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Summary of Revisions:
This April 2017 version of the Biological Resources technical report replaces the version submitted to Santa Clara County in November 2016. Revisions to the report include:

- In response to peer review comments, a regulatory setting section was added in Section 5.
- Information about Stanford's Habitat Conservation Plan and Special Conservation Area Plan were moved to the regulatory setting section.
- In response to peer review comments, identification of significance criteria and analyses of project impacts were added in Sections 6 and 7.
- Conservation measures previously identified in Appendix B were moved into the impact analyses in Section 7.

1.0 AUTHORS

Dr. Alan Launer
Dr. Esther Cole Adelsheim
Others[1]

[1] Sections 5 and 6 were contributed by Barbara Schussman (Perkins Coie). The regulatory setting section is partially based on material from the Lehigh Permanente Quarry Reclamation Plan Amendment EIR, 2011 by ESA.

2.0 INTRODUCTION

This technical report addresses potential impacts to biological resources from implementation of the 2018 General Use Permit (or project). The report includes a review of biological community types, wildlife, special status plant species, and jurisdictional waters and wetlands that occur within Stanford's lands in unincorporated Santa Clara County. The report also identifies the federal, state, and local regulations that pertain to biological resources; identifies applicable CEQA significance criteria; and evaluates impacts to biological resources.

Stanford's approach to biological resource conservation is outlined within the Stanford Habitat Conservation Plan (HCP) approved by the United States Fish and Wildlife Service and the Special Conservation Area Plan approved by Santa Clara County. The Stanford HCP covers 4,372 acres of the total 8,180 contiguous acres owned by Stanford (see **Figure BIO.1**). All areas covered by the HCP are located within Santa Clara County. The Special Conservation Area Plan covers 395 acres, of which 73 acres are not specifically included in the HCP.

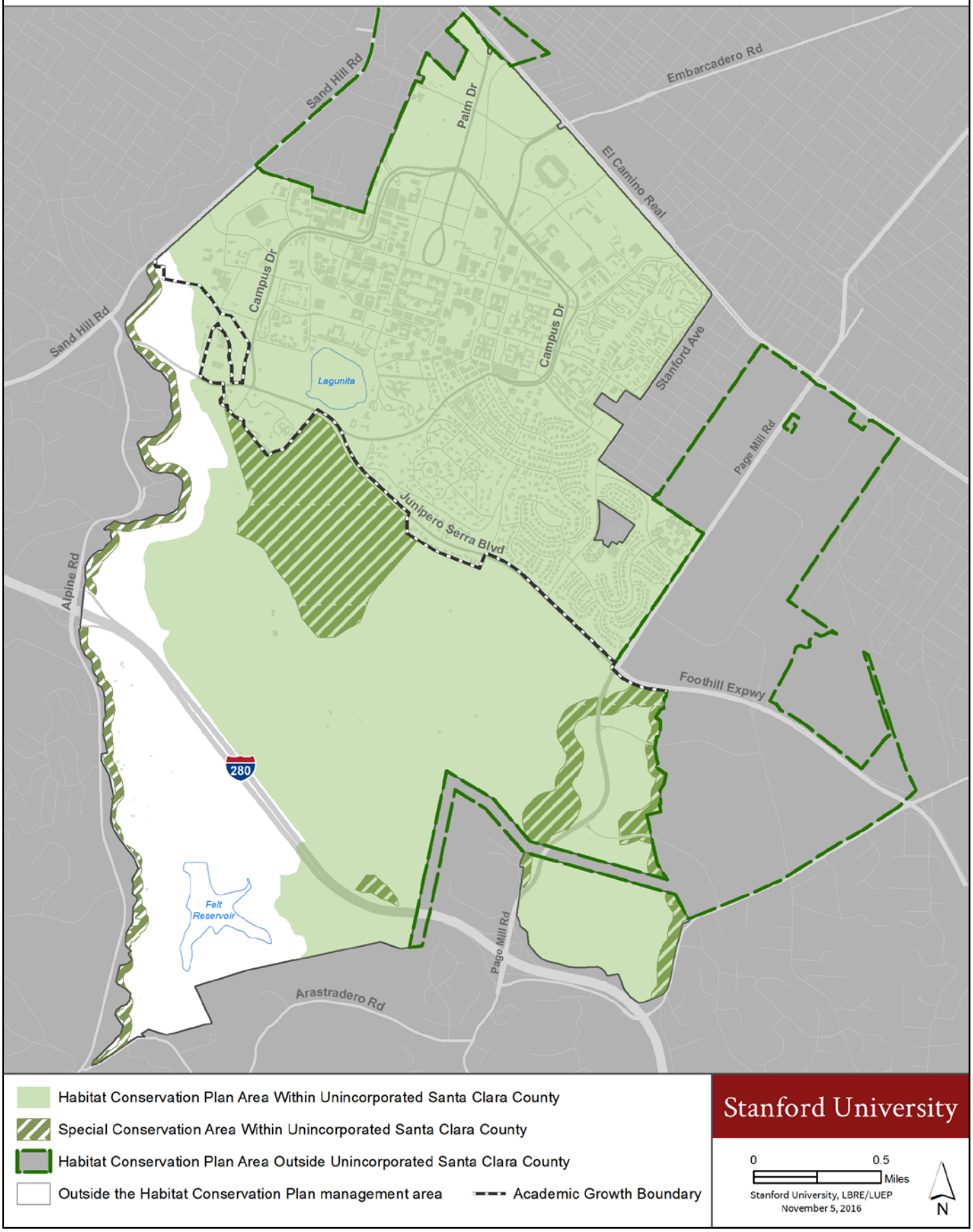
In addition to implementing these two approved conservation plans, Stanford regularly implements the following conditions required by the 2000 General Use Permit:

- Qualified biologists approved by the County conduct pre-construction surveys to prevent impact to active bird nests during construction activities.

- Stanford delineates potential jurisdictional wetlands, receives United States Army Corps of Engineers approval for these wetlands delineations, sites development projects to avoid wetlands to the extent feasible and, where avoidance is not possible, obtains appropriate authorization from the U.S. Army Corps of Engineers or Regional Water Quality Control Board.

Pursuant to 2000 General Use Permit Condition K.1, surveys for special-status plant species have been conducted by independent biologists hired by the County at proposed building project sites located within specified areas of the campus lands. No special-status plant species have been found during these surveys. Accordingly, this report recommends that future plant surveys occur only in the undeveloped portions of the campus: the lands outside the Academic Growth Boundary; the Lathrop Development District; Lagunita and its adjacent uplands, and jurisdictional wetlands.

Figure BIO.1: Habitat Conservation Plan & Special Conservation Areas



This report recommends the following changes to the 2000 General Use Permit Conditions of Approval:

1. Conditions addressing the California tiger salamander (J1 through J9) are no longer necessary. The County has found that the USFWS-approved Stanford HCP provides as much habitat value and protection for California tiger salamander as the conditions in the 2000 General Use Permit, and therefore supersedes those conditions. Note that the Stanford HCP has received a Consistency Determination from the State of California in 2016, meaning that the HCP and federal Incidental Take Permit, serves as the regulatory document for Stanford's compliance with the State Endangered Species Act (concerning the state-listed California tiger salamander).

2. Updated mitigation measures are proposed to modify and replace the 2000 General Use Permit conditions addressing special status plant surveys and protections (K.1), raptors and migratory birds (K.2), oak woodland (K.3), protected trees (K.4), and wetlands (K.5).

3. Stanford has submitted and the County Planning Office has approved a Special Conservation Area Plan; therefore Condition K.7 is no longer necessary.

4. With regard to Condition K.6, Stanford suggests that the condition should be revised to clarify that Stanford submits California Natural Diversity Database records to the State.

This technical report:

- Describes the biological community types and special-status species that occur on Stanford lands in Santa Clara County outside the Academic Growth Boundary, both in the undeveloped portion of the lands and in the developed portions occupied by the Stanford Golf Course and isolated facilities (see **Figure BIO.2**).

- Describes the biological community types and special-status species that occur on Stanford lands within the Academic Growth Boundary. The lands within the Academic Growth Boundary are divided into four distinct sub-areas (each of which may include wetlands) (see Figure BIO.2):
    - Lathrop Development District
    - Lagunita and its adjacent uplands
    - Arboretum
    - Central Campus.

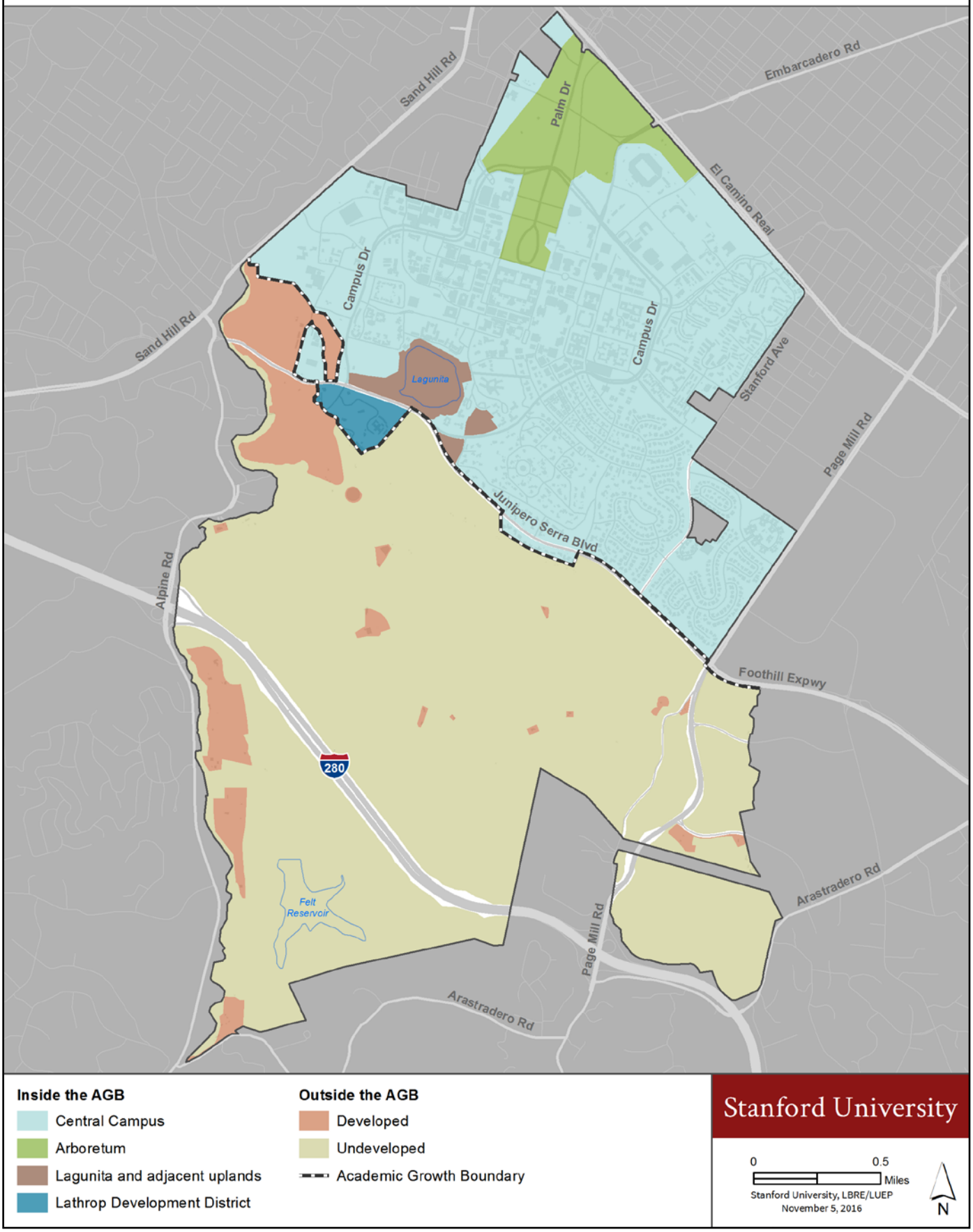
- Summarizes federal, state and local regulations governing biological resources at Stanford, including Stanford's approved federal Habitat Conservation Plan, with State Consistency Determination, and Special Conservation Area Plan.

