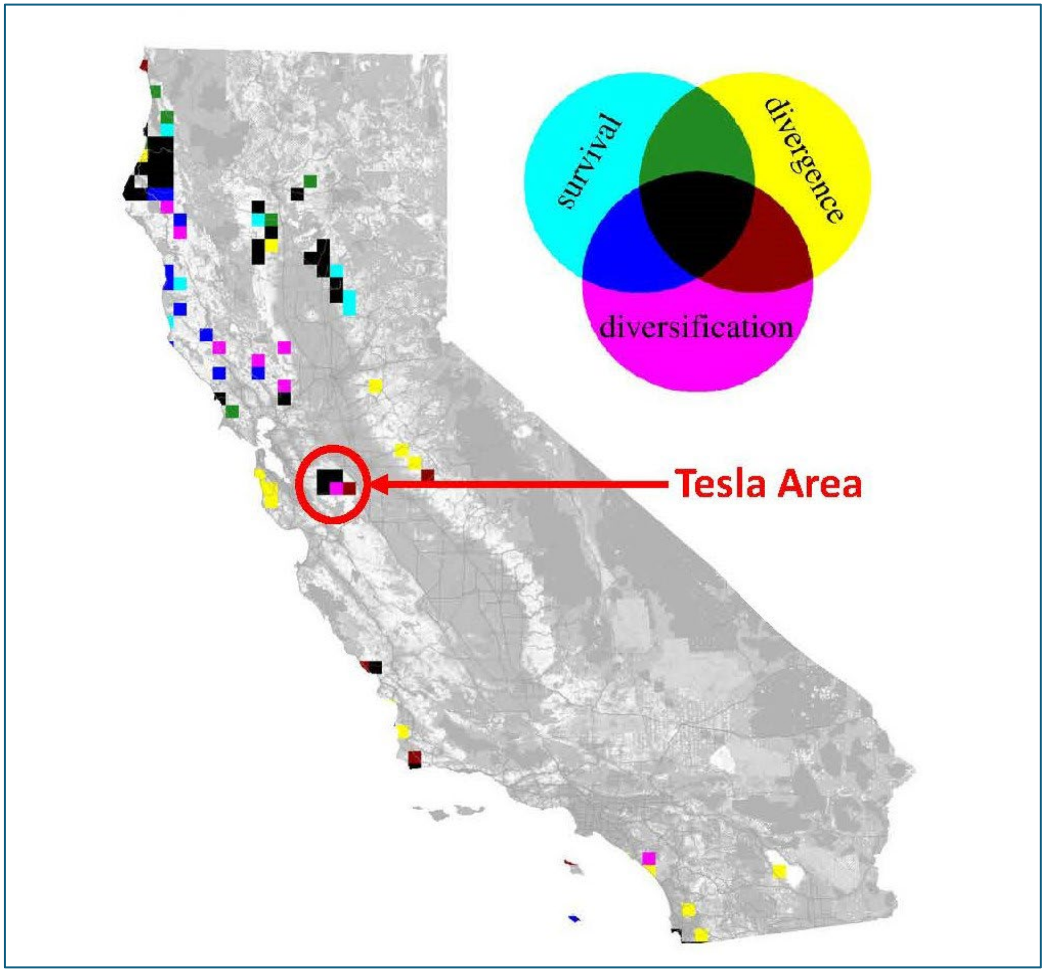

Figure 3. An independent study by UC Berkeley scientists using advanced phylogenetic biodiversity metrics found that the area where Tesla is located is ranked high in all three metrics of phylogenetic diversity, making it a top conservation priority for California. Adapted with permission from Kling et al. (2018).

(Kling MM, Mishler BD, Thornhill AH, Baldwin BG, Ackerly DD. 2018. Facets of phylodiversity: evolutionary diversification, divergence, and survival as conservation targets. Philosophical Transactions of the Royal Society B. 374:20170397.)

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

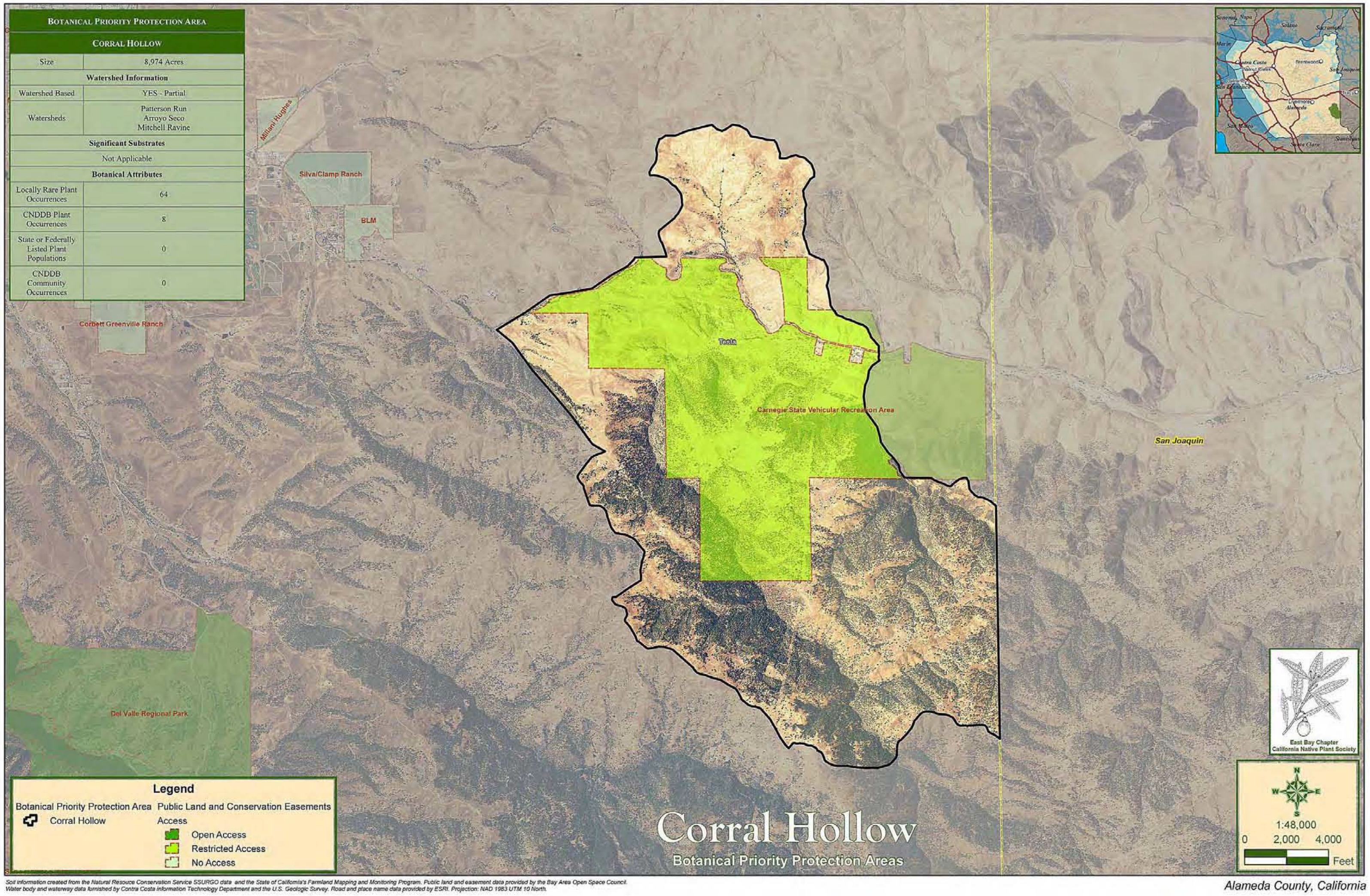

Figure 4. Corral Hollow Botanical Priority Protection Area (BPPA) in relation to Tesla. Almost all of Tesla is contained within the BPPA.

