

5. ECOLOGY



Sonoma County is one of the most biologically diverse regions in California. Its varied terrain, proximity to both coastal and inland habitats, and extensive undeveloped lands allow it to support a wide array of plants and wildlife. The biological diversity of SDC reflects that of the county. Oak woodlands, bay and redwood forests, grasslands, wetlands, and corridors of riparian habitat on the site each have unique ecological functions. Each supports abundant plant and animal life—from the familiar, like live oaks and coyotes, to the uncommon and threatened or endangered, like steelhead and freshwater shrimp. The property is also located at the core of an important movement corridor for wildlife at both a local and regional scale. This chapter is based mainly on the more detailed Existing Conditions Assessment: Natural and Recreational Resources prepared by Prunuske Chatham, Inc. in December 2017, and included as Appendix C.



5.1 Regional Setting

REGIONAL SETTING

WILDLIFE HABITAT AND CONNECTIVITY

The Sonoma Valley Wildlife Corridor is considered by local and regional conservation agencies to be a crucial part of a network of linkages connecting large undeveloped landscape blocks in Marin County to those in the Blue Ridge-Berryessa Natural Area in eastern Napa County (Figure 5-1).

SDC is a central link in a swath of over 8,000 acres of protected open space and parkland that has been assembled over the past few decades (Figure 5-2). (Additional nearby lands have been protected for agricultural uses; lands with intensive agricultural uses such as vineyard generally have lower habitat and connectivity value.) SDC represents the largest and most ecologically significant unprotected property in the Sonoma Valley.

Adjacent protected parklands include:

- **Jack London State Historic Park (SHP)** and surrounding Camp Via. Established in 1959 on the ranch of author Jack London. Approximately 1,500 acres; reaches nearly to the top of Sonoma Mountain, and contains headwaters of Asbury and Hill Creeks, which both run through SDC, as well as the headwaters of Graham Creek.
- **Sonoma Valley Regional Park.** 232-acre park with a paved trail. Several unpaved trails lead from this main trail

onto the SDC property. A recently-completed master plan for portions of the park calls for new trails, including some that connect to SDC.

Adjacent lands protected for a mixture of agricultural and conservation purposes include:

- **Sonoma Land Trust (SLT) property Glen Oaks Ranch (234 acres)** and conservation easements on Oak Hill Farm (677 acres) and Old Hill Ranch (37 acres). These easements protect agricultural uses of the lands as well as riparian habitat and other wildlands.

Adjacent lands protected primarily for agricultural uses include:

- **Shepard Ranch.** 178-acre remnant of Jack London's ranch, protected by a conservation easement held by the State. The property has been converted to vineyard and is currently owned by London relatives Brian Shepard and Neil Shepard.

Some of the other nearby lands protected for parks or natural resource protection include:

- Bouverie Preserve, east of Highway 12. 535-acre preserve of the Audubon Canyon Ranch, an environmental conservation and education non-profit.
- SLT property Secret Pasture (300 acres) southeast of Bouverie Preserve. This property protects wildlife

habitat, valley oak habitat, and historic structures. Stuart Creek Hill (14 acres) and other nearby parcels north of SVRP provide steelhead habitat and wildlife corridors.

- Sonoma County Agricultural Preservation and Open Space District (SCAPOS) conservation easements on multiple privately owned properties on Sonoma Mountain: McCrea (282 acres), Frieberg (203 acres), and the Eliot and Lupine Hill (71 acres) parcels immediately south of Jack London SHP, protected for their viewsheds, wildlife corridors, and other conservation values.
- North Sonoma Mountain Regional Park and Open Space Preserve (820 acres), owned by Regional Parks; adjacent to Jack London SHP's western border. The property provides hiking trails that connect SDC to the 550-mile Bay Area Ridge Trail. SCAPOS-held conservation easement protects the scenic, natural, recreational, educational, and agricultural resources of the property.
- Sonoma Mountain Ranch, on the summit and western slope of Sonoma Mountain. 613-acre ranch run by a private non-profit dedicated to preserving biodiversity of the Sonoma Mountain area, and providing education and research for the preservation and enhancement of agricultural, natural, scenic, and open lands.

Figure 5-1

LARGE LANDSCAPE BLOCKS AND CRITICAL WILDLIFE LINKAGES



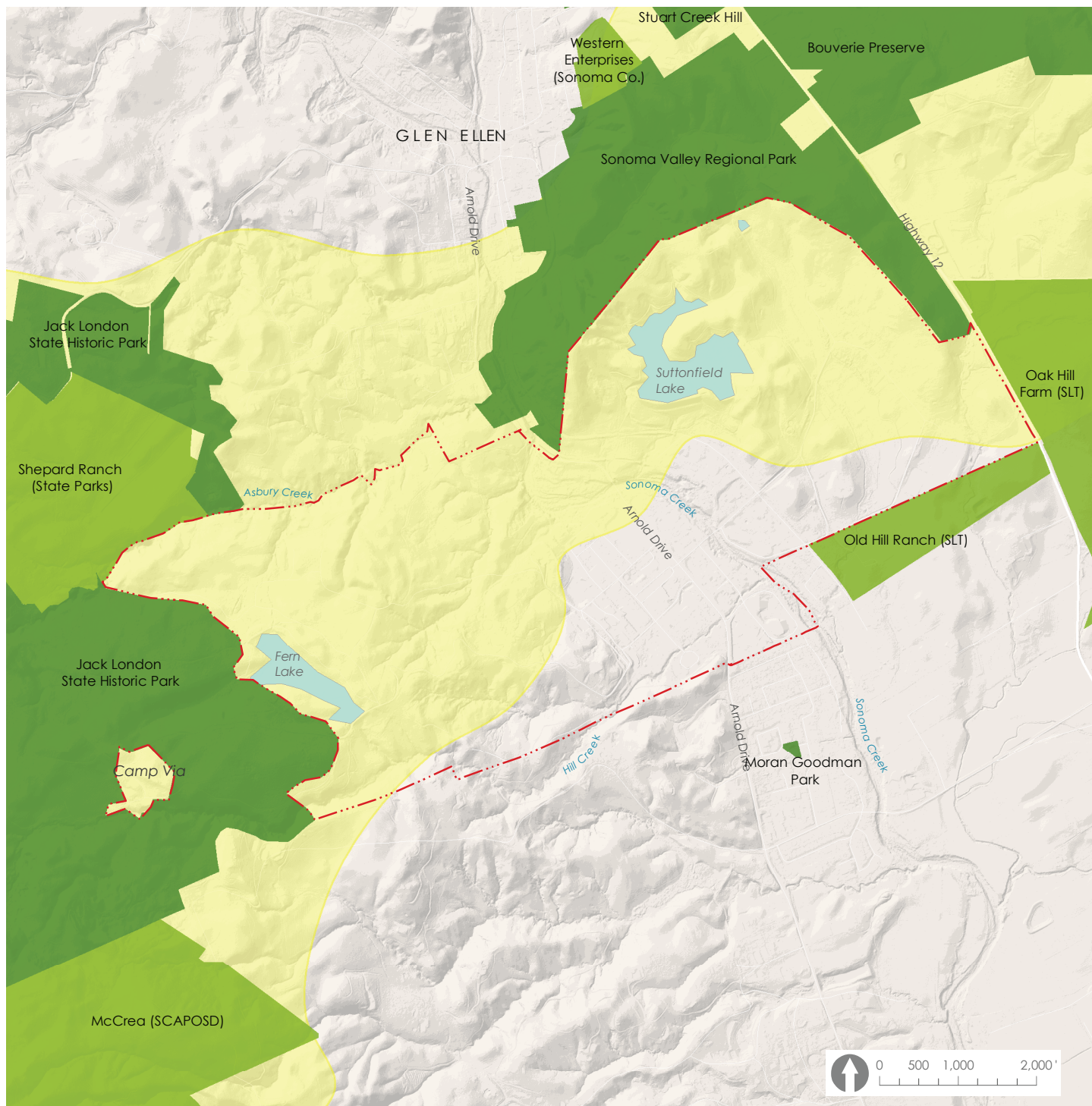
-  Critical Wildlife Linkage
-  Large Landscape Blocks
-  SDC Property
-  County Boundary

Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

Sources:
 USGS, US Census Bureau,
 California Geoportal,
 GreenInfo Network, Sonoma
 Ecology Center

Figure 5-2

PROTECTED LANDS AND CRITICAL WILDLIFE LINKAGES ADJACENT TO THE SDC SITE



- SDC Property
- Protected Lands, Public or Private Ownership
- Other Lands Protected by Conservation Easement
- Critical Wildlife Linkage, Marin Coast-Blue Ridge

Sources
 USGS, California Geoport, GreenInfo Network, Conservation Lands Network, California Protected Areas Database

SCAPOS: Sonoma County Agricultural Preservation and Open Space District
 SLT: Sonoma Land Trust

5.2 Biological Resources at the SDC Site

Diverse terrain and soils, valuable water resources, a history of limited land development, and connectivity with adjacent natural lands all contribute to SDC’s rich biological resources. Vegetation types range from low-lying grasslands

used historically for livestock grazing to dense native forests high on the slopes of Sonoma Mountain. Many species of wildlife make use of these varied settings. The site’s streams support imperiled salmonids, amphibians, and invertebrates;

its forests and woodlands provide forage and shelter for many bird and mammal species; its grasslands support many common reptiles and raptors; and even the central campus itself provides resources to bats, birds, and mammals.

PLANT COMMUNITIES

Vegetation on the site reflects the influences of terrain and human uses of the land. Upper portions of the property, on the western side, are dominated by dense, shady forests and redwood groves. Midslopes, in the central part of the property, are dominated by deciduous oak woodlands. Near the center of the property, a corridor of riparian woodland follows Sonoma Creek from north to south. The easternmost part of the property, with its gentle terrain, has been used more extensively for agricultural purposes and supports grassland with scattered mature oaks. In addition to these primary vegetation types, there are several

other plant communities of note. Wetland vegetation occurs in narrow slivers along the periphery of the lakes, in isolated low-lying pockets in grassland and forest, and in the eastern grassland. Stands of coyote brush are present in some grasslands in the process of succession toward oak woodland. Even the developed core campus supports valuable vegetation, including many large, mature landscape trees as well as remnant natives.

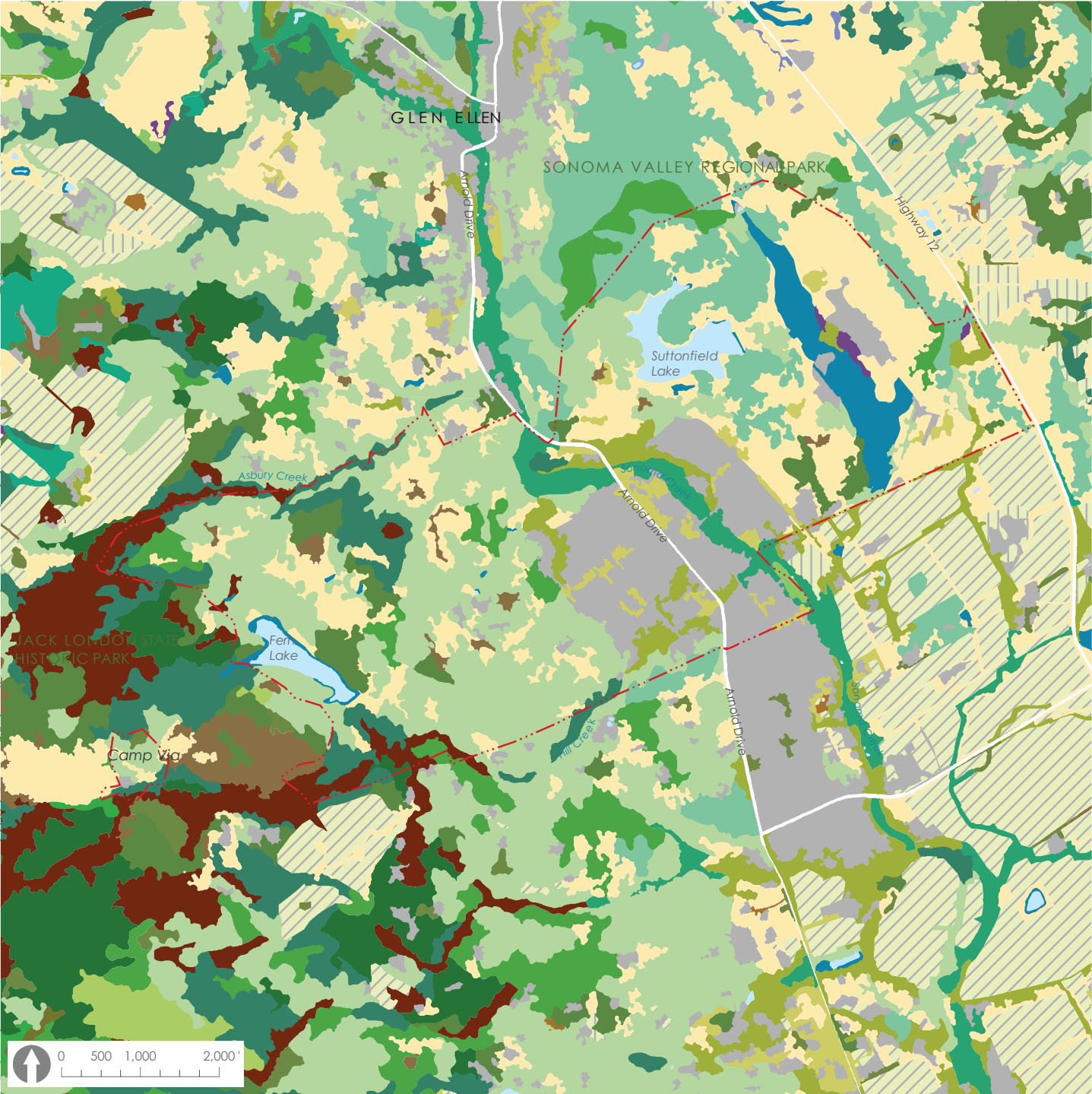
SDC’s vegetation also reflects a history of land use. Starting in the mid-1800s, timber was cut for Colonel Mariano Vallejo’s mill at the mouth of Asbury Creek (Berber et

al 2012). Redwoods were nearly clear-cut in the effort to rebuild San Francisco and local communities after 1906 earthquake. Oaks were harvested for fuel in mid 1900s, and tanoaks were harvested for their tannins, used in preparing leather. Open areas have a long history of livestock use.

Figure 5-3 provides a map of SDC’s vegetation types. These are based primarily on a recently completed countywide, fine-scale vegetation classification and mapping effort (SCAPOS 2017). PCI refined this map based on 2017 fieldwork. Refinements focused on sensitive habitats including wetlands.



Figure 5-3
VEGETATION





Redwood grove along Hill Creek drainage

MIXED EVERGREEN AND REDWOOD FORESTS

Mixed evergreen forests dominate the western part of SDC, occupying approximately 70 acres. A changing mosaic of coast live oaks, California bays, Douglas-firs, and madrones creates a dense canopy, with a limited understory of herbs and shrubs in their shade. On moister slopes, black oaks and big leaf maples can be found and the understory is more varied and extensive. Along the major drainages of upper Hill Creek and Asbury Creek, there are several stands of second or tertiary-growth redwoods, up to 4' in diameter at breast height.

The forests on the property are relatively intact and undisturbed, with a diverse suite of natives and few introduced species. Invasive Scotch and French broom are present along some roads and trails, and Himalayan blackberry occurs in some forested wetlands. Sudden Oak Death, the forest disease caused by the pathogen *Phytophthora ramorum*, is known to occur within Jack London SHP. Confirmed cases are documented in bays and coast live oaks on Jack London SHP near Asbury Creek (Oak Mapper, 2017), and the disease is highly likely to be present on the SDC site. However, no large stands of affected trees are currently apparent and no formal assessment of infection has been done. Related pathogens *P. cinnamomi* and *P. cambivora* have also been identified as present within Jack London SHP.

SDC's forests are continuous with

extensive evergreen forests to the west, as well as to the north and south, on the lower flank of the Sonoma Mountains. Portions of these adjacent lands, however, have been cleared for vineyard.

In addition to disease and natural regeneration, other key ecological processes that affect SDC's forests include fire and climate change. These forests have evolved with fire; oaks, bays, and redwoods in particular can survive or resprout from fire, depending on temperatures and frequencies. Moderate fires may be important to maintaining forest diversity. Long-term buildup of fuels and/or drought-stressed trees—which may accompany changing climate or disease outbreaks—may result in more damaging fires. Climate change may also reduce natural regeneration and long-term tree health; redwoods and other moisture-dependent forest species are especially at risk.

The forests of SDC serve important functions of biodiversity conservation, wildlife habitat and connectivity, carbon sequestration, climate regulation, air quality protection, soil conservation, nutrient cycling, and water supply and water quality protection.

OAK WOODLAND

Oak woodlands dominate the central part of SDC, occupying approximately 380 acres the gentle hills on both sides of the central campus. These are characterized by a deciduous canopy of Oregon, blue,

black, and valley oaks, which is nearly continuous in some areas and open and savanna-like in others. Coast live oaks and occasional bays are often present in drainages. The dappled shade to full sun provided by these woodlands allows for a varied and well-developed native understory.

Several areas of the property have scattered oaks in a grassland setting. These savanna-like areas are found on relatively level land within the denser woodlands on the west side of the property, as well as within the grassland and agricultural lands on the east side of the property. Valley oaks and blue oaks are more common in these areas; some of the valley oaks are large, spreading specimens. Typically, coyote brush, manzanita and regenerating trees are also abundant, suggesting that these areas may be in transition toward more typical woodland habitat over time. These areas, with their gentle terrain, may have been grazed by livestock in the past, and when grazing was ended, tree regeneration may have been released. Where livestock grazing continues, as on the eastern edge of the property, natural regeneration is limited. In addition to shrubs, there is extensive grass cover in these areas, with both native (California oatgrass) and non-native (annual bromes, Harding grass, and wild oats) species

Where the oak woodlands occur on slopes and steeper locations on SDC, they have been less heavily disturbed by human activities and retain a native-dominated understory. The savanna-like, more



Typical oak woodland understory of poison oak and annual grasses (top). Natural regeneration of oaks (bottom).



Oak woodlands east of Arnold Drive in November 2017, after the October wildfires. Brown leaves were killed by heat, but in many cases these trees are already showing new growth. Mostly intact trees (leafless at this season) in background. Green new grass visible in foreground.

open-canopied oak stands in gentler areas have a larger non-native component in their understory. Dense infestations of invasive broom are present in a number of disturbed locations along roads and trails, especially in the area north of campus and west of Sonoma Creek, and areas near Suttonfield Lake. Yellow starthistle is also common along trails through woodland in these areas.

Natural regeneration of trees is visible in many areas. These oak woodlands are remnants of more extensive oak habitat that once lined the Valley of the Moon but which has been fragmented by human settlement and land use.

In addition to grazing and natural regeneration, other key ecological processes that affect SDC's woodlands include climate change and fire. Climate change may reduce natural regeneration and long-term tree health. As noted above, California oaks have evolved with fire and frequently survive or resprout from fire, unless temperatures or frequencies are unusually high. Fuel loads in SDC's oak woodlands are generally moderate. Long-term buildup of fuels and/or drought-stressed trees—which may accompany changing climate—may result in more damaging fires. Portions of the oak woodland on the east side of the property burned in October 2017. Mature trees appear to have been killed in some locations, especially near structures, which provided dense fuel sources. Away from structures, oak canopies frequently appeared to have been partially or mostly

killed by heat. However, new growth was observed on many of these trees in November 2017, indicating recovery is likely. Apparently intact acorns were also observed on the ground. The burn appeared relatively patchy and roughly 30% of mature trees within denser oak stands appeared not to have been damaged by the fire. A spring 2018 review of site conditions is recommended to assess status, outlook, and restoration needs for oak woodlands in this area more definitively.

The oak woodlands and savannahs of SDC serve important functions of biodiversity conservation, wildlife habitat, carbon sequestration, soil conservation, and water supply and water quality protection.

GRASSLANDS

Grasslands dominate the eastern side of SDC, and also occur in patches interspersed with the woodlands on the slopes of the western side. They occupy approximately 210 acres. The eastern grasslands, used for agricultural purposes historically, are primarily composed of non-native annuals. The smaller patches of grassland to the west typically have a strong component of native perennial grasses within a matrix of annual species. Scattered mature oaks are also present in most of the grasslands.

The perennial bunchgrass-dominated habitats have clumps of long-lived grasses interspersed with forbs and annual grasses. California oatgrass and purple needlegrass

are the most abundant bunchgrasses. Native perennials are common, including milk maids, blue-eyed grass, California buttercup, narrow-leaved mule's ears, soap root, yellow mariposa lily, and hedge nettle. Native annuals including tarweeds and purple clarkia are present in low numbers. Many of the non-native forbs and grasses found in the site's annual grasslands are also present here.

Non-native annual grassland occurs throughout the eastern portion of the site. This grassland type is more homogeneous in structure than native grassland. The dominant annual grasses form a uniform cover rather than the patchy cover provided by perennials. Non-native forbs are common, while native forbs occur sporadically at low cover. Invasive species including fennel, yellow star thistle, Klamathweed, and medusahead are also common. The natives present include the disturbance-adapted common fiddleneck, miniature lupine, and California buttercup. Weedy invasive species are especially common along roads and trails and near structures.

As described in the Oak Woodland section, coyote brush is common in some areas transitional between grassland and woodland. Coyote brush is a disturbance-adapted species that often facilitates the re-establishment of oaks in previously logged, grazed or otherwise disturbed areas, providing shade for the seeding oaks and then dying out as the oaks in turn shade the coyote brush. Within low-lying grasslands, a few seasonal wetlands are present; see Wetlands section below.

In comparison with other Sonoma County grasslands of similar extent and use history, SDC's grasslands have a strong component of native species and limited invasive species infestations. Most of the upper grasslands have a substantial element of native perennial grasses. On adjacent properties, most low-lying grasslands have been developed for row crops or vineyard, making SDC's eastern grassland, with its scattered oaks, an important remnant habitat.

Key ecosystem processes in SDC's grasslands include grazing, succession, and fire. Historic livestock grazing has strongly shaped most of the grasslands of the county (and the State), and SDC is no exception. Current livestock use is relatively light. Future livestock management methods will play an important role in the fate of native grassland stands and the spread of invasive species. Succession is occurring in some areas as apparently disturbed areas transition from grassland to shrubland, and likely to woodland in the future. California grasslands are adapted to fire, with annual species typically reseeding readily and perennial species surviving most fires unless burn temperatures are unusually elevated. The adjacent Bouverie Preserve, Sonoma Mountain Ranch, and other conservation landowners in the region are experimenting with the use of prescribed fire to encourage native grassland diversity. Grassland east of Arnold Drive burned in October 2017. Dense new growth was already present by PCI's November visit. The burn may have a limited effect on



- ① *Typical grassland on upper western slope at SDC*
- ② *Yampab, native bulb common in less-disturbed SDC grasslands Yampab once served as an important food*
- ③ *Native oatgrass along trail*

species composition in the grassland but is not expected to have long-lasting effects unless firefighting efforts introduced new species.

Native grasslands on SDC serve important functions of wildlife habitat, biodiversity conservation, soil conservation and water quality protection, and carbon sequestration. Non-native annual grasslands provide similar functions, but to a lesser degree. The grasslands have also served to support livestock grazing.