- Identifies the standards that are used to measure significance of impacts to biological resources under CEQA.

- Evaluates the potential for implementation of the proposed 2018 General Use Permit to result in significant impacts to biological resources.

- Identifies measures to prevent significant impacts to biological resources caused by implementation of the 2018 General Use Permit.

Figure BIO.2: Biological Resource Areas



3.0 SETTING: BIOLOGICAL COMMUNITIES OUTSIDE THE ACADEMIC GROWTH BOUNDARY

For purposes of analyzing effects on biological resources, this report divides the campus lands between areas outside the County's approved Academic Growth Boundary and areas within the Academic Growth Boundary. In general, the areas outside the Academic Growth Boundary have greater habitat value for special-status wildlife and plant species; no new buildings are proposed outside the Academic Growth Boundary.

Stanford lands in unincorporated Santa Clara County that are outside the Academic Growth Boundary are designated by the Stanford Community Plan as Open Space and Field Research and Special Conservation Area. Stanford does not propose development of new structures or buildings in these areas. However, as occurred under the 2000 General Use Permit, some infrastructure improvements such as pathways, underground pipelines, electrical transmission lines, water supply infrastructure, habitat enhancements, and similar types of improvements could be constructed outside the Academic Growth Boundary. To understand the various biological community types, lands outside the Academic Growth Boundary are divided into three categories: undeveloped lands; the Stanford Golf Course; and isolated facilities (see Figure BIO.2).

3.1 Undeveloped Lands Outside the Academic Growth Boundary

3.1.1 Annual and Perennial Grassland[2]

Annual and perennial grassland is a community type on Stanford lands outside the Academic Growth Boundary comprised primarily of nonnative annual grasses and forbs. Nonnative species dominating these areas include ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), Italian rye *(Festuca perennis*), wild oat (*Avena fatua and A. barbata*), wall barley (*Hordeum murinum*), Italian thistle (*Carduus pycnocephalus*), storksbill (*Erodium* species), bristly ox-tongue (*Helminthotheca echioides*), purple star thistle (*Centaurea calcitrapa*), yellow star thistle (*C. solstitialis*), common groundsel (*Senecio vulgaris*), geranium (*Geranium* species) and milk thistle (*Silybum marianum*). Occasional individual oak trees or small, open-canopied groupings of oaks occur within this community type.

Several native grasses, most notably purple needlegrass (*Stipa pulchra*), form relatively dense patches that are not uncommon in some areas of the grasslands at Stanford. Native forbs that commonly occur within this community include: California poppy (*Escholzia californica*), California buttercup (*Ranunculus californicus),* blue-eyed grass (*Sisyrinchium bellum*), blue dicks (*Dichelostemma capitatum*), Ithuriel's spear (*Tritelia laxa*), yampa (*Perideridia kelloggii*), coyote brush (*Eryngium jepsonii*) and mule's ear (*Wyethia augustifolia*). Occasional individual oak trees or small, open-canopied groupings of oaks occur within this community type.

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2 Defining and delineating biological communities is a complex and inexact exercise. The communities identified in this document are based on the state's Natural Communities definitions (which incorporate a number of other sources, including the California Native Plant Society). The definitions used by the Stanford Conservation Program are, however, slightly modified from the original sources in order to account for local conditions (primarily species present and spatial extent) and be useful for the University's conservation planning.

Grasslands outside the Academic Growth Boundary at Stanford provide habitat for a diversity of terrestrial wildlife. Amphibians include western toad (*Anaxyrus boreas*), Sierran treefrog (*Pseudacris sierra*) and California tiger salamander (*Ambystoma californiense*). Reptiles include the western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis catenifer*) and western racer (*Coluber constrictor*).

A variety of bird species are at least seasonally present in the grasslands outside the Academic Growth Boundary at Stanford. Avian seedeaters, including western meadowlark (*Sturnella neglecta*), nest in grazed annual grasslands, while other grassland species, such as red-winged blackbirds (*Agelaius phoeniceus*), are more likely to nest in taller, ungrazed vegetation. Many other species, including American goldfinch (*Carduelis tristis*), California towhee (*Pipilo crissalis*), loggerhead shrike (*Lanius ludovicianus*), and northern mockingbird (*Mimulus polyglottos*), nest in scattered shrubs throughout annual grasslands. Raptors, including white-tailed kite (*Elanus caeruleus*), red-tailed hawk (*Buteo jamaicensis*), barn owl (*Tyto alba*), and American kestrel (*Falco sparvarius*), nest in nearby trees and forage in grasslands. Burrowing owls (*Athene cunicularia*) have not been observed nesting at Stanford for nearly a century, but overwinter at several locations outside the Academic Growth Boundary at Stanford. Aerial foragers, including northern rough-winged swallow (*Stelgidopteryx serripennis*), tree swallow (*Tachycineta bicolor*), violet-green swallow (*T. thalassina*), cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), and white-throated swift (*Aeronautes saxatilis*), also may frequent annual grasslands. Great blue herons (*Ardea herodias***)** and great egrets (*A. alba*) frequently are observed foraging in the grasslands outside the Academic Growth Boundary at Stanford.

Small mammals that forage on the plants found in this habitat type include deer mice (*Peromyscus* species), western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), California ground squirrel (*Otospermophilus beecheyi)* and Botta's pocket gopher (*Thomomys bottae*). Larger mammals, such as bobcat (*Lynx rufus*), coyote (*Canis latrans*), opossum (*Didelphis virginiana)*, raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), black-tailed jack rabbit (*Lepus californicus*), and black-tailed deer *(Odocoileus hemionus*), also use the annual grasslands outside the Academic Growth Boundary at Stanford, though other habitats are generally required for cover. Badgers (*Taxidea taxus*) are rarely sighted at Stanford and other areas of the southeastern portion San Francisco Peninsula, but may be increasing in numbers and distribution. Mountain lions (*Felis concolor*) are occasionally reported from the grasslands, riparian zone and woodlands of the lower foothills region.

3.1.2 Oak Woodland/Savannah

While oaks grow in abundance across Stanford lands, the only biologically functional oak woodlands/savannahs occur where natural processes, such as regeneration and mortality, are occurring. These natural processes occur in the undeveloped areas outside the Academic Growth Boundary and within parts of the Lathrop Development District within the Academic Growth Boundary. By contrast, while oaks growing within the urban/suburban matrix within the Academic Growth Boundary at Stanford may serve some important functions (i.e., energy savings, atmospheric carbon dioxide reductions, air quality benefits, storm water runoff reductions, food and habitat), the trees within the Academic Growth Boundary are heavily managed to meet the demands of civil infrastructure, aesthetics and public safety. Therefore, it is appropriate to consider the oaks growing in open space outside the Academic Growth Boundary as an oak woodland/savannah community whereas oaks growing within an urban/suburban context should be considered as individual components of an urban forest.

Oak woodland/savannah occurs in a number of locations outside the Academic Growth Boundary at Stanford. This community is dominated by a mix of coast live oaks (*Quercus agrifolia*), blue oaks (*Q.*

douglasii), valley oaks (*Q. lobata*), and California buckeye (*Aesculus californica*). Understory species include shrubs such as poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), common snowberry (*Symphoricarpos albus*), blue elderberry (*Sambucus nigra*), western leatherwood (*Dirca occidentalis*), and occasional dense patches of coyote brush *(Baccharis pilularis*) along the edges of the woodland. Common grass species and herbs found beneath the oak woodland canopy include the nonnative species ripgut brome (*B. diandrus),* wide-leaf filaree (*E. botrys*), soft chess (*B. hordeaceus*), Italian rye (*F. perennis*), Italian thistle (*Carduus pycnocephalus*) and soft geranium (*G. dissectum*), as well as native species including bedstraw (Galium angustifolium), Indian lettuce (*Claytonia parviflora*), and goldenback fern (*Pentagramma triangularis*). In many instances, nonnative plants dominate the understory vegetation in oak woodlands.

The wildlife typically associated with oak woodland outside the Academic Growth Boundary at Stanford include: bobcat (*L. rufus*), gray fox (*Urocyon cinereoargenteus*), western gray squirrel (*Sciurus griseus*), California ground squirrel (*O. beecheyi*), black-tailed deer (*O. hemionus*), deer mice (*Peromyscus* species), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), broad-footed mole (*Scapanus latimanus)*, acorn woodpecker (*Melanerpes formicivorus*), band-tailed pigeon (*Columba fasciata*), northern flicker (*Colaptes aurantus*), and western scrub jay (*Aphelocoma californica*). Oak trees and other hardwoods in this community provide shelter, shade and breeding habitat for mammal species such as raccoon (*P. lotor*), striped skunk (*M. mephitis*), and cottontail rabbits (*Sylvilagus audubonii*).

The abundant insect and plant life present in the oak woodlands outside the Academic Growth Boundary provide food for bird species such as white-breasted nuthatch (*Sitta carolinensis*), California thrasher (*Toxostoma redivivum),* bushtit (*Psaltriparus minimus*), oak titmouse (*Baeolophus inornatus*), dark-eyed junco (*Junco hyemalis*), blue-gray gnatcatcher (*Polioptila caeurlea*), Bewick's wren (*Thryomanes bewickii*), spotted towhee (*P. maculatus*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), and ash-throated flycatcher (*Myiarchus cinerascens*). A wide variety of woodpecker species are primary-cavity nesters in oak trees, while house wren (*Troglodytes aedon),* western bluebird (*Sialia mexicana*), and American kestrel (*F. sparverius*) are secondary-cavity nesters (e.g., utilizing abandoned woodpecker cavities). Oak woodland also is important to neotropical migrant songbirds (e.g., warblers, vireos, grosbeaks) providing feeding, resting and nesting habitats. Raptors that nest and forage in the oak woodland habitat include great horned owl (*Bubo virginianus*), barn owl (*T. alba*), western screech-owl (*Otus kennicotti*), red-tailed hawk (*B. jamaicensis*), and red-shouldered hawk (*B. lineatus*). Cooper's hawk (*Accipiter cooperi*), white-tailed kite (*E. leucurus),* and golden eagle (*Aquila chrysaetos*) are additional special-status bird species that have been recorded in woodlands and grasslands of the Stanford foothills.

More than 10 species of bats are common in the Stanford area; individuals of some species roost in tree cavities. Townsend's big-eared bats (*Corynorhinus townsendii*) are occasionally recorded at Stanford and probably utilize local woodlands and riparian areas outside the Academic Growth Boundary on a regular basis, at least for foraging.

Amphibian and reptile species that are found in the oak woodlands outside the Academic Growth Boundary at Stanford include: California tiger salamander (*A. californiense*), western toad (*A. boreas*), Sierran treefrog (*P. sierra*), California slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), sharp-tailed snake (*Contia tenuis*), ringneck snake (*Diadophis punctatus*), California kingsnake (*Lampropeltis getulus californiae*), gopher snake (*P. catenifer*), western racer (*C. constrictor*), western skink (*Eumeces skiltonianus*), western fence lizard (*S. occidentalis*), and southern alligator lizard (*Elgaria multicarinata)*. It is

likely that California red-legged frogs (*Rana draytonii*) regularly traverse many of the oak woodlands outside the Academic Growth Boundary at Stanford.