[Excerpted from the *Corral Hollow Botanical Priority Handbook*, East Bay Chapter of the California Native Plant Society]

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

Figure 5. Hexagons (in yellow) within the CDFW Central Valley Coast Ranges Ecoregion that have Ecoregion Biodiversity Weights of at least 0.83. The abundance of hexagons with very high Ecoregion Biodiversity Weights in the Corral Hollow area where Tesla is located demonstrates it is a top biodiversity hotspot.

Figure 5, which is adapted from the CDFW ACE program online application, depicts areas within the Central Valley Coast Ranges Ecoregion that have Ecoregion Biodiversity Weights of at least 0.83. The ACE Project provides the "Ecoregion Biodiversity Weight" of each hexagon. The Ecoregion Biodiversity Weight is defined as the "[a]ggregated total of ecoregionally normalized biodiversity values including native species richness, rare species richness, and rarity weighted index" (CDFW 2018a).

Over 93% of Tesla lies within hexagons that have Ecoregion Biodiversity Weights ranging from 0.83 to 0.92. These weights greatly exceed those of nearby public lands, including the Corral Hollow Ecological Reserve (0.69), Lake Del Valle State Recreation Area (range 0.58 to 0.63), Marsh Creek State Park (range 0.43 to 0.72), and Henry W. Coe State Park (range 0.27 to 0.58). Indeed, outside of the Corral Hollow area, there are only three places within the Central Valley Coast Ranges Ecoregion that have weights of at least 0.83: (1) two hexagons south of Hollister (weights 0.88 and 0.90); (2) two partial segments of a hexagon at Fort Hunter Liggett (weights 0.84 and 0.85); and (3) one hexagon near Santa Margarita (weight 0.86).

See also related Table 1 below.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

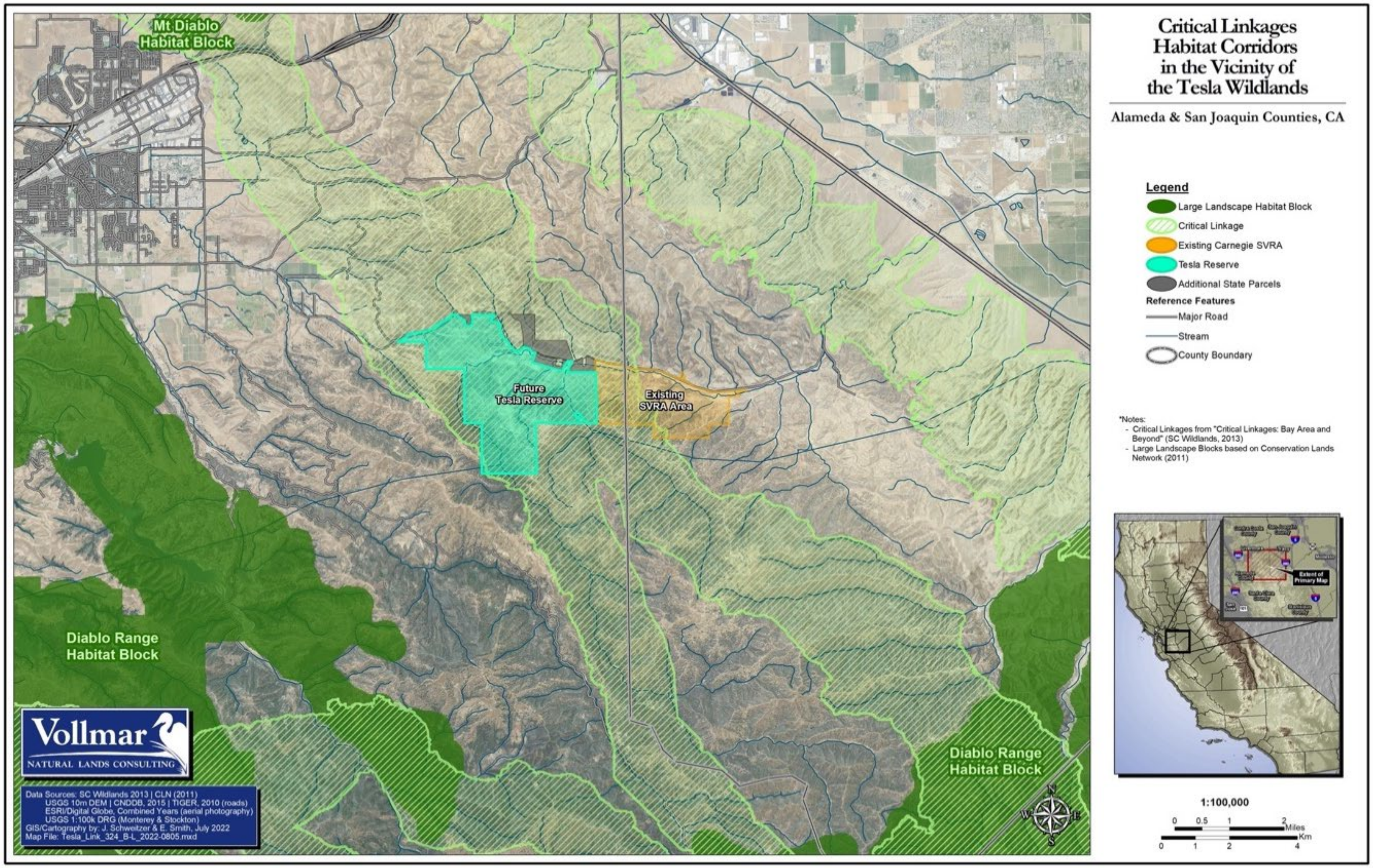

Figure 6. Critical Linkage Habitat Corridor running through Tesla between Mount Diablo and the greater Diablo Range. Damaging impacts from CSVRA make the Tesla Wildlands essential to maintaining a viable movement corridor.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