RIPARIAN FOREST

Riparian forest follows the course of Sonoma Creek through the property, occupying approximately 25 acres. The width of the riparian woodland along Sonoma Creek is typically 150-300'; in some areas this is further buffered from development by other oak woodland types. Sonoma Creek's total riparian corridor is widest at the northern end of the property, where the creek meanders away from Arnold Drive. The width of the Asbury Creek riparian corridor is relatively unconstrained by development, shaped instead by terrain and access to water. The Hill Creek riparian corridor is limited where it flows through campus; some buildings are as close as 25-30' from the creek thalweg, and for most of this reach, there is only one tree canopy-width of native vegetation present on each side of the creek.

Along Sonoma Creek, white alders line the channel. Bays and oaks are abundant

on the banks, bigleaf maple is common, and stands of willow occur in scattered locations. Along the tributaries to Sonoma Creek, narrow bands of alders continue in lower locations but redwoods, bays, maples, and other trees of the mixed evergreen forest are dominant higher in the watershed. Occasional Oregon ash trees are also present. Some dieback of alders was noted, which may reflect recent drought conditions.

The understory along Sonoma Creek is comprised of a dense tangle of shrubs, vines, and herbs. Immediately along the active channel, native rushes and sedges are common, but upslope of the active channel, vegetation is largely non-native, as is typical of Sonoma County's major creeks. Himalayan blackberry and vinca are abundant. Invasive giant reed (*arundo*) occurs in patches.

Along the tributaries, these same invasive species are common in the understory of the lower reaches. French broom is dense in some places, and wild plums are also common. Further upstream, the understory is dominated by native shrubs and ferns.

As in other habitats, invasive species along the creek can limit native plant diversity, change habitat structure, alter hydrology, and exacerbate erosion concerns. Invasive species are typically fast-growing and often create very dense stands, excluding other species with their intense competition for space, light, and water. As a result, the multiple layers of vegetation in a healthy



Alder-dominated riparian forest along Sonoma Creek, in winter (top). Riparian woodland along Sonoma Creek and upper Hill and Asbury Creeks includes native understory shrubs like spicebush (bottom).



Riparian corridor along upper Hill Creek, dominated by redwood and bay (top). Riparian habitat along lower Hill Creek includes dense infestations of Himalayan blackberry and other invasive species (bottom).

native riparian setting—from herbs and shrubs to vines and trees—can be reduced to a single layer of vegetation, such as Himalayan blackberry. This in turn reduces wildlife habitat diversity. The loss of varied native plant types, with their varying root structures, can also mean reduced erosion resistance. For instance, Himalayan blackberry, with its relatively shallow roots, does not protect stream banks as well as a native mix of fibrous-rooted sedges and rushes with trees like oaks and alders, which are extensively rooted at multiple depths.

The riparian woodland on SDC is relatively wide in most areas and provides valuable shade and inputs of organic matter to the creek, supporting salmonids and other aquatic life. Despite the presence of invasive species, there are sufficient openings to allow native riparian trees to regenerate. The corridor is contiguous with riparian woodland upstream and downstream of the property, as well as being connected with intact upland habitats.

Key ecological processes in SDC’s riparian habitats include climate change and water flows. These two interrelated processes directly drive riparian characteristics. As flows become more variable and temperatures increase, riparian vegetation is likely to undergo drought stress and could diminish in extent. Levels of water diversion also influence the extent and health of riparian plant communities.

Stream corridors and their adjacent

vegetation serve important functions of wildlife habitat and connectivity, climate change refugia, soil conservation and water quality protection. SDC’s riparian woodland is especially valuable as its width and connection to upland habitats increase its value for wildlife habitat and movement, tree regeneration and recruitment, and temperature buffering.

WETLANDS

Wetlands occur in several locations on the property, occupying a total of approximately 30 acres. Aquatic and wetland vegetation is present in narrow bands along the shorelines of Fern Lake and Suttonfield Lake. A large seasonal wetland (which comprises most of the 30 wetland acres on the site) is present in the eastern grassland. Small, scattered seeps and swales support small seasonal wetlands elsewhere on the property, including along drainages, below the Fern Lake dam, and below the water treatment plant.

Along the lakeshores, emergent species including native tule rushes and cattails are common. At the edges of the water surface itself, native mosquito fern is present in some places. Barber et al. (2012) also noted submerged vegetation including invasive hydrilla, native common waterweed, and unknown species of water milfoil and pondweed. Adjacent to the seasonally fluctuating water’s edge, common native and non-native wetland species adapted to shallower water and seasonal drying occur. A dense stand of invasive teasel is present

at the north end of Fern Lake; invasive poison hemlock and Harding grass are also common.

In the eastern grassland, a large wet meadow is present below a small created pond. A grassy swale leads down from the pond onto the gentler terrain west of the agricultural buildings, where it becomes a shallow, straightened channel, which may have been created or altered historically to improve drainage for agricultural use. This channel leads through a culvert under Sunrise Road. Downstream of Sunrise Road, the channel continues as a narrow ditch along the periphery of the meadow. Another drainage channel is present along the eastern edge of the meadow below Sunrise Road. See Figure 5-4. Soils in the wetland have concentrations of oxidized iron, a typical seasonal wetland indicator that results from extended periods of saturation.

Vegetation in the wet meadow is dominated by non-native species adapted to seasonally moist, marginal wetland conditions, including perennial grasses and forbs and Himalayan blackberry. In wetter areas near the center of the wetland, patches of native species that require more moisture are present, including rushes and sedges. Several mature willows are present, which suggests the site may have been



Horses grazing in large wet meadow on east side of site. (Top) Roulette Springs wetland. (Bottom)



Figure 5-4
WET MEADOW ON EAST SIDE OF SDC SITE

wetter in the past. There are also several young valley oaks present. The area is currently grazed lightly by horses. Based on the historical ecology study of Dawson et al. (2016), the wetland appears to have been present at the time of European settlement, in the mid-1800s, as well. The wet meadow area burned in the October 2017 wildfire, but was already dense with new green growth by the time of PCI's November visit. The burn may have a limited effect on species composition in the meadow but is not expected to have significant long-term impacts unless debris or contaminated runoff from adjacent buildings is allowed to enter the wetlands.

Seep, swale and riparian wetlands on SDC are dominated by perennial herbaceous species adapted to seasonal to perennial moisture. In drier seeps and swales within grassy areas, non-native seasonal wetland species dominate. The riparian wetlands occur in less disturbed settings, beneath forest canopy, and are generally dominated by native species. These include small patches of wetlands in relatively level areas along upper Asbury Creek, and more extensive, well-developed wetlands surrounding Roulette Springs. Sedges, horsetail, and ferns are common in these riparian wetlands.

The Roulette Springs wetlands occupy approximately 0.8 acre in a gentle swale below Fern Lake in the upper watershed of Asbury Creek. (No formal jurisdictional delineation has been performed; wetland boundaries were estimated based on vegetation and hydrology observations

in the field in combination with existing aerial imagery and topographic data.) The wetlands occur mostly under the canopy of redwoods. These wetlands are fed by perennial springs and support stands of panicked bulrush, mugwort, knotweed and sneezeweed as well as the ferns and monocots found in the other riparian wetlands. Sapling bigleaf maples, bays, and redwoods as well as spicebush are present in some locations. Water from Roulette Springs is diverted for SDC use, and a network of water transport channels and other infrastructure is present. These diversions and channels may reduce the extent and development of the wetlands; further study would be needed to confirm and quantify these impacts.

The habitat integrity of SDC's wetlands varies. The lower-lying wetlands are low in native species diversity and are heavily influenced (or created) by human land and water use, while upper riparian wetlands are smaller but less disturbed, and more diverse in terms of structure and composition. The hydrology and vegetation of the eastern wet meadow is likely strongly influenced by the upstream impoundment, multiple drainage channels, and history of livestock use. The riparian wetlands along upper Asbury and Hill Creeks are small but less disturbed, and are high in native diversity and habitat value. The Roulette Springs wetlands are relatively large (compared to the other riparian wetlands), and are also high in native diversity, and habitat value, despite ongoing water withdrawals and infrastructure that have occurred since 1897.

While small seep wetlands are relatively common on undeveloped lands on the slopes of Sonoma Mountain, larger lower-lying wetlands are rare in the Glen Ellen area, where filling and leveling for agricultural uses has dramatically reduced their extent. Well-developed riparian wetland complexes like that of Roulette Springs are uncommon on the slopes of Sonoma Mountain.

Key ecosystem processes that shape SDC's wetlands include grazing, water flows, and climate change. Livestock grazing has shaped species composition in the wet meadow. The interaction of water inputs from rainfall, diversions, impoundments, drainage ditches, and drought stress from climate change affects the wetlands' extent and species composition.

Wetlands provide groundwater recharge, mitigate storm flows, and filter contaminants and sediments from runoff. Aquatic and wetland vegetation also provide wildlife habitat, protects soil from erosion. The reservoirs provide additional wildlife habitat, as well as serving as water storage for human needs.

ORNAMENTAL LANDSCAPING AND REMNANT ORCHARDS

Within the central campus, there are many mature trees that have been planted for landscaping purposes which provide ecological benefits as well as shady, beautiful places for people to enjoy and

an important component of the historic landscape. Large, spreading magnolias, tall sycamores lining the streets, palms and many other species provide wildlife habitat and shading of buildings. The variety, size, and beauty of the campus plantings are unusual for the Sonoma Valley, providing an almost arboretum-like character.

Remnant native valley oaks are present on the southwestern portion of the central campus as well, and native riparian trees have been retained along the creek where it divides the campus. Remnant orchard plantings are present, including a grove of large walnuts on the southeast side of the property near the John Mesa fields, and a few old apricot trees behind (east of) the Camp Via buildings. Additional historic orchard is present just west of Camp Via, on what is now Jack London SHP, and Jack London Park Partners is tending those trees (pruning deadwood, thinning fruit) to help prolong their lives.

Most of the landscape trees are situated within irrigated lawns, and probably benefit from that added water and/or have become reliant on it. SDC staff noted that tree dieback resulted when irrigation was cut back in response to recent drought, and a number of dead or stressed trees were apparent in summer 2017.

FISH AND WILDLIFE RESOURCES

SDC's wildlife habitat diversity reflects that of the county, providing nesting opportunities, food, shelter, and water for many of the county's animal species. The property is located at the core of the Sonoma Valley Wildlife Corridor, serving as an important movement corridor at both a local and regional scale. SDC itself is large and diverse enough to sustain many wildlife species throughout their life cycles. Its expansive undeveloped lands contribute to the genetic diversity that helps build resiliency in regional wildlife populations. Special-status California freshwater shrimp, northern spotted owl, foothill yellow-legged frog, California giant salamander, and steelhead are all known to occur on or adjacent to the property.

WILDLIFE HABITAT CONNECTIVITY

SDC is situated at the heart of the Sonoma Valley Wildlife Corridor (Figure 5-1) and is a key linkage in a larger corridor from coastal Marin to eastern Napa County. With only half of the land comprising the Sonoma Valley Wildlife Corridor (i.e., approximately 5,700 acres of the approximately 10,000-acre corridor) under permanent protection for natural resource conservation, much of the remaining land is subject to development pressure and the permeability and integrity of the Corridor is at risk (SLT 2014a). (Approximately 175 additional acres within the Corridor have conservation easements protecting intensive agricultural uses, including

vineyard; these are not considered part of the protected Corridor since their wildlife permeability is generally lower.) Development within the Corridor has potential to affect the long-term survival of local wildlife populations.

Beginning in the 1990s, the Sonoma Valley Wildlife Corridor began to be recognized as an area of significant wildlife presence and movement (SLT 2014a). Early efforts by SDC staff and SEC were successful at advocating for the inclusion of the property and surrounding lands as a crucial wildlife corridor in the General Plan 2020 (Sonoma County 2008). The lands south of Glen Ellen connecting Sonoma Mountain and the Mayacamas Ranges, including SDC, were identified as an important linkage. Subsequent studies, including the Conservation Lands Network project (Bay Area Open Space Council, 2011), Critical Linkages: The Bay Area and Beyond (Penrod et al. 2013), have supported these findings.

SONOMA VALLEY WILDLIFE CORRIDOR PROJECT

In 2013, Sonoma Land Trust initiated the multi-year Sonoma Valley Wildlife Corridor Project. The goal of the project is to assess the permeability of the Corridor, develop a set of management and monitoring recommendations, and protect key properties that provide critical wildlife passage features. Components of the larger project include the Management and Monitoring (Strategy) report (SLT 2014a)

and Sonoma Valley Wildlife Corridor Road Underpass Use Report (2013-2014) (SLT 2014b).

The Strategy document identifies SDC as a critical path in the Corridor and states that permeability constraints here can have a significant detrimental impact on the function of the overall Corridor (SLT 2014a). While the SDC property was not formally assessed in that effort, potential factors affecting wildlife use were identified that require further evaluation including "some aspects of recreation, such as quantity of visitors, presence of dogs, night versus day use." The Strategy did identify the permanent conservation of SDC as a means to ensure protection of the larger Corridor.

Subsequent to the Strategy report, UC Berkeley researchers completed a connectivity analysis for Sonoma Land Trust with a specific emphasis on SDC (Gray and Merenlender 2015). Their research modeled the degree of wildlife "permeability" on the SDC property. They found that the northern portion of SDC has relatively high permeability. However, the network of roads, especially Arnold Drive, and the high density of development in the center of the property, pose the greatest obstacles for movement through the property.

As part of the multi-year project, SLT established wildlife camera monitoring stations in the Corridor, including two on Sonoma Creek on SDC land (SLT 2014b). A goal of the camera

monitoring was to determine whether undercrossings of Highway 12 and Arnold Drive are facilitating wildlife movement. Camera monitoring data shows high wildlife use in undercrossings, especially creeks, as animals navigate through the valley. Protecting lands adjacent to undercrossings, controlling domesticated animals, and maintaining undercrossings both within SDC and across the Corridor will be critical for wildlife survival.

AUDUBON CANYON RANCH MOUNTAIN LION PROJECT

Audubon Canyon Ranch (ACR) has recently undertaken a community-based research and education project, ACR Mountain Lion Project, to expand the understanding of mountain lions in the Mayacamas Mountains and extending into Sonoma Mountain and SDC lands. Movements of mountain lions fitted with GPS collars are being tracked over a study area encompassing approximately 1,000 square miles in Sonoma and Napa counties. The goal of the project is to understand the behavior, population size, feeding habits, home range, and movements of this top predator. The results of the project will provide valuable information on priority habitats areas for conservation and use of the Sonoma Valley Wildlife Corridor.

Currently, ACR is actively tracking four lions in the Sonoma Valley area – one adult female (P1), a female offspring of P1 (P2), a male with overlapping territory

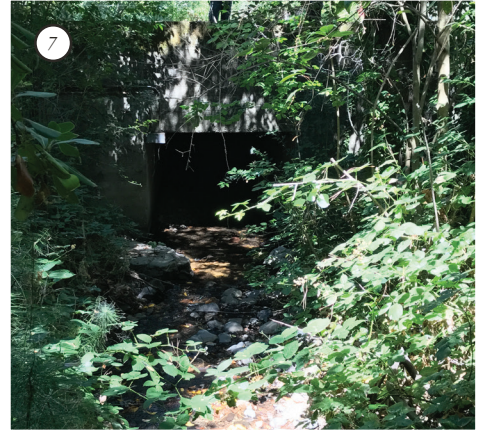
(P5), and a female near Sonoma (P4) with two cubs (not collared). Based on ACR's observations, the primary limitation for mountain lion use of the SDC area is the extent of developed land and loss of natural vegetation, rather than roads as specific movement obstacles.

WILDLIFE CROSSINGS

To supplement the work completed by SLT (SLT 2014a and 2014b), Prunuske Chatham reviewed the undercrossings (culverts and bridge underpasses) of major roads on the SDC site to assess their potential to facilitate wildlife movement. Suggestions for potential enhancements can be found in Section 5.6: Considerations for Reuse and Conservation, and shown on Figures 5-13 through 5-15.

FENCING

The property also includes many perimeter and cross fences that restrict wildlife movement. Much of this fencing also poses a danger to wildlife that try to cross. Fences across key movement areas and near water sources are of particular concern. Removal of unnecessary interior and perimeter fencing, and working with other landowners within the Wildlife Corridor to remove interior and perimeter fencing, and replacement of required perimeter fencing with wildlife friendly materials as appropriate (Hanophy 2009) would improve wildlife permeability.



1 Crossing 1. North Butler Canyon Creek/
Highway 12
Blackberry thicket at North Butler Canyon Creek
crossing.

4 Crossing 4. North Sonoma Creek/
Arnold Drive
Looking upstream at North Sonoma Creek
crossing

7 Crossing 7. Hill Creek/
Arnold Drive
Looking upstream (left) and downstream (right) at
Hill Creek at Arnold Drive crossing

2 Crossing 2. South Butler Canyon Creek/
Highway 12
South Butler Canyon Creek crossing; note banana
slug crossing at bottom right

5 Crossing 5. South Sonoma Creek/
Arnold Drive
Looking downstream at South Sonoma Creek
crossing

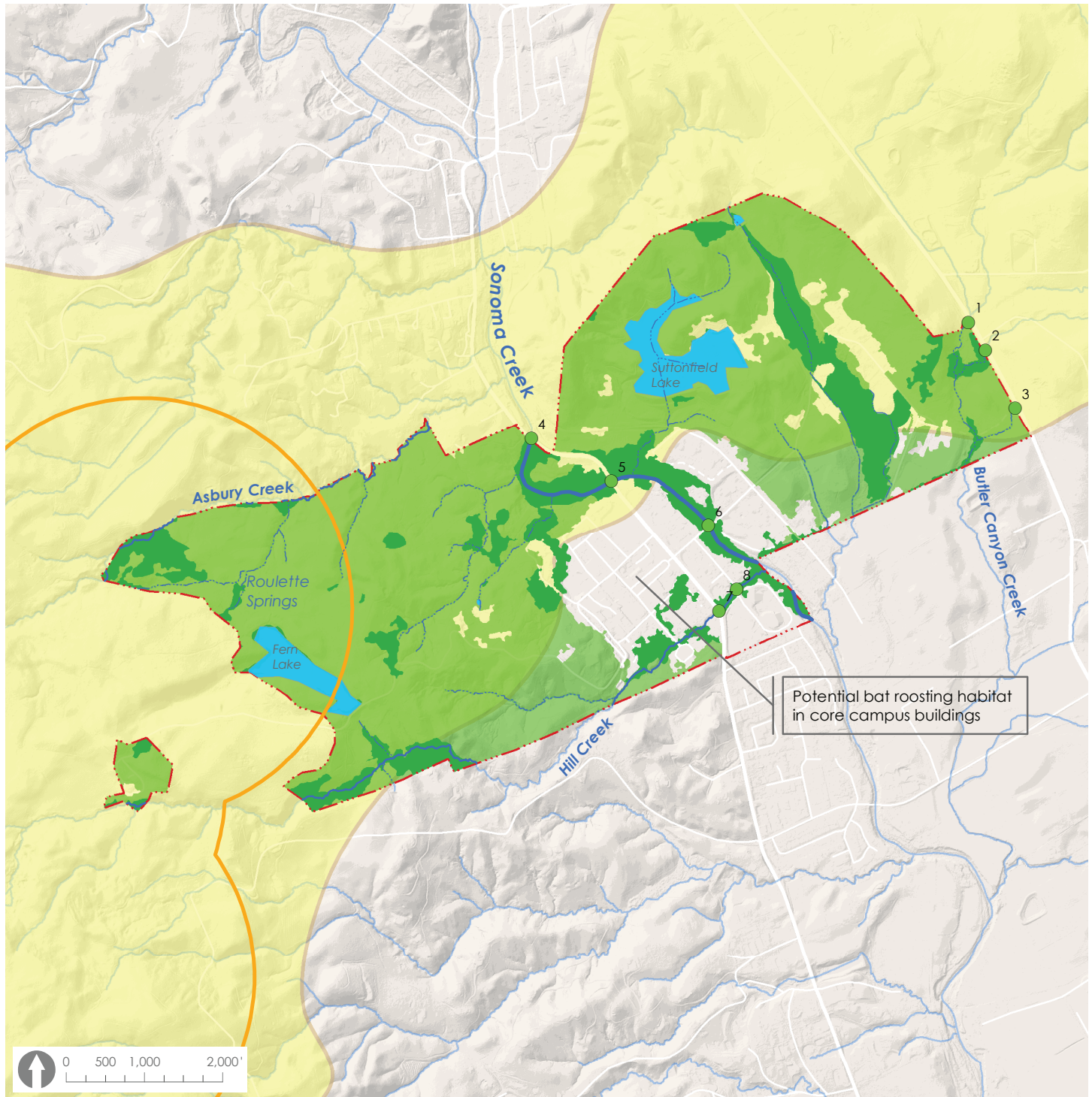
8 Crossing 8. Hill Creek/
Redwood Drive
Looking downstream at Hill Creek and Redwood
Drive crossing.

3 Unnamed Butler Canyon Creek/
Highway 12
Unnamed Butler Canyon Creek crossing post fire
in November 2017

6 Crossing 6. Sonoma Creek/
Harney Drive
Looking downstream at Sonoma Creek crossing at
Harney Drive

9 Fencing: Strands of barbed wire between oak trees
above Suttonfield Lake.

Figure 5-5
SENSITIVE NATURAL RESOURCES



SDC Property

Vegetation

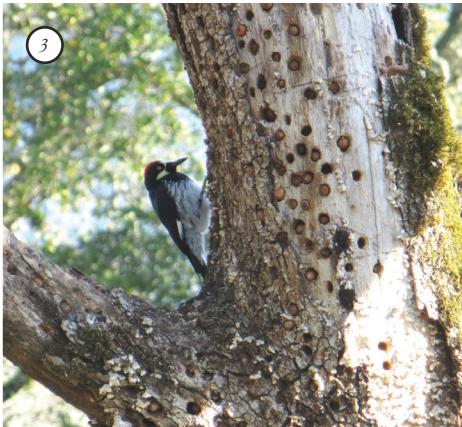
- Sensitive vegetation types: riparian, wetland, redwood, valley oak, Oregon oak, madrone
- Other natural vegetation

Water Resources

- Sonoma Creek
- Hill and Asbury Creeks
- Seasonal streams
- Lakes and ponds

Wildlife Movement and Habitat

- Critical wildlife corridor
- Undercrossings
- Northern spotted owl - 800 m buffer from known occurrences



- 1 *California towhee in oak woodland habitat.*
- 2 *Red-breasted sapsucker (woodpecker) feeding holes around oak tree on SDC; wells are excavated and sap allowed to accumulate for feeding.*
- 3 *Acorn woodpecker and acorn granary in SDC's woodlands.*
- 4 *Banana slug traveling through South Butler Canyon Creek underpass.*

WILDLIFE COMMUNITIES

FORESTS AND WOODLANDS

Forests and woodlands provide the greatest habitat diversity on SDC ranging from the dense, mixed-evergreen and shady redwood groves on the east-facing slopes and drainages of Sonoma Mountain to the mixed oak woodlands scattered throughout the property. Birds are the most abundant and prominent wildlife in these habitats.