3.1.3 Riparian Woodland and Creeks

Riparian woodland is located along Matadero Creek, Deer Creek and the creeks in the San Francisquito watershed. Vegetation along the creeks consists primarily of a moderately closed canopy of valley oak (*Q. lobata*), coast live oak (*Q. agrifolia*), and California buckeye (*A. californica*) that ranges from approximately 20 to 40 feet in height. Associated species within this community include bay (*Umbellularia californica*), redwood (*Sequoia sempervirens*), willow (*Salix* species) and white alder (*Alnus rhombifolia*). An understory shrub layer occurs beneath much of the riparian canopy, particularly in areas where gaps in the overstory allow direct sunlight. Shrub species present include poison oak (*T. diversiloba*), California rose (*Rosa californica*), blackberry (*Rubus ursinus*), common snowberry (*Symphoricarpus albus*), blue elderberry (*S. nigra*), and coyote bush (*B. pilularis*).

Small clumps of native and nonnative grasses and forbs are present in the understory of the riparian woodland. Aquatic vegetation found intermittently along the creek channels includes water cress (*Rorippa nasturtium-aquaticum*), iris-leaved juncus (*Juncus xiphioides*), broad-leaved cattail (*Typha latifolia*), and curly dock (*Rumex crispus*).

Riparian woodland provides abundant food, cover and breeding habitat for wildlife. Bird species associated with this habitat outside the Academic Growth Boundary at Stanford include California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), orange-crowned warbler (*Vermivora celata*), Nuttall's woodpecker (*Picoides nuttallii*), black phoebe (*Sayornis nigricans*), black-crowned night heron (*Nycticorax nycticorax*), belted kingfisher (*Ceryle alcyon*), western wood-pewee (*Contopus sordidulus*), California towhee (*Melozone crissalis*), and song sparrow (*Melospiza melodia*). Many birds associated with riparian woodlands nest or roost in riparian trees and feed in adjacent habitat areas, such as annual grasslands. Steller's jay (*Cyanocitta stelleri*) and western scrub jay (*Aphelocoma californica*) are found in abundance in the riparian woodlands outside the Academic Growth Boundary at Stanford, as are California thrasher (*Toxostoma redivivum*), red-tailed hawk (*B. jamaicensis*), Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*B. lineatus*), and sharp-shinned hawk (*Accipiter striatus*). Riparian woodlands also provide important feeding, resting and nesting for neotropical songbirds such as warblers, vireos, grosbeaks and flycatchers.

Common mammals found within this riparian woodland include: black-tailed deer (*O. hemionus*), opossum (*D. virginiana*), raccoon (*P. lotor*), deer mice (*Peromyscus* species), Botta's pocket gopher (*T. bottae*), tree squirrels (*Scirus* species), San Francisco dusky-footed wood rat (*Neotoma fuscipes annectens*), California vole (*M. californicus*), coyote (*C. latrans*), gray fox (*U. cinereoargenteus*), bobcat (*L. rufus*), striped skunk (*M. mephitis*), and the nonnative red fox (*Vulpes vulpes*). Riparian areas at Stanford are used extensively by foraging bats (Evelyn et al. 2004). A number of bat species have been recorded, including: Townsend's big-eared bat (*Corynorhinus townsendii*), red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), California myotis (*Myotis californicus*), Yuma myotis (*Myotis yumanensis*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), big brown bat (*Eptesicus fuscus*), and western pipistrelle (*Pipistrellus hesperus*).

Amphibians and reptiles known to occur in this biotic community outside the Academic Growth Boundary at Stanford include western toad (*A. boreas*), Sierran treefrog (*P. sierra*), California red-legged frog (*Rana draytonii*), arboreal salamander (*Aneides lugubris*), black salamander (*Aneides flavipunctatus*), slender salamander (*Batrachoseps attenuates*), California newt (*Taricha torosa*), rough-skinned newt (*T. granulosa*), Santa Cruz ensatina (*Ensatina eschscholtzi*), California kingsnake (*L. getula californiae*), gopher snake (*P.*

catenifer), western night snake (*Hypsoglena torquata*), western fence lizard (*S. occidentalis*), alligator lizard (*Elgaria species*), and western skink (*Plestiodon skiltonianus*). Western pond turtles (*Clemmys marmorata*) are found in Felt Reservoir and in the San Francisquito Creek system.

Native fish recorded from the Matadero and San Francisquito systems include three-spined stickleback (*Gasterosteus aculeatus*), roach (*L. symmetricus*), Sacramento sucker (*Catostomus occidentalis*), and sculpin (*Cottus asper* and *C. gulosus*). Steelhead/rainbow trout (*Oncorhynchus mykiss*) are found locally in the San Francisquito system, but have not been recorded in the Matadero system in recent surveys conducted by Stanford. Hitch (*Lavinia exilicauda*) and Sacramento blackfish (*Orthodon microlepidotus)* have historically been present in the San Francisquito system.

San Francisquito Creek contains one of the few remaining steelhead runs in the San Francisco Bay drainage. Steelhead spawn throughout the San Francisquito Creek system, including those portions that flow through Stanford. The number of steelhead present in the watershed ranges from essentially zero in drought years to several hundred adult fish during wet years. At Stanford, relatively large numbers of parr are typically found in Los Trancos Creek and in a few portions of San Francisquito Creek. Native mussels (*Anodonta* species) are also found scattered across the San Francisquito Creek system.

Nonnative aquatic animals that have been recorded from the creeks outside the Academic Growth Boundary at Stanford include bullfrog (*Lithobates catesbeiana*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), red-ear sunfish (*Lepomis microlophus*), mosquito fish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), Louisiana red swamp crayfish (*Procambarus clarki*) and signal crayfish (*Pascifasticus leniusculus*). Bullfrogs are occasionally observed in the Stanford portions of Matadero Creek and Deer Creek; generally, no more than three or four individuals are observed each year (and fewer than 10 bullfrog tadpoles have been encountered in Matadero and Deer creeks since the mid-1990s). Green sunfish are present but uncommon in the unincorporated Santa Clara County portion of Matadero Creek, and are limited in Deer Creek to reaches immediately upstream from its confluence with Matadero Creek (reaches that do not typically dry out). No young-of-the-year green sunfish have been observed in the Stanford portions of Matadero Creek and Deer Creek during annual surveys since 1997, suggesting that juvenile or adult sunfish may be dispersing into either downstream or upstream reaches. During recent annual surveys, only one largemouth bass and one sunfish were observed in the Stanford portion of the Matadero watershed; Louisiana red swamp crayfish are found in Matadero Creek.

Mitten crabs (*Eriocheir sinensis*) have been observed in the San Francisquito watershed. The number of these invasive nonnative crabs in the Stanford portions of the creeks varies each year, and it is unclear if this invasive species is still present in the area. From 1996 to 1998, there were very few observations of crabs upstream of El Camino Real. In 1999 and 2000, hundreds of crabs were seen in San Francisquito Creek, with some individuals found upstream as far as the confluence of Corte Madera and Bear creeks. During 2001 through 2015, very few crabs were observed in the system (and none during the last few years). In 2000, a mitten crab was observed in Matadero Creek, just downstream of the Foothill Expressway bridge (there were mid-1990s reports of mitten crabs at Matadero Creek's outflow into San Francisco Bay). Mitten crabs have not been observed in the areas of the creek that support red-legged frogs, but they could colonize the area in the future. At the present time, the extent and impacts of this recent invasion are unclear.

3.1.4 Chaparral and Scrub

Chaparral and scrub are present outside the Academic Growth Boundary at Stanford in several locations including the Dish area and small peripheral areas off Alpine Road. This chaparral includes dense stands of

chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), coyote brush (*B. pilularis*), buckbrush (*Ceanothus cuneatus*), yerba-santa (*Eriodictyon californicum*), toyon (*H. arbutifolia*), scrub oak (*Q. berberidifolia*), poison oak (*T. diversiloba*), black sage (*Salvia mellifera*), sticky monkey flower (Mimulus auranticus), and California bee plant (*Scrophularia californica*).

Chaparral and scrub outside the Academic Growth Boundary at Stanford provide habitat for a diversity of terrestrial wildlife. Amphibians include western toad (*A. boreas*) and Sierran treefrog (*P. sierra*). Reptiles include western fence lizard (*S. occidentalis*), gopher snake (*P. catenifer*), western racer (*C. constrictor*), and northern Pacific rattlesnake (*Crotalus oreganus oreganus*).

A wide range of mammals and birds can be found in the chaparral and scrub outside the Academic Growth Boundary at Stanford. These are, however, primarily the same species found in the annual grasslands and oak woodlands in the area.

3.1.5 Seasonal Wetlands

The seasonal wetlands outside the Academic Growth Boundary at Stanford include several constructed ephemeral ponds and some small semi-natural seasonal pools scattered across the lower foothills. Rainfall permitting, all of these bodies of water support large numbers of aquatic invertebrates and vegetation.

3.1.6 Perennial Standing Water

Felt Reservoir supports populations of fishes, most of which are nonnative game species such as largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus),* sunfish (*Lepomis* species) and catfish (*Ameiurus* species*)*. Felt Reservoir does not provide high-quality habitat for native aquatic species of conservation concern due to the presence of bullfrogs (*L. catesbiana*), the abundance of nonnative fishes, the highly variable water level, and the lack of cover-providing emergent vegetation. However, western toads (*A. boreas*) reproduce in Felt Reservoir and the reservoir provides habitat for waterfowl and foraging areas for bats. In 2015 and 2016, two bald eagles (*Haliaeetus leucocephalus*) were frequently observed foraging at Felt Reservoir; they successfully fledged two young in 2016. Felt Reservoir is used by both migratory and resident birds. Freshwater mussels (likely *Anodonta californiensis* and/or *A. oregonensis*) were present in Felt Reservoir, but have not been documented in the reservoir since the renovation work of 2008. Nonnative Chinese mystery snails (*Cipangopaludina chinensis*) and Louisiana red swamp crayfish (*Procambarus clarkii*) are abundant. Western pond turtles (*Actinemys marmorata*) and nonnative red-eared sliders (*T. scripta elegans*) are also present in Felt Reservoir.

3.2 Developed Lands Outside of the Academic Growth Boundary

3.2.1 Stanford Golf Course

The Stanford Golf Course, located outside of the Academic Growth Boundary, contains Riparian Woodland and Creeks (same community type as described in section 3.1.3) as well as an artificial, heavily managed landscape environment potentially used by some native species. The golf course maintains putting and driving greens interspersed with "rough." The golf course manages the landscape through irrigation, mowing, tree trimming and removal, and rodent trapping. High amounts of human use coupled with active landscape management make the golf course unsuitable for many native plants, vertebrates and invertebrates. However, the golf course is used by a number of native bird species, small mammals, amphibians and native plants. Some native species may thrive at the golf course because they favor the artificially high levels of moisture caused by irrigation, and the relative absence of predators.

The presence of special-status species within the golf course is highly dependent on the specific microhabitat. The creek and riparian areas located within the golf course support steelhead (*O. mykiss*), dusky-footed woodrat (*N. fuscipes*) and Cooper's hawk (*A. cooperii*). Western pond turtle (*A. marmorata*) has historically been found upstream of the golf course on San Francisquito Creek and therefore may be present. Margins of the golf course, mainly the rough closest to the constructed ponds in the foothills and Lagunita, may occasionally support California tiger salamanders.

Despite use of the golf course by native species, the terrestrial environment present there does not contain the same set of species with the same levels of abundance or functioning processes as Oak Woodland/Savannah or Annual and Perennial Grassland communities found in the undeveloped areas outside the Academic Growth Boundary. Moreover, the rough areas located in the interior of the golf course are partially isolated from other, more natural areas by heavily managed areas of turf and often internally fragmented cart paths and utilities.

3.2.2 Isolated Facilities

Outside the Academic Growth Boundary, there are a number of existing facilities associated with civil infrastructure, research, education and agricultural leaseholds, including water reservoirs, solar observatories, caretakers' residences, etc. The vegetation immediately surrounding the facilities consists of highly managed, mostly nonnative vegetation. Isolated facilities and associated grounds may be occupied by California ground squirrels, deer mice and birds. Occupancy by rodents is controlled through mechanical and chemical methods for human safety and protection of property.