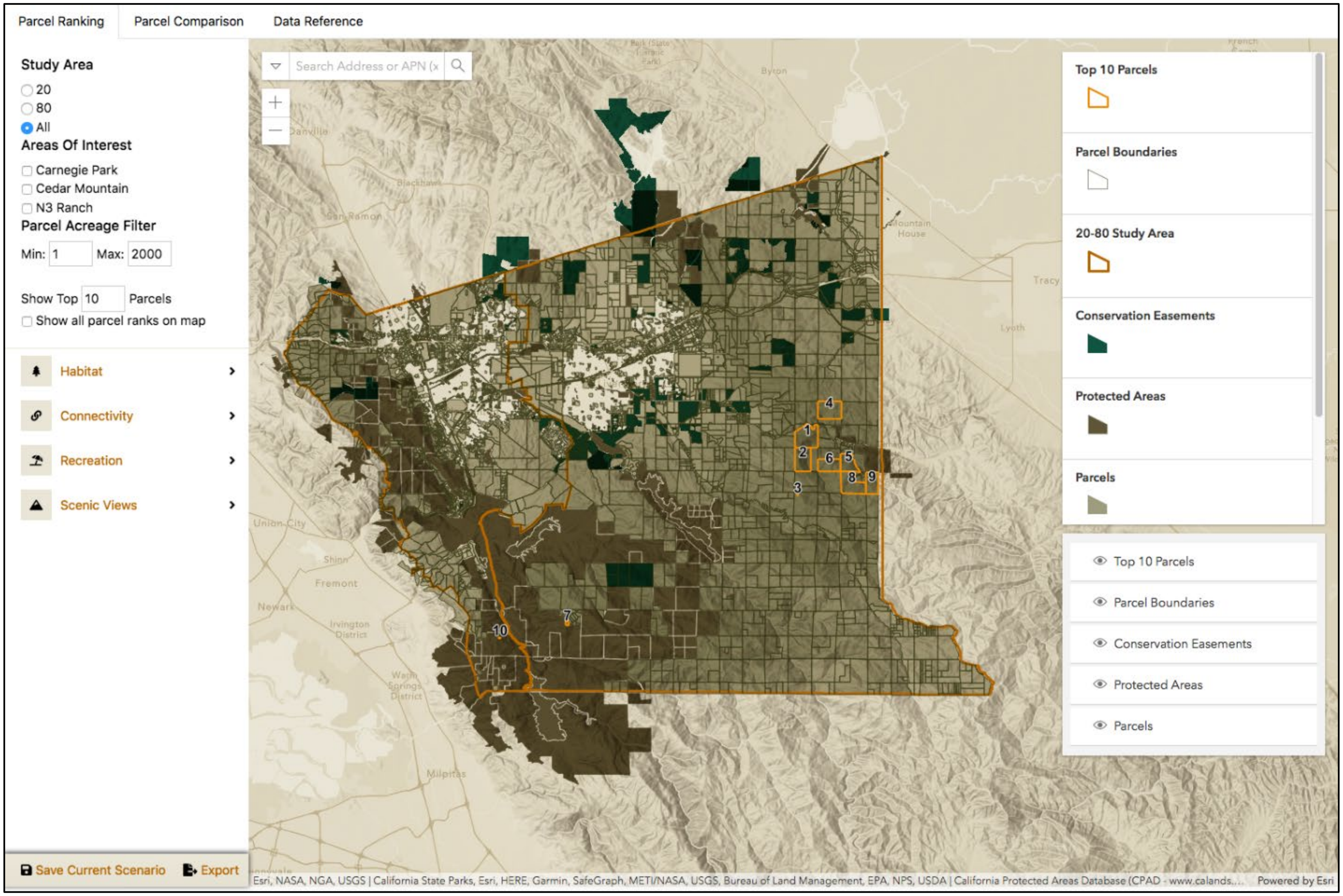

Figure 7. ALOS program conservation prioritization map depicts that using equal weight ranking most of the highest ranked parcels for conservation in eastern Alameda County are within or surrounding Tesla.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

Figure 7 is a map from the ALOS online parcel ranking tool (Butsic and Moanga 2019). **Using equal weight ranking, the parcel ranking tool illustrates that 7 of the top 10 highest ranked parcels for conservation in eastern Alameda County are within, or in areas surrounding, Tesla. If sensitive species and connectivity are ranked as a "2" instead of a "1,"** ***all*** **top 10 parcels are in or around Tesla.** The ALOS program conservation prioritization mapping tool provides further landscape-level evidence that Tesla should be targeted for conservation based on the presence of sensitive species and habitat connectivity, in addition to visual (scenic) quality and non-motorized recreation opportunities.

The Altamont Landfill Open Space (ALOS) Fund was established to mitigate the loss of habitat for native plants and animals and scenic resources in Eastern Alameda County through the acquisition of sensitive lands in fee or by permanent conservation easements. To identify target lands for conservation, the ALOS Committee engaged scientists at the University of California, Berkeley and the UC Division of Agriculture and Natural Resources to create a parcel-ranking tool for eastern Alameda County. The parcel-ranking tool, which can weight ranking factors such as sensitive species and connectivity, is based on publicly available biological assessments and maps, and it ranks undeveloped parcels of 1 acre or larger that are not already protected (Butsic and Moanga 2019).

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

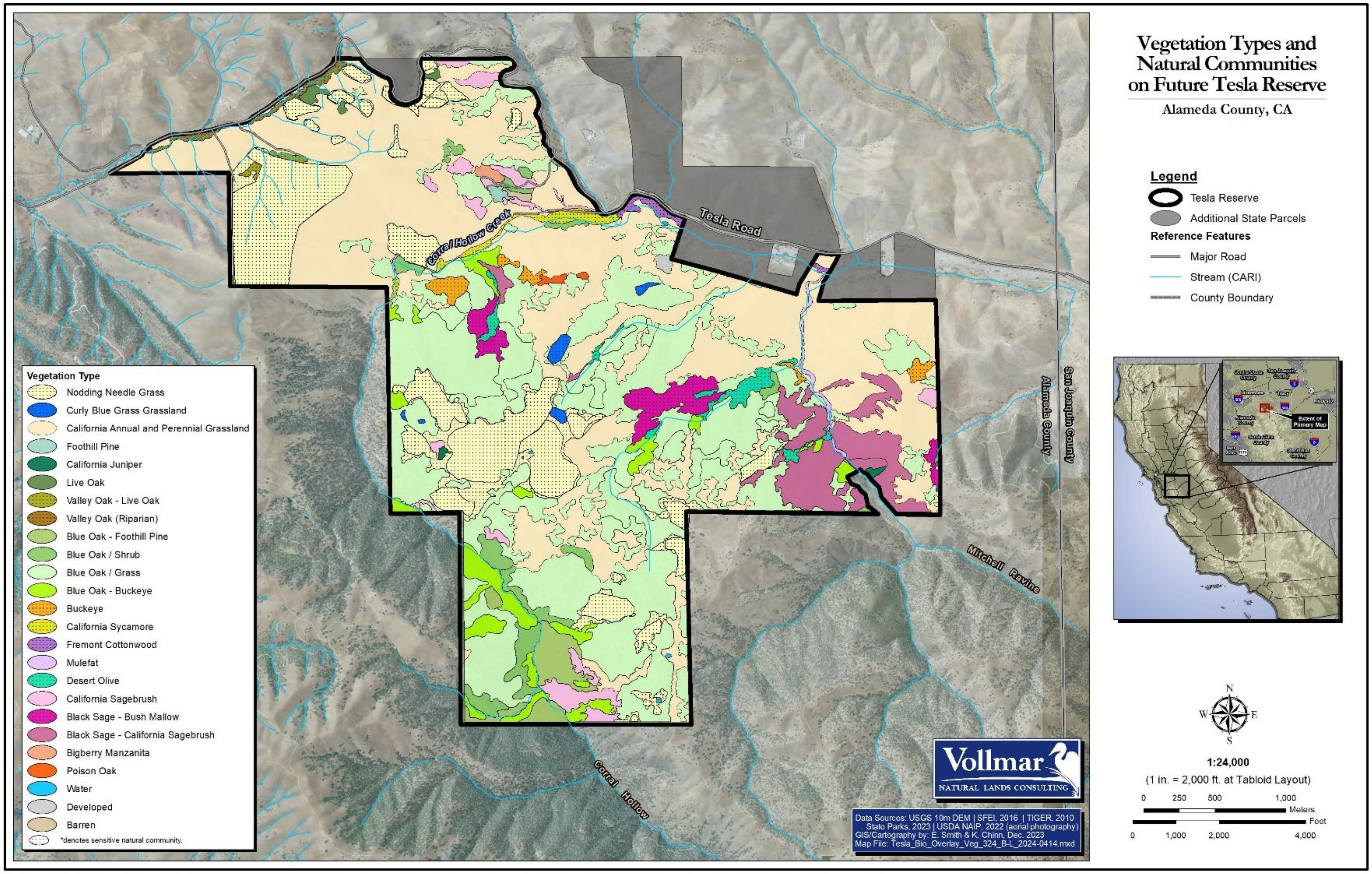

Figure 8. Vegetation Types and Sensitive Natural Communities documented on Tesla.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