Year-round residents documented at SDC include chestnut-backed chickadee, western-scrub jay, American robin, common bushtit, oak titmouse, Bewick's wren, California quail, dark-eyed junco, and spotted towhee. Migratory species observed and breeding within the property include orange-crowned warbler, Pacific-slope and ash-throated flycatchers, and swallows.

Tree-climbing birds such as woodpeckers, nuthatches, and brown creeper also frequent the property. Year-round residents include acorn, Nuttall's, hairy, and downy woodpeckers. Casual winter residents include red-breasted sapsucker (see photo), ruby-crowned kinglet, varied thrush, and Townsend's and yellow-rumped warblers. The dense fir and redwood patches are also key habitat for Sonoma County's largest woodpecker, the pileated woodpecker. Pileated woodpeckers can be heard frequently in the redwood-dominated drainages along Hill and Asbury Creeks—this is likely a pair of birds defending their territory, which they tend to do year-round.

Suitable foraging and breeding habitat also exists on the property for raptors. Red-tailed, red-shouldered, and Cooper's hawks have all been confirmed nesting nearby. Falcons, including American kestrel, frequent the area as well. Cooper's and sharp-shinned hawks, uncommon forest and woodland hawks, use the site especially in winter when they are more readily observed. Small vertebrates within the habitats serve as a food source for predatory hawks and falcons. The larger oak, fir, and redwood trees are prime habitat for nesting raptors. The large mature trees on the site provide excellent raptor nesting habitat.

Mature redwood and Douglas-fir habitats are likely to support special-status northern spotted owl given the close proximity to established territories and the large territory size of this species. There are documented territories just outside of the SDC property boundary on Jack London SHP and private lands (Evens 2009), and LSA (2001) documented three owls in the redwood habitat along Asbury Creek in June 2000. Further focused surveys for northern spotted owl within SDC are warranted to determine current habitat use and evaluate potential impacts of land use changes on this species. Dusky-footed woodrats are the preferred food source for spotted owls and occur within the understory of SDC's woodlands. Additional native owl species documented within SDC and nearby include barn owl, western screech-owl, great horned owl, and northern pygmy owl.

The woodland and forested habitats of SDC support a variety of mammals. Undisturbed habitats with limited human activity provide escape, cover, migration corridors, and nesting sites for a number of larger mammals. SLT has documented the occurrence of several mammal species in high numbers and on a routine basis via camera monitoring; these include black-tailed deer, raccoon, and gray fox (see Wildlife Habitat Connectivity above). All of Sonoma County's top predators - mountain lion, bobcat, and coyote have been documented on SDC as well (SLT 2014b). Native black bears are occasionally reported in the Sonoma Valley; a black bear was spotted on Hood Mountain in August 2017 by Regional Parks. However, black bears are fairly uncommon and not expected on SDC with any regularity. California ground squirrels are abundant on the property. The diversity of forested and wooded habitats on SDC and their proximity to aquatic habitats also provides excellent foraging and roosting habitat for bats, including several special-status species.

Native oaks at SDC provide important food and shelter for wildlife. Every part of the oak tree is utilized as forage by native fauna. Perhaps the most widely recognized source of food is the acorn. This high-energy food is used heavily by acorn woodpeckers, western-scrub jays, and western gray squirrels. Individual trees are also important food storage sites for acorn woodpeckers, which cache acorns for future consumption, particularly in dead and dying oak trees. Many acorn caches occur throughout SDC (see photo).

On the woodland and forest floor, woody debris piles and layers of duff provide habitat for amphibians. Locally common amphibians including *Ensatina*, California slender salamander, and arboreal salamander are likely to occur on SDC. Common reptiles of this community include Skilton's skink, fence lizard, alligator lizard, common kingsnake, rubber boa, gopher snake, rattlesnake, and ring-necked snake. SDC also supports habitat for a variety of native butterflies, other beneficial pollinators, and additional invertebrates. Banana slugs are common; a group of slugs were found burrowed into a damp bank along the Butler Canyon Creek. One slug crossed through the Highway 12 underpass (see photo below).

GRASSLANDS

SDC's grasslands provide cover for birds, small mammals, and reptiles, and provide food in the form of seeds, other plant parts, and insects. Oak trees scattered throughout the grasslands provide key habitat for birds and other wildlife; see Forests and Woodlands discussion. Many of the grasslands on SDC are also interspersed with coyote brush. These shrubby patches increase habitat complexity of the grasslands, providing additional perching, foraging, and nesting opportunities.

Grassland songbirds, including grasshopper sparrow, rufous-crowned sparrow, savannah sparrow and western meadowlark, use the property for nesting. Western bluebird, loggerhead shrike,



*Black-tailed jackrabbit at woodland edge (Top).
Western fence lizard in open grassland habitat
(middle). Rattlesnake on Sonoma Creek.
(Bottom)*

and Say's phoebe also utilize grasslands, especially when there are adequate perches to forage from. Predatory hawks and owls, including American kestrel, white-tailed kite, and barn owls, frequent these areas as well. Red-shouldered hawks are frequently seen flying from the woodlands areas to grasslands in search of food. Small vertebrates and invertebrates within the grasslands are a key food source predatory birds.

Subterranean foragers, such as Botta's pocket gopher and California mole, commonly occur in grassland habitats. Underground digging and mounds and small wildlife tunnels can be seen throughout the property and are clear indicators of the presence of subterranean wildlife and small mice and voles. Scattered oak trees and coyote brush provide additional browsing and protective cover for wildlife. Black-tailed jackrabbit (see photo) occur along the grassland edges and eat twigs, evergreen leaves, and bark from plants. Shrubs are important to many other mammals (e.g., bobcat, gray fox) as shade during hot weather. Reptiles of this community include western fence lizard, alligator lizard, western skink, and snakes. Bats also forage over grasslands. Seasonal wetlands mixed within the grasslands add to the habitat complexity.

RIPARIAN HABITATS

Riparian habitats tend to have an exceptionally high value for both aquatic and terrestrial animals. In general,

riparian habitats and stream channels provide nesting opportunities, food, and shelter, and may serve as corridors or refugia during migration for a variety of fish and wildlife species. Riparian vegetation provides foraging and nesting opportunities for birds. Herons and egrets forage for fish and other vertebrates in shallow waters, along with the fish-eating belted kingfisher. Birds like the black phoebe are seen sallying over water sources for aerial insects, and dabbling ducks such as mallards and wood ducks are frequently observed foraging within stream channels. Bird species observed along riparian corridors and in adjacent uplands on SDC include red-shouldered hawk, California quail, mourning dove, great horned owl, Anna's and Allen's hummingbirds, downy and hairy woodpeckers, western wood-pewee, Pacific-slope flycatcher, tree swallow, Steller's and western-scrub jays, chestnut-backed chickadee, bushtit, Bewick's wren, Swainson's thrush, American robin, wren, warbling vireo, orange-crowned, yellow and Wilson's warblers, black-headed grosbeak, spotted towhee, song sparrow, purple finch, and American goldfinch.

Aquatic salamanders, including newts and giant salamanders, utilize stream channels during the wet winter months, and terrestrial species (e.g., slender salamander, *Ensatina*) inhabit the adjacent woodlands. California giant salamander, a special-status species, has been documented in Asbury Creek (SSRCD 1996) and suitable habitat is also present in Sonoma and Hill Creeks. Sonoma and Hill Creeks support healthy

populations of western toad; toadlets were abundant during summer surveys of mainstem Sonoma Creek and at small wetland seeps on Hill Creek, where froglets of Sierran treefrog were also abundant. A single adult foothill yellow-legged frog was observed in Asbury Creek by PCI in July 2017; this is a new occurrence for this species in the watershed. California red-legged frogs occur within the Sonoma Mountain watershed and upslope of SDC on nearby SCAPOSD-owned properties (PCI 2012) but have not been confirmed on SDC. The most common reptiles of riparian habitats are the northern western pond turtle and aquatic garter snake; western rattlesnake have also been documented in the riparian habitats on SDC (see photo). Western pond turtles have been observed at the north Butler Canyon Creek crossing under Highway 12 (Nelson 2017).



Open channel under a canopy of alder on Sonoma Creek.

Mammals documented in SDC's riparian habitats include western gray squirrel, dusky-footed woodrat, northern raccoon, gray fox, and black-tailed deer (see discussion about beavers below in the Sonoma Creek section). In addition, common bat species may forage over stream channels and adjacent woodlands and roost within the larger trees. The stream channels themselves are an important habitat for a variety of aquatic organisms that serve as the food base for larger aquatic and terrestrial species. Fisheries resources and other aquatic species are described below for the individual watersheds. Riparian habitats act as key migration corridors at both a local and regional scale.



Schools of California roach at debris jam at Harney Drive.

SONOMA CREEK

Historically, the Sonoma Creek watershed supported the second largest steelhead run among Bay Area streams (Becker et al. 2007). Today, the mainstem and a number of tributaries still support notable runs of steelhead. However, steelhead production in the watershed is limited by the availability of suitable spawning habitat, availability of summer water, fish passage barriers, sedimentation, and water temperatures (SEC 2006). A few young-of-the-year steelhead were documented in the upstream reaches of Sonoma Creek in summer 2017.

In addition to steelhead, small numbers of adult Chinook salmon are frequently reported in the watershed; however, they are believed to be strays from the neighboring Napa River and not a self-sustaining run. The creek is also known



Instream habitat conditions on Hill Creek.

to support California roach, threespine stickleback, Pacific lamprey, Sacramento pikeminnow, Sacramento sucker, prickly sculpin, and riffle sculpin (Cox 2014, Penrod et al. 2013). Large schools of California roach were seen in summer 2017.

The SDC reach of Sonoma Creek also provides important habitat for a number of other aquatic species. The reach is known to support a fairly robust population of California freshwater shrimp, a federally and State endangered crustacean, with habitat conditions ranging from suitable to marginal (Cox 2014). Sonoma Creek throughout SDC provides undercut banks with overhanging willows, suitable for shrimp foraging and high refuge habitat. Freshwater shrimp are endemic to three California counties—Napa, Sonoma, and Marin—and four drainage systems within those counties. Sonoma Creek and Napa River form one



Habitat along tributary to Butler Canyon Creek

of these four drainages (USFWS 1998).

Sonoma Creek supports a small population of beavers. After being exterminated from the watershed in the mid-1900s due to the California Fur Rush, beavers returned in 1996 only to be trapped and killed once more after destroying merlot grapevines in a creekside vineyard. Community uproar and a shift in attitude ensued. Beavers have since returned, and now, sightings are common near Sonoma and Glen Ellen. On the SDC property, beaver dams and scat are frequently seen along the creek (Barber et al. 2012, Nelson 2015). Sonoma Creek and its tributaries also support river otter; river otter scat is abundant along Sonoma Creek through SDC.

HILL CREEK

In 2007, steelhead of unknown life stage were documented in Hill Creek 100 feet downstream of the road crossing at



Roulette Springs

Arnold Drive on SDC (Leidy et al. 2005). SEC reported seeing a small number of steelhead young-of-the-year and one-year and older fish, at an unreported location (Leidy et al. 2005). California roach and sculpin have been documented in the watershed (Leidy 2008). PCI did not observe any fish during surveys in summer 2017, but the creek flows perennially and supports pools and shallow riffles that are potentially suitable for spawning. Based on SEC (2007), Hill Creek supports high quality steelhead habitat in the upper watershed, with suitable wood and canopy coverage, but limited aquatic life. The creek experiences high sediment loads and has documented fish barriers, which may limit fish within the watershed. It is possible that with the removal of the instream barriers and addressing the sediment issues, the watershed could support a small population of steelhead. Suitable habitat is also present for and other native fish and wildlife, including special-status foothill yellow-legged frog and California giant salamander, which occur in nearby Asbury Creek.

ASBURY CREEK

Dawson (2005), citing California Department of Fish and Game (now CDFW) stream surveys, notes that Asbury Creek historically supported a population of steelhead. From the early 1900s until the 1970s, Asbury Creek was a popular fishing location and evidence of steelhead spawning was documented. A severe decline (70-99%) in the population was

noted in the 1960s-1970s. Between 1974-1977, no steelhead were documented in the watershed based on CDFW survey data. Dawson (2005) notes a possible cause for the decline was the culvert at Arnold Drive.

In 1996, Southern Sonoma County Resource Conservation District (SSCRCD) and CDFW completed a survey of Asbury Creek from the confluence to the diversion structure on SDC (SSCRCD 1996). They noted six steelhead below the diversion structure; five one-year-old fish and one young-of-the-year. The survey was terminated at the diversion structure, but the team completed a visual survey for another 0.5 mile upstream of the diversion and documented no fish. SSCRCD(1996) noted that the 123' concrete culvert at the confluence with Sonoma Creek at Arnold Drive and an 84' concrete flume upstream of the culvert (both outside of SDC property) were partial fish barriers; they recommended baffles to improve fish passage at high winter flows. One of the structures was retrofitted in 2003. The SDC diversion structure and 2' high dam were also noted to be a fish barrier. The survey team also noted that the lower reaches of the watershed provided limited spawning habitat and the presence of fine sediment. In September 2002, wooden baffles were installed in the culvert and three rock step pools were constructed below the outlet (Young¹, 2018). According to Young, the retrofits are not functioning

well currently and need repair, and SEC considers this a priority site for potential fish passage work.

Geomorphic channel surveys completed in the watershed in 2003 noted that the creek provides relatively poor quality habitat (Tessera Consulting and SEC 2004). The channel is steep and confined to a narrow channel, and areas of unstable banks and impassible woody debris barriers are present. As part of the surveys, several human-made barriers to fish passage were noted including SDC's diversion structure and a downstream culvert (Tessera Consulting and SEC² 2004). PCI did not observe any fish during surveys in summer 2017.

Based on these watershed conditions, there are numerous factors that may limit fish utilization within Asbury Creek. However, stream reaches do support perennial water with instream habitat and steelhead were present in the past. Special-status, perennial stream-dwelling foothill yellow-legged frog was observed on Asbury Creek in July 2017; see Special- status Species below. Asbury Creek also supports special-status California giant salamander (SSRCD 1996). The potential for re-establishment of steelhead should be further evaluated.

BUTLER CANYON CREEK

Butler Canyon Creek is a seasonal drainage flowing across the southeastern corner of SDC. The creek supports no fisheries

resources on the SDC site. It does support wildlife habitat and seasonal habitat for aquatic species. As noted above, northern western pond turtles have been noted crossing under Highway 12 through a culvert on the creek. Improvements at all crossings are warranted; see Wildlife Crossings for additional information.

ROULETTE SPRINGS

Roulette Springs support potential habitat for foothill yellow-legged frogs, which occur downstream in Asbury Creek. Suitable foraging and refugia habitat is also present for California red-legged frogs. The shallower, fish-free aquatic habitat present at the springs is a habitat type not present at the reservoirs. However, the current water diversions at the springs may limit wildlife use and availability of water for local wildlife. Old barbwire fences near the springs are not wildlife friendly and warrant removal.

FISH PASSAGE BARRIERS

Section 5.6: Considerations for Reuse and Conservation features photos and brief descriptions of potential fish barriers on Sonoma, Asbury, and Hill Creeks on or adjacent to the SDC property, with recommendations for potential enhancement. Locations of potential enhancements are shown on Figures 5-12 through 5-14.

1 Young, Alex. 2018. Personal communication (email) from A. Young, GIS Manager, Sonoma Ecology Center, to J. Michaud and J. Schwan (PCI). August 23, 2018.

2 Tessera Consulting and Sonoma Ecology Center. 2004. Geomorphic Channel Surveys. Appendix E to Limiting Factors Analysis Data. October 2004.

RESERVOIRS

Both Fern and Suttonfield lakes support an abundance of warm water fish including bass and sunfish. Non-native crayfish and American bullfrog have also been documented at Fern Lake (LSA 2001) and bullfrogs at Suttonfield Lake. These non-native species serve as food sources for wildlife, especially piscivorous birds like double-crested cormorant, hooded merganser, great blue heron, and belted kingfisher, all of which have been seen on SDC, and mammals like river otters and raccoons. However, non-native aquatic species can be detrimental to native fish and wildlife and need to be carefully managed. These non-native species can compete directly with and prey on native wildlife. For example, the presence of non-native fish and American bullfrog within the reservoirs may preclude California red-legged frog from successfully breeding

there. Bullfrogs are at a competitive advantage due to their larger size and longer breeding season. They have been known to prey upon red-legged frogs and outcompete the species. California red-legged frogs have not been documented in the reservoirs, but in the absence of fish these features would provide excellent breeding habitat. Both reservoirs provide suitable habitat for northern western pond turtle. Two turtles were observed in November 2014 in Fern Lake during a citizen science wildlife survey (Hunn 2015).

The open water reservoirs also provide foraging opportunities for waterfowl and wading birds which consume aquatic invertebrates and plants. Mallard, pied-billed grebe, western grebe, Canada goose, American wigeon, bufflehead, common goldeneye, ruddy duck, and great egret are common visitors to SDC. Smaller songbirds may use the habitats

for foraging and nesting. Black phoebes and swallows sally over aquatic habitats, catching insects on the wing. Red-winged blackbirds and marsh wrens commonly nest along reservoir margins in emergent vegetation. Many birds (e.g., swallows, Steller's jay, American robin) also rely on exposed mud banks along the water's edge for construction of all or portions of their nests. Small and large mammals are attracted to reservoirs not only as a direct source of water, but also to prey on abundant wildlife. The unobstructed open water is very important for bats which drink in flight and require large swoop zones. These reservoirs provide a year-round water supply for wildlife and serve as valuable watering holes when other sources have dried up.

WETLANDS AND PONDS

Wetlands and ponds on the SDC site support a suite of endemic invertebrates that are well-adapted to life in these seasonal environments. These include a variety of crustaceans such as clam shrimp, copepods, and water fleas, and aquatic beetles, dragonflies, damselflies, aquatic snails and worms, and zooplankton. These invertebrates serve as a food source for amphibians and birds.

Within the seasonal wetlands, shallow pockets of water provide breeding habitat for common Sierran treefrog, which is most active during winter months. The larger of the two ponds also support breeding western toad; toadlets are common along the water's edge in spring



Canada geese along the margins of Suttonfield Lake.



Widow skimmer dragonfly at Fern Lake.

and summer. Juvenile non-native American bullfrogs were observed at the large pond as well, suggesting this feature holds water throughout the year (bullfrogs require perennial water for successful breeding; they generally overwinter as tadpoles). Evidence of amphibian breeding was not observed at the water treatment plant pond, but it is likely an important resource for local amphibian populations and other wildlife species as well. Both ponds may support California red-legged frog breeding and foraging habitat, but they have yet to be documented on the property. The largest pond is stocked with mosquito fish. Associated wetland and adjacent upland vegetation provides additional foraging habitat, cover, and nesting sites for wildlife and an important water resource.

DEVELOPED AREAS

The wildlife habitat values of developed areas are generally considerably less than those of the surrounding natural habitats. Wildlife in the developed areas are typically more acclimated to human activity and include species common in urban and suburban habitats. Common mammals include native raccoon, striped skunk, and non-native Virginia opossum, rats, and mice. Black-tailed deer are common throughout the core campus. California ground squirrels and their burrows are abundant around John Mesa field and Camp Via. Ornamental trees and shrubs provide roosting and potential nesting substrate for numerous species of birds. Mature valley oaks and palms within the core campus are used by woodpeckers to cache acorns. MacDonald (2015) has made personal observations of a colony of hundreds of Vaux's swift emerging

from a chimney in one of the old buildings on the property. Buildings with minimal human intrusion and exterior access may provide roosting habitat for many local bat species as well. No formal bat survey has been conducted. Rattlesnakes are also common in the developed areas. According to SDC staff, they are found throughout the core campus and the cement sidewalks surrounding Camp Via are used extensively.

SDC supports known or potential habitat for a number of special-status species, which are afforded legal protections because they are at risk. These species require careful consideration for resource management actions or land-use changes.



Pond on east side of property.



Pond below water treatment plant.



Non-native American bullfrog at east side pond.

SPECIAL STATUS SPECIES

SPECIAL-STATUS PLANTS

Based on site conditions, CNDDDB data, and plant records from the vicinity (Calflora 2017), a number of special-status plant taxa have moderate potential to occur on SDC. No focused botanical surveys of the entire site have been undertaken to date. Surveys for this project were more general in nature and occurred after the typical blooming period for many species. Focused surveys are recommended if any development is proposed in natural areas. Figure 5-6 shows locations of special-status plants with CNDDDB records in the vicinity of SDC.

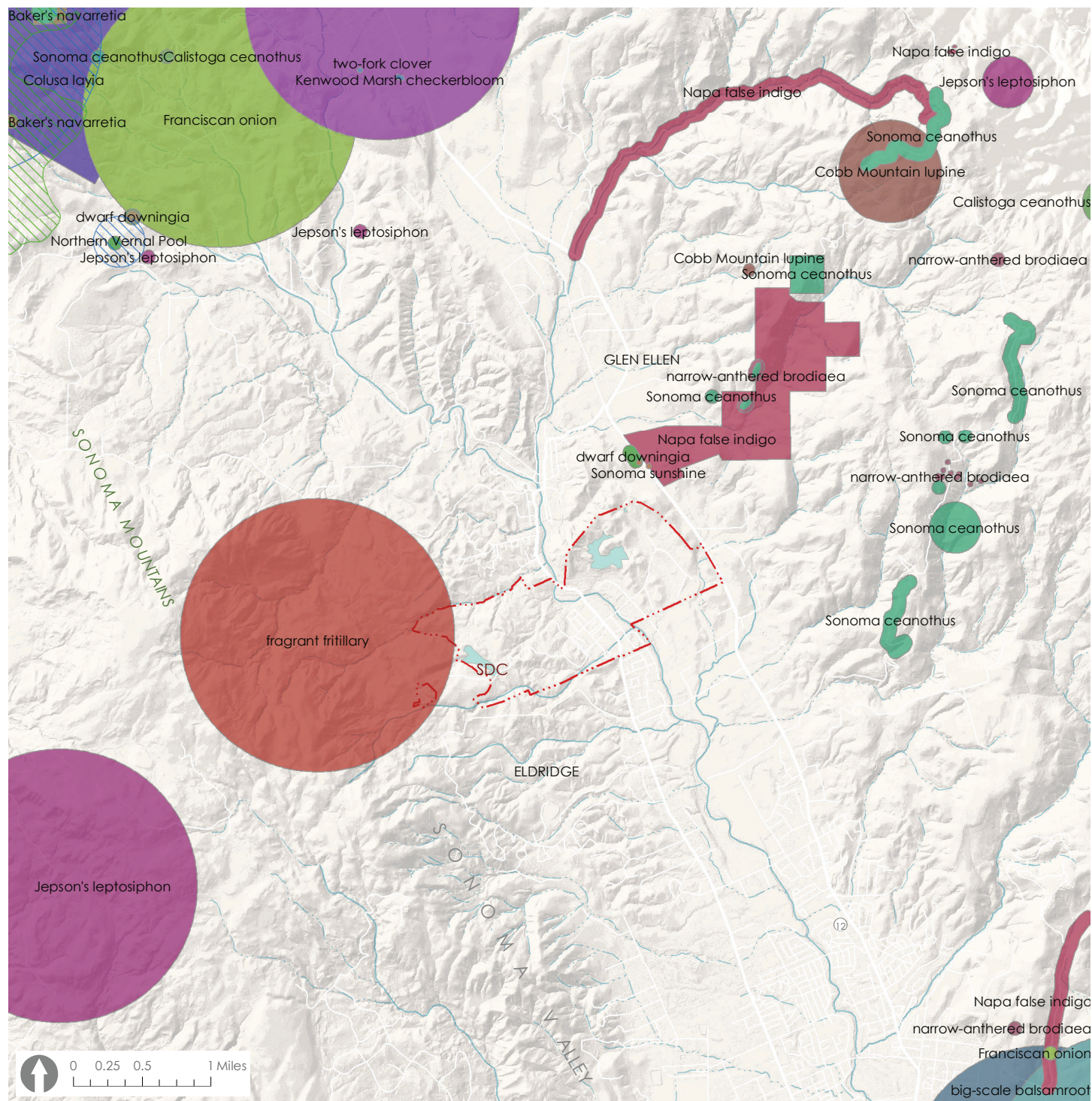
The following species have low to moderate potential to occur on the property. These are considered rare, threatened, or endangered in California and elsewhere, and fairly endangered in California (California Native Plant Society

Rare Plant Rank [CRPR] 1B.2) or of limited distribution in California, and fairly endangered in California (CRPR 4.2). See PCI's full report for detail.