4.0 EXISTING BIOLOGICAL RESOURCES WITHIN THE ACADEMIC GROWTH BOUNDARY

All areas within the Academic Growth Boundary are highly altered and their biological conditions reflect a long history of intensive human use. This landscape contains extensive infrastructure and small remnant patches of natural habitat. Some native species are able to survive and reproduce within areas of intensive human use, but many are not. Within the Academic Growth Boundary, fragmented patches of native vegetation and isolated wetlands provide habitat for native species. Remnant habitat patches can resemble the biological communities found in undeveloped lands outside the Academic Growth Boundary. However, these remnant patches tend to be of lower ecological value because they are small and are isolated from more extensive and biologically intact semi-natural areas.

For purposes of describing biological resources, the lands within the Academic Growth Boundary are divided into four distinct geographic sub-areas (see Figure BIO.2): the Lathrop Development District; Lagunita and its adjacent uplands; the Arboretum; and Central Campus. Isolated wetlands can occur throughout this region. All of the Arboretum and most of Lagunita and its associated uplands are designated Campus Open Space; no new buildings would be constructed within these areas under the 2018 General Use Permit. 20,000 net new square feet of academic and academic support spaces could be constructed in the Lathrop Development District. The remainder of the proposed net new academic and academic support space and the proposed housing would be located in the Central Campus, with the potential for some development within the portions of Lagunita and its associated uplands that are not within Campus Open Space. Infrastructure such as pathways, underground pipelines, electrical transmission lines, water supply infrastructure, habitat improvements, and similar types of improvements could be constructed throughout the lands within the Academic Growth Boundary.

4.1 Biological communities within the Academic Growth Boundary

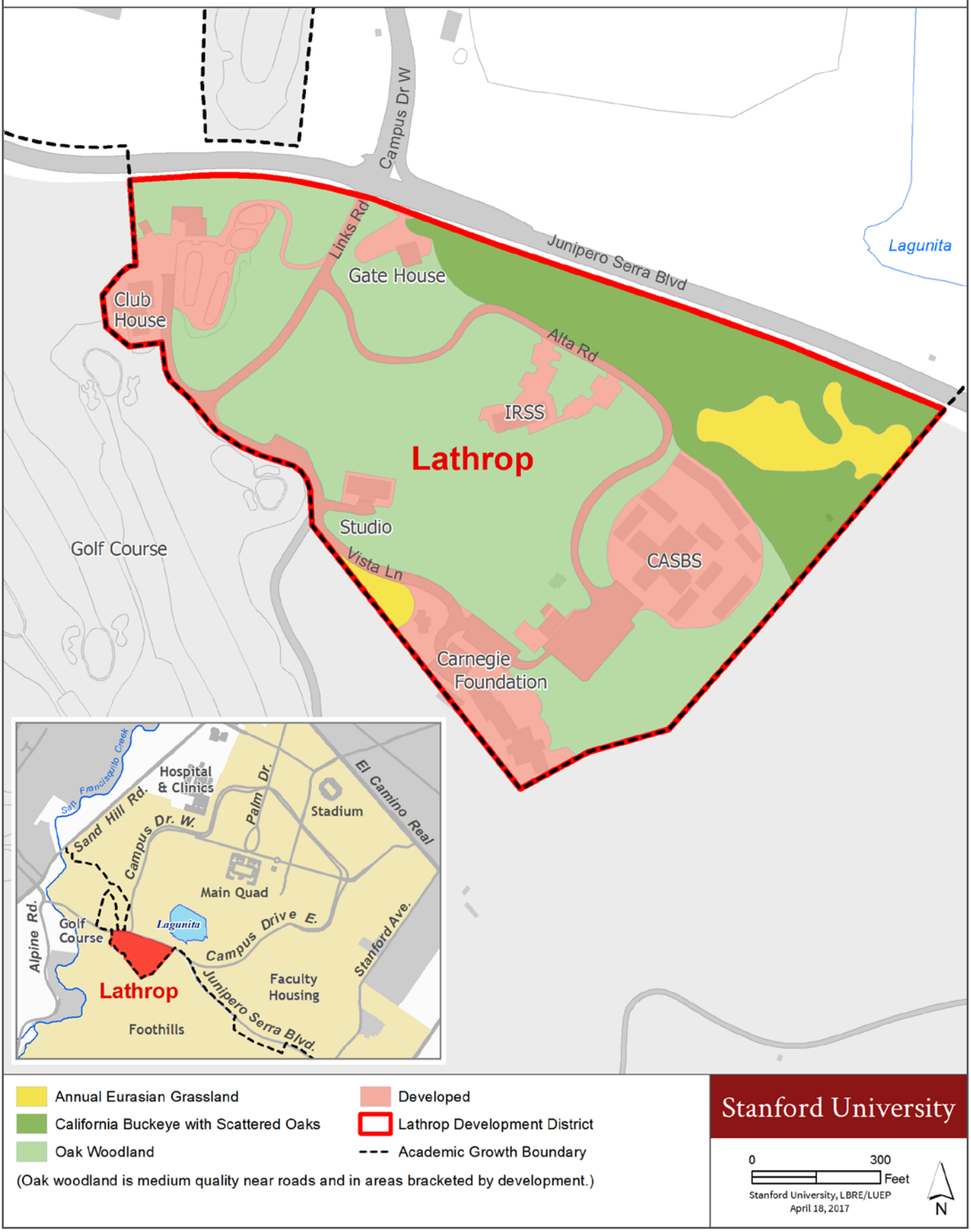
4.1.1 Lathrop Development District

The Lathrop Development District contains a significant proportion of built elements as well as natural elements. The Student Observatory, Carnegie Foundation, the Center for Advanced Study in the Behavioral Sciences, and the Stanford Department of Art & Art History have facilities within the Lathrop Development District.

However, the Lathrop Development District also contains an Oak Woodland/Savannah community (same community type as described in section 3.1.2) with significant abundance of native plant species. **Figure BIO.3** depicts the Oak Woodland/Savannah community within the Lathrop Development District. The Oak Woodland/Savannah community supports California tiger salamander and other native amphibian species. A number of native bird species, including migratory song birds and raptors, also forage and nest in this district.

The Oak Woodland/Savannah community within the Lathrop Development District is dominated by a mix of coast live oaks (*Quercus agrifolia*), blue oaks (*Q. douglasii*), valley oaks (*Q. lobata*), and California buckeye (*Aesculus californica*). Understory species include shrubs such as poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), common snowberry (*Symphoricarpos albus*), blue elderberry (*Sambucus nigra*), western leatherwood (*Dirca occidentalis*), and occasional dense patches of coyote brush *(Baccharis*

Figure BIO.3: Oak Woodlands in the Lathrop Development District



pilularis) along the edges of the woodland. Common grass species and herbs found beneath the oak woodland canopy include the nonnative species ripgut brome (*B. diandrus),* wide-leaf filaree (*E. botrys*), soft chess (*B. hordeaceus*), Italian rye (*F. perennis*), Italian thistle (*Carduus pycnocephalus*) and soft geranium (*G. dissectum*), as well as native species including bedstraw (Galium angustifolium), Indian lettuce (*Claytonia parviflora*), and goldenback fern (*Pentagramma triangularis*). In many instances, nonnative plants dominate the understory vegetation in oak woodlands.

The wildlife typically associated with oak woodland within the Lathrop Development District include: bobcat (*L. rufus*), gray fox (*Urocyon cinereoargenteus*), western gray squirrel (*Sciurus griseus*), California ground squirrel (*O. beecheyi*), black-tailed deer (*O. hemionus*), deer mice (*Peromyscus* species), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), broad-footed mole (*Scapanus latimanus)*, acorn woodpecker (*Melanerpes formicivorus*), band-tailed pigeon (*Columba fasciata*), northern flicker (*Colaptes aurantus*), and western scrub jay (*Aphelocoma californica*). Oak trees and other hardwoods in this community provide shelter, shade and breeding habitat for mammal species such as raccoon (*P. lotor*), striped skunk (*M. mephitis*), and cottontail rabbits (*Sylvilagus audubonii*).

The abundant insect and plant life present in the oak woodlands provide food for bird species such as white-breasted nuthatch (*Sitta carolinensis*), California thrasher (*Toxostoma redivivum),* bushtit (*Psaltriparus minimus*), oak titmouse (*Baeolophus inornatus*), dark-eyed junco (*Junco hyemalis*), blue-gray gnatcatcher (*Polioptila caeurlea*), Bewick's wren (*Thryomanes bewickii*), spotted towhee (*P. maculatus*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), and ash-throated flycatcher (*Myiarchus cinerascens*). A wide variety of woodpecker species are primary-cavity nesters in oak trees, while house wren (*Troglodytes aedon),* western bluebird (*Sialia mexicana*), and American kestrel (*F. sparverius*) are secondary-cavity nesters (e.g., utilizing abandoned woodpecker cavities). Oak woodland also is important to neotropical migrant songbirds (e.g., warblers, vireos, grosbeaks) providing feeding, resting and nesting habitats. Raptors that nest and forage in the oak woodland habitat include great horned owl (*Bubo virginianus*), barn owl (*T. alba*), western screech-owl (*Otus kennicotti*), red-tailed hawk (*B. jamaicensis*), and red-shouldered hawk (*B. lineatus*). Cooper's hawk (*Accipiter cooperi*), white-tailed kite (*E. leucurus)*, and golden eagle (*Aquila chrysaetos*) are additional special-status bird species that have been recorded in woodlands and grasslands near the Lathrop Development District.

More than 10 species of bats are common in the Stanford area; individuals of some species roost in tree cavities. Townsend's big-eared bats (*Corynorhinus townsendii*) are occasionally recorded at Stanford and probably utilize local woodlands within the Lathrop Development District on a regular basis, at least for foraging.

Amphibian and reptile species that are found in the oak woodlands within the Lathrop Development District include: California tiger salamander (*A. californiense*), western toad (*A. boreas*), Sierran treefrog (*P. sierra*), California slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), sharp-tailed snake (*Contia tenuis*), ringneck snake (*Diadophis punctatus*), California kingsnake (*Lampropeltis getulus californiae*), gopher snake (*P. catenifer*), western racer (*C. constrictor*), western skink (*Eumeces skiltonianus*), western fence lizard (*S. occidentalis*), and southern alligator lizard (*Elgaria multicarinata)*. It is very unlikely that California red-legged frogs (*Rana draytonii*) regularly traverse the oak woodlands within the Lathrop Development District.

4.1.2 Lagunita and its adjacent uplands

The area designated as Lagunita and its adjacent uplands includes a seasonal wetland and a mix of plant and animals in what Stanford terms "adjacent uplands."

The wetlands at Lagunita are biologically important and support a wide range of native and non-native plant and animal species. These ephemeral wetlands support two species covered under the Habitat Conservation Plan: California tiger salamander and a population of an intergrade form of the common gartersnake (*Thamnophis sirtalis*). Plant species are abundant in the Lagunita wetlands and include a mix of native and non-native species, including: northern water plantain (*Alisma triviale*), narrowleaf milkweed (*Asclepias fascicularis*), hen-fat (*Atriplex prostrata*), pale spikerush (*Eleocharis macrostachya*), fringed willowherb (*Epilobium ciliatum*), toad rush (*Juncus bufonius*), California grey rush (*Juncus patens*), alkali mallow (*Malvella leprosa*), longroot smartweed (*Persicaria amphibia*), Harding grass (Phalaris aquatic), common knotgrass (*Polygonum aviculare*), annual beard-grass (*Polypogon monspeliensis*), Himalayan blackberry (*Rubus armeniacus*), and common cocklebur (*Xanthium strumarium*).

Several amphibian species commonly reproduce in Lagunita, including California tiger salamander (*A. californiense*), western toad (*A. boreas*), and Sierran treefrog (*P. sierra*). Reptiles commonly found in the reservoir include Pacific gopher snake (*P. catenifer*), western racer (*C. constrictor*), western fence lizard (*S. occidentalis*), and southern alligator lizard (*Elgaria multicarinata*). The intergrade gartersnake (*Thamnophis sirtalis*) is only rarely observed in Lagunita. While there are historic records of California red-legged frogs in Lagunita, Stanford knows of no reports or specimens of the protected amphibian in the reservoir since 1956 (and no red-legged frogs have been seen at Lagunita during the intensive annual work on California tiger salamanders which began in the early 1990s).