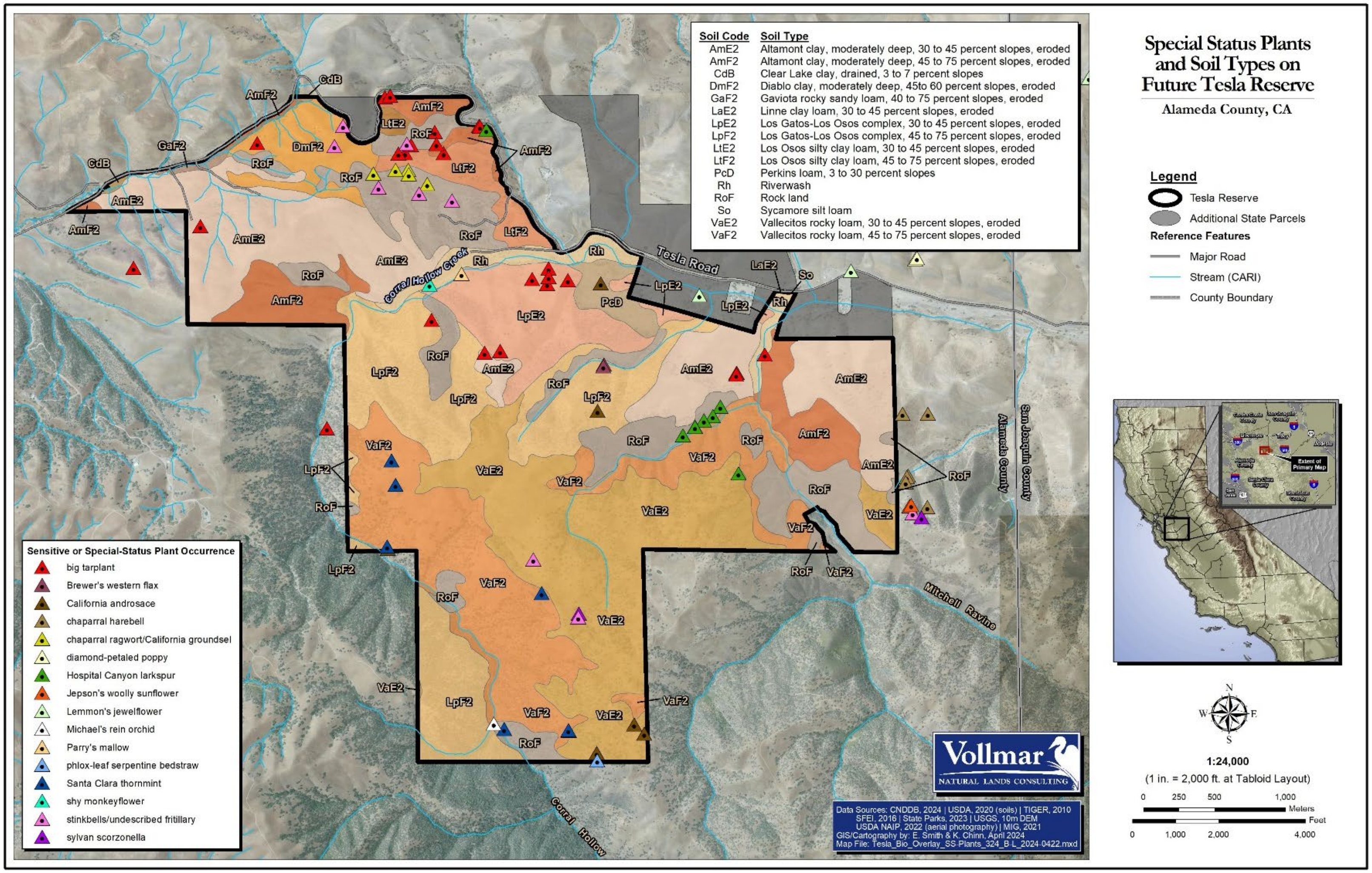

Figure 9. Special-status (Rare) Plants and Soil Types documented on and immediately adjacent to Tesla.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

Table 1. CDFW ACE Biodiversity Ranks for Tesla on a scale of 1 (lowest) to 5 (highest).

Metric[a] [BIOS dataset number][b]	Biodiversity Rank
Species Biodiversity [ds2769]	**5**
Terrestrial Biodiversity [ds2739]	5
Terrestrial Native Species Richness [ds2703]	5 (predominately) and 3
Terrestrial Rare Species Richness [ds2709]	5
Terrestrial Irreplaceability [ds2715]	5
Aquatic Biodiversity [ds2768]	5
Aquatic Native Species Richness [ds2743]	4
Aquatic Rare Species Richness [ds2748]	5
Aquatic Irreplaceability [ds2752]	4

[a] *Biodiversity* incorporates three measures of biodiversity: 1) native species richness, 2) rare species richness, and 3) irreplaceability.
Native Species Richness represents a count of the total number of native terrestrial species potentially present in each hexagon based on species range and distribution information.
Rare Species represents a count of the total number of rare terrestrial species potentially present in each hexagon based on documented species occurrence information.
Irreplaceability represents the relative importance of each hexagon based on the uniqueness of habitat areas present for California rare endemic and near-endemic species.
[b] See CDFW 2022b.

CDFW's Areas of Conservation Emphasis Project (ACE) uses the best available scientific information to assess biodiversity throughout the entire State of California (CDFW 2022a). The ranks range from 1 to 5 for terrestrial ecosystems within each USDA recognized ecoregion of the State using a 2.5 square mile-hexagon grid format. For aquatic ecosystems, biodiversity ranks are assigned at the level of sub-watershed (i.e., HUC-12).

ACE evaluates: (1) native species richness, which represents overall native diversity of all species in the state, both common and rare; (2) rare species richness; and (3) irreplaceability, which is a weighted measure of endemism. The area within Tesla has the highest possible rank in all three of these categories (Gogol-Prokurat 2018, 2019, 2020, 2021). **In comparison to other sites within the same ecoregion (or watershed), Tesla ranks highest (i.e., top quantile) in terms of terrestrial biodiversity, aquatic biodiversity, and overall species biodiversity.**

See also related Figure 5 above.

Table 2. Sensitive Natural Communities documented on Tesla.