- Big-scale balsamroot (*Balsamorhiza macrolepis*)
- Chaparral or redwood lily (*Lilium rubescens*)
- Fragrant fritillary (*Fritillaria liliacea*)
- Franciscan onion (*Allium peninsulare* var. *franciscum*)
- Harlequin lotus (*Hosackia gracilis*)
- Hayfield tarweed (*Hemizonia congesta*)
- Jepson's leptosiphon (*Leptosiphon jepsonii*)
- Napa false indigo (*Amorpha californica*)
- Narrow-anthered brodiaea (*Brodiaea leptandra*)
- Pink star-tulip (*Calochortus uniflorus*)

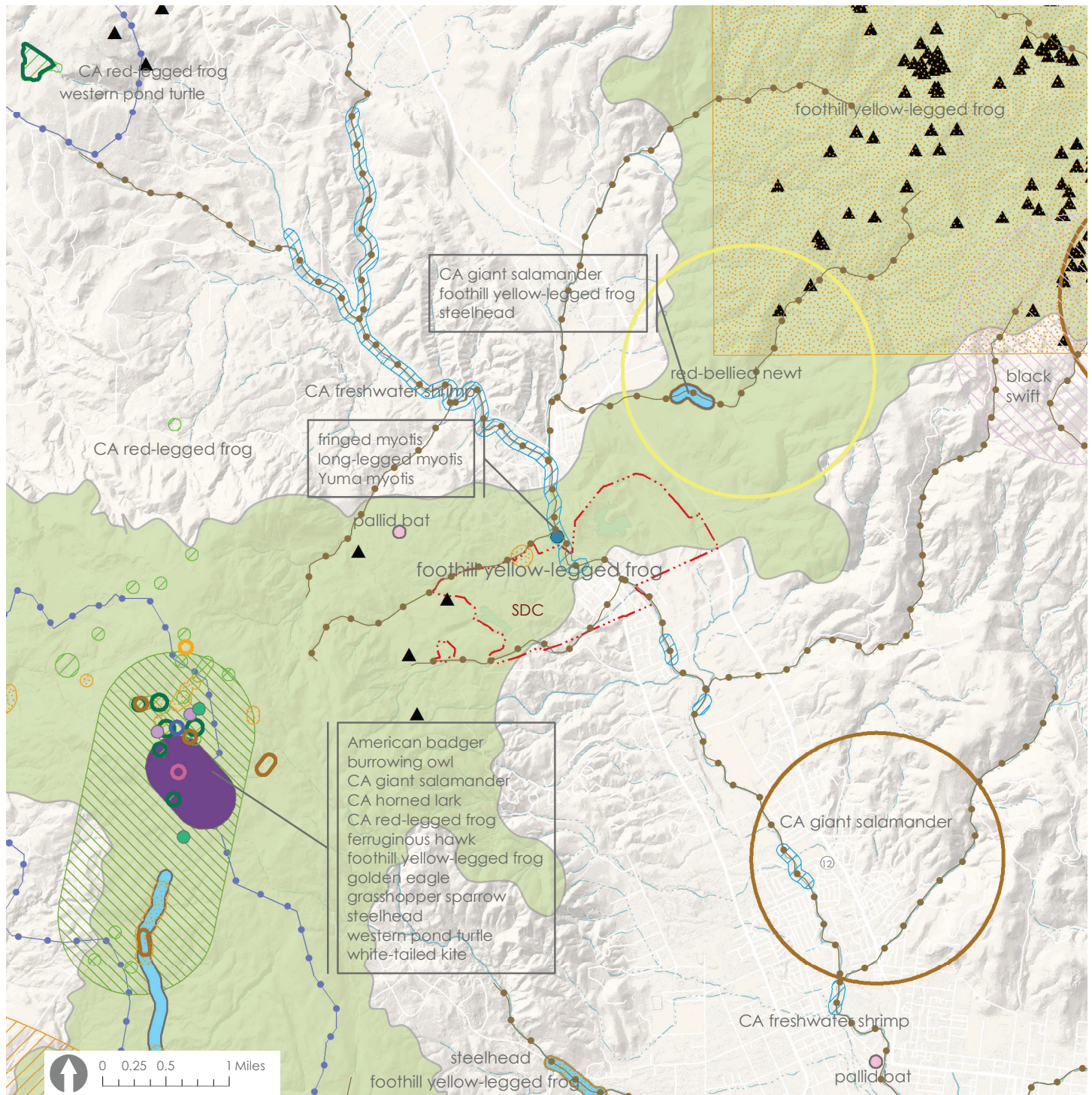


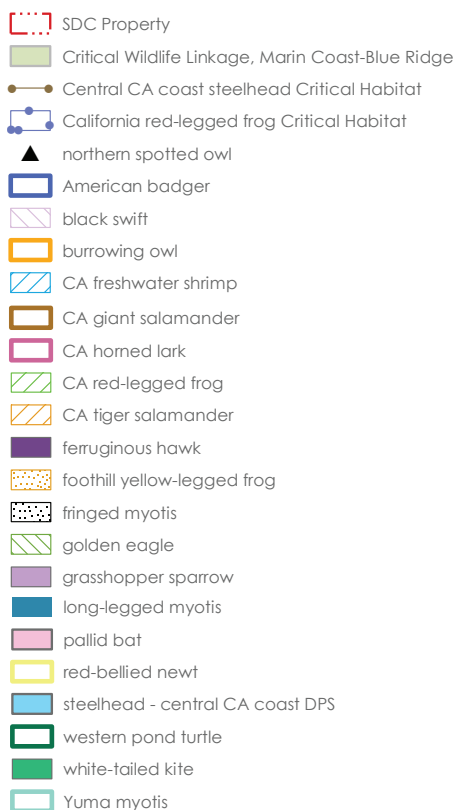
Figure 5-6
SPECIAL-STATUS PLANT AND SENSITIVE HABITAT OCCURRENCES



Note: Extents shown represent approximate locations as provided by the California Natural Diversity Database (CDFW 2018); species populations do not necessarily occupy all of each polygon. Fragrant fritillary has been reported from Jack London SHP but has not been observed on SDC.

Figure 5-7
SPECIAL-STATUS WILDLIFE OCCURRENCES & SONOMA VALLEY WILDLIFE CORRIDOR





Sources
 CNDDDB (CDFW), PCI, USGS

NOTES
 Map does not include records for non-listed invertebrates and species known to be extinct. See text.

SPECIAL-STATUS ANIMALS

The following descriptions include special-status animal taxa observed on SDC lands, identified as having a high potential for occurrence, or having historical significance. In addition, a number of special-status birds and mammals have been documented on the property or have potential to occur there; these species are indicated in the full biological resources report (Appendix A). The focus of this section is to highlight special-status¹ wildlife and fish species with the most pressing management needs. The presence or potential for occurrence of these species based on documented occurrences nearby warrants further consideration in site planning.

INVERTEBRATES

California Freshwater Shrimp (*Syncaris pacifica*; FE, SE)

The California freshwater shrimp is a small, 10-legged crustacean occurring in low-elevation and low-gradient perennial streams in Marin, Sonoma, and Napa counties. They are known to occur on the SDC property in Sonoma Creek. Local retired CDFW biologist, Bill Cox, has surveyed the SDC reach and habitats immediately upstream and downstream and found shrimp to be fairly abundant

¹ Listing Status: FE-federally listed as endangered, FT-federally listed as threatened, SE-state listed as endangered, ST-state listed as threatened, Candidate ST-state candidate to be listed as threatened under CESA, and SSC-California Species of Special Concern.

(Cox 2014). Portions of Hill and Asbury Creeks appear suitable to support this species and should be considered important habitat (LSA 2001)

FISH

Steelhead – Central California Coast DPS (*Oncorhynchus mykiss*; FT)

Steelhead are anadromous salmonids. They migrate upstream from the ocean during the rainy season, and spawn in freshwater streams. Juveniles remain in freshwater streams from one to three years. Steelhead are known to occur on the SDC property in Sonoma Creek. Steelhead have also been reported in Asbury and lower Hill Creeks. However, both tributaries have fish passage barriers that may obstruct movement in these drainages. Sonoma



California Freshwater Shrimp (Syncaris pacifica)

Creek has a partial barrier at SDC's intake. Two concrete sills are present at this location. One is notched but the other is not; the un-notched sill acts as a low-flow partial barrier. It most likely restricts passage during times when the water is lower, such as summer and fall, especially for juvenile fish, California freshwater shrimp, and other aquatic life. Sonoma, Hill, and Asbury Creeks are designated critical habitat for central California coast steelhead (USFWS² 2005).

AMPHIBIANS

California Giant Salamander (*Dicamptodon ensatus*, SSC)

California giant salamanders utilize wet coastal forests near permanent and semi-permanent streams and springs. Eggs are laid in water and larvae transform into land-dwelling salamanders. California giant salamanders were documented in Asbury Creek during a stream inventory of the watershed completed by CDFW in 1996 (SSRCD 1996) and during a survey by Barber et al. (2012). Salamanders may utilize Asbury, Hill, and mainstem Sonoma Creeks for breeding and adjacent woodlands during their terrestrial adult stage.

Foothill Yellow-legged Frog (*Rana boylei*, ST, SSC)

The foothill yellow-legged frog is found in or near partly shaded rocky streams (Thomson³² et al. 2016). Egg masses are attached to the downstream side of rock and gravel in shallow, slow, moderate-sized streams. During all seasons, this species is generally found in or within close proximity to streams. Foothill yellow-legged frogs are known to occur within tributaries to Sonoma Creek (CDFW 2018). In July 2017, PCI observed a single foothill yellow-legged frog in Asbury Creek on the SDC property. PCI observed frogs in the summer of 2014 in Stuart Creek, a Sonoma Creek tributary to the northeast of SDC, under similar habitat conditions (PCI 2014). They have also been recently sighted in tributaries on the west side of Sonoma Mountain in Adobe and Copeland Creeks (Wilcox 2015). Suitable habitat for foothill yellow-legged frog in present in Asbury and Hill Creeks, Roulette Springs, and mainstem Sonoma Creek within the SDC property. The current water diversions and instream barriers on SDC may limit the use of habitat by foothill yellow-legged frog by reducing the availability of water and restricting movement.

California Red-legged Frog (*Rana draytonii*; FT, SSC)

The California red-legged frog is most common in marshes, streams, lakes, reservoirs, ponds, and other water sources



California Giant Salamander



Steelhead



Foothill yellow-legged frog observed on SDC

2 US Fish and Wildlife Service. 2005. Critical Habitat for Central California coast steelhead (GIS data). Accessed at: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>.

3 Thomson, R.C., A.N. Wright, and B. Shaffer. California Amphibian and Reptile Species of Special Concern. California Department of Fish and Wildlife.

with plant cover. Breeding occurs in deep, slow-moving waters with dense shrubby or emergent vegetation. SDC's aquatic habitats could support breeding; however, the presence of non-native fish and bullfrogs may be precluding frogs from successfully breeding on the property. Frogs have been reported on SCAPOSD-owned lands on the north slope of Sonoma Mountain (PCI 2012), at Fairfield Osborn Preserve, and in Annadel State Park (CDFW 2018). Focused surveys at Jack London Lake in the adjacent Jack London SHP have not found any frogs, although suitable habitat is present (Fawcett 2011). All aquatic habitats on the property warrant further evaluation.

Red-bellied newt (*Taricha rivularis*, SSC)

Red-bellied newts are a stocky, medium sized salamander of coastal woodlands and redwood forests. Breeding occurs stream and rivers. The nearest red-bellied newt occurrence in the Sonoma Valley area is from a collection made in 1977 (CDFW 2018). The specimen was documented in a "mountain range overlooking Valley of the Moon." Additional sightings are reported to the north of SDC in Santa Rosa and Mark West Creeks. Suitable habitat for red-bellied newts is present within the SDC property.

REPTILES:

Northern Western Pond Turtle (*Actinemys marmorata*, SSC)

The northern western pond turtle is most commonly found in or near permanent or semi-permanent water sources in a variety of suitable habitats. Nest sites include areas with sparse vegetation of short grasses and forbs, in hard-packed clay or silt soils, and along south- or west-facing slopes (Bettelheim, 2005). The reservoirs and ponds on SDC and creeks support suitable habitat for pond turtles. This species is known to occur well upstream of the SDC near Oakmont (CDFW 2018). Sonoma Mountain Ranch Preservation Foundation (SMRPF) reports pond turtles on the top of Sonoma Mountain (SMRPF 2017). On SDC, two turtles were observed in November 2014 in Fern Lake during a citizen science wildlife survey. These were likely northern western pond turtles. Northern western pond turtle has also



California Red-legged Frog

been observed at the northern Butler Canyon Creek undercrossing of Highway 12 (Nelson 2017).

BIRDS

Northern Spotted Owl (*Strix occidentalis caurina*; FT, ST, SSC)

The northern spotted owl is an uncommon permanent resident of dense forest habitats in northern California. This nocturnal species requires dense, multi-layered canopy cover for roosting sites. Nest sites include tree or snag cavities or broken tops of large trees. Suitable habitat for spotted owls is present within the forested habitats on SDC. Established territories are reported in Jack London SHP just outside of the SDC property boundary and on adjacent private lands (Evens 2009). Given the close proximity of reported territories and existing conditions,



Northern Western Pond Turtle

the forest and dense woodland habitats on SDC are likely to support northern spotted owl. Further focused surveys for northern spotted owl within SDC are warranted to determine current habitat use and evaluate potential impacts of land use changes on this species.

MAMMALS

Mountain Lion

(*Puma concolor*; designated as a “specially protected mammal in California” under California Wildlife Protection Act of 1990)

Mountain lions occupy forested, wooded, and brushy habitats throughout their range. They are primarily solitary animals, shy, and seldom seen. Mountain lions are known to occur throughout the Sonoma and Mayacamas Mountains range and on SDC lands. As noted above, the ACR Mountain Lion Project is actively tracking four lions in the Sonoma Valley area – one adult female (P1), a female offspring of P1 (P2), a male with overlapping territory (P5), and a female near Sonoma (P4) with two cubs (not collared). Based on preliminary data by ACR, SDC is used primarily by P1 and P2 with occasional visits from P5. Most of the observations on SDC are limited to the west side of Arnold Drive in areas with some canopy cover. No detections have been made on the east side near Suttonfield Lake, but PCI noted the presence of mountain lion

scat during a field survey of this area. Not all lion movements are recorded by ACR given the current data collection methods. Further study of mountain lion habitat use and movement on SDC is warranted to evaluate potential impacts of land use changes on this species.

American Badger (*Taxidea taxus*)

American badgers are a widespread, uncommon resident across California; they are found year-round in Sonoma County. They occur in a variety of habitat types with dry, friable soils. In 2015, SMRPF documented the first American badger sighting in 20 years on the top of Sonoma Mountain (SMRPF 2017). In March 2015, badger activity was captured on a remote camera placed in a recently burned meadow. There is anecdotal information that a badger has been seen on the east slope of Sonoma Mountain closer to SDC, but the sighting has not been confirmed. Badger burrows and dens have not been observed on SDC, but suitable habitat is present. Further assessment of American badger activity on SDC is warranted to evaluate potential impacts of land use changes on this species.

BATS

SDC supports a wide variety of habitats that provide critical foraging and roosting habitat for a number of bat species. There are approximately 25 bat species with known occurrences within Northern

California, and at least 12 of these species have a high probability of occurring on SDC. Bats are highly mobile; many are migratory. Foraging habitats range from woodlands, forests, and grasslands to open water. While focused surveys for bats have not been performed on SDC, they would be sure to reveal a number of species utilizing the existing habitats or structures, especially given the age and condition of many of the buildings. One special-status bat species has reported occurrences near SDC (pallid bat, *Antrozous pallidus*, SSC) and another has high potential for occurrence (Townsend’s big-eared bat, *Corynorhinus townsendii*, SSC) (CDFW 2018). Additional bat species (i.e., fringed myotis, long-legged myotis, Yuma myotis) identified as having moderate to high priority for conservation by the Western Bat Working Group, may also occur on the property.



Pallid bat.

5.3 People and Land at the SDC Site

SDC's expansive landscape provides ecological functions that are critical to human well-being on the property and in the region. At the same time, the presence

and influence of people on the land and its functions is evident throughout. This section discusses the intersection of people and natural systems on the site,

with an overview of the idea of ecosystem services, followed by discussion of three important values offered by the SDC site: scenic views, recreation, and agriculture.

ECOSYSTEM SERVICES

Natural systems and their functions provide the foundation for human existence. To help illuminate this relationship, and to help people consider it in decision-making, natural functions are often described in terms of "ecosystem services." These services can be classified into four groups:

- Provisioning services – products including food, water, energy, and other raw materials for human activity
- Regulating services – natural processes that help maintain the conditions needed for human survival, such as purifying water and air, preventing erosion and flooding, regulating climate, decomposing of materials, and pollination
- Cultural services – non-material benefits supporting the development of ideas, knowledge, and well-being, including spiritual inspiration, educational and recreational opportunities and their benefits to human health
- Supporting services – the fundamental natural processes that allow all other services to continue. These include photosynthesis, nutrient cycling, and sustenance of biodiversity.

The SDC site provides--or has in the past or has future potential to provide--an array of valuable ecosystem services to the people of Sonoma County and beyond. Figure 5-8 provides a visual representation of how selected services are distributed across the site.

PROVISIONING SERVICES

- Production of timber, livestock, fish and game, fruit, crops
- Provisioning of surface and groundwater for drinking water, irrigation, and commercial use
- Pollination for agricultural plants

Provisioning services are generally the functions people are the most familiar with, and may be the easiest to place monetary value on. SDC's conifer forests and oak woodlands have historically provided timber for construction and wood for fuel. The grasslands and wet meadow have supported livestock for meat, milk, and working animals. Healthy soils of both uplands and lowlands on the site have supported orchard fruits and nuts and row crops. The site's forested slopes, healthy riparian zones, and wetlands

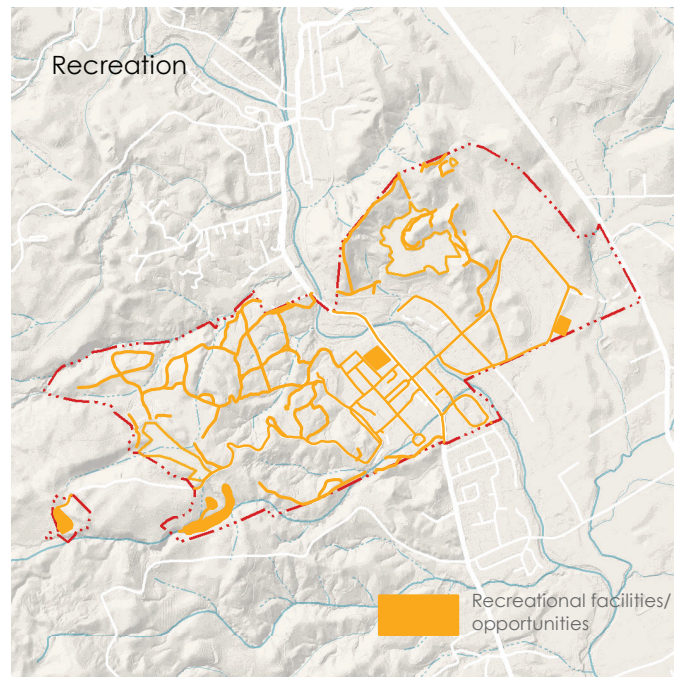
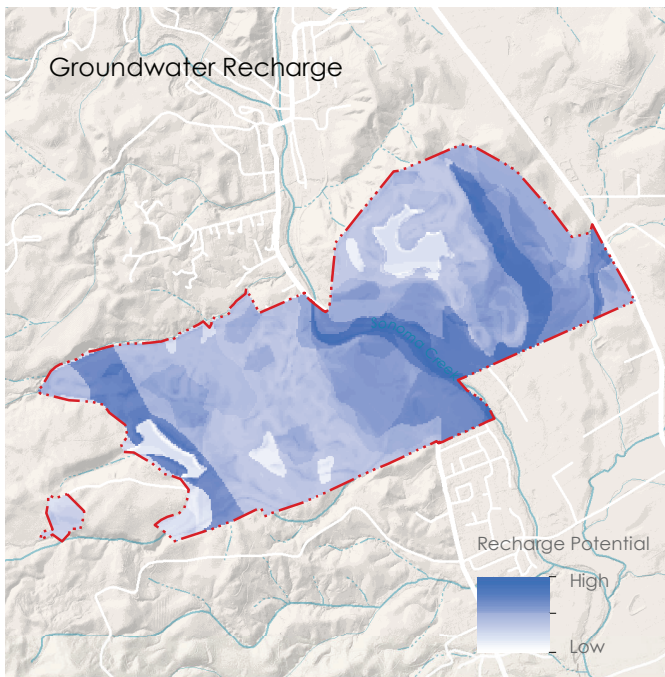
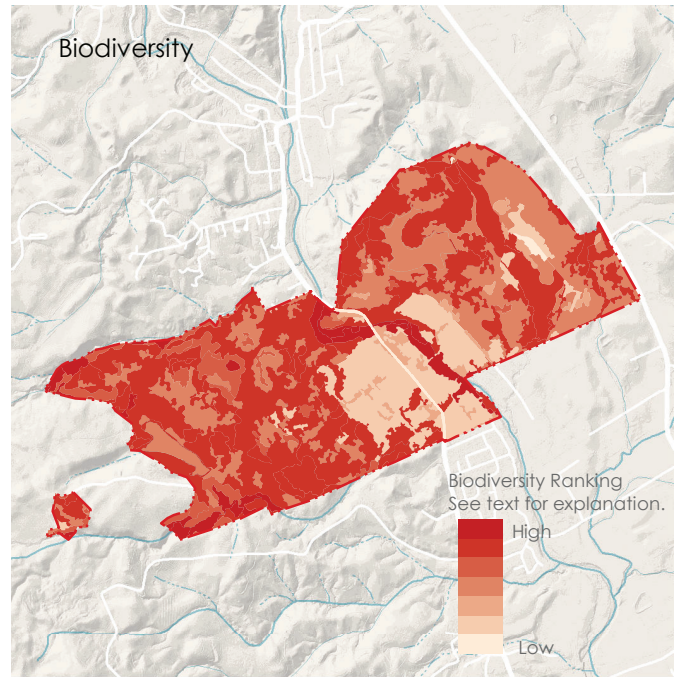
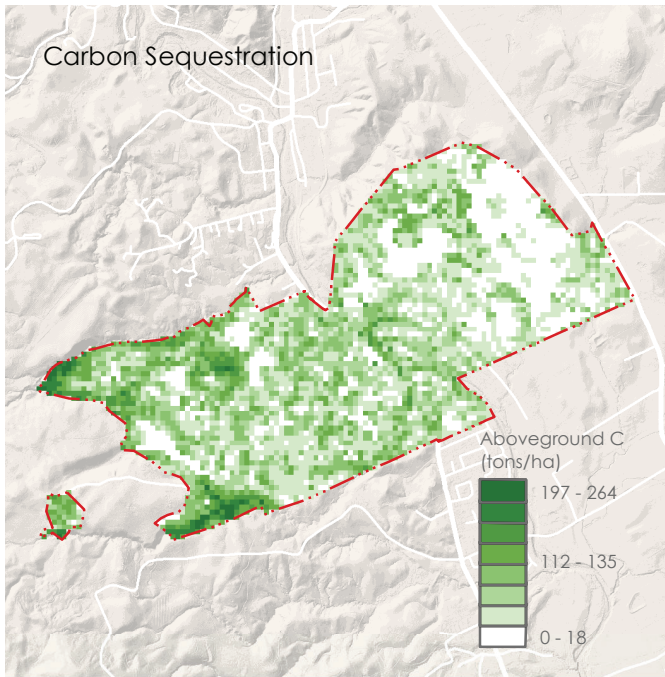
collect rainfall, facilitate its infiltration into soil, and gradually release it into Asbury, Hill, and Sonoma Creeks, or underground aquifers, providing water for domestic use as well as irrigation throughout the site and beyond. Diverse habitat types, healthy soils, and a wide array of flowering plants provide the year-round resources that pollinators, from native bees to honeybees, require as they pollinate on-site or nearby crop and orchard species.