Few bird species regularly nest within the actual seasonal wetland, but many bird species forage at the site. Species which regularly nest there include: killdeer (*Charadrius vociferous*), red-winged black birds (*Agelaius phoeniceus*), American coots (*Fulica americana*), and mallard ducks (*Anas platyrhynchos*). The list of species that at least occasionally forage at Lagunita includes virtually all the bird species regularly found at Stanford. Bird foraging at Lagunita, however, is seasonal; when there is water in the reservoir, many birds forage at the site; when the reservoir is dry, far fewer birds can be observed at Lagunita.
Other common wildlife in the reservoir proper include California voles (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), mice (mainly *Peromyscus* species), and black-tailed jackrabbit (*Lepus californicus*).

The upland areas adjacent to Lagunita are varied and include species found in grasslands, oak woodlands/savannahs, and riparian zones. The upland areas associated with Lagunita provide habitat for small mammals, including California ground squirrel (*Otospermophilus beecheyi*), jack rabbit (*Lepus californicus*), and San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*). Coyote (Canis latrans) and black-tailed deer (*O. hemionus*) are also occasionally found in these upland areas. Native amphibians and reptiles found in these uplands, include: western toad (*A. boreas*), Sierra treefrog (*P. sierra*), western racer (*C. constrictor*) and Pacific gopher snake (*P. catenifer*).

Plant species found in these uplands are numerous and include a large mix of native and non-native shrubs, trees, and annual and perennial grassland species. A partial list of the plant species found in this area includes acacias (*Acacia* species), buckeye (*Aesculus californica*), fiddleneck (*Amsinckia menziesii*), burr chervil (*Anthriscus caucalis*), slender wild oat (*Avena barbata*), common wild oat (*Avena fatua*), Coyote bush (*Baccharis pilularis*), California brome (*Bromus carinatus*), ripgut brome (*Bromus diandrus*), soft cheat

(*Bromus hordeaceus*), compact brome (*Bromus madritensis*), Italian thistle (*Carduus pycnocephalus*), valley tassels (*Castilleja attenuata*), owl's clover (*Castilleja densiflora*), purple starthistle (*Centaurea calcitrapa*), bindweed (*Convolvulus arvensis*), beaked hawks-beard (*Crepis vesicaria*), teasel (*Dipsacus sativus*), blue wild rye (*Elymus glaucus*), creeping wild rye (*Elymus triticoides*), redstem filaree (*Erodium cicutarium*), Italian ryegrass (*Festuca perennis*), bristly oxtongue (*Helminthotheca echioides*), toyon (*Heteromeles arbutifolia*), shortpod mustard (*Hirschfeldia incana*), wild barley (*Hordeum marinum* and *Hordeum murinum*), smooth cat's ear (*Hypochaeris glabra*), birdsfoot trefoil (*Lotus corniculatus*), scarlet pimpernel (*Lysimachia arvensis*), hyssop loosestrife (*Lythrum hyssopifolia*), man-root (*Marah fabacea*), olive (*Olea europaea*), frogfruit (*Phyla nodiflora*), live oak (*Quercus agrifolia*), blue oak (*Quercus douglasii*), valley oak (*Quercus lobata*), wild radish (*Raphanus sativus*), dock (*Rumex crispus*, *Rumex pulcher*, *Rumex salicifolius*), milk thistle (*Silybum marianum*), purple needlegrass (*Stipa pulchra*), poison oak (*Toxicodendron diversilobum*), California bay tree (*Umbellularia californica*), and periwinkle (*Vinca major*).

Lagunita and its adjacent uplands are abutted by developed areas: on two sides by student residences, on one side by a golf driving range and on a fourth side by a major road. As noted below in describing the Central Campus sub-area, the developed landscape is capable of supporting and sustaining some native biodiversity. However, the developed environment poses several threats to the survival and persistence of native biodiversity, and is a difficult "neighbor" for Lagunita and its adjacent uplands.

4.1.3 Arboretum

The Arboretum is embedded within an urban matrix and used as for recreation and overflow parking for Stadium events. The trees are trimmed to maintain line of sight for public safety and the area is mowed and disked for fire safety. Eucalyptus trees and oaks dominate the overstory plant assemblage while the understory plants are mostly nonnative annual Eurasian grasses. The Arboretum also hosts the Arizona Garden. The Arizona Garden was designed for Jane and Leland Stanford by landscape architect Rudolf Ulrich between 1881 and 1883. The garden includes selections from the cacti family (Cactacace) including columnar, barrel and monstrose forms. The garden also contains selections of succulents, including aloes (Aloaceae), crassulas (Crassulaceae) and rosette-forming agaves (Agavaecae). The Arboretum is a highly managed landscape, and has been for more than 100 years. This artificial landscape feature does not contain the natural community types described in section 3.

Wildlife, including jack rabbits, striped skunk, raccoons, western fence lizards and raptors, may be found within the Arboretum. However, while it does have some biological value, the Arboretum does not function as a natural area. Successful reproduction by many native species of plants, amphibians, birds, reptiles and small mammals is very limited in this area due to the ongoing active maintenance of the area, the high abundance of mesopredators (raccoons, skunks and opossums), and human disturbance. Tree-nesting birds, however, do frequently nest in the Arboretum.

See sections 4.2.1 and 4.2.2 for a full description of wildlife and bird species that may be present within all of the Stanford lands within the Academic Growth Boundary, including the Arboretum.

4.1.4 Central Campus

The lands within the Academic Growth Boundary include both native and nonnative vegetation. Vegetation consists of remnant stands of native species, such as oaks, as well as nonnative trees (primarily eucalyptus), annual grasslands and ornamental landscape plants. In this area, many species native to the region have been planted as part of the ornamental, and drought-resistant, landscaping. The Central Campus is a highly modified and management landscape. This area does provide some very limited value to wildlife,

predominately providing nest locations for birds and roosts for bats, does not contain the natural community types described in Section 3. In general, the extensively built Central Campus is an inhospitable landscape for native species of plants and non-flying animals. Dispersal of California tiger salamanders (*A. californiense*) from Lagunita downslope to the developed campus lands is not impossible, but their successful return migration is highly unlikely due to the high density of buildings, roads, drains, curbs, retaining walls and stairs. California tiger salamanders have limited climbing abilities; therefore, relatively short features, such as curbs and stairs, present barriers to dispersal. The developed campus lands have long been considered a population sink for tiger salamanders. For this reason, the Stanford HCP focuses conservation efforts on Lagunita and the lands outside the Academic Growth Boundary.

Native and introduced animals that are tolerant of human activities can thrive in urban landscapes. These species include: western fence lizard (*S. occidentalis*), southern alligator lizard (*Elgaria multicarinata*), northern mockingbird (*M. polyglottos*), barn swallow (*H. rustica*), raccoon (*P. lotor*), striped skunk (*M. mephitis*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), eastern gray squirrel (*S. caralinensis*), fox squirrel (*S. niger*), house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), black rat (*Rattus rattus*), and opossum (*D. virginiana*).

See sections 4.2.1 and 4.2.2 for a full description of wildlife and bird species that may be present within all of the Stanford lands within the Academic Growth Boundary, including the Central Campus.

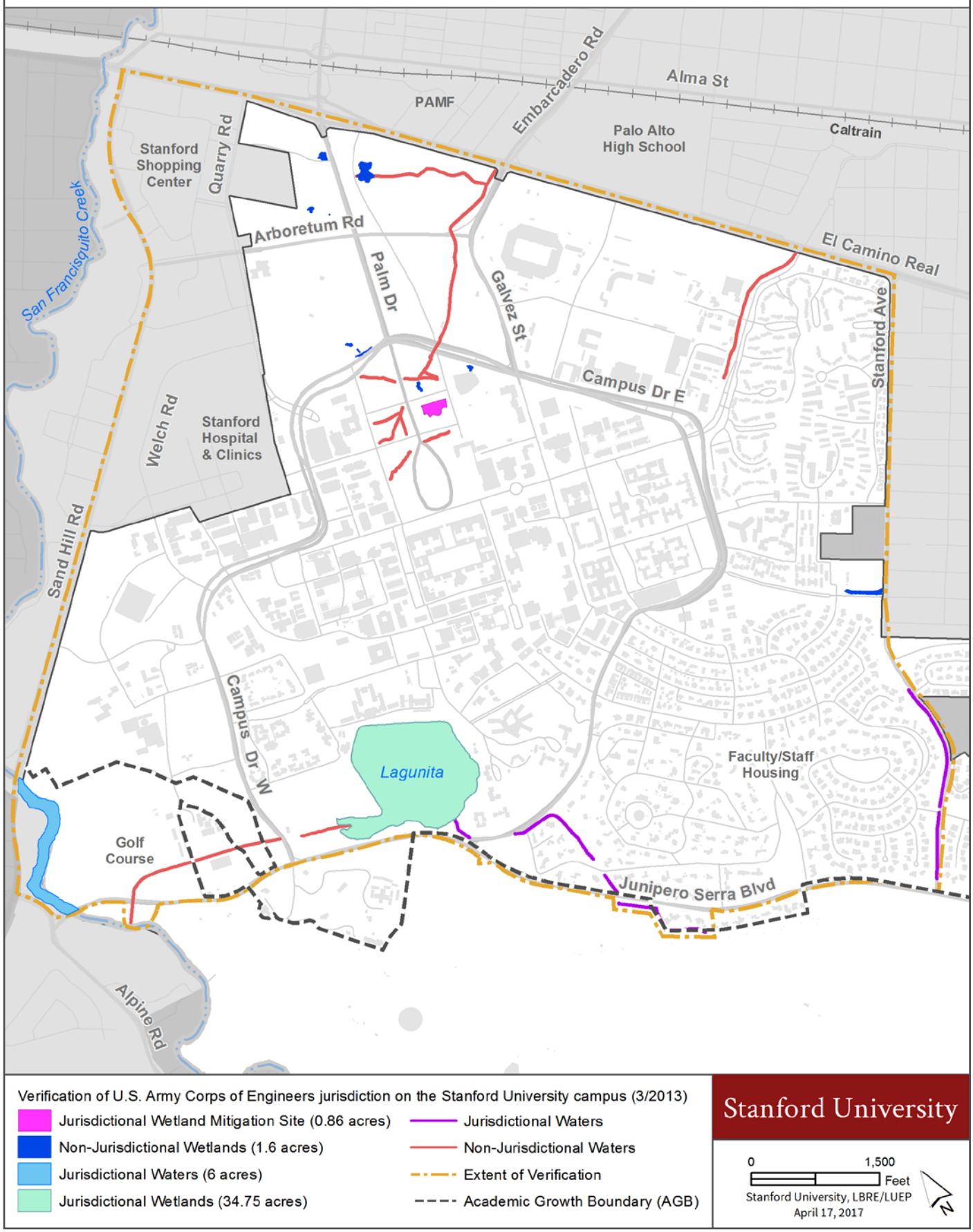
4.1.5 Jurisdictional Waters and Wetlands

Nearly all of the area within the Academic Growth Boundary has been assessed for the presence of jurisdictional waters and wetlands. The latest delineations[3] indicate 36.6 acres of jurisdictional wetlands, 8.19 acres of jurisdictional waters and 0.781 acre of isolated wetlands within the Academic Growth Boundary, as shown on **Figure BIO.4**. Of the 36.6 acres of jurisdictional wetlands, 34.75 acres are in the HCP's 50-year no-build zone and therefore cannot be developed under the 2018 General Use Permit. Another 0.88 acre of jurisdictional wetlands is located within the Campus Open Space designation where new structures are prohibited.