Vegetation Types based on A Manual of California Vegetation [a]		**SNC name in Figures 2 and 8 [b]**	**State Rank [c]**	**Data sources [d]**	**Approximate acres [d]**	**Mapping source [e]**
Common name	**Scientific name**					
Grasslands						
Nodding Needle Grass Association (under the Needle grass–Melic Grass Grassland Alliance)	*Nassella cernua* Association (under the *Nassella* spp.–*Melica* spp. Herbaceous Alliance)	Nodding Needle Grass	S3	MIG 2021 (*Nassella cernua* association), CSP 2023 (*Nassella cernua* Association)	345	MIG 2021 data (Figures 5a-5e, pages 14–16)
One-sided Bluegrass–Mat Muhly–Douglas' Sedge Moist Meadow	*Poa secunda–Muhlenbergia richardsonis–Carex douglasii* Herbaceous Alliance	Curly Blue Grass Grassland	S3	MIG 2021	9	
Woodlands						
Valley Oak–Live Oak Association (under the Valley Oak Woodland and Forest Alliance)	*Quercus lobata–Quercus agrifolia* Woodland Association (under the *Quercus lobata* Woodland Alliance)	Valley Oak –Live Oak	S3	AECOM 2012, CSP 2023	10	CSP 2023 data (Figure 1, Table 1)
Valley Oak Riparian Forest and Woodland	*Quercus lobata* Riparian Forest and Woodland Alliance	Valley Oak (Riparian)	S3	AECOM 2012, CSP 2023	13	
California Sycamore–Coast Live Oak Riparian Woodlands	*Platanus racemosa–Quercus agrifolia* Woodland Alliance	California Sycamore	S3	CSP 2023	17	
California Buckeye Groves	*Aesculus californica* Forest and Woodland Alliance	Buckeye	S3	CSP 2023	20	
Fremont Cottonwood Forest and Woodland	*Populus fremontii–Fraxinus velutina–Salix gooddingii* Forest and Woodland Alliance	Fremont Cottonwood	S3.2	AECOM 2012, CSP 2023	19	
Shrublands						
Basket bush–River Hawthorn–Desert Olive Patches	*Rhus trilobata–Crataegus rivularis–Forestiera pubescens* Shrubland Alliance	Desert Olive	S3.2?	AECOM 2012, CSP 2023	26	CSP 2023 data (Figure 1, Table 1)

Table 2 (continued) **Vegetation Types based on A Manual of California Vegetation** [a]		**SNC name in Figures 2 and 8** [b]	**State Rank** [c]	**Data sources** [d]	**Approximate acres** [d]	**Mapping source** [e]
Common name	**Scientific name**					
Black sage–Bush mallow Association (under the Black Sage Scrub Alliance)	*Salvia mellifera–Malacothamnus fasciculatus* Shrubland Association (under *Salvia mellifera* Shrubland Alliance)	Black Sage–Bush Mallow	S3	CSP 2023	53	CSP 2023 data (Figure 1, Table 1)

[a] Sensitive Natural Communities are typed to alliance or association level based on the online edition of A Manual of California Vegetation (CNPS 2023).

[b] Name of Sensitive Natural Community (SNC) as mapped on Figures 2 and 8.

[c] State Ranks for Sensitive Natural Communities (CDFW 2023):

S3 = Vulnerable – at moderate risk of extirpation in California due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors. Denoted a sensitive natural community by CDFW.

S#? = Denotes inexact numeric rank due to insufficient samples over the full expected range.

0.2 = Threatened

[d] Data sources used to identify Sensitive Natural Communities, including approximate acreage of SNC.

[e] Data sources utilized for mapping.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

Table 3. Special-status (Rare) Plants documented on Tesla, associated habitats, and presence/absence in maps (Figures 2 and 9).

Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
CRPR List 1B species						
Blepharizonia plumosa	big tarweed, big tarplant	1B.1	A2 (northern and western edge of range)	Yes	MIG 2021, Ecosystems West 2004	Valley and foothill grassland in dry slopes, usually clay areas
Campanula exigua	chaparral harebell	1B.2	A2 (northern edge of range)	Yes	MIG 2021 (observed 2016)	Rocky, usually serpentinite areas of chaparral
Delphinium californicum subsp. *interius*	Hospital Canyon larkspur	1B.2	A2 (northern edge of range)	Yes	MIG 2021, Ecosystems West 2004	Generally east-facing slopes in open woodland (including oak/blue oak woodland), eastern side of coast ranges, also openings in chaparral and coastal scrub
Hesperolinon breweri	Brewer's western flax	1B.2	A2 (southern edge of range)	Yes	Ecosystems West 2004	Usually serpentinite areas in chaparral, cismontane woodland (including oak/blue oak woodland), and valley and foothill grassland
Lagophylla diabolensis (formerly L. dichotoma)	Diablo Range hare-leaf (formerly forked hareleaf)	1B.2	None (north of known range)	No	Ecosystems West 2004	Cismontane woodland (including oak/blue oak woodland) and valley and foothill grassland, sometimes on clay
CRPR List 2B species						
Senecio aphanactis	chaparral ragwort, rayless ragwort, California groundsel	2B.2	A1x	Yes	Kramer 2016, Ecosystems West 2004	Sometimes alkaline areas in chaparral, cismontane woodland (including oak/blue oak woodland), and coastal scrub
CRPR List 4 species						
Acanthomintha lanceolata	Santa Clara thornmint	4.2	A2 (northern and western edge of range)	Yes	MIG 2021, Ecosystems West 2004	In talus, rocky slopes, or outcrops in chaparral (often serpentinite), cismontane woodland (including oak/blue oak woodland, occasionally serpentine), and coastal scrub

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Amsinckia douglasiana	Douglas' fiddleneck	4.2	A1x	No	Kramer 2016, Ecosystems West 2004	Dry areas, often on Monterey shale, in cismontane woodland (including oak/blue oak woodland) and valley and foothill grassland
Androsace elongata subsp. *acuta*	California androsace	4.2	A2	Yes	MIG 2021 (observed 2016), Ecosystems West 2004	On slopes in chaparral, cismontane woodland (including oak/blue oak woodland), coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland
Clarkia breweri	Brewer's clarkia	4.2	A1	No	EBCNPS	Often serpentinite areas in chaparral, cismontane woodland (including oak/blue oak woodland), and coastal scrub
Eriophyllum jepsonii	Jepson's woolly sunflower	4.3	A2 (northern edge of range)	Yes	MIG 2021, Ecosystems West 2004	Sometimes serpentinite in chaparral, cismontane woodland (including oak/blue oak woodland), and coastal scrub
Fritillaria agrestis	stinkbells	4.2	A2	Yes	MIG 2021, Ecosystems West 2004	Clay, often vertic, occasionally serpentine in chaparral, cismontane woodland (including oak/blue oak woodland), pinyon/juniper woodland, and valley and foothill grassland
Galium andrewsii subsp. *gatense*	phlox-leaf serpentine bedstraw, serpentine bedstraw	4.2	A2	Yes	MIG 2021 (observed 2016)	Rocky or serpentinite areas in chaparral, cismontane woodland (including oak/blue oak woodland), and lower montane coniferous forest
Hesperevax caulescens	hogwallow starfish	4.2	A2	No	Kramer 2016	Sometimes alkaline areas in mesic clay valley and foothill grasslands or shallow vernal pools
Microseris sylvatica	sylvan scorzonella	4.2	A1	Yes	MIG 2021 (observed 2016), Ecosystems West 2004	Rarely serpentinite areas of chaparral, cismontane woodland (including oak/blue oak woodland), Great Basin scrub, pinyon and juniper woodland, and valley and foothill grassland