REGULATING SERVICES

- Carbon sequestration
- Water regulation – groundwater recharge, moderation of floods and stream flows
- Air quality protection
- Soil formation and retention
- Waste treatment – decomposition and filtration of human and animal wastes

Regulating services keep the environment suitable for human life. As changing climate is one of the world community's most pressing challenges, carbon sequestration services are of critical interest. All of SDC's intact habitats

Figure 5-8
SELECTED ECOSYSTEM SERVICES



incorporate and store carbon, offsetting the accumulation of heat-trapping carbon dioxide in the atmosphere due to human activity. Long-lived trees like oaks and redwoods provide the greatest benefits, but all of SDC's forests, woodlands, wetlands and grasslands sequester substantial carbon.

There is also potential to increase carbon sequestration on the SDC site through oak and riparian restoration for increasing carbon sequestration. In contrast, if SDC's intact habitats were converted to developed areas or vineyard, the land would no longer serve as a carbon "sink" but would generate those uses would generate carbon dioxide, via the use of fossil fuels, loss of vegetation, and soil management practices.

Water regulation provided by SDC is of great local value. The Sonoma Valley in general has limited water resources, but most local residential and agricultural uses require abundant clean water. The intact slopes, meandering watercourses, and complex native vegetation on SDC's slopes and along streams help slow the movement of water, allowing for capture or filtration of sediments or other contaminants and infiltration into groundwater or gradual release into stream courses. This protects water supply and quality for SDC itself but also for downstream users. The broad, gently sloping wet meadow on the east side is an example of an area that allows for the slow movement and infiltration of water. In contrast, paved roads and parking lots and other impermeable surfaces do not absorb water, resulting in rapid runoff,

addition of pollutants from road surfaces, and greater erosion when flows re-enter permeable areas.

Other regulating services of the SDC landscape include protection of air quality. Forests remove air pollutants such as particulates, nitrogen dioxide and sulfur dioxide from smoke, burning of fossil fuels, and other human activities. Forests and urban trees can also help mitigate high temperatures—an increasingly important function as climate warms. Another service is provided by the site's healthy soil biota and decomposers recycling dead plant and animal matter and animal waste into soils that support our crops and livestock. For instance, vegetated buffers along streams and drainages prevent raw livestock waste from entering waterways, instead providing for their conversion into rich soil.

CULTURAL SERVICES

- Beauty of natural setting which contributes to local views and enjoyment
- Human health benefits of access to nature and opportunities for exercise
- Recreation and tourism opportunities
- Educational and scientific opportunities
- Spiritual and historical inspiration and activities; preservation of cultural/historical identity and sense of place

The value of access to beautiful natural public lands for recreation and for scenic views is widely acknowledged. A portion of this value can be estimated based on

monetary benefits to the area via tourism and increased property values. Recently, the direct impact of access to nature on human health is also being explored. Most people know intrinsically that access to natural open areas makes them feel better. Open access to parklands encourages people to exercise and provides long-term health improvements and reduced health care expenditures (Batker et al. 2014). Recent psychological research suggests that spending time in nature improves cognition, relieves anxiety and depression, and boosts empathy (Hartig et al. 2014). The diverse outdoor environments of the SDC campus and undeveloped lands provide a wealth of opportunities for various recreational pursuits that positively affect the social, mental, and physical health of the human community. Exhibit 8 illustrates the distribution of current recreational facilities on the site.

The environmental education potential inherent in the property could provide significant enrichment opportunities and long-term positive impacts on how people understand and care for their landscape and its resources. The site is currently supporting scientific research (including mountain lion tracking by Audubon Canyon Ranch, and a study of wildlife use relative to recreational use led by Sonoma Land Trust) and could support other studies such as farming practices that support carbon sequestration; the use of prescribed burns to prevent high-intensity wildfires; or impacts of changing climate on Sonoma County wildlands.

SUPPORTING SERVICES

- Maintenance of genetic and biological diversity
- Nutrient cycling
- Photosynthesis/primary production

Supporting services provide the foundation for all other benefits we receive from nature, but are so fundamental that they are rarely quantified or monetized. Maintenance of biodiversity is one of these. Variation among individuals, populations, and species is the source material for the evolution of life on earth. Sonoma County is recognized as one of the most biologically diverse regions in California and the entire U.S., and SDC supports a cross-section of this diversity (CDFG, 2013; West Coast Watersheds and SEC, 2010). SDC's natural areas include and connect most of the broad

vegetation types found in the region.

This connectivity is important not only for wildlife movement, but also for biodiversity at the population level. Plants and animals must be able to move and disperse to exchange genetic material and adjust to changing conditions.

Other supporting services that are so fundamental as to be almost invisible are nutrient cycling and photosynthesis. Nutrient cycling includes the capture of elements essential to life, like nitrogen from the atmosphere, converting it to forms usable by plants and animals, supporting agriculture as well as wild plants and animals. Photosynthesis is the process by which plants capture energy from the sun and convert it to stored energy, which humans and other animals require for sustenance.

SCENIC VIEWS

Sonoma Developmental Center plays a key role in the scenic beauty of the Sonoma Valley, which is deeply valued by local residents and regional visitors and is also enjoyed by tourists from around the world. Predominant views into and from the site are of open grassy hills, dark forested mountains, agricultural landscapes and historic architecture.

Motorists and cyclists passing through the property on Arnold Drive or Highway 12 can see sweeping vistas around the valley and up the full height of Sonoma Mountain. Along Arnold Drive, the large, stately shade trees lining the road provide a welcoming visual marker that you have entered the unique setting of the campus. The view into the campus from the main entrance at Harney Road and Arnold Drive is also picturesque, with a palm tree-lined avenue leading to the historic PEC building, which itself is framed to the back by the deep green, forested flanks of Sonoma Mountain.

Scenic views and scenic landscape units are protected through the Sonoma County General Plan and zoning, as summarized in Chapter 8: Economy + Land Use.



View into the property from Harney Drive entrance to the southwest.



View to the north from the south side of Fern Lake.

RECREATION

The SDC site includes miles of trails and quiet roads that are highly valued by site staff, clients, and the public as well as other facilities that currently serve therapeutic and recreational purposes for clients. Public recreational use has generally been allowed by SDC, although it is not formally encouraged or facilitated (e.g., with trail maps or formal trailheads). Parking is possible along Arnold Drive or along SDC campus roadsides.

PAVED ROADS

The largest road on the property is Arnold Drive, which bisects the core campus. Sidewalks and pathways on the main campus, although not currently heavily used except by locals and SDC staff and clients, offer pleasant walkways, with many mature, attractive shade trees and buildings of historical and architectural interest to view.

Orchard Road leads from the core campus to the west, for approximately 1.2 miles. A locked gate at the base of the road restricts access to authorized vehicles, although it is frequently used by walkers. Orchard Road acts as the service road to the water treatment plant and several storage areas and ends at Camp Via. On the east side of Arnold Drive, pedestrians frequently access the eastern agricultural area of the property by walking along Harvey Street to Sunrise Street; this road segment has an existing bike/pedestrian lane and low traffic volume.

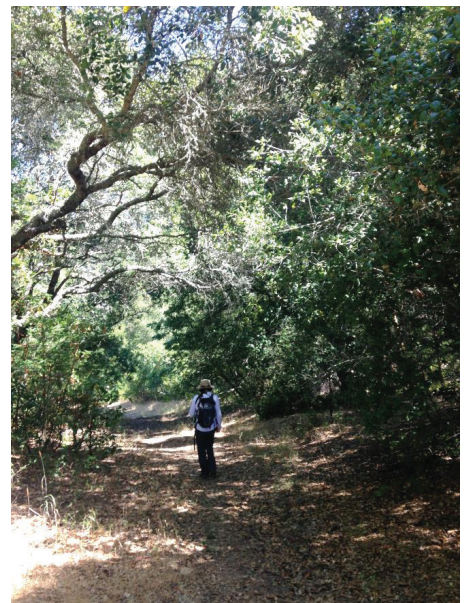
ACCESS ROADS

The unpaved access roads were originally graded and maintained to facilitate fire protection, access water tanks and other facilities, including the extensive agricultural landscapes that were once a thriving component of the SDC operation. These include the service road leading up and around Suttonfield Lake from Sunrise Drive on the east and Arnold Drive on the west, which together form a 1.8-mile loop. The Fern Lake fire road is approximately 0.75 miles and originates near Fern Lake off of Orchard Road and continues around the lake to the water diversion structure on Asbury Creek. Directly east of Arnold Drive and north of the Core Campus, an unpaved access road leads up a short rise to Suttonfield Lake. From there, a well-graded trail contours around Suttonfield Lake, offering sweeping views down the valley.

TRAILS

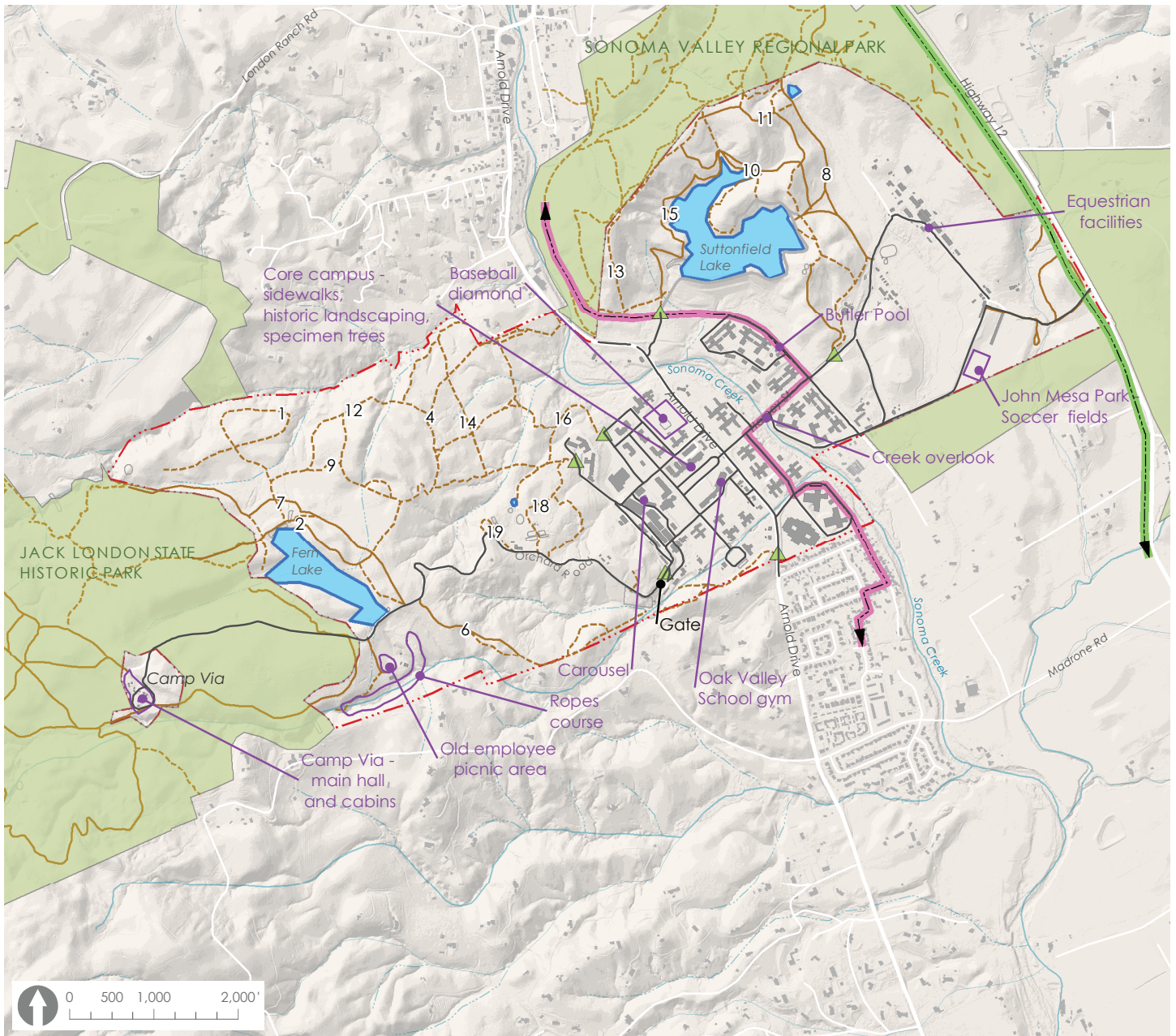
The informal and formal trail network meanders through the undeveloped areas of the property east and west of Arnold Drive and the core campus. The trails extend from various points along the perimeter of the facility and from the unpaved access roads.

To the west of the Core Campus, the routes meander up through dense mixed woodlands and open meadows where quick elevation gains afford sweeping valley views to the east. Various routes converge toward Fern Lake where a trail



Campus sidewalks provide appealing walkways (top). Steep access road used as trail (bottom).

Figure 5-9
RECREATIONAL RESOURCES

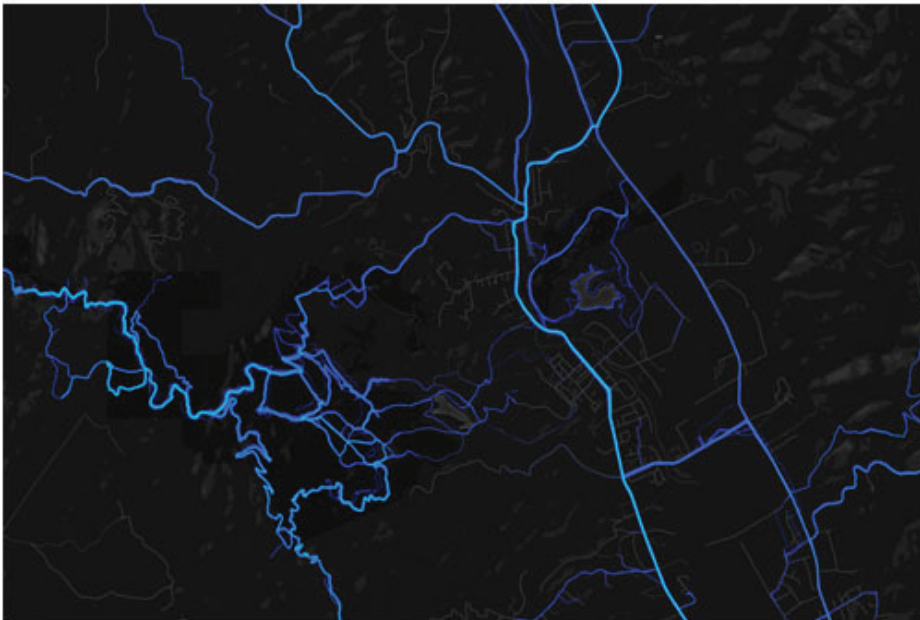


- SDC Property
- Adjacent public lands
- Recreational facilities
- Paved road
- Unpaved access road
- Trail
- ▲ Trail access points
- Proposed Glen Ellen-Eldridge Bikeway
- Proposed Sonoma Valley Regional Trail
- Lakes and pond

- | | | |
|------------------------|-----------------------------|---------------------------|
| 1. Asbury Crk Trail | 8. Frog Pond Fire Road | 14. Pine Trail |
| 2. Bay Fire Road | 9. Meadow Trail | 15. Suttonfield Fire Road |
| 3. Bucky's Trail | 10. NE Lake Loop Fire Road | 16. Wagner Trail |
| 4. Carolyn Day Trail | 11. NE Ridge Loop Fire Road | 17. Water Tank Trail |
| 5. Coon Trap Trail | 12. North Boundary Trail | 18. Water Tower Trail |
| 6. Eldridge Fire Road | 13. NW Ridge Trail | 19. Water Treatment Trail |
| 7. Fern Lake Fire Road | | |

Figure 5-10

BIKE AND WALKING USE AT AND AROUND THE SDC SITE



Maps of 2015 use by cyclists (above) and runners (below) who recorded their path using Strava, an online recreation mapping application. Brighter blue and thicker lines indicate higher use levels. Relatively high cyclist use visible for Arnold Drive, Orchard Road, Camp Via area, and other connections into Jack London SHP. Relatively high runner use visible for Arnold Drive, trails around both lakes, and trails connecting to Sonoma Valley Regional Park and Jack London SHP. Many users appear to enter from Jack London. Maps from Strava.com.

circumnavigates the lake. From there, a trail traverses through the historic orchards, now part of the adjacent Jack London SHP, connecting to the greater network of trails and the historic features in that park, and beyond to the newly opened trails traversing the north and east slopes of Sonoma Mountain.

Some of the access roads and trails are very steep. Some of these steep trails also have deep ruts from vehicle use in wet weather, uncontrolled widening, and/or significant erosion issues.

TRAIL USAGE

Pedestrians, hikers, and dog walkers were observed on all visits, especially around Suttonfield Lake, on Orchard Road, and at Camp Via. Bicyclists and equestrians were also observed at lower levels. Dogs were frequently off leash, and were observed swimming with their owners in Suttonfield Lake. Dog droppings were abundant by the side of major trails. Dog use may be a significant source of contamination of local water supplies.

Usage levels were not quantitatively studied for this effort, but information from the two adjacent parks, and online user applications, provides insight into potential use levels of SDC. Based on Regional Parks data (SCRIP 2017), recreational usage at Sonoma Valley Regional Park (which recently expanded from 92 acres to 162 acres) is steadily increasing, approximately 3 to 5 percent per year over the past 5 years. Over 50,000 people visited the park in most recent year.

Jack London Park Partners, the non-profit organization currently managing Jack London SHP, estimates that approximately 80,000 people visit that park each year (van Wyk 2017). Approximately 1,000 of their annual visitors have annual passes, which suggests they are repeat users visiting to enjoy the trails on foot or by bicycle.

Strava, an online recreation mapping and tracking application, also provides some insight into recreational use of the site.

These maps show routes recorded by Strava users (runners and cyclists) in and around the SDC site.

TRAIL SIGNS

Trail directional signage of a variety of formats, vintages, and states of repair is present in scattered locations. Signage indicating use limitations is present, especially around the lakes. Several



A variety of trail signage is found at SDC.

memorial trail signs are present throughout the property, a testament to the fact that the public considers the property de facto public open space, and has strong feelings of connection to the property.

CONNECTIONS TO ADJACENT LANDS

SONOMA VALLEY REGIONAL PARK

Currently there are many informal access points into the Regional Park to the north, including links to the Northwest Ridge Trail, the Frog Pond Fire Road, and the Northeast Ridge Loop Fire Road (see Figure 5-9). Some of these trails and access points may be redundant and could be considered for consolidation and decommissioning if the east side of SDC becomes formal parkland in the future. New planned trails along the southeastern portion of Sonoma Valley Regional Park will also bring new visitors along the eastern boundary of SDC, with a view into the SDC agricultural area and wet meadow. There is currently fencing in place that would serve as a deterrent to trail users wandering off trail onto SDC, but determined visitors could readily cross that boundary and create new social trails.

JACK LONDON STATE HISTORIC PARK

Camp Via and Coon Trap Trail lead from Camp Via to the west onto Jack London SHP. Coon Trap Trail leads to the Sonoma Ridge Trail, part of the Bay Area Ridge Trail. Sonoma Ridge Trail extends 8.6 miles from the North Sonoma Mountain Regional Park and Open Space Preserve south to the Eliot Family Loop Trail. Fern Lake Trail leads from Fern Lake to the west; connects with Vineyard Trail, which leads to the main park entrance, key park historic features and museum. No dogs are allowed on park trails.

PROPOSED SONOMA VALLEY REGIONAL TRAIL

Regional Parks has completed a feasibility study (Questa 2016) and is now seeking funding for this project, which would include a paved trail extending 13 miles from Santa Rosa to Sonoma. The SDC segment would follow SDC's eastern boundary, parallel to Highway 12. This is part of a larger segment identified as a Phase 1 Priority project. One small section, in the Agua Caliente area, has been funded and is under construction.

The alignment of the trail along SDC is recommended for the west side of Highway 12. The current conceptual alignment roughly follows existing SDC dirt access roads. If the regional trail is developed, users would likely access the SDC site via the existing dirt roads in that vicinity and connecting John Mesa Drive.

PROPOSED SONOMA VALLEY-ELDRIDGE BIKEWAY

Local resident Arthur Dawson has developed a conceptual plan for a bikeway extending approximately four miles north from Madrone Road to Glen Ellen and beyond, through the SDC property, providing safe, non-motorized access to shopping, commuting, recreation, and transit stops. The proposed route incorporates the railroad grade on the SDC property. Except for a very short section in downtown Glen Ellen, the bikeway avoids heavily traveled roads. The bikeway is already usable, though two barriers restrict easy passage. Suggested steps to improving the bikeway conditions include three that directly apply to the SDC site:

- Removing a metal rail next to the gate at the SDC end of the old railroad grade to allow easy bike and pedestrian access;
- Opening the gate between SDC and Burbank Drive; and
- Removing the gate between the Regional Park and SDC, which has been open for years

The Glen Ellen-Eldridge Bikeway could also link in the regional system envisioned in the Sonoma County Bicycle & Pedestrian Plan (2010). The planned Sonoma Valley Regional Trail would be just over a mile east of this proposed Bikeway; connecting the two would bring additional benefits to cyclists.