Jurisdictional waters and wetlands within the Academic Growth Boundary are used by water birds, wildlife seeking water sources, aquatic invertebrates, and native wetland plants. The only special-status species located within the jurisdictional waters and wetlands within the Academic Growth Boundary are found within the Lagunita basin, described in section 4.1.2.

[3] Wetland delineations at Stanford are conducted by independent consultants under contract to the University's Department of Sustainability and Energy Management.

Figure BIO.4: Jurisdictional Waters and Wetlands within the AGB



4.2 Special-Status Species Within the Academic Growth Boundary

4.2.1 Wildlife

Appendix A provides a summary table of species of conservation concern that are often indicated as being potentially from the Stanford area by a variety of public and Stanford sources. Specifically, the table includes species identified by California Department of Fish and Wildlife's online Rarefind (CNDDB) data searches and by Stanford databases. The species included are species that have the potential to be found within the Academic Growth Boundary at Stanford, with annotations regarding the likelihood of the presence of these species based on decades of monitoring activities at Stanford. Of the special-status species identified through Rarefind and from Stanford records, California tiger salamander (*Ambystoma californiense*) and the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) are present within the Academic Growth Boundary. Mitigation for impacts to California tiger salamanders occurs through the Stanford Habitat Conservation Plan; Stanford has incidental take authorization for impacts to this species from existing and future campus development, operations and maintenance. Measures to address potential impacts to the San Francisco dusky-footed woodrat are discussed in section 7.

4.2.2 Birds

Many species of raptors are frequently observed at Stanford, including within the Academic Growth Boundary. Peregrine falcons (*Falco peregrinus*) have been observed within the Academic Growth Boundary but, despite persistent rumors, they have never been documented to nest within the Academic Growth Boundary. Western burrowing owl (*Athene cunicularia*), bald eagle (*Haliaeetus leucocephalus*), northern harrier (*Circus cyaneus*) and golden eagle (*Aquila chrysaetos*) have been observed regularly outside of the Academic Growth Boundary, and occasionally fly over the lands within the Academic Growth Boundary. However, nesting of these species has never been observed within the Academic Growth Boundary. Many of the more regionally common species of raptors, including red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*B. lineatus*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), and great horned owl (*Bubo virginianus*) do frequently nest within the Academic Growth Boundary.

In addition to the above-mentioned raptors, many bird species covered by the federal Migratory Bird Treaty Act nest at Stanford, including on many portions of the lands within the Academic Growth Boundary.

4.2.3 Bats

The bats historically found on Stanford lands include California bat (*Myotis californicus*), western small-footed bat (*Myotis ciliolabrum*), Yuma bat (*Myotis yumanensis*), little brown bat (*Myotis lucifugus*), long-legged bat (*Myotis volans*), fringed bat (*Myotis thysanodes*), long-eared bat (*Myotis evotis*), silver-haired bat (*Lasionycteris noctivagans*), western pipistrelle (*Pipistrellus Hesperus*), desert red bat (*Lasiurus blossevilli*), hoary bat (*Lasiurus cinereus*), Townsend's long-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), Mexican free-tailed bat (*Tadarida brasiliensis*), western mastiff bat (*Eumops perotis*), and big free-tailed bat (*Nyctinomops macrotis*). Breeding records are sparse. However, pallid bat (*Antrozous pallidus*) has historically had a maternal site on campus within the Academic Growth Boundary (but this maternal roost has not been documented to be active for many years).

4.2.4 Others

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), a California species of special concern, is found within the Academic Growth Boundary, primarily in the Lathrop Development District and at Lagunita and its adjacent uplands. However, woodrats can be found across the lands within the Academic Growth Boundary (but are uncommon in many of the more managed areas of campus). San Francisco dusky-footed woodrats are abundant in many areas outside of the Academic Growth Boundary.

4.2.5 Special-status Plants

For most areas within the Academic Growth Boundary, the types and abundance of native plant species has been heavily manipulated through a combination of agricultural use, seeding of "wildflower" mixes, landscape planting, disking, mowing, fertilization, irrigation, and soil compaction. Decades of research on plants, often occurring in "experimental" areas adjacent to academic buildings, has also resulted in the unintentional release of numerous species of native and non-native plants. While it is possible that virtually any Mediterranean climate dwelling plant might be encountered growing on the majority of main Stanford campus, it is considered very unlikely native species of conservation concern will be encountered in most areas of main campus. Indeed, surveys completed by Environmental Science Associates (ESA) at Santa Clara County's direction over the last 16 years at potential development sites within the Academic Growth Boundary have never yielded observations of special-status plants.

Based on these 16 years of plant surveys, most of the areas within the Academic Growth Boundary should be considered to have an exceedingly low potential to support naturally occurring special-status plant species. The only areas that should be considered to have a reasonable potential to host special-status plant species are as follows: jurisdictional wetlands and waterways; Lagunita and its associated uplands; and the Oak Woodland/Savannah community within the Lathrop Development District. These areas are somewhat less impacted that the other areas on the inside of the AGB and have better maintained natural processes and are more likely to support special-status plants than the extensively managed and modified locations on campus.

5.0 REGULATORY SETTING

This subsection briefly describes federal, state, and local regulations, permits, and policies pertaining to biological resources and wetlands as they apply to the Project.

5.1 Special-Status Species and Sensitive Communities

5.1.1 Federal Endangered Species Act

The United States Fish & Wildlife Service (USFWS), which has jurisdiction over plants, wildlife, and most freshwater fish, and the National Marine Fisheries Service (NMFS), which has jurisdiction over anadromous fish, marine fish, and marine mammals, oversee implementation of the Federal Endangered Species Act (FESA). The FESA includes protections for species that are formally listed by the USFWS or NMFS (as applicable) as either "endangered" or "threatened." An "endangered" species is an animal or plant species that has been determined to be in danger of extinction throughout all or a significant portion of its range. A "threatened" species is an animal or plant species that has been determined as likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

The implementation of the FESA depends on whether a federal agency action is involved, which includes the issuance of a federal permit to a private party.

Federal Agency Action – Section 7 Consultation. If a federal agency action "may affect" a listed species or its "critical habitat" (defined below), the federal agency must engage in a consultation process with the USFWS and/or NMFS (as applicable). This consultation process, which applies to both listed animal and plant species, is designed to ensure that the federal agency action (including the issuance of a federal permit) does not jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat.

"Critical habitat" is defined as the specific areas that are essential to the conservation of a federally listed species, and that may require special management consideration or protection. Critical habitat is determined using the best available scientific information about the physical and biological needs of the species. These needs, which are referred to as "primary constituent elements," include: space for individual and population growth and for normal behavior; food, water, light, air, minerals, or other nutritional or physiological needs; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitat that is protected from disturbance or is representative of the historical geographic and ecological distribution of a species.

The designation of critical habitat by the USFWS and NMFS has often lagged behind the listing of species as threatened or endangered under the FESA. As a result, for various listed species, there is no designated critical habitat.

No Federal Agency Action – Section 10 Habitat Conservation Plan & Incidental Take Permit. Section 9 of the FESA prohibits the "take" of any listed animal species. The federal definition of "take" includes actions that unintentionally "harass" or "harm" a listed animal species. "Harass" is defined by the USFWS as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, and sheltering. "Harm" is defined as an act which actually kills or injures wildlife, which

may include significant habitat modification or degradation where it kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

The "take" prohibition applies only to listed animal species, and not to listed plants. For plants, Section 9 of the FESA prohibits the removal, possession, damage or destruction of any endangered plant from federal land, as well as acts to remove, cut, dig up, damage, or destroy an endangered plant species in nonfederal areas in knowing violation of any state law or in the course of criminal trespass.

When there is no federal agency action that triggers the FESA Section 7 consultation process as described above, but where a public or private action would result in the unintentional "take" of a listed animal species, for example as a result of the impacts of a development project, FESA Section 10 requires the issuance of an "incidental take" permit. This permit requires the preparation and implementation of a "habitat conservation plan," which is referred to as an "HCP." An HCP outlines conservation measures to minimize the impacts to listed species, including measures to maintain, enhance and protect the species' habitat.

5.1.2 Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

5.1.3 California Endangered Species Act

Under the California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) (CESA), a permit is required from the California Department of Fish & Wildlife (CDFW) for the incidental "take" of a state-listed species. There are several important differences between the FESA and the CESA. First, the state list of protected species is different than the federal list, although there are various species that are listed at both the state and federal level. Second, the definition of "take" under the CESA is narrower than the federal definition under the FESA. In particular, Fish & Game Code § 86 defines take to mean to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Unlike the federal definition, the state law definition does not include "harming" or "harassing" a listed species, such as by way of habitat modification. Third, whereas the federal "take" prohibition does not apply to "candidate" species that are being considered for future federal listing, the state prohibition applies to "candidate" species being considered for listing under the CESA, unless the CDFW provides otherwise. Fourth, whereas the federal "take" provisions make a significant distinction between listed animal and plant species, the state law "take" provisions apply equally to listed animal and plant species. Fifth, whereas the FESA authorizes the USFWS or NMFS (as applicable) to provide lesser protections for "threatened" species than for "endangered" species, there is no such allowance for this distinction under the CESA. Sixth, there are no provisions in the CESA for the designation of "critical habitat."

5.1.4 California Environmental Quality Act

Under CEQA Guidelines § 15065(a), a project has a significant impact on the environment where there is substantial evidence, in light of the whole record, that the project has the potential to "substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; [or] substantially reduce the number or restrict the range of an endangered, rare, or threatened species."

Under CEQA Guidelines § 15380(b), a species is considered "endangered" for CEQA purposes if "its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors." A species is considered "rare" for CEQA purposes if it meets either of the following two criteria: (1) although not presently threatened with extinction, the species exists in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or (2) the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the FESA.

Species that are formally listed under the FESA are presumed the meet the definition of "endangered, rare, or threatened species." Similarly, species that are formally listed under CDFW regulations (see Title 14, Cal. Code Regs., §§ 670.2 and 670.5) are presumed to meet this definition. In addition, a CEQA lead agency has discretion to determine that a species that is not formally listed meets this definition. The CDFW interprets Lists 1A, 1B, and 2 of the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California to comprise plants that, in a majority of cases, would qualify as rare, threatened, or endangered.

5.1.5 California Oak Woodlands Conservation Act

California Senate Bill 1334, the Oak Woodlands Conservation Act, became law on January 1, 2005 and was added to CEQA as Public Resources Code § 21083.4. This law protects oak woodlands that are not protected under the Z'Berg-Nejedly Forest Practice Act (Pub. Res. Code §§ 4511-4628). The Oak Woodlands Conservation Act requires a county to determine whether or not a project would result in a significant impact on oak woodlands. If the project would result in a significant impact on oak woodlands, then the county must implement mitigation measures as prescribed under the Public Resources Code to reduce or compensate for the loss of oak woodlands.

5.1.6 California Fish and Game Code Requirements

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed the CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this State." The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The CESA expanded upon the original NPPA and enhanced legal protection for plants. The CESA established threatened and endangered species categories, and grandfathered all rare animals—but not rare plants—into the CESA as threatened species. Thus, there are three official listing categories for plants in California: rare, threatened, and endangered.

Nesting Birds

Under Fish & Game Code § 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. In turn, § 3503.3 prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs.

Fully Protected Species

The California Fish and Game Code also allows the designation of a species as Fully Protected (see § 3511 regarding birds, § 4700 regarding mammals, § 5050 regarding reptiles and amphibians, and § 5515 regarding

fish). This designation provides a greater level of protection than is afforded by the CESA, and until recently, fully protected species could not be taken at any time. On October 18, 2011, Senate Bill 618 was signed into law, which permits take of fully protected species where a Natural Communities Conservation Plan has been approved and is being implemented to ensure protection of those species.