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Piperia michaelii	Michael's rein orchid	4.2	A2	Yes	MIG 2021 (observed 2016)	Coastal bluff scrub, closed-cone coniferous forest, chaparral, cismontane woodland (including oak/blue oak woodland), coastal scrub, and lower montane coniferous forest
EBCNPS Locally Rare Species (Locally Rare Rank A1)						
Allium crispum	crinkled onion	none	A1	No	MIG 2021, Ecosystems West 2004	Generally shale slopes in foothill woodland (including oak/blue oak woodland) and valley grassland (Calflora 2024)
Amsinckia vernicosa	waxy fiddleneck	none	A1 (northern edge of range)	No	Ecosystems West 2004	Slopes in foothill woodland (including oak/blue oak woodland) and valley grassland (Calflora 2024)
Astragalus didymocarpus var. *didymocarpus*	two-seeded milkvetch	none	A1	No	Kramer 2016	Grassy areas
Athysanus unilateralis	heterodraba	none	A1	No	Kramer 2016, Ecosystems West 2004	Grassy, open slopes, flats, clay soils, floodplains, gypsum-clay slopes; also foothill woodland (including oak/blue oak woodland) (Calflora 2024)
Elymus elymoides var. *elymoides*	squirreltail	none	A1	No	MIG 2021	Desert shrubland, often in disturbed sites
Epilobium cleistogamum	cleistogamous boisduvalia	none	A1 (western edge of range)	No	Kramer 2016	Vernal pools, clay flats
Eremalche exilis	white mallow	none	A1	No	EBCNPS	Desert scrub
Eremalche parryi subsp. *parryi*	Parry's mallow	none	A1 (western edge of range)	Yes	Calflora 2024	Grassland, scrub, foothill woodland (including oak/blue oak woodland)
Eremothera boothii subsp. *decorticans*	shredding evening primrose	none	A1	No	Ecosystems West 2004	Open, generally steep and rocky, especially shale slopes
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat	none	A1	No	MIG 2021	Gravel on dry slopes, washes and canyons

Table 3 (continued) Scientific name	Common name	CRPR rank [a]	EBCNPS locally rare rank [b]	Mapped on Figures 2, 9 [c]	Data source [d]	Habitat Associations [e]
Eriogonum fasciculatum var. *polifolium*	Mojave desert California buckwheat	none	A1	No	MIG 2021, Ecosystems West 2004	Sand, gravel or rocks on dry slopes, washes and canyons
Eriogonum nudum var. *pauciflorum*	little-flower wild buckwheat	none	A1	No	MIG 2021, Ecosystems West 2004	Sand in openings
Hesperolinon disjunctum	dwarf flax	none	A1	No	Kramer 2016	Openings in chaparral, serpentine, vertic clay
Heterotheca oregona var. *scaberrima*	Oregon false goldenaster	none	A1	No	MIG 2021	Seasonally dry streambeds on sand, gravel, or rocks
Holozonia filipes	whitecrown	none	A1	No	MIG 2021	Banks, dry streambeds, pools, rocky or alkaline clay, sometimes serpentine
Lasthenia minor	coastal goldfields, woolly goldfields	none	A1	No	Kramer 2016	Grassland
Mentzelia micrantha	small-flowered stick-leaf	none	A1	No	Kramer 2016	Open, generally recent-burned or disturbed chaparral and oak woodland (including blue oak woodland)
Parietaria hespera var. *californica*	California pellitory	none	A1 (northern edge of range)	No	EBCNPS	Rocky slopes, canyons, among boulders, in coastal scrub, chaparral, oak woodland (including blue oak woodland)
Silene antirrhina	sleepy catchfly, snapdragon catchfly	none	A1	No	Kramer 2016, Ecosystems West 2004	Open areas, burns
EBCNPS Locally Rare Species (Locally Rare Rank A2)						
Caulanthus flavescens	yellow-flowered thelypodium	none	A2	No	Ecosystems West 2004	Dry, exposed slopes, open hillsides, vertic clay, often serpentine; valley grassland
Delphinium parryi subsp. *parryi*	Parry's larkspur	none	A2 (northern edge of range)	No	Kramer 2016, Ecosystems West 2004	Chaparral, oak woodland (including blue oak woodland)
Elatine californica	waterwort	none	A2	No	Ecosystems West 2004	Pools, ponds, rice fields, streambanks

Table 3 (continued) **Scientific name**	**Common name**	**CRPR rank [a]**	**EBCNPS locally rare rank [b]**	**Mapped on Figures 2, 9 [c]**	**Data source [d]**	**Habitat Associations [e]**
Eriogonum roseum	wand wild buckwheat	none	A2	No	MIG 2021	Sand or gravel in oak woodland (including oak/blue oak woodland), chaparral
Erythranthe nasuta	shy monkeyflower	none	A2	Yes	Calflora 2024	Seeps in rock outcrops, streams and creeks
Lasthenia microglossa	small-ray goldfields	none	A2 (northern edge of range)	No	Kramer 2016, Ecosystems West 2004	Shaded slopes of woodland (including oak/blue oak woodland), chaparral, desert scrub
Nuttallanthus texanus	blue toadflax	none	A2	No	EBCNPS	Sand or gravel in foothill woodland (including oak/blue oak woodland), chaparral, and valley grassland
Perideridia oregana	yampah	none	A2	No	Ecosystems West 2004	Open flats or slopes, pine/oak woodland (including blue oak woodland)
Ribes aureum var. *gracillimum*	golden current	none	A2 (northern edge of range)	No	MIG 2021, Ecosystems West 2004	Alluvial areas, forest edges and riparian forest
Potentially Newly Described Species, Rank Undetermined						
Fritillaria sp. (undescribed)	potentially undescribed fritillary	unk	unknown	No	Ecosystems West 2004	Clay soils in grasslands and open areas of blue oak woodland (Ecosystems West 2004)

[a] California Rare Plant Ranks (CDFW 2023)

1B = Rare or Endangered in California and elsewhere.
2B = Rare or Endangered in California, but more common elsewhere.
4 = Plants of limited distribution – Watch list

Threat Ranks

.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat).
.2 = Moderately threatened in California (20-80% of occurrences threatened / moderate degree and immediacy of threat).
.3 = Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

[b] EBCNPS Locally Rare Ranks (EBCNPS 2022)
(Table 3 continued)

A1 = Species known from 2 or less botanical regions in Alameda and Contra Costa Counties, either currently or historically.
A2 = Species currently known from 3 to 5 regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc.

[c] Documents if location for rare plants is mapped (Yes/No) on Figures 2 and 9. Only 14 of 45 rare plant species are mapped on Figures 2 and 9 because location data for mapping was not available from or not provided by California State Parks.

[d] Survey data source for rare plants listed in Table 3.

[e] Habitat Associations for each rare plant based on CNPS 2024, unless other source noted. Twenty-five (25) of 45 rare plants are associated with blue oak woodlands.

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

Table 4. Special-status animals detected on Tesla (or nearby, see footnotes c-e) on the California Special Animals List (CNDDB 2024b) and the list of Birds of Conservation Concern (USFWS 2021a).