SCENIC LAKES AND CREEKS

In addition to providing water storage and serving as important wildlife habitat, the two lakes on the property are also recreational features serving as destinations for hikers and equestrians, providing scenic views and opportunities for wildlife observation. As described above, a combination of trails and unpaved access roads encircle both of the lakes. Although swimming, fishing and other aquatic activities are prohibited for water quality, safety, and liability reasons, the trails around the lakes are well used and visitors and their dogs have been observed swimming.

EQUESTRIAN FACILITIES

Historically, the complex of barns, out-buildings and paddocks along Sunrise and Dairy Roads were a part of the extensive agricultural use of the SDC property. While many of the structures remain underutilized or have been converted to storage or other uses, the Eldridge Equestrian Center operates out of one of the central barn structures and maintains the actively used riding ring facility. A number of the other barns and several of the paddocks are well used by the community for boarding horses. The equestrian facilities also support a therapeutic riding program for patients of SDC. **This area was impacted by the October 2017 fires; current status has not been evaluated.**

ELDRIDGE FARM

The Eldridge Farm has been in existence since the late 1960s. SDC staff recognized the potential benefits that the relationship between individuals with developmental disabilities and animals provides, a relationship that fosters personal and social growth, and environmental awareness, as well as unparalleled enjoyment. The area currently accommodates horses belonging to SDC employees and local residents, and other small farm animals including miniature horses, llamas, donkeys, and birds. There is an outdoor horse arena next to the farm buildings. The number of animals still residing at the farm has dwindled over the years as has visitation by outside groups. **This area was impacted by the October 2017 fires; current status has not been evaluated.**

ATHLETIC FIELDS

There are two athletic field areas on the SDC property. The first is the softball field on the northern edge of the main campus adjacent to Arnold Drive. The well-maintained field is lighted and is used by local organizations and clubs as well as informally by the local community, for both softball and soccer. The field is easily accessible from Arnold Drive and is a valuable asset for SDC and the greater community. The second area is located in the southeast corner of the property and contains two former soccer fields, known as John Mesa Park. These fields previously hosted occasional informal soccer play by



Fern Lake prohibitions (top). Warning signage at Suttonfield Lake (bottom).

the community but are currently closed to public use. A gravel parking area west of the field accommodates approximately 25 to 30 cars.



Horse corral.



Softball field.



The main dining hall at Camp Via.

CAMP VIA

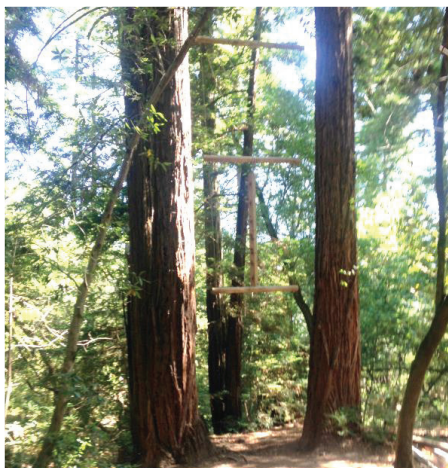
Camp Via is located west of the Core Campus at the end of Orchard Road. It is now surrounded by Jack London SHP and is adjacent to the historic orchard that was once part of SDC. Camp Via is a 40-bed camping facility built in 1961 that at one time provided outdoor activities for residents and staff.

Currently, Camp Via is used as an occasional day-use destination by SDC residents and staff, but not as an overnight retreat. The camp is also used by trail users for resting, refilling water, picnicking, and as a destination for people walking or riding their bikes up Orchard Road. The main dining hall is the only building which appears to be in functional condition. Other facilities which are in disrepair include seven cabins, barbeque pits, a small amphitheater, a water tower, a wheelchair swing and wading pool.

A large population of western rattlesnakes is present at the main hall entrance and around other concrete areas where snakes warm in the sun. According to SLT, this area is used extensively by mountain lions. These wildlife occurrences could pose a safety hazard. In addition, there are a number of very large mature oaks surrounding the camp, one of which fell onto the cabins. A tree hazard assessment would be beneficial prior to future uses.

ROPES COURSE

The privately operated Challenge Sonoma Adventure Ropes Course is operated on the SDC grounds off of Orchard Road on the way up to Camp Via, along upper Hill Creek. The non-profit group has maintained and operated the course since 1984 to support school children and youth-at-risk in the Sonoma Valley. The ropes course facility provides experiential training, challenge courses, teambuilding, corporate events and wilderness adventure to a variety of groups. Currently, 60 to 70 courses are offered per year, in addition to 8 days of training. 80 percent of attendees are from school groups, sports teams, and universities. In total, approximately 1,400 people participate per year.



Rope course elements (top); stairs to the ropes course (bottom).



The historic carousel.

OTHER RECREATIONAL RESOURCES

A number of other resources are present on the site, including:

- Butler Pool and Bathhouse. On Railroad Drive, the pool includes equipment to provide accessibility for users with limited mobility, as well as restrooms, showers, and an equipment room.
- Old Employee Picnic Area. This is an open area between Fern Lake and the ropes course, which includes picnic tables, a BBQ pit, dancefloor, and an employee restroom; these are in disrepair. The area is currently used as a staging area for Challenge Sonoma's ropes course.
- Carousel. Built in 1918 and renovated seven to nine years ago, but not used since children were being treated in the 1980s. It is located on Palm Street.
- Oak Valley School Gym. This small gym includes an indoor basketball court.

AGRICULTURE

SDC, in its original conception during the late 19th Century, was created as a self-contained and self-sustaining psychiatric care hospital. A key part of this model was an extensive agricultural operation that provided food for the hospital and also activity and training for patients. The Site has ample agricultural soils and water supply that supported these agricultural operations for 100 years or more.

Historically, SDC supported dairy, poultry and pig operations, orchards (including walnuts, apples, pears, plums and prunes, apricots and cherries) and gardens that provided food for, and was tended by, the 5,000 or so clients and staff. In the early 1900's, the facility was nearly self-sufficient in terms of food (SDC Resource Assessment, 2015). In fact, the site for the facility was chosen in part due to its high agronomic value, based on good soils, ample water supply and benign climate. In addition, SDC has an equestrian operation and farm that provided therapy for clients and recreation for clients and staff.

Even before the recent fire, only a small vestige of these agricultural operations remained, including an equestrian facility for horse boarding; a small farm with a few animals that provides recreation and therapy for the remaining clients; and a community-based effort to restore some of the germplasm from the old SDC orchards, now part of Jack London State Park.

Though a detailed inventory has not been identified post-fire, agriculture and related operations could be developed as integral parts of a reuse concept or could be separated as stand-alone agricultural operations

AGRICULTURAL SUB-AREAS

Agricultural uses may be appropriate for the eastern portion of the SDC campus, in balance with recreation, open space conservation, and protection of sensitive biological resources. The eastern part of the site can be thought of as having seven loosely-defined subareas. These sub-areas are based on soil characteristics, slope, vegetation, and current use. They are depicted on Figure 5-11 and described here.

SUB-AREA 1: SOUTHERN EDGE

Location. Along the property's southern boundary, adjacent to Old Hill Ranch.

Land. This area includes the most extensive, level agricultural areas on the site; ~ 20 – 30 acres, remnants of an old walnut orchard; leveled for soccer fields (in disrepair but used occasionally by the community). An area of a few acres was used to pile green waste. It also includes some smaller areas for gardens around existing residences located near the landscape complex buildings.

Structures.

- Landscape complex. Approximately 7 buildings, including equipment and storage sheds, repair shop, hazardous materials storage, a residence with garage, and greenhouse. The office and storage buildings are in good working condition, as they are currently utilized by plan operations. While the greenhouse is no longer in use, it appears to be in relatively good condition.
- Poultry complex. Approximately 8 buildings, including one very large barn, possibly used for walnut processing in the past; and now used for storage. The complex is largely underutilized, with a minimal amount of occupied storage space. (Some of these buildings burned in the Tubbs Fire.)

Opportunity. The soccer field and old walnut orchard area offer potential for flexible use as row crops, orchard, vineyard, or mixed crop and livestock operation. An onsite green compost facility could be located in the vicinity of the current green waste piles. The service buildings, barn, and greenhouse all have potential to be restored for use as part of agricultural operations.

Natural Resources Considerations.

Maintain buffer from riparian corridor; protect wildlife passage along the creek and east-west along the property boundary. Protect water quality, given potential for intensive fertilized agricultural production.

Recreation Considerations. The soccer field also have some value for restoration as playing fields.

Figure 5-11

SUB-AREAS FOR CONSIDERATION OF AGRICULTURAL SUITABILITY



SUB-AREA 2. HIGHWAY 12 ADJACENCY AREA

Location. The SDC frontage on Highway 12; adjacent to Old Hill Ranch on the south and across the highway from Oak Hill Ranch on the east.

Land. The area includes some gentle slopes dotted with oaks, with a few steeper grades; also includes some small level areas near the highway and an access road to Highway 12.

Structures. None.

Opportunity. This area offers the potential for public access into the main agricultural area. It could also include a farm stand that could complement the Oak Hill Farms farm stand nearby. Ag uses would be in smaller plots within the area.

Natural Resources Considerations. Maintain and enhance wildlife passage through culverts under Hwy. 12. Maintain riparian corridor along the seasonal creek. Maintain oak woodland in the upland. Protect water quality

SUB-AREA 3. EASTERN RIDGELINE AND SUNRISE COMPLEX

Location. The area located between the Sonoma Regional Park on the east side of the site and the seasonal wetlands on the west. Intersected by Dairy Road.

Land. To the eastern property boundary is a steep, grassy landscape with rocky outcroppings. Edge of Eastern boundary is visible at the hill's tree line. Land to the west is limited and slopes down to seasonal wetlands (area #4).

Structures. Approximately 18 buildings, ranging from pole barns used for furniture and plant operations storage to staff residences and old dairy stalls. While some buildings are in poor condition, the huge pole barns are in good shape and are an impressive component of the site. Many of the structures in the complex remain underutilized or have been converted to storage or other uses. The Eldridge Equestrian Center operates out of one of the central barn structures and maintains the actively used riding ring facility. A number of the other barns and several of the paddocks are well used by the community for boarding horses. The equestrian facilities also support a therapeutic riding program for clients of SDC. (Some of these buildings burned in the Tubbs Fire.)

Opportunity. Sloped land on the east could be used for grazing; land around the building complexes could be used for enclosed livestock operations. Reuse potential for buildings still intact after the fire.

Natural Resources Considerations. Grazing management needed to be compatible with natural regeneration of oaks, potential oak woodland restoration, and invasive species control; protect wildlife passage. Protect water quality.

SUB-AREA 4. NORTHERN EDGE SURROUNDING SUTTONFIELD LAKE

Location. The area surrounding Suttonfield Lake

Land. The land is mostly steeply sloped with more or less dense patches of oaks, and a few small areas (1-3 acres) of level ground.

Structures. Two water towers

Opportunity. Potential for agriculture limited to seasonal grazing for land management.

Natural Resources Considerations. Trails on steeper slopes can exacerbate erosion. Steep slopes with potential erosion concerns from road, trail and livestock use. Limited grasslands. Grazing management needed to be compatible with natural regeneration of oak woodland species and invasive species control. Protect wildlife passage by using wildlife-friendly fencing. Protect water quality.

SUB-AREA 5. SEASONAL WETLANDS

Location. An area in the center of the overall site that extends from an impoundment pond which captures local runoff in the northeast corner of the site to Toyon Rd. on the south, near the location of Old Ranch Hill Rd.; bounded by the Sunrise complex area on the east and the Eldridge farm area on the west and intersected by Sunrise Rd.

Land. Seasonal wetlands with areas remaining wet much of the year and other areas completely drying out. Likely used for seasonal grazing in the past; some areas were also likely tilled. Drainage ditches created historically to reduce wetland characteristics.

Structures. A large oval equestrian ring and a smaller round equestrian ring with some small ancillary structures and a parking area.

Opportunity. Potential for seasonal grazing or permanent pasture in parts of the area; potential for continued equestrian activities.

Natural Resources Considerations. Potential to enhance considerable existing values of this area including water recharge, water quality, wetland function, and native diversity. Well-managed seasonal grazing could be compatible with these values.

SUB-AREA 6. ELDRIDGE FARM AREA

Location. Bounded by Sunrise Road on the north, seasonal wetlands on the east, and Baker Street on the west.

Land. Small areas of land surround this complex, including a small hill to the west with grasslands, oaks and views west; and land to the east is limited and slopes to seasonal wetlands.

Structures. Approximately 15 buildings, including old hog pens, a slaughter house, an aviary, a large oval equestrian ring

and a smaller round equestrian ring with some small ancillary structures, and small parking areas. The farrowing pens are home to several rabbits, chickens, birds, and other animals, while llamas, donkeys, and miniature horses are sheltered nearby. Numerous picnic tables surround the farrowing pens for visitors to the farm. The Eldridge farm has been used since the 1960s as a therapeutic feature for SDC residents. The farm is also open to the public.

Challenges. Reuse of specialized buildings (e.g. slaughterhouse) and structures (e.g. hog pens).

Opportunity. Equestrian rings are in relatively good condition and could accommodate greater public use. Expansion of farm's therapeutic uses.

Natural Resources Considerations. Fairly disturbed area has more limited ecological values. Retain oak woodland and protect water quality in adjacent drainage.

SUB-AREA 7. WESTERN EDGE

Location. Bounded by the Suttonfield Lake are on the north east, Harney Road on the south and by Arnold Drive and Railroad Road on the west.

Land. Area includes about 20 acres of level ground, intersected by some trails, on the west and some smaller areas of level ground near Harney Road; the rest of the area has more or less dense stands of trees and some sloped sections.

Structures. None

Opportunity. The level areas offer potential for flexible use as row crops, orchard, vineyard, or mixed crop and livestock operation; the adjacency to Arnold Drive suggests potential for a farm stand site. Ag uses would be in smaller plots within the area.

Natural Resources Considerations. Protect oak woodland, riparian corridor, and wildlife movement between Sonoma Creek and the lake. Protect water quality.

TYPES OF AGRICULTURAL USES

General Requirements

Water supply and irrigation infrastructure, drainage, fences, roads, structures for storage/repair of equipment, corporation yard, storage for supplies, processing and post-harvest storage. Many crops and farm products can be produced at a range of scales and can be integrated in diversified operations. One limiting factor in terms of small scale production is often the economies of scale in terms of need for specialized training and equipment.

Row Crop Land

Crops includes all annual vegetable crops. Crop rotations and inter-plantings are common. Needs fairly level ground to facilitate drip irrigation. High fertility requirements. Adaptable for many

micro-climates. Many operations include greenhouses for starts. Production of cut flowers and berries take place on row crop land. Berry crops include bush berries (e.g. strawberries) and perennial cane berries, such as raspberries and blackberries and can be planted on gentle slopes.

Field crop land

Crops include hay and silage crops, as well as field beans and grains and some seed and oil crops. Can be dry-farmed. Needs larger fields.

Vineyards

The most widely planted crop in the County; can be produced in a variety of soil and slope conditions.

Nursery product facilities/land

Products include cut flowers (usually planted as annual row crops, often started in greenhouses), ornamentals and bedding plants (usually requiring greenhouse operations), Christmas trees, etc. Native plant nursery and/or native seed production could also be a possibility. Can be operated intensively on a few acres but can also be scaled.

Orchards

Crops includes apples, pears, persimmons, stone fruit, figs, tree nuts, olives, kiwi, etc. Can be planted intensively using dwarf varieties. Strong interest in heirloom varieties. Needs fairly level, well-drained soil. Scale can range from part of an acre to many acres.

Grazing Land

Fields or hillsides covered with grass or herbage and suitable for grazing by livestock; often a seasonal use.

Pasture Land

Enclosed fields with grasses for grazing livestock; often irrigated.

Livestock Operations Facilities/Land

In addition to grazing land and pasture land, livestock are raised in many kinds of enclosed outdoor and indoor facilities. Livestock include cattle/calves, sheep/lambs, hogs, goats, turkey, ducks, chicken, game birds etc. Livestock products include meat, milk, cheese and eggs.

Table 5-1

SDC SUB-AREAS WITH SUITABILITY FOR TYPES OF AGRICULTURAL USES AND KEY NATURAL RESOURCE CONSIDERATIONS

BUILDING	RAW CROPS	ORCHARDS	VINEYARDS	NURSERY FACILITIES	GRAZING LAND	PASTURE LAND	LIVESTOCK FACILITIES	NATURAL RESOURCES CONSIDERATIONS
1. SOUTHERN EDGE, INCLD. LANDSCAPE COMPLEX AND SOCCER FIELD AREA	x	x	x	x		x		A, B
2. HWY 12 ADJACENCY	x	x		x				A, B, C, D
3. EASTERN RIDGELINE AND SUNRISE COMPLEX					x		x	A, C, G
4. NORTHERN EDGE SURROUNDING SUTTONFIELD LAKE					x			A, D, E, G
5. SEASONAL WETLANDS					x	x		E, F
6. ELDRIDGE FARM AREA				x			x	D
7. WESTERN EDGE, NORTH OF HARNEY RD AND EAST OF ARNOLD DRIVE	x	x	x			x		A, B, C, D, E

Natural Resources Considerations notes:

All native habitat on the site provides multiple ecological benefits. This list only highlights key sensitive resources for each location.

- A. Wildlife passage
- B. Riparian corridor
- C. Oak woodland restoration
- D. Protection of oak woodland and natural regeneration
- E. Water recharge and water quality
- F. Wetland function
- G. Protection from soil erosion

CONTAMINATED SOIL

BACKGROUND

Human activities at the SDC site—including uses associated with the medical program, the farm, the vocational program, landscape operations, and waste management—have resulted in potentially contaminated soils.

A Phase I Environmental Site Assessment (ESA) was conducted in October 2016 by URS Corporation. The Phase I identified various recognized environmental conditions (RECs), Historical RECs, and Controlled RECs. A Phase II investigation was recommended.

A Phase II investigation was conducted by EBA Engineering for this analysis. EBA's methodology and findings are summarized here; the Limited Phase II Investigation Report is provided as Appendix D.

The constituents of potential concern (COPCs) identified for the limited Phase II investigation included:

- Arsenic
- Organochlorine pesticides (OCPs)
- Lead from lead based paint
- Polychlorinated biphenyls (PCBs)
- Volatile organic compounds (VOCs)
- Semi-volatile organic compounds (SVOCs)
- Dioxins and Furans
- Title 22 (CAM 17) Metals
- Petroleum Hydrocarbons – Gasoline Range Organics (GRO), Diesel Range
- Organics (DRO), Heavy Range Organics (HRO)
- Nitrate (as Nitrogen)

PHASE II INVESTIGATION

Sample locations were screened in the field for potential impacts prior to collecting soil samples. The field screening consisted of visual inspection for staining or free fluids, and unusual odor. Additionally, a photo-ionization detector (PID) was used to screen for VOCs and a Geiger counter was used to screen for radiological impacts.

Shallow soil samples were collected at a depth of 0.5 feet below ground surface (BGS). Soil sample locations were selected in an effort to prioritize the most significant RECs identified during review of the Phase I ESA as well as initial site reconnaissance. Soil borings were conducted at numerous buildings, as well as areas where various operations have occurred, including an incinerator, hazardous material storage shed, PCB storage shed, fruit drying facility, Sunrise Industries, historical pesticide storage area, and landscape maintenance area. Samples were then laboratory-tested for specified COPCs.

FINDINGS AND RECOMMENDATIONS

Historical Buildings

Organochlorine pesticides (OCPs) were detected at all historical building locations except for the PEC Building. However, no detections of OCP constituents were above respective screening levels. Given the limited breadth of this investigation and the historic use of OCPs at the Sonoma Developmental Center, EBA recommends further investigation to determine the full extent of OCP impacts to soil.

No historical building samples analyzed for polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), or semi-volatile organic compounds (SVOCs) contained any confirmed detections. However, given the presence of VOCs and SVOCs at other historical areas, as well as the limited scope of this investigation, the potential presence of these COPCs at historical building locations cannot be ruled out.

All historical building samples analyzed for arsenic contained detections that are above the US EPA Residential Screening Level of 0.68 mg/Kg. Although arsenic detections were above the RSL, background concentrations suggest regionally high levels of arsenic. However, one sample from the Walnut Building location contained detections of arsenic at 38.4 mg/Kg, which is generally one order of magnitude higher

as compared to other historical buildings at the Sonoma Developmental Center. Further investigation appears warranted to delineate the full extent of arsenic impacts in this area.

Lead was detected in all soil samples collected from historical building locations. Historical buildings which contained detections at or above the residential screening level include the Walnut Building, Chamberlain/CPS Building, Garage Building, Sonoma HSC, Blue Rose, Manzanita/Powerhouse building, and Paxton-Goddard Building. Federally designated Resource Conservation and Recovery Act (RCRA) Hazardous Waste was detected at the Sonoma HSC building, which contained lead at a concentration of 2,320 mg/kg. The potential presence of Title 22 non-RCRA Hazardous waste was noted in all samples which exceeded 50 mg/kg and could have implications in future redevelopment in a soil disposal scenario. Given the widespread lead impacts exceeding both human health-based screening levels and RCRA hazardous waste limits, a comprehensive investigation appears warranted to determine the lateral and vertical extent of lead contamination at the Sonoma Developmental Center.

Historical Areas

Petroleum hydrocarbons were detected in samples collected from the Hazardous Materials Storage Shed, the Fruit Drying shed, the Landscape Maintenance area and the PCB Storage Shed. Organics detections were flagged by the laboratory as heavier hydrocarbons contributing to a diesel range quantitation. Both the Fruit Drying shed as well as the PCB Storage shed contained detections of heavy range organics. Abundant redwood encountered during sample collection and elevated organics concentrations suggest the potential presence of an underground storage tank (UST) at the Fruit Drying Facility. Further investigation in the vicinity of the Fruit Drying Shed appears warranted. SVOCs were also detected in the Fruit Drying Shed, with four exceeding the US EPA's recommended screening levels (RSLs). Further investigation will be required to determine the extent of SVOC impacts in this area.

No samples analyzed for OCPs contained detections that exceed the US EPA RSLs. However, detections of OCPs indicate the historical use of OCPs at the Sonoma Developmental Center and given the limited scope of this initial investigation, additional sampling and characterization may be warranted.

Arsenic was detected above the RSL at the Incinerator, the Hazardous Materials Storage Shed, Sunrise Industries, Pesticide Storage and Landscape maintenance. Regional arsenic levels generally appear high. That being said, several samples

from historical areas contain arsenic levels that are significantly higher than typical regional levels. Further investigation is recommended.

Lead was detected in all soil samples collected from the identified RECs sampled during this initial investigation. Historical areas which contained detections at or above the residential screening level include the Hazardous Materials Storage Shed, Fruit Drying Shed, Sunrise Industries, Pesticide Storage Area, and Landscape Maintenance Area. Federally designated Resource Conservation and Recovery Act (RCRA) Hazardous Waste was detected at the Fruit Drying Shed. Additionally, the potential presence of Title 22 non-RCRA Hazardous waste was noted in all samples which exceeded 50 mg/kg and could have implications in future redevelopment in a soil disposal scenario. Given the widespread lead impacts exceeding both human health-based screening levels and RCRA hazardous waste limits, a comprehensive investigation appears warranted.