Sensitive Natural Communities

Sensitive natural communities are identified as such by the CDFW's Natural Heritage Division and include those that are naturally rare and those whose extent has been greatly diminished through changes in land use. The California Natural Diversity Database (CNDDB) tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site's location, extent, habitat quality, level of disturbance, and current protection measures. The CDFW is mandated to seek the long-term perpetuation of the areas in which these communities occur. While there is no statewide law that requires protection of all special-status natural communities, CEQA requires consideration of a project's potential impacts on biological resources of statewide or regional significance.

5.2 Wetlands and Jurisdictional Waters

5.2.1 U.S. Army Corps of Engineers

Under Section 404 of the federal Clean Water Act, a permit from the U.S. Army Corps of Engineers (Corps) is required for the discharge of dredged or fill material into "waters of the United States." However, the scope of what constitutes a "water of the U.S." is presently unclear. The Corps and the U.S. Environmental Protection Agency (EPA) jointly adopted final regulations in June 2015 to define this term. 80 Fed. Reg. 37,054 (June 29, 2015). But the new regulations have been stayed in litigation and are not currently in effect. Further, an Executive Order adopted in February 2017 directed the Corps and EPA to reconsider and revise the regulations. Until this regulatory process is completed, the scope of jurisdiction under the federal Clean Water Act likely will remain uncertain and require a case-by-case evaluation, particularly for water bodies that do not qualify as "Traditional Navigable Waters" (which are waters that are currently used, were used in the past, or may be susceptible to use in interstate and foreign commerce, including waters subject to the ebb and flow of the tide). The EPA retains the authority under the Clean Water Act to veto Section 404 permits issued by the Corps. In implementing Section 404 with respect to the fill of wetlands, the federal government supports a policy of minimizing "the destruction, loss or degradation of wetlands" under Executive Order 11990 (May 24, 1977).

In addition to permits required for dredge and fill projects under Section 404, a Corps permit is required under Section 10 of the Rivers & Harbors Act of 1899 (33 U.S.C. § 403) for work or structures in or affecting navigable waters.

Depending on the nature of the activity in question, an applicant for a Corps permit may qualify for a Nationwide Permit or a Letter of Permission, which are abbreviated permit processes. Alternatively, an Individual Permit may be needed, which in turn may require a formal alternatives analysis (for Section 404 permits), a public interest review, and environmental documentation under the National Environmental Policy Act.

5.2.2 San Francisco Bay Regional Water Quality Control Board

The State Water Resources Control Board and the nine Regional Water Quality Control Boards regulate "waters of the state," which are broadly defined under the Porter-Cologne Water Quality Control Act (Water

Code §§ 13000 et seq.) as "any surface water or groundwater, including saline waters, within the boundaries of the state." The San Francisco Regional Water Quality Control Board (SFRWQCB) has jurisdiction over waters of the state in the Bay Area.

For discharges of dredged or fill material, when a permit is required from the Corps under Section 404 of the federal Clean Water Act, the SFRWQCB is responsible for issuing a Water Quality Certification under Section 401 of that act. This certification, which is a prerequisite for the Corps permit, is designed to ensure that the activity involving the discharge will comply with the applicable state water quality standards. When a permit is not required from the Corps – for example, if the discharge is to an isolated, intermittent or ephemeral water body that is not considered a "water of the U.S." – the SFRWQCB assumes primary permitting responsibility under state law, through the issuance of "Waste Discharge Requirements" (or WDRs), which implement the relevant water quality control plans and take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, and the need to prevent nuisances (Water Code § 13263). In implementing these provisions, the SFRWQCB follows a policy of no net loss of wetlands and typically requires mitigation for impacts to wetlands before authorizing dredge and fill projects that discharge to wetlands.

In addition, California has been delegated the authority under Section 402 of the Clean Water Act to issue permits under the National Pollutant Discharge Elimination System (NPDES) permit program. This program governs wastewater discharges, including discharges of stormwater, to surface water bodies. The SFRWQCB oversees this permit program in the Bay Area.

5.2.3 California Department of Fish and Wildlife

Under Fish and Game Code §§ 1600–1616, the CDFW regulates activities that would substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes. The jurisdictional limits of the CDFW are defined in § 1602 as the "bed, channel, or bank of any river, stream, or lake." CDFW conditions activities regulated under these provisions through issuance of a Streambed Alteration Agreement.

5.3 Local Plans and Policies

5.3.1 Stanford Community Plan

The Stanford Community Plan is the portion of the Santa Clara County General Plan that governs Stanford's lands in unincorporated Santa Clara County. Several strategies in the Resource Conservation Chapter of the Stanford Community Plan address habitat and biodiversity. These strategies, policies and recommended implementation measures include:

Resource Conservation Strategy #1: Improve current knowledge and awareness of habitats and natural areas.

> **SCP-RC 1**: Maintain and update inventories and maps of important biological resources on Stanford lands, including protected species, species considered at risk of local extinction, and habitat types (biotic communities), for use in conservation efforts, land use decision making, and monitoring of resource status.
>
> **SCP-RC 2**: Allow field research and other academic activities related to improvement of knowledge and understanding of habitat resources to occur in areas south of Junipero Serra Boulevard.

SCP-RC (i)1: Require Stanford to prepare California Natural Diversity Database records for species of concern.

SCP RC (i)2: Transmit natural resource map updates to the County using the County's current electronic map format standards.

Resource and Conservation Strategy #2: Protect the biological integrity of habitat areas and adequately mitigate impacts.

SCP-RC 3: Assure the protection of habitats for special status species in approving the location and design of new development. Avoid habitat areas for these species in the location of development whenever feasible.

SCP-RC 4: Protect and maintain habitats, natural areas, and wildlife corridors in development and redevelopment.

SCP-RC 5: Protect habitat areas through use of the Open Space and Field Research, Special Conservation, and Campus Open Space land use designations, and through use of the Academic Growth Boundary. If land use designation changes or AGB relocation is proposed, conduct detailed studies for presence of special status species and their habitat prior to decision making.

SCP-RC 6: Require Stanford to mitigate any impacts on special status species or other biological resources that result from land development through:

a. Mitigation measures that have proven to be effective, which shall be implemented prior to commencement of site preparation and construction activities as appropriate.
b. Mitigation measures, such as provision of new habitat areas which shall be monitored and, if necessary, revised over time to ensure the viability of those measures as mitigation.

SCP-RC 7: Maintain and restore riparian buffer zones along creeks as described in Santa Clara County General Plan policy R-RC-37.

SCP-RC 8: Monitor and evaluate the recreational use of sensitive habitat areas and limit if necessary the recreational use of areas supporting significant, but less sensitive, natural resources.

SCP-RC (i)3: Establish guidelines for review and approval of research and teaching activities in habitat areas, particularly in those areas which support special-status species.

SCP-RC (i)4: Develop and implement a program for monitoring and managing recreational activities in the foothills with regard to the habitat impacts of these activities.

SCP-RC (i)5: Participate in the preparation and implementation of a Habitat Conservation Plan for Stanford lands, if such effort is initiated by Stanford or the USFWS.

SCP-RC (i)6: Require long-term habitat protection measures in appropriate locations as mitigation for development in habitat areas that support special-status species or that are protected through local, state, or federal regulations.

SCP-RC (i)7: Require replacement of trees greater than 12 inches in diameter which are removed at a 1:1 ratio of replacement to removed trees. For oaks, which meet this criteria, require relocation of trees or replacement at a 3:1 ratio.

SCP-RC (i)8: Develop guidelines for the location, siting and review of proposed construction projects that minimize impacts to natural resources.

SCP-RC (i)9: Identify opportunities to conserve water used for irrigation and other purposes in order to limit use of water from creeks.

Resource Conservation Strategy #3: Encourage and promote habitat restoration.

SCP-RC 9: Establish priorities for the restoration or rehabilitation of sensitive habitat areas and include habitat restoration as a key component of conservation management and planning.

SCP-RC 10: Stanford shall continue and support efforts to enhance habitats and populations of protected native species, including, but not limited to:

a. reduction of non-native invasive species;
b. wetland creation efforts, particularly to increase breeding sites for California tiger salamander; and
c. the oak reforestation program in the foothills, the Arboretum, and in other natural areas.

SCP-RC (i)10: Coordinate wetland preservation for flood control purposes with habitat restoration efforts.

SCP-RC (i)11: Encourage location of facilities and trails out of sensitive habitat areas and areas undergoing habitat restoration.

5.3.2 Santa Clara County General Plan

As indicated in the prior section, Stanford Community Plan Policy RC-7, which addresses buffer zones along creeks, contains a cross reference to Santa Clara County General Plan policy R-RC 37. General Plan Policy R-RC 37 states as follows:

R-RC 37: Lands near creeks, streams, and freshwater marshes shall be considered to be in a protected buffer area, consisting of the following: 1. 150 feet from the top bank on both sides where the creek or stream is predominantly in its natural state; 2. 100 feet from the top bank on both sides of the waterway where the creek or stream has had major alterations; and 3. In the case that neither (1) nor (2) are applicable, an area sufficient to protect the stream environment from adverse impacts of adjacent development, including impacts upon habitat, from sedimentation, biochemical, thermal and aesthetic impacts.

5.3.3 Santa Clara County Oak Woodlands Impact Guidelines

In accordance with the Oak Woodlands Conservation Act, Santa Clara County created the Santa Clara County Planning Office Guide to Evaluating Oak Woodlands Impacts (last updated July 28, 2011). According to the County's guidelines, oak woodlands include a woodland (grouping of trees) on a unit of land or project site where oak trees encompass 10 percent or greater of the canopy cover. The 10 percent canopy cover applies to the individual woodland and not the entire project site (which may contain one or more woodlands). Oak

woodlands within Santa Clara County are identified in the County Planning Office's GIS map information using sources from Santa Clara Valley Habitat Conservation Plan data, and California Department of Forestry and Fire Protection's Fire and Resource Assessment Program data.

A land development project is considered to have a significant direct impact on oak woodlands if the project will result in a decrease of 0.5 acre or more of native oak canopy within oak woodland on the project site. If the project is within a mapped oak woodland area, and the project proposes oak tree removal, a tree removal plan and arborist report (if requested) must be submitted which identifies the species type, diameter, and amount of canopy of oak trees proposed for removal within the woodland.

5.3.4 Santa Clara County Tree Preservation Ordinance

The County's tree preservation ordinance is codified in division C16 of the County Code of Ordinances. The interpretation memorandum dated July 1, 2014 documents the manner in which the ordinance has been applied to Stanford lands. The following description is taken from that memorandum.

> Section C16-2 defines a "tree" as a woody plant having a single trunk measuring at least 37.7 inches in circumference (12 inches or more in diameter) or in the case of multi-trunk trees, a trunk size of 75.4 inches in circumference (24 inches in diameter).
>
> Section C16-3 defines a "protected tree" as a tree that meets any of the following requirements:
>
> (a) Any tree in the following areas of the County:
>
> (1) Parcels zoned "Hillsides" (three acres or less);
>
> (2) Parcels within a "-d" (Design Review) combining zoning district;
>
> (3) Parcels within the Los Gatos Hillside Specific Plan.
>
> (b) A tree that is located within the "-h1" Historic Preservation zoning district for New Almaden.
>
> (c) Any "heritage tree, as that term is defined in Section C16-2." Section C16-2 defines "heritage tree" as follows: Heritage tree shall include any tree which, because of its history, girth, height, species or other unique quality, has been recommended for inclusion on the heritage resource inventory by the Historical Heritage Commission and found by the Board of Supervisors to have special significance to the community, and which has therefore been included in the heritage resource inventory adopted by resolution of the Board of Supervisors.
>
> (d) Any "tree required to be planted as a replacement for an unlawfully removed tree, pursuant to Section C16-17(e) of this division."
>
> (e) Any "tree that was required to be planted or retained by the conditions of approval for any use permit, building site approval, grading permit, architectural and site approval (ASA), design review, special permit or subdivision."
>
> (f) Trees owned or leased by the County.
>
> (g) "Any tree, regardless of size, within rights-of-way and easements of the County, whether within or without the unincorporated territory of the County.