Scientific name	Common name	Special status [a]	Data source [b]
Insects			
Desmocerus californicus dimorphus [c]	Valley elderberry longhorn beetle	FT	GP, Shepard 2021
Bombus occidentalis	western bumble bee	Candidate SCE, SA (S1): GCN	CNDDB
Amphibians			
Ambystoma californiense	California Tiger Salamander	FT, ST, GCN, C. CA target	HMS, GP, CNDDB
Spea hammondii	Western Spadefoot Toad	SSC, FPT, GCN, C. CA target	HMS, GP, CNDDB
Rana boylii	Foothill Yellow-legged Frog	FT, SE, GCN, C. CA target	CNDDB
R. draytonii	California Red-legged Frog	FT, GCN, C. CA target	HMS, GP
Reptiles			
Emys marmorata	Western Pond Turtle	SSC, FPT, GCN, C. CA target	HMS, GP, CNDDB
Phrynosoma blainvillii	Coast Horned Lizard	SSC, GCN, C. CA target	2000 GPA EIR
Anniella pulchra	No. California Legless Lizard	SSC, GCN, C. CA target	PRA
Arizona elegans occidentalis	California Glossy Snake	SSC, GCN, C. CA target	CNDDB
Masticophis flagellum ruddocki	San Joaquin Coachwhip	SSC, GCN, C. CA target	MVZ
M. lateralis euryxanthus	Alameda Whipsnake	FT, ST, GCN, C. CA target	MVZ, PRA, Alvarez pers. comm., Swaim 2002
Birds			

Table 4 (continued)

Scientific name	Common name	Special status [a]	Data source [b]
Larus californicus	California Gull	WL, BCC	PRA
Accipiter cooperii	Cooper's Hawk	WL	PRA
A. striatus	Sharp-shinned Hawk	WL	PRA
Aquila chrysaetos	Golden Eagle	WL, FP, Eagle Act	Hunt and Hunt 2015, GP
Buteo regalis	Ferruginous Hawk	WL	GP
B. swainsoni	Swainson's Hawk	ST	PRA
Circus cyaneus	Northern Harrier	SSC	GP, PRA
Elanus leucurus	White-tailed Kite	FP, BLM: S	GP, PRA
Haliaeetus leucocephalus	Bald Eagle	SE, FP, Eagle Act	PRA
Falco columbarius	Merlin	WL	PRA
F. mexicanus	Prairie Falcon	WL	PRA
Athene cunicularia	Burrowing Owl	SSC, BCC	GP, PRA
Chaetura vauxi	Vaux's Swift	SSC	PRA
Selasphorus sasin	Allen's Hummingbird	BCC	PRA
Contopus cooperi	Olive-sided Flycatcher	SSC, BCC	PRA
Empidonax traillii	Willow Flycatcher	SE	PRA
Lanius ludovicianus	Loggerhead Shrike	SSC	PRA
Pica nuttalli	Yellow-billed Magpie	BCC	PRA

Table 4 (continued)

Scientific name	Common name	Special status [a]	Data source [b]
Eremophila alpestris actia	California Horned Lark	WL	CNDDB, PRA
Riparia riparia	Bank Swallow	ST, GCN, C. CA target	PRA
Baeolophus inornatus	Oak Titmouse	BCC	PRA
Chamaea fasciata	Wrentit	BCC	PRA
Icteria virens	Yellow-breasted Chat	SSC, GCN, C. CA target	PRA
Setophaga petechia	Yellow Warbler	SSC, GCN, C. CA target	GP, PRA
Toxostoma redivivum	California Thrasher	BCC	PRA
Ammodramus savannarum	Grasshopper Sparrow	SSC, GCN, C. CA target	GP, PRA
Artemisiospiza belli belli	Bell's Sage Sparrow	WL	PRA
Icterus bullockii	Bullock's Oriole	BCC	PRA
Agelaius tricolor	Tricolored Blackbird	ST, BCC, GCN, C. CA target	PRA
Spinus lawrencei	Lawrence's Goldfinch	BCC	PRA
Mammals			
Myotis yumanensis	Yuma myotis	BLM: S	HMS, Wildlife Project 2014
M. thysanodes	fringed myotis	BLM: S	Wildlife Project 2014
Lasiurus cinereus	hoary bat	SA (S4)	HMS, MIG 2016
Antrozous pallidus [d]	pallid bat	SSC	MIG 2016, Wildlife Project 2014 (CSVRA ponds)
Corynorhinus townsendii	Townsend's big-eared bat	SSC	Wildlife Project 2014

MAP AND TABULAR SYNOPSIS OF BIOLOGICAL RESOURCES IN TESLA

Table 4 (continued)

Scientific name	Common name	Special status [a]	Data source [b]
Perognathus inornatus	San Joaquin pocket mouse	BLM: S, GCN	CNDDB 2014, 2021
Dipodomys heermanni heermanni	Heermann's kangaroo rat	SA (S2), GCN	MIG 2020
Puma concolor	mountain lion, So. Cal./Central Coast ESU	Candidate for state listing	MIG 2021
Vulpes macrotis mutica [e]	San Joaquin kit fox	FE, ST, GCN, C. CA target	GP
Taxidea taxus	American badger	SSC, GCN, C. CA target	HMS, CNDDB
Cervus canadensis nannodes	tule elk	SA (S3), GCN, C. CA target	PRA, GPA EIR

[a] Special Status Code Key
BLM (Bureau of Land Management)
S = Sensitive Species
CDFW (California Department of Fish and Wildlife):
SA = Special Animal
S1 = (NatureServe State Rank) = Critically Imperiled: At very high risk of extirpation in the state.
S2 = (NatureServe State Rank) = Imperiled: At high risk of extirpation in the state.
S3 = (NatureServe State Rank) = Vulnerable: At moderate risk of extirpation in the state.
S4 = (NatureServe State Rank) = Apparently Secure: At a fairly low risk of extirpation in the state.
SCE = State candidate for listing as endangered
SE = State listed as endangered
SSC = California Species of Special Concern
ST = State listed as threatened
WL = Watch List
USFWS (U.S. Fish and Wildlife Service)
BCC = Bird of Conservation Concern in Bird Conservation Region 32
Eagle Act = Protected under the Bald and Golden Eagle Protection Act
FE = Federally listed as endangered
FP = Fully protected under CA Fish and Game Code
FPT = Federally proposed for listing as threatened

(Table 4 continued)

FT = Federally listed as threatened
California State Wildlife Action Plan
GCN = Species of Greatest Conservation Need
C. CA Target = targeted for conservation in the Central CA Coast Ranges

[b] Data Source Code Key (see also Section 3 Literature Cited)
CNDDB = California Natural Diversity Database
GP = Carnegie SVRA General Plan Revision PGP, April 2015
GPA EIR = CSVRA General Plan Amendment Draft Environmental Impact Report, 2000
HMS = California State Parks Carnegie SVRA 2011-2014 Habitat Monitoring Systems Report, May 2015
MIG 2016 = Acoustic Bat Survey at CSVRA
MIG 2020 = Rodent Diversity and Population Dynamics in an Off-highway Vehicle Area, prepared for CSVRA
MIG 2021 = Habitat Use by Mountain Lions at CSVRA
PRA = Various datasheets, maps, spreadsheets, and reports provided by California Department of Parks and Recreation in response to Public Records Act request 22-077.
MVZ = UC Berkeley Museum of Vertebrate Zoology Records, https://arctos.database.museum; data compiled by Kevin Wiseman of Kleinfelder, San Francisco, CA.

[c] Host plants for the Valley elderberry longhorn beetle have been documented in Corral Hollow Creek; surveys to determine presence in Tesla have not yet been conducted.

[d] Pallid Bat has been detected near two CSVRA ponds, Lime Kiln and Tyson's, according to MIG 2016 bat report and Wildlife Project 2014 report.