CAM 17 metal detections were present in multiple historical areas. Although none of these metals exceeded their respective screening limits, given the history of the project site, further investigation may be warranted to comprehensively characterize delineation of CAM 17 impacts. It should be noted that there were access issues and confusion regarding the proper sampling locations at the PCB Storage Shed. Further investigation of the correct location of the PCB storage shed is warranted

5.4 Climate Change and Resilience

The North Bay Climate Adaptation Initiative projects that Sonoma, Marin, and Napa counties “should anticipate summer temperatures increasing by approximately 6 to 8 degrees Fahrenheit, on average, in our region by approximately the end of the century...with a likelihood of an increase in the frequency and intensity of extreme events such as droughts and floods” (NBCAI, 2013). These changes are likely to have a cascade of effects on people and natural systems at SDC and the Sonoma Valley, including:

- Higher demand for groundwater pumping and surface water diversion due to either lower total precipitation or extreme, short duration storm events with more runoff and less rainwater infiltration
- Declines in plant and wildlife species that are less tolerant of drought conditions and higher temperatures
- Changes in the varieties or types of crops that can thrive in the area
- Increased fire risk. Wildfires like those of October 2017 are likely to occur more frequently.

- Changes in pests and disease vectors due to reduced frost frequency

A resilient ecosystem is one that is resistant to change from outside forces, and/or is able to recover rapidly from disturbance. In its current state, with extensive open space, SDC has significant capacity to contribute to the region’s resilience to ongoing climate changes. The site’s water resources, intact native habitats across a range of elevations, and connectivity to other protected lands are key to this resilience.

RESILIENCE RESOURCES

WATER

SDC’s abundant water resources and dense riparian vegetation can moderate water temperatures in the reaches of stream on the property and create thermal refuges. The plant communities on the property sequester carbon from the atmosphere as well as provide cooler temperatures for heat-stressed animals through shade and evapotranspiration. Were they to be replaced with driveways and buildings, the property’s capacity to help wild species adapt to climate change would be significantly diminished while the problem that creates the need would be intensified.

found to be important for the long-term population persistence of plants, invertebrates, and other species (Anderson et al. 2014, Timpane-Padgham et al. 2017). The topographic diversity of SDC’s landscape, with elevations ranging from valley floor to upper slopes of Sonoma Mountain, and a range of landforms, aspects, and cover types, offers local-scale thermal options to plants and wildlife, buffering them from changes in the regional climate.

A recent study of SDC’s value for maintaining wildlife connectivity along the Sonoma Valley corridor analyzed expected rates of climate change and the distribution of climates across space to help assess the relative importance of the SDC corridor in climate adaptation (Gray & Merenlender, 2015). Because of its topographically diverse habitats, and its connection to more coastal climates, they found that the SDC corridor is likely to be particularly valuable in terms of access to cooler areas, slower rates of change, and greater climatic diversity compared to other similarly sized linkages in the North Bay.

TOPOGRAPHIC DIVERSITY

Under variable climatic conditions, areas of high landscape diversity have been

CONNECTIVITY

Habitat connectivity supports climate resilience by allowing species with ranges large or small to move or shift over time to find cooler temperatures, moister soils, or to follow plant and insect populations as they also adapt to changing conditions (Timpane-Padgham et al. 2017).

POTENTIAL VEGETATION CHANGES

Understanding how plants and wildlife respond to climate change is an emerging area of study. Some forecasts have been made for how future conditions will fit with the habitat needs of dominant plant types. However, the timing and mechanisms for vegetation community shifts are complex at a local scale and difficult to forecast. In general, the Bay Area climate is becoming more conducive to shrub-dominated vegetation and less conducive to montane coniferous vegetation. Likely vegetation changes on Sonoma Mountain (NBCAI 2017) include:

- Expansion of California bay and chaparral
- Declining Oregon oak and grassland. Oregon oak is already near the southern limit of its distribution here. Recruitment failure has already been observed in some populations, though causes are uncertain.
- Stable populations of coyote brush, coast live oak. Douglas-fir may be stable or declining.

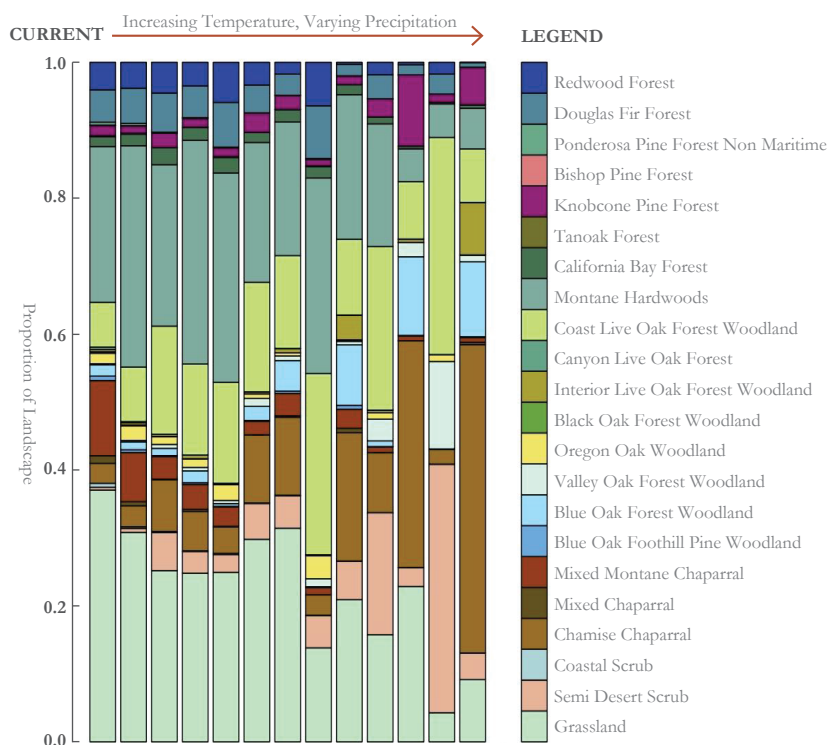
The researchers note that “these changes may occur slowly over many decades (or even centuries!), as long-lived trees

eventually die off, and are replaced by other species. Major disturbance events, such as fire or drought-related tree mortality, may speed up these transitions. Seed dispersal, the way a plant produces and spreads its seeds, will be a key factor that may limit the expansion of well-adapted species or favor invasive weeds as conditions change, particularly after a major disturbance.” The October 2017 wildfires may be an example of a “major disturbance event” for some vegetation in the SDC vicinity.

See Figure 5-12 for NBCAI’s (2017) forecast of changes in suitable conditions over time for each of the Sonoma Mountain region’s current vegetation types.

Figure 5-12

CHANGES IN SUITABLE CONDITIONS BY VEGETATION TYPE



5.5 Regulatory Jurisdictions and Policies

A number of state and local plans and policies govern land use and development on the SDC property. Future development and land use changes on SDC would be subject to a range of local, State and federal regulations. This section includes a description of applicable regulations and the agencies responsible for enforcing them. The list is not exhaustive and additional regulations may apply. Further detail is provided in the PCI report included as an appendix.

SONOMA COUNTY GENERAL PLAN AND LOCAL ZONING

The Sonoma County General Plan (General Plan) is the blueprint for how land is used in unincorporated Sonoma County, and it sets forth the County's official position on issues, such as development and resource management (PRMD, 2008). These policies are then translated into implementation tools (such as the zoning ordinance, subdivision regulations, and design guidelines) to assure that the County's vision is implemented. Sonoma County's General Plan and zoning as they would apply to the SDC property when it is under the County's Jurisdiction are described in Chapter 8.

STATE AND FEDERAL REGULATIONS

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Projects undertaken, funded, or requiring a permit by a state or local public agency must comply with the California Environmental Quality Act (CEQA). The primary purposes of CEQA are to inform decision-makers and the public about the potential environmental impacts of the proposed activities, identify ways that environmental damage can be avoided or significantly reduced, require changes in projects through the use of alternatives or mitigation measures when feasible, and disclose to the public the reasons why a project was approved if significant environmental effects are determined.

The sale of surplus property by the State of California is commonly exempt from the provisions of CEQA under Section 15312, Surplus Government Property Sales. Regardless of the CEQA requirements for the property sale, any future development of the property would likely require CEQA compliance and documentation needs would vary depending on the proposed project.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE/CALIFORNIA DEPARTMENT OF FISH AND GAME CODE

The California Department of Fish and Wildlife (CDFW) is responsible for managing, conserving, and protecting the state's biological resources including fish, wildlife, and plants. Any future development of the SDC property will require consultation with CDFW and issuance of a permit if work is proposed in any aquatic resources or where native species would derive benefit. Under sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code, CDFW designates certain animal species as "fully protected." Fully protected species may not be taken or possessed at any time. Future development of the property will require avoidance of fully protected species.

REGIONAL WATER QUALITY CONTROL BOARD

Under Section 13263 of the Porter-Cologne Water Quality Act, the Regional Water Quality Control Board (RWQCB) is authorized to regulate discharge and fill within waters of the State, including isolated wetlands. Future development of the property will require consultation with the RWQCB and permitting if work is proposed in any wetland or other waters of the State.

STATE AND FEDERAL ENDANGERED SPECIES ACT COMPLIANCE

The federal Endangered Species Act of 1973 (FESA) prohibits “take” of any fish or wildlife species listed as threatened or endangered, including the destruction of habitat that could hinder species recovery. Future development of the property will require consultation with USFWS and/or NOAA Fisheries issuance of a permit if proposed activities will result in take or habitat modification for listed species.

Under the California Endangered Species Act of 1984 (CESA), CDFW is responsible for maintaining a list of endangered and threatened species. The list also includes federally proposed and state candidate species, which are species that CDFW has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species, as well as fully protected species. CDFW also maintains lists of California special concern species that serve as watch lists.

Protected Bird Species

Nesting native bird species are protected under both federal and state regulations. According to the US Fish and Wildlife Service, under the federal Migratory Bird Treaty Act of 1918 (MBTA; 50 CFR 10.13), “it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird, unless authorized under a permit issued by the Secretary of the Interior.”

Birds and their nests are also protected under the California Fish and Wildlife Code (§3503 and §3513). The federal Endangered Species Act and California Endangered Species Act also protect nesting threatened and endangered bird species.

JURISDICTIONAL WETLANDS AND WATERS

Jurisdictional wetlands and other waters of the U.S., including stream channels, are regulated by the U.S. Army Corps of Engineers (Corps) under the provisions of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Future development of the property will require consultation with the Corps and issuance of a permit if work is proposed in any wetland or other waters of the U.S.

Under Section 401 of the federal Clean Water Act, the Corps is required to meet state water quality regulations prior to granting a Section 404 permit. This is accomplished by application to the local RWQCB for Section 401 certification that requirements have been met. Future development of the property will require consultation with the RWQCB and issuance of a permit if work is proposed in any wetland or other waters of the U.S. A Section 401 Water Quality Certification will require CEQA compliance.

5.6 Considerations for Reuse and Conservation

This section describes potential strategies for protecting natural resources in future development, as well as opportunities for improving ecological conditions. Implementing some of these strategies would require funding or other resources, and/or could limit fund-generating activities on the site. In other cases, the strategies may be cost-neutral and/or could increase fund-generating opportunities. Weighing economic considerations, natural resource values and other landowner and stakeholder interests is discussed in more detail in Chapter 8: Economy, and is expected to be part of the next phase of planning for the site. See Figure 5-5 for a map of key sensitive natural resources, and Figures 5-13, 5-14 and 5-15 for locations of key opportunities for enhancement.

PROTECTION AND ENHANCEMENT OF THE WILDLIFE CORRIDOR

PROTECTION STRATEGIES - ALL SETTINGS

- Avoid conversion of native land cover to developed or agricultural uses.
- Limit new road, driveway, and trail construction, especially outside the core campus area. If new roads are constructed or old roads upgraded, consider crossing structures to accommodate wildlife.
- Maintain crossing structures. Culverts should be checked periodically for debris, vegetation overgrowth (e.g., Himalayan blackberry), and other blockages.
- Limit fencing and use wildlife-friendly fence designs (see SLT 2014a and Hanopy 2009). Fencing that crosses or bisects streams—or otherwise discourages use of safe passages—is particularly problematic.
- Meet but do not exceed fire safe vegetation maintenance guidelines. Leave wildlife habitat beyond the defensible space zone intact.
- Limit the use pesticides and herbicides.
- Engage in ongoing monitoring and/or collaborate with partners to evaluate changes to natural resources and wildlife use with changing land use.
- Educate and outreach to property owners and managers about actions they can take to protect the wildlife corridor. Consider partnering with agencies like the Sonoma Resource

Conservation District and Natural Resources Conservation Service for outreach, technical and financial assistance.

PROTECTION STRATEGIES - RESIDENTIAL AND COMMERCIAL SETTINGS

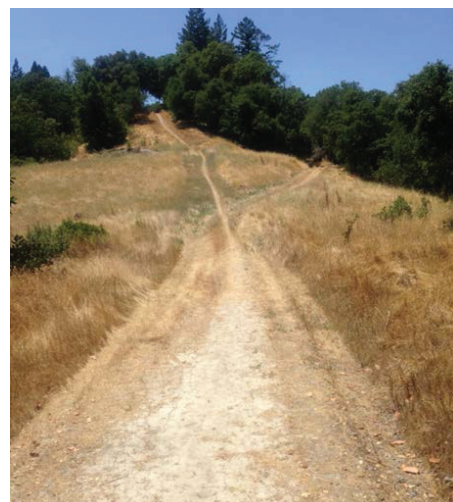
- Keep speed limits and traffic speeds low (25 miles per hour maximum).
- Minimize human presence at night.
- Minimize outdoor night lighting, especially near creeks or other known high wildlife use areas. Keep lighting to the minimum needed for safety, only within 50' of buildings, as low as possible, pointed toward the structure or immediate ground, and use the lowest wattage possible. Use narrow spectrum bulbs to reduce the range of species affected by lighting.
- Do not allow pets to roam freely in wildlands.
- Educate residents about living safely with mountain lions.

PROTECTION STRATEGIES - AGRICULTURAL SETTINGS

- Create native plant hedgerows in or along cultivated fields, as Oak Hill Farm has done in some of its fields. This provides cover for small and medium size wildlife.
- Engage with livestock operators to address any concerns of predation by native wildlife, and seek solutions compatible with resource protection.
- Avoid nighttime agricultural work (often done in vineyards; not compatible with corridor).

OPPORTUNITIES FOR ENHANCEMENT

- Decommission unneeded roads, driveways, buildings, trails, and fencing. If the site is consolidated with adjacent parklands, there are many opportunities to reduce fencing and decommission duplicate trails. Look for opportunities to consolidate/ reduce campus footprint.
- Widen corridors of native habitat along creeks (see below for discussion of recommended setbacks).
- Improve undercrossing conditions; see Wildlife Crossings section above.
- Look for opportunities to improve wildlife permeability along the site's south-central border.
- Incorporate native plants into new landscaping and when replacing declining ornamentals.
- Minimize light pollution when possible: consider wildlife needs and behavior when planning lighting along roads; avoid lighting near undercrossings, but lighting may be appropriate in any areas where roadkill is frequent.
- In bridge/undercrossing design, include some upland above the scour zone of streams for winter crossing



Top: Chain link fence at Suttonfield Lake, a barrier to some wildlife.

Middle: Multiple trails providing similar routes.

Bottom: Concrete rubble in drainage.

PROTECTION AND ENHANCEMENT OF RIPARIAN HABITAT, STEELHEAD, AND OTHER AQUATIC SPECIES

STRATEGIES FOR PROTECTION

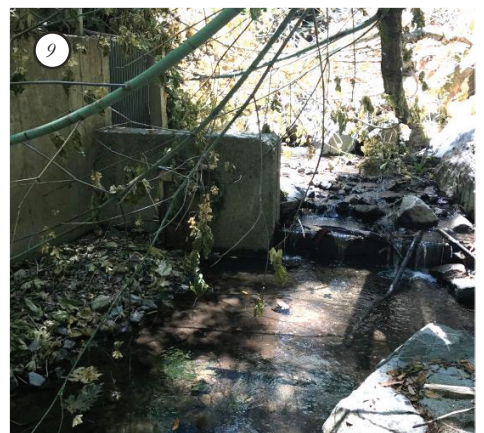
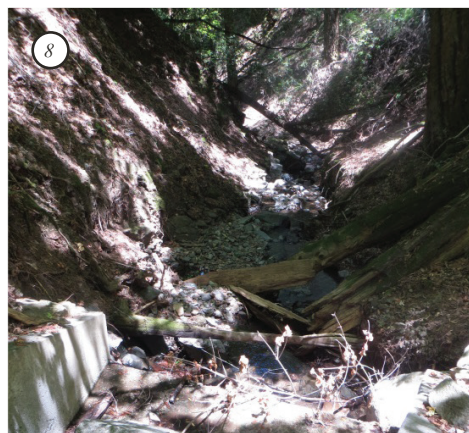
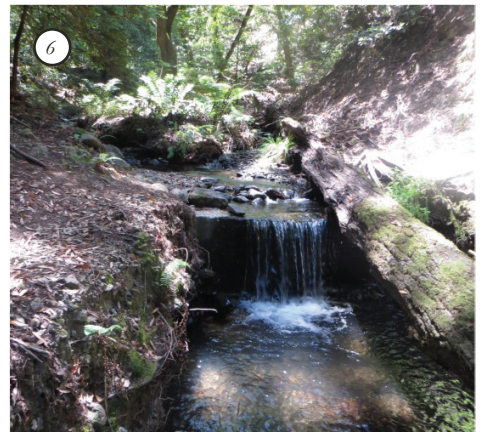
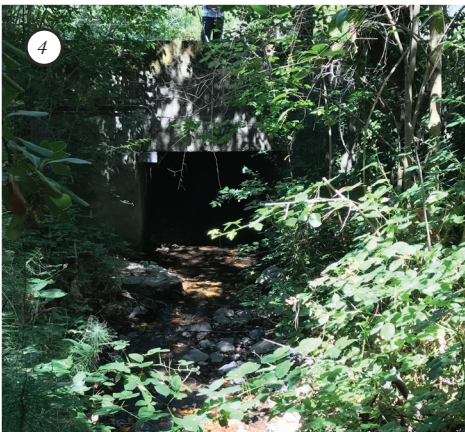
- Maintain existing buffers of riparian vegetation, which provides shade, shelter, habitat complexity, nutrient input, and/or a buffer from human presence.
- Maintain adequate flows and high water quality.
- Undertake an assessment of flow-related habitat conditions in Sonoma Creek and Hill Creek to determine whether current diversions and withdrawal regimes may constrain fish populations.

OPPORTUNITIES FOR ENHANCEMENT

- Expand buffers from developed areas, restoring native riparian vegetation.
- Manage invasive plants, restore native vegetation and improve structural habitat diversity on lower portions of Asbury and Hill Creeks.
- Remove arundo and other invasive plants on Sonoma Creek.
- Look for opportunities to reduce fish passage barriers; see Fish Passage Barriers section above.
- On upper Hill Creek, manage ropes course to prevent compaction and erosion.

- On lower Hill Creek, widen riparian corridor; consider laying back banks to provide floodplain access. Look for opportunities to decommission buildings adjacent to creek.
- Consider elimination/reduction of Roulette Springs diversion to enhance wetland habitat.
- Consider setting minimum bypass flow rates and limitations on the period of diversion for all diversion points, similar in nature to the Asbury Creek diversion, based on ecological instream flow needs.
- Remove concrete rubble from culverts on east side. Ensure no dumping of materials occurs near riparian areas.
- Prohibit dog use of reservoirs and enforce County ordinance requiring owners to pick up dog waste.
- Complete focused surveys for foothill yellow-legged frog on Hill and Asbury Creeks; further evaluate habitat conditions and enhancement needs.
- Coordinate with other organizations to identify sites with promise for restoring hydrologic function and providing benefits such as reduced flooding, increased groundwater recharge and retention, water quality improvement, and habitat improvement.

- ① *Asbury Creek Diversion and dam*
- ② *Looking towards right bank of Sonoma Creek*
- ③ *Looking upstream of Hill Creek at Redwood Drive*
- ④ *Looking downstream of Hill Creek at Arnold Drive*
- ⑤ *Looking upstream of Hill Creek at Pedestrian Footbridge*
- ⑥ *Looking upstream of Hill Creek near ropes course*
- ⑦ *Looking downstream of Hill Creek at culvert*
- ⑧ *Looking downstream of Hill Creek at baffles for energy dissipation*
- ⑨ *Looking upstream at Hill Creek diversion*



OTHER SENSITIVE RESOURCES

STRATEGIES FOR PROTECTION

- Maintain areas of intact habitat; reduce/ consolidate developed footprint and restore native vegetation where possible.
- Maintain habitat connections with adjacent area of high quality habitat (including those in Jack London SHP, Sonoma Valley Regional Park, and private lands) that facilitate plant and wildlife movement and dispersal.
- Perform spring surveys for special-status plants.
- Complete focused surveys for American badger, Northern spotted owl, Foothill yellow-legged frog, California giant salamander, and California red-legged frog on SDC; further evaluate habitat conditions and enhancement needs in the undeveloped portions of the property.
- Evaluate all buildings and structures on SDC for the presence of bats; further evaluate habitat conditions and enhancement needs. If bats are present, develop protection strategies for use during building repair or removal.
- Develop an invasive animal control program for American bullfrog on SDC; participate in local management programs to control wide-spread species (e.g., barred owl, wild turkey) if such programs become established.
- Monitor and control for the presence of feral cats.
- Avoid ground-disturbing activity outside the existing development

footprint to prevent the spread of invasive species. Ensure that any agricultural operations do not facilitate invasive infestations.

- Avoid soil compaction and grading outside existing footprint to protect trees and other native vegetation, natural regeneration.
- As appropriate to the habitat type, perform focused surveys for special-status species prior to grading, vegetation removal, or other development (including recreational/trail facilities) outside existing footprint. Perform pre-construction surveys and crew trainings as applicable.

ENHANCEMENT OPPORTUNITIES

- Large wet meadow: Manage invasives (teasel, hemlock, Harding grass, other non-native perennial grasses); improve native diversity through plantings. If livestock grazing is to continue, develop a grazing plan that targets natural resource enhancement and protects oak regeneration. Consider planting woody species including valley oak, willows, and shrubs.
- East side grassland: Consider oak woodland/savanna restoration through plantings or protection of natural regeneration. If livestock grazing is to continue, develop a grazing plan that targets natural resource enhancement and protects oak regeneration.
- Grasslands throughout: Reduce yellow starthistle infestations. Consider use of fire or grazing to control invasives and encourage natives.
- Dump site along Orchard: Investigate possibility of removing garbage and restoring; note steep slope.

- Develop a fire management plan in cooperation with local fire agencies and fire ecologists that identifies site-specific goals and strategies for protection of both public safety and natural resources, some of which benefit from burning. Consider the use of controlled burning in areas of high fuels.
- Consider restoration plantings in forest or woodland settings found to be lacking in natural regeneration.

RECREATIONAL RESOURCES

CONSTRAINTS

- Prioritize protection of natural resources and wildlife use when considering recreational uses. Higher human and dog presence results in decreased use by some key wildlife species. See California Water Resources Control Board's "Erase the Waste." Recreational use levels are likely to increase dramatically if areas become a formal park/open space preserve with increased public visibility, and also if the proposed Sonoma Valley Regional Trail is developed along SDC's eastern edge.
- Substantial resources will be needed to manage new parklands in a way that protects the site's multiple sensitive resources. The more recreational opportunities offered, the more resources (staff, funding) likely needed to manage those.
- Some existing facilities are in varying levels of disrepair (e.g., Camp Via, soccer field) and would require either complete replacement or renovation before being fully functional.



Top: Duplicate trails along SDC northeastern boundary.

Bottom: A variety of trail signage is present; much is in need of repair.

- Trails are steep and eroding in some locations; access roads now used as trails were not necessarily designed with recreational use in mind.
- The site's bisection by Arnold Drive separates the two open space areas to some extent.
- There is limited ADA accessibility to trails.
- Allowable public uses on SDC trails should take into consideration the policies of adjacent parklands, and support their successful implementation. For instance, dogs are only allowed in one designated area and one designated trail in Jack London SHP to protect wildlife, but dogs are allowed in Sonoma Valley Regional Park. Off-leash dogs are not allowed in either park.
- Complete a detailed trail and road assessment and trail plan. Identify locations of erosion concern, trails to decommission or realign, drainage improvements needed, and ongoing maintenance needs.
- Link east and west sides with clear signage and a safe pedestrian route.
- Clarify access points, limitations, and regulations with signage; identify primary entry points; provide site maps. Consider possible trailhead parking on North Street at the base of Orchard Road. Consider preferred west side access to Suttonfield, which could be via Sonoma Valley Regional Park, pedestrian linkages to the west side of the campus, and/or through designated parking areas on the east side.
- Clarify linkages to adjacent public lands. Consolidate trails, decommission unneeded ones and informal ones. Direct recreational use to areas of lower ecological sensitivity.

OPPORTUNITIES FOR ENHANCEMENT

- Prioritize wildlife corridor protection when considering recreational uses.
- Consider terms for providing public access to trails.
- Consider integration of undeveloped lands and recreational facilities into existing adjacent park facilities (Jack London State Historic Park and Sonoma Valley Regional Park) for efficient, coordinated land management and recreational opportunities. Alternatively, consider terms for providing public access to trails.
- Consider site needs, sensitivities and resources in relation to the mission, goals, and resources available to potential future owners or management agencies.
- Coordinate management with that of adjacent parks and preserves for more effective and efficient efforts (e.g., invasive control, trail maintenance, restoration, possible prescribed burns).
- Provide opportunities for environmental and agricultural education.
- On core campus, inventory landscape trees and provide education on selected specimens and historic landscape setting (e.g. species labels, signage, or self-guided walks).
- Support regional trails through SDC where natural resources can be protected.

- Consider providing an ADA-accessible pedestrian overlook of Sonoma Creek, to allow for public education/enjoyment/awareness without negative impacts to creek
- Consider Camp Via rehabilitation, and possible use as children’s camp or environmental education center; but note important location in corridor/mountain lion territory and ensure that uses are compatible.
- Improve ADA accessibility.
- Develop ropes course management guidelines to ensure course activities are compatible with resource protection. Include the course in the property wide erosion assessment, and conduct ongoing annual assessments of erosion and tree health. Minimize impacts to sensitive riparian and redwood habitat by implementing a limit to visitor numbers and limiting vehicular access.
- For ropes course users, consider offering overnight camping prior to courses on the old employee picnic grounds, or use of campus buildings for pre-course meeting space.
- Consider providing site access for limited hiking/walking/running events as long as those events protect natural resources.
- Consider community interest in swimming or fishing in Suttonfield Lake, balanced with concern for compatibility with wildlife use, safety, and water quality.
- Consider restoring soccer field for community use, potentially including addition of restrooms and picnic area, and restoration of shed for shaded seating, snack bar, storage, or other recreational uses. This site also

has potential for agriculture; a fuller evaluation of the tradeoffs associated with potential reuse options is expected to follow in a later phase.

AGRICULTURE

Potential agricultural uses and agricultural sub-areas are described in Section 5.3; sub-areas are shown on Figure 5-11: Agricultural Site Suitability.

Opportunities for Agriculture

- Sub-Area 1: Southern Edge. The soccer field and/or the old walnut orchard area offer potential for flexible use as row crops, orchard, vineyard, or mixed crop and livestock operation. As noted in the discussion of recreation opportunities, the soccer field also has potential to be restored for recreational use. An onsite green compost facility could be located in the vicinity of the current green waste piles. The service buildings, barn and greenhouses all have potential to be restored for use as part of agricultural operations.
- Sub-Area 2: Highway Adjacency Area. This area offers the potential for public access into the main agricultural area. It could also include a farm stand that could complement the Oak Hill Farms farm stand nearby. Ag uses would be in smaller plots within the area.
- Sub-Area 3: Eastern Ridgeline and Sunrise Complex. Sloped land on the east could be used for grazing; land around the building complexes could be used for enclosed livestock operations. Reuse potential for buildings still intact after the fire.

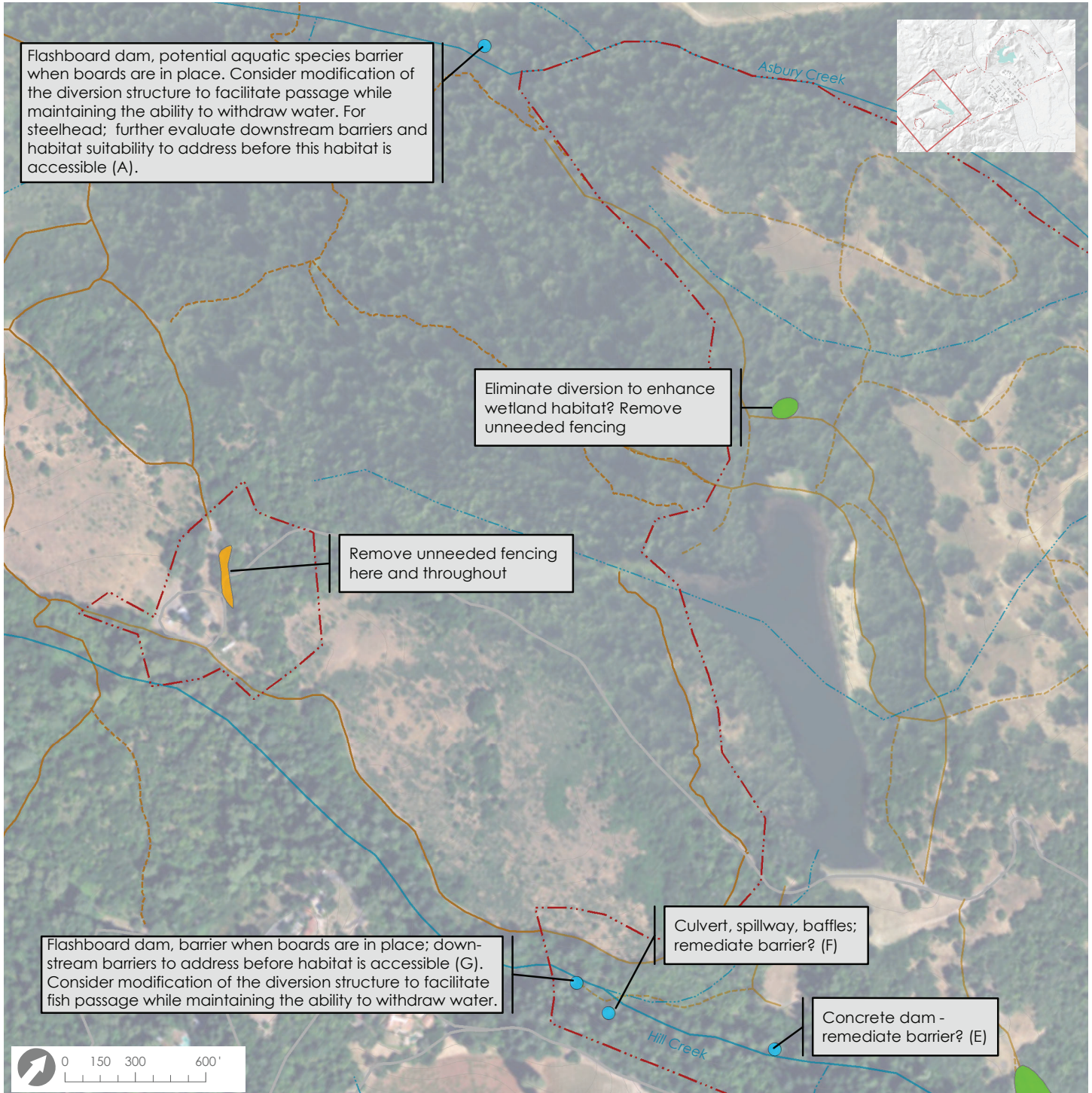
- Sub-Area 4: Northern Edge surrounding Suttonfield Lake. Potential for agriculture limited to seasonal grazing for land management with appropriate buffers and exclusion fencing. Fencing should protect wildlife passage by using wildlife-friendly fencing.
- Sub-Area 5: Seasonal Wetlands. Potential for seasonal grazing or permanent pasture in parts of the area; potential for continued equestrian activities.
- Sub-Area 6: Eldridge Farm Area. Equestrian rings are in relatively good condition and could accommodate greater public use. Expansion of farm’s therapeutic uses.
- Sub-Area 7: Western Edge. The level areas offer potential for flexible use as row crops, orchard, vineyard, or mixed crop and livestock operation; the adjacency to Arnold Drive suggests potential for a farm stand site. Ag uses would be in smaller plots within the area.

Natural Resource Considerations

- Sub-Area 1: Southern Edge. Maintain buffer from riparian corridor; protect wildlife passage along the creek and east-west along the property boundary. Protect water quality, given potential for intensive fertilized agricultural production.
- Sub-Area 2: Highway Adjacency Area. Maintain and enhance wildlife passage through culverts under Hwy. 12. Maintain riparian corridor along the seasonal creek. Maintain oak woodland in the upland. Protect water quality

Figure 5-13

ECOLOGICAL ENHANCEMENT OPPORTUNITIES – SDC WEST



- SDC Property
 - General Habitat Enhancement
 - Corridor/Wildlife Movement
 - Fish Passage
- Enhancement Opportunities

Figure 5-14

ECOLOGICAL ENHANCEMENT OPPORTUNITIES – SDC CENTRAL

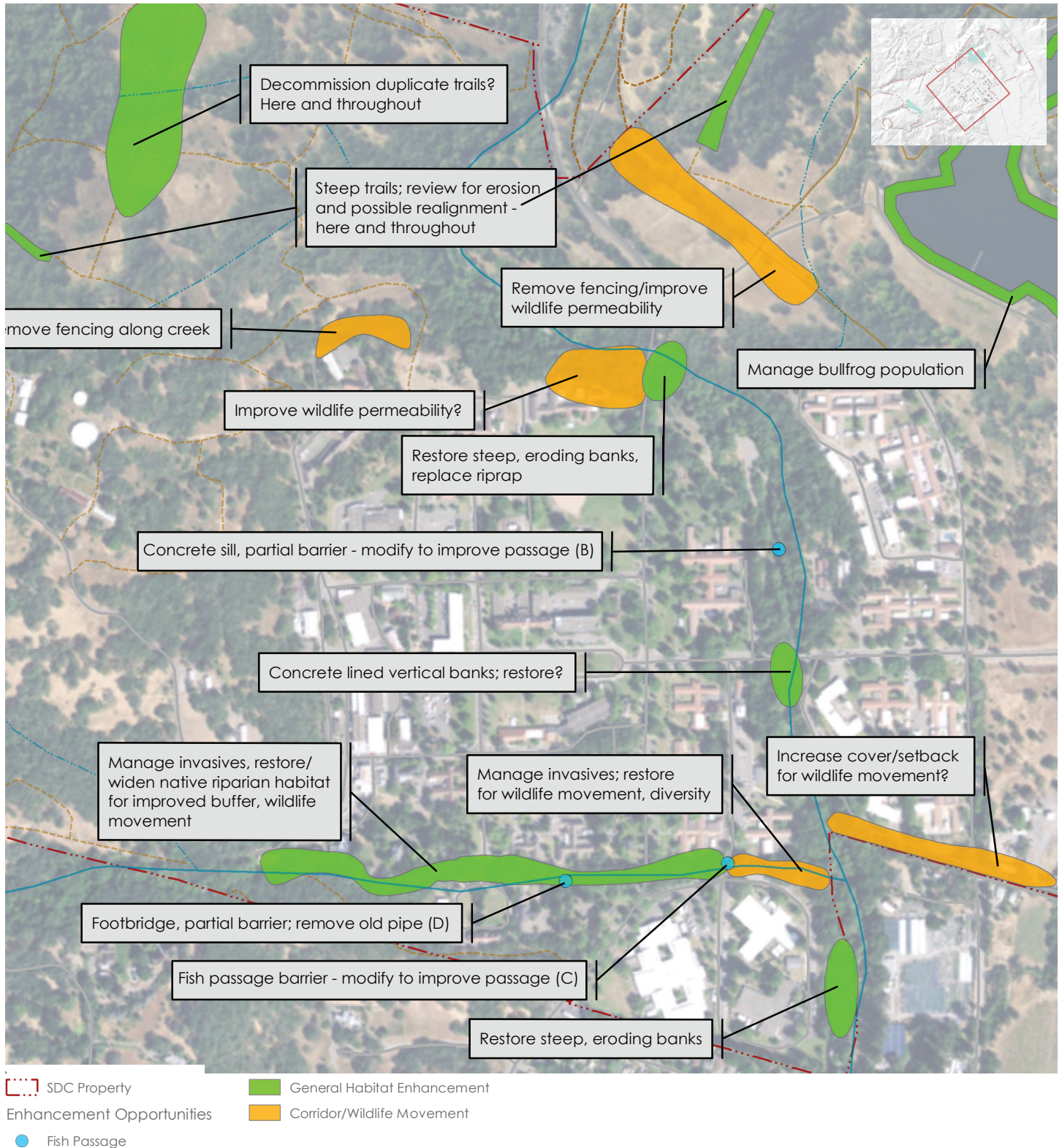
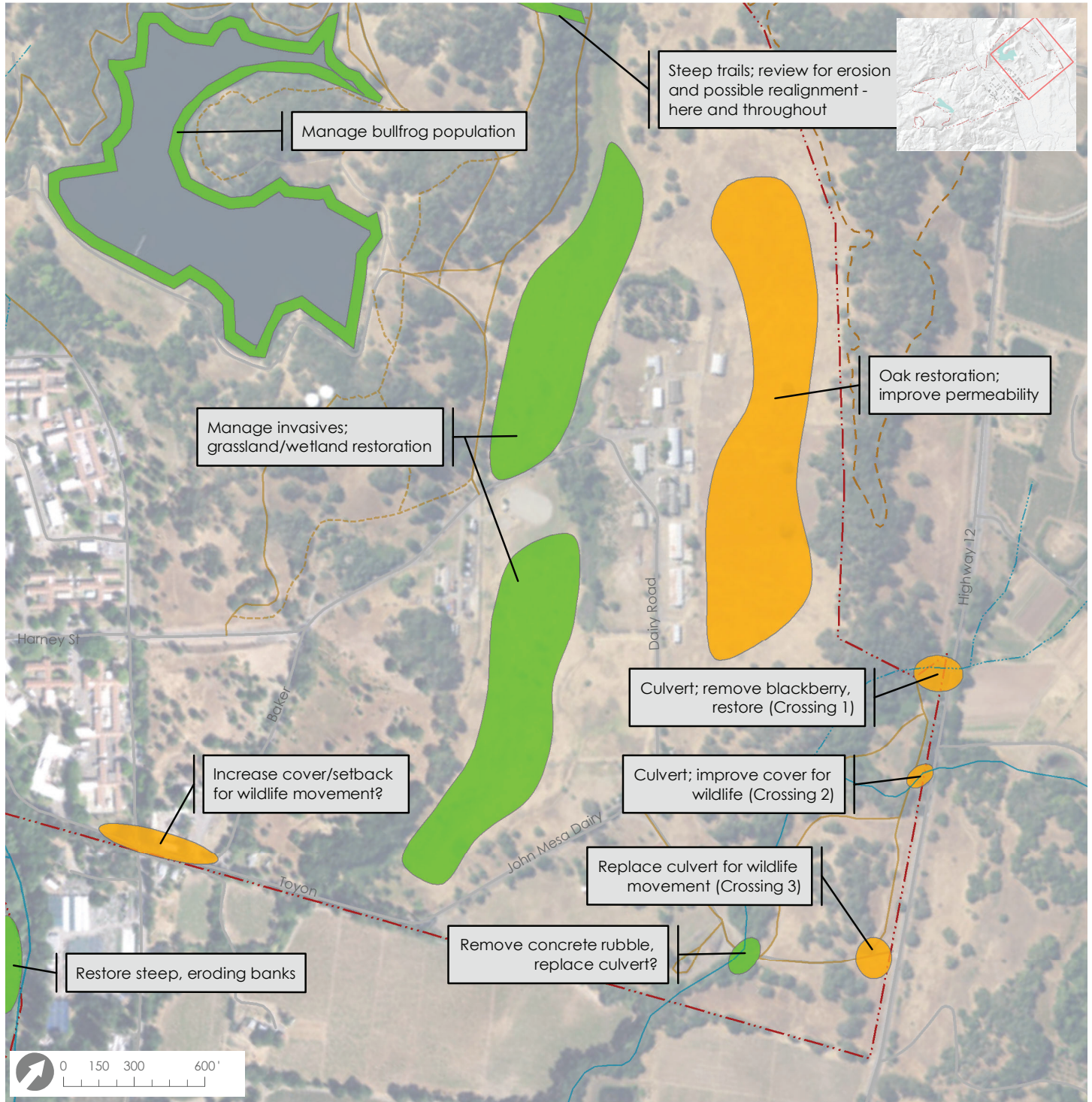


Figure 5-15

ECOLOGICAL ENHANCEMENT OPPORTUNITIES – SDC EAST



- SDC Property
- General Habitat Enhancement
- Enhancement Opportunities
- Corridor/Wildlife Movement
- Fish Passage

- Sub-Area 3: Eastern Ridgeline and Sunrise Complex. Grazing management needed to be compatible with natural regeneration of oaks, potential oak woodland restoration, and invasive species control; protect wildlife passage. Protect water quality.
- Sub-Area 4: Northern Edge surrounding Suttonfield Lake. Trails on steeper slopes can exacerbate erosion. Steep slopes with potential erosion concerns from road, trail and livestock use. Limited grasslands. Grazing management needed to be compatible with natural regeneration of oak woodland species and invasive species control. Protect wildlife passage by using wildlife-friendly fencing. Protect water quality.
- Sub-Area 5: Seasonal Wetlands. Potential to enhance considerable existing values of this area including water recharge, water quality, wetland function, and native diversity. Well-managed seasonal grazing could be compatible with these values.
- Sub-Area 6: Eldridge Farm Area. Fairly disturbed area has more limited ecological values. Retain oak woodland and protect water quality in adjacent drainage.
- Sub-Area 7: Western Edge. Protect oak woodland, riparian corridor, and wildlife movement between Sonoma Creek and the lake. Protect water quality.

RECOMMENDED SETBACKS FOR DEVELOPMENT

Ensuring that developed areas are set back from sensitive natural areas—with natural vegetation between them—will help minimize the impacts of land uses on sensitive plants, wildlife, and aquatic resources. In general, the larger the setback, the greater the protection of natural resources (Castelle et al. 1994, Lee et al. 2004, Osborne and Kovacic 2004). Exact distances required for resource protection will vary with the nature of the proposed development, local qualities of the natural features, and qualities of the buffer zone vegetation. The distances below are a general guideline to minimum setbacks to help protect key ecological functions; they are based on PCI's ongoing literature review of this topic and field observations.

In some cases, current development (primarily buildings and paved areas) encroaches closer than these setbacks recommend. Figure 7-11 shows building footprints and other impervious surfaces with respect to potential riparian buffer areas. As building conditions are reviewed and future uses are explored, these areas of encroachment represent key locations to consider for opportunities to reduce

building footprints or impervious areas. Setback distances also need to take into consideration user behavior. For instance, in a park setting, visitors will want to visit and explore special habitats regardless of formal trail placement, and requiring very wide setbacks for trails from destination habitats could lead to informal trail creation. Informal trail creation could in turn have greater impacts on native habitats than carefully-planned formal trails.

CONTAMINATED SOILS

A Limited Phase II investigation was done for this analysis. The goal of the work performed was to develop an initial dataset to be used for further Phase II investigation. Several RECs identified in the initial Phase II investigation were not investigated during this Phase II Investigation. These areas include several former leaking Underground Storage Tanks (USTs), landfills, and unauthorized release sites. Given the presence of soil impacts in areas investigated and included in this Draft Report, further investigation of RECs not included in this Report is warranted.

Please refer to the Limited Phase II, provided as Appendix D.

Table 5-2

RECOMMENDED SETBACKS FROM SENSITIVE HABITATS

HABITAT TYPE	IMPACT TYPE	RECOMMENDED SETBACK ²	RATIONALE
Creeks, Lakes and Wetlands ³	Low-Medium (e.g., trails, benches)	Sonoma Creek: 50' ⁴ Other Settings: 25'	<ul style="list-style-type: none"> Allows space for natural creek/wetland adjustment. Reduces erosion into creek/wetland. Allows for natural regeneration of native vegetation and maintenance of creek shading. Helps maintain migration corridors for wildlife by reducing human presence.
	High (e.g., buildings, parking)	Sonoma Creek: 100'-300' Other Settings: 50-100' <i>Upper range of setbacks recommended where feasible or where already in place.</i>	<ul style="list-style-type: none"> Increases water quality protection (sediment and nutrient removal). Allows for greater natural regeneration of trees and greater vegetative diversity. Protects against potential changes to temperature and hydrology. Improved connectivity between aquatic and upland habitats and more effective wildlife corridors.
Valley Oak Woodland and Redwood Forest	Low-Medium	25-50' <i>Upper range of setbacks recommended where feasible or where already in place.</i>	<ul style="list-style-type: none"> Reduces grading damage or compaction of tree root zone. Improves infiltration of water and air into soil for tree roots. Protects understory species and seedlings from trampling.
	High	No high impact activities anticipated or recommended near redwoods. For oaks, avoid grading within 1.5 times the diameter of the dripline.	<ul style="list-style-type: none"> As above; greater setbacks required to protect roots from more extensive grading and compaction.
Other Sensitive Native Habitat ⁵	Low-Medium	25'	<ul style="list-style-type: none"> Reduces likelihood of trampling and infestation by invasive species. Allows for natural regeneration.
	High	50'	<ul style="list-style-type: none"> Protects against potential changes to hydrology, sun/shade exposure.

Note:

- Setbacks from riparian settings are from top of bank. See Figure 9. Top of bank is located at the edge of the active channel or, where present, the active floodplain.
- Sonoma County setback for development along Sonoma Creek is 50'.
- Setback applies to limited creek access points. More extensive linear impacts (e.g., trails that closely parallel the creek) not recommended. Trails that extend across important wildlife pathways are also not recommended.
- For example, stands of native grassland that may be identified as more detailed site planning proceeds.