[e] A pair of kit foxes were incidentally detected in the CSVRA in 2002; the USFWS has assumed the species also occurs at Tesla (GP, p. 2-90).

Table 5. Movement, home range, and protective buffer zones (i.e., spatial ecology) for *some* special-status animals on Tesla.

The spatial ecology for just some of Tesla's special-status species require protection of the entire 3,100 acre Tesla site.

Scientific name	Common name	Spatial ecology	References [a]
Amphibians			
Ambystoma californiense	California tiger salamander	• Migration distances up to 1.3 mi between aquatic and upland habitats • Maximum distance serves as basis for USFWS minimum preserve size and protective buffer radius around ponds	Orloff 2007, Searcy and Shaffer 2011, Searcy et al. 2013, USFWS 2017
Spea hammondii	Western spadefoot	• home ranges up to 15 acres • 95% of a pond's breeding population occurs up to 0.3 mi radius from water's edge with site-to-site variation • Buffer of 1,207 ft from suitable breeding pools may provide protection	Semlitsch and Brodie 2003, Baumberger et al. 2019, Halstead et al. 2021
Rana boylii	Foothill yellow-legged frog	• breeding migrations up to 4.3 mi among tributaries and mainstems, usually along stream courses • upland dispersal of juveniles documented	Twitty 1967, Bourque 2008, Gonsolin 2010
Rana draytonii	California red-legged frog	• Maximum protective buffer limit of 1 mi set by USFWS. • Dispersal can be up to 2 mi overland	Bulger et al. 2003, USFWS 2010
Reptiles			
Emys marmorata	Western pond turtle	• Overwinters in uplands • Excavates nests for eggs up to 0.3 mi from ponds and streams • In arid sites like Tesla, radio-tagged turtles left ponds as water receded, moved 837 to 3,596 feet overland, on land 10–30 wks • Buffer zone should encompass the uplands around aquatic habitat	Gervais et al. 2009, Bury et al. 2012, Pilliod et al. 2013
Arizona elegans occidentalis	California glossy snake	• Home range size not known • Habitat includes chaparral, sage-scrub, alluvial soils	Richmond et al. 2016

Table 5 (continued) Scientific name	Common name	Spatial ecology	References [a]
Masticophis flagellum ruddocki[†]	San Joaquin coachwhip	• Home range size not known • Occurs in open dry areas embedded within mosaic of scrub, chaparral, oaks, and grass • Uses burrows for refuge and oviposition	Stebbins and McGinnis 2012
Masticophis lateralis euryxanthus	Alameda whipsnake	• Radiotelemetry and visual encounters confirm use of atypical sites up to 500 ft away from suitable scrub habitat (e.g., grassland, oak woodland, and basking on trails, roads, parking areas) • Habitat patches can be connected by rock outcrops or stream corridors	Swaim and McGinnis 1992, USFWS 2003, Alvarez 2005, 2006, 2021, Miller and Alvarez 2016
Birds			
All species		• Minimum no disturbance buffer of 250 ft around active nests • 500-ft buffer around active nests of non-listed raptors	Chappell 2022
Aquila chrysaetos	Golden hagle	• 1 mi buffer around nests with no ground-based human activities.	USFWS 2021
Buteo regalis	Ferruginous hawk	• Winters in Alameda Co., so no breeding / nesting • Winter territoriality not reported	Ng et al. 2020
Buteo swainsoni	Swainson's hawk	• Buffer = no disturbance within 0.25 mi (up to 0.5 mi depending on site conditions) March 1 to September 15	Chappell 2022
Circus cyaneus	Northern harrier	• Nests on ground in tall grass or clumps of vegetation, thus easily disturbed by humans and dogs • Territory area highly variable, mean = 83 acres, range 9.6–308.6 • Territory size varies inversely with rodent prey abundance	Temeles 1987, 1989
Elanus leucurus	White-tailed kite	• Territory area decreases as California voles (*Microtus californicus*) increase • Range of territory sizes = 4.0–53.1 acres (n = 25) • In Bay Area, nests in trees and willows near streams	Waian 1973, Faanes and Howard 1987, Dunk and Cooper 1994, Niemela 2007
Athene cunicularia	Burrowing owl	• Setback distances vary by level of disturbance and season • 50 to 500 m buffers from burrow complexes	Scobie and Faminow 2000

Table 5 (continued) Scientific name	Common name	Spatial ecology	References [a]
Lanius ludovicianus	Loggerhead shrike	• Highly territorial, occurs in open habitats with sparse shrubs, trees • Mean territory size = 21 acres, range = 10.9–39.5 acres (n =10)	Miller 1931
Eremophila alpestris actia	Ca. horned lark	• Other sub-species, territory size ranges from 1.5–7.7 acres (mean = 4.0) in agricultural lands of the Midwest; 0.74–3.5 acres reported in shortgrass prairie of CO • territory size not known in CA	Beason and Franks 1974, Boyd 1976
Ammodramus savannarum	Grasshopper sparrow	• Territory size depends on grassland qualities • In So. CA territory = 0.91 ± 0.4 (SD) acre (*n* = 41) • Mowing can lead to nest failure; grazing effects detrimental in southern CA and AZ	Ruth 2017, Vickery 2020
Setophaga petechia	Yellow warbler	• Nests in riparian zones, territory area varies with tree density. • No. CA, mean territory = 1.1 ± 0.37 acres (n = 215)	Stephens and Rockwell 2019
Mammals			
Corynorhinus townsendii	Townsend's big-eared bat	• Highly sensitive to disturbance at roosts, human activity near roosts should not occur • Travels up to 6.5 mi from day roosts to foraging areas • Center of activity for females = 2.0 ± 0.3 mi from roost • Mean center for males was 0.81 ± 0.1 mi	Fellers et al. 2002, Gruver and Keinath 2006
Lasiurus cinereus	hoary bat	• Roost in foliage of trees • GPS tracking recorded winter season flights between 10's to 100's of kms with extended roosting/ torpor periods in between	Weller et al. 2016
Myotis thysanodes	fringed myotis	• Roosts in crevices, decadent trees, and snags • Distance between successive roosts = 0.34 ± 0.07 mi. • Distance between roost and closest perennial stream where the bats forage =0.87 ± 0.22 mi • Distance between successive captures = 1.0 ± 0.21 mi	Lacki and Baker 2007, WBWG 2005
Myotis yumanensis	Yuma myotis	• Moves between roost and water bodies to forage • Roosts in bridges, buildings, cliff crevices, caves, mines, and trees	Brigham et al. 1992, WBWG 2005

Table 5 (continued) Scientific name	Common name	Spatial ecology	References [a]
Perognathus inornatus	San Joaquin pocket mouse	• Occurs in dry, open grasslands or scrub on fine-textured soils • Density, home range on sites grazed by cattle = 7.3/ha, 148 m^2 (range 0–333m^2) • Density, home range 5/ha and 258 m^2 (0–385m^2) at ungrazed sites	Best 1993
Cervus canadensis nannodes	tule elk	• San Luis Reservoir Tule Elk Management Unit, home range area = 6,175 acres (N = 44 radio collared individuals, SD = 3,632) • proximity to water sources, avoidance of roads predict habitat use • present at Tesla, absent from CSVRA	Dziegiel 2021, Mohr et al. 2022, Kupferberg and Furey 2015

[a] Sources in Section 3 Literature Cited.