Under section C16-4 of the County's tree preservation ordinance, a permit for removal of a protected tree is not required "for the cutting, removal, destruction, or pruning of a tree" in circumstances that among others, include the following:

- The tree is diseased, dead, or dying, or substantially damaged from natural causes (§ C16-4(a));
- Tree cutting is needed to remove a hazard to life and personal property (§ C16-4(b));
- Tree removal is necessary to carry out building site approval or other land use application approved by the County (§ C16-4(e)); and
- Maintenance work within public utility easements (§ C16-4(f)).

The third bullet point listed above indicates that if removal of a protected tree is authorized by a land use application approved by the County, then a separate administrative tree removal permit is not needed. However, "no removal shall be permitted until such grading or building permit has been issued by the County as indicated on approved plans." (§ C16-4(e))

If a project necessitating removal of a protected tree is not the subject of a land use application and if none of the other exceptions apply, then the proper means to obtain permission to remove the protected tree is an administrative permit or encroachment permit for tree removal. (Ordinance Code § C16-3)

Section C16-7 of the tree preservation ordinance specifies the requirements for an administrative permit to remove protected trees. Among other provisions, section C16-7(e) addresses the replacement requirements for protected trees:

> The ratio of trees removed to trees planted shall be determined by the Planning Department.

5.4 Stanford Habitat Conservation Plan/Incidental Take Permit

The Stanford Habitat Conservation Plan (HCP) establishes a conservation strategy for the next 46 years (the HCP and associated Incidental Take Permit (ITP) are 50-year documents, and were approved in the summer of 2013). The Stanford HCP creates a comprehensive conservation program that protects, restores and enhances habitat; monitors and reports on Covered Species; and minimizes impacts on the Covered Species and their habitats. The HCP also provides major commitments of land protection, personnel and resources dedicated to biological resource conservation.

A Habitat Conservation Plan is part of a process outlined by Section 10 of the federal Endangered Species Act. Congress adopted Section 10 as a way to promote creative partnerships between public and private sectors and governmental agencies in the interest of species and habitat conservation. The Stanford HCP outlines what Stanford, as the landowner, will do to minimize or mitigate the impact of its activities on federally protected species. In turn, federal wildlife agencies have provided assurances to Stanford and have issued a long-term ITP that authorizes "take" of protected species associated with otherwise lawful activities. These activities are related to academic uses, general campus management and maintenance, redevelopment, future development and even the conservation programs.

On August 13, 2013, the United States Fish and Wildlife Service approved the Stanford HCP and issued an ITP, finding that the proposed minimization and mitigation measures more than make up for the anticipated level of take of listed species.

The Stanford Habitat Conservation Plan includes the following strategies:

- Concentrate conservation efforts in high-priority areas
- Establish long-term habitat protection
- Protect and restore riparian areas
- Enhance habitat areas
- Perform monitoring and adaptive management practices

Examples of conservation actions the University accomplished since approval of the HCP:

- Established 120 acres of conservation easements over high-quality habitats for the benefit of the Covered Species
- Established a 315-acre, 50-year no-build zone in the foothills
- Established a 40-acre, 50-year no-build zone and water management schedule for Lagunita
- Monitored species and habitat conditions

On August 13, 2013, Santa Clara County determined that the Stanford HCP provides at least as much habitat value and protection for the California tiger salamander as the County's adopted 2000 General Use Permit conditions of approval. Pursuant to 2000 General Use Permit Condition J.9, the County determined that the Stanford HCP supersedes 2000 General Use Permit Conditions J.1 through J.8.

On May 4, 2016, the California Department of Fish and Wildlife issued a Consistency Determination, determining that the ITP issued by USFWS, including the incorporated measures in the HCP, is consistent with the California Endangered Species Act (CESA), meeting the requirements set forth in California Fish and Game Code section 2081 for authorizing take of CESA-listed species (i.e., California tiger salamander). As a

result, implementation of the Stanford HCP satisfies the requirements of both the federal and state endangered species acts.

5.4.1 Covered Species

Three species receive specific coverage under the Stanford HCP. The protected species covered by the HCP and ITP are:

- California red-legged frog (*Rana draytonii*)
- California tiger salamander (*Ambystoma californiense*)
- San Francisco gartersnake (*Thamnophis sirtalis tetrataenia*) [4]

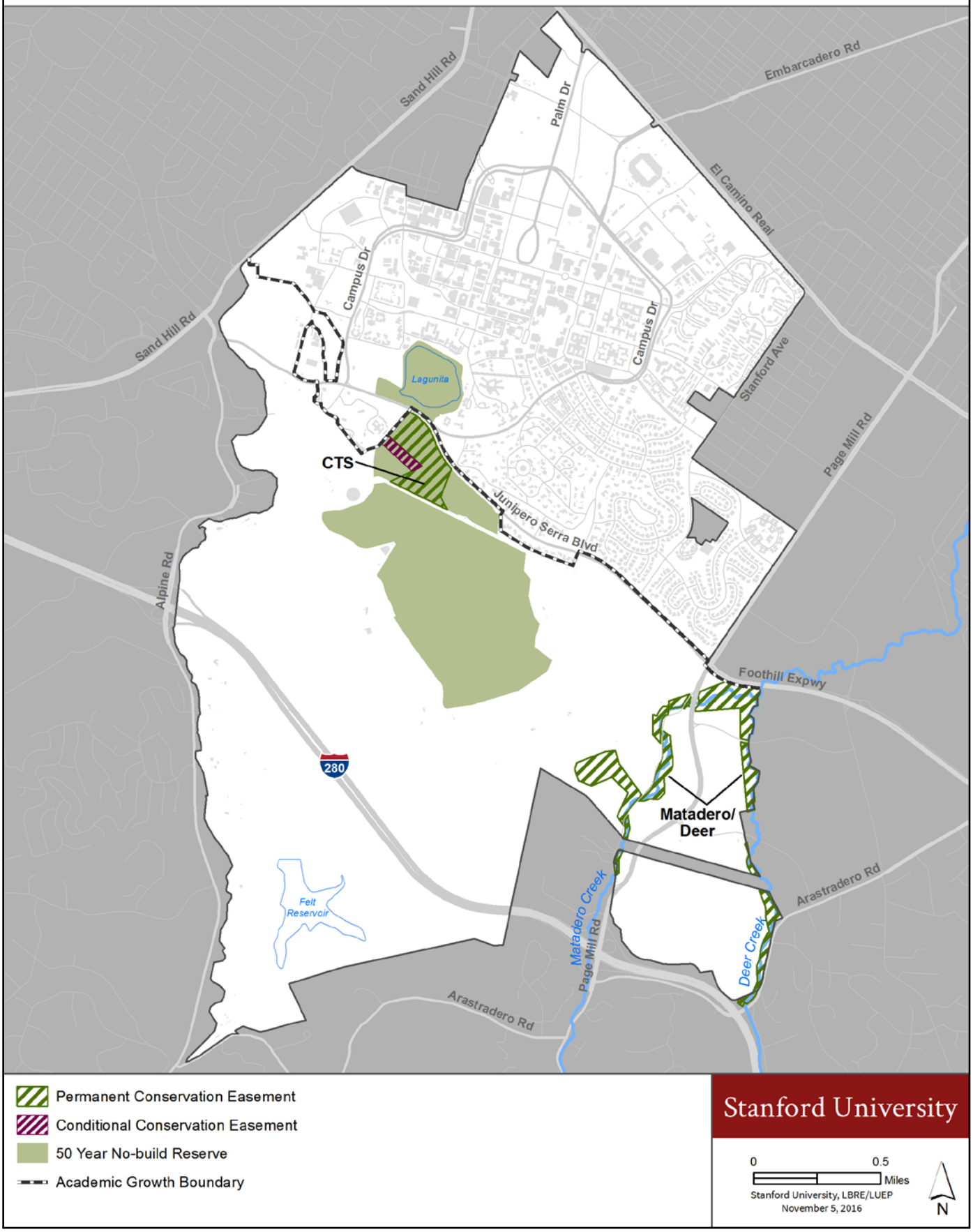
Management of the Covered Species includes population monitoring, habitat restoration and enhancement, educational programs for individuals whose work activities may impact the Covered Species and minimization and mitigation of impacts caused by University operations. The habitat requirements of the three Covered Species overlap with the habitat requirements of many other native species. Therefore, conservation actions implemented at Stanford to protect the Covered Species also benefit many additional native species.

5.4.2 Permanent Conservation Easements

At the present time there are two permanent conservation easements resulting from implementation of the HCP: a 30-acre easement located in the lower foothills (primarily for the California tiger salamander) and the 90-acre Matadero/Deer Creek easement (primarily for the California red-legged frog) (see **Figure BIO.5**). California tiger salamanders (*A. californiense*) require seasonal ponds that fill in December or January and hold water until June, with sufficient levels of aquatic prey and cover to allow for larval development and metamorphosis; adjacent upland areas that provide sufficient densities of rodent burrows or debris for California tiger salamanders to inhabit during the non-reproductive period; and vegetation appropriate for California tiger salamander residency and dispersal. Common gartersnakes are typically associated with permanent or nearly permanent bodies of water, usually with areas of shallow water and heavily vegetated shores; however, they are known to occur, at least temporarily, in grassland, riparian woodland, oak woodland and coniferous forest. California red-legged frogs (*R. draytonii*) require permanent bodies of slow-moving or standing water, with sufficient vegetation to provide cover and support ample prey, and with areas that are at least three feet in depth, along with adjacent upland areas of suitable vegetation to allow for dispersal and seasonal support of non-breeding individuals.

4 The San Francisco gartersnake (*T. s. tetrataenia*) and red-sided gartersnake (*T. s. infernalis*) are two nominally distinct subspecies of the common gartersnake (*Thamnophis sirtalis*). The San Francisco garter snake is listed as endangered under the ESA. The red-sided garter snake is not a federally listed species. Both of these subspecies are found on the San Francisco Peninsula. Stanford is located within a well-documented intergrade zone between these two subspecies; it is acknowledged in the HCP that the San Francisco form of the species is not currently recognized as being present at Stanford. The conservation program provided in the HCP supports the intergrade gartersnake that is present at Stanford.

Figure BIO.5: Conservation Easements and No-Build Areas



5.4.3 Conditionally Permanent Conservation Easement

A 4.5-acre conditionally permanent conservation easement, located in the lower foothills adjacent to the California tiger salamander easement discussed above, is the result of construction of the Carnegie Foundation's campus in 2003 (see Figure BIO.5). This easement is in place as long as the Carnegie Foundation's buildings and amenities exist. If the buildings and supporting amenities are removed and the site restored to the preconstruction condition, the 4.5 acres would no longer be subject to use restrictions (aside from those enumerated in the HCP and Open Space/Field Research zoning).

5.4.4 Habitats Protected by a 50-year No-build Agreement

Additional areas used by the Covered Species are protected in two 50-year no-build zones (see Figure BIO.5). The 40-acre Lagunita basin, which includes Lagunita and unbuilt surrounding upland, and a 315-acre California tiger salamander reserve in the lower foothills were designated to protect California tiger salamanders (*A. californiense*) and Stanford's intergrade population of gartersnakes. The Lagunita basin contains an ephemeral body of water (Lagunita, an artificially constructed and managed reservoir), aquatic prey and sufficient density of burrowing rodents. The 315-acre California tiger salamander reserve protects upland habitat composed of grassland, oak woodland/savannah, chaparral and scrub. Eight seasonal ponds constructed by Stanford in 2004 are also located in this no-build zone. The 30-acre permanent conservation easement targeting California tiger salamander conservation is a subset of the 315 acres within the California tiger salamander no-build reserve.

5.4.5 Management Zones

The HCP classifies Stanford's lands into four management zones according to the habitat value of the land, if any, to the Covered Species. The four zones and the quality of habitat they provide are discussed below. **Figure BIO.6** depicts the location of these zones.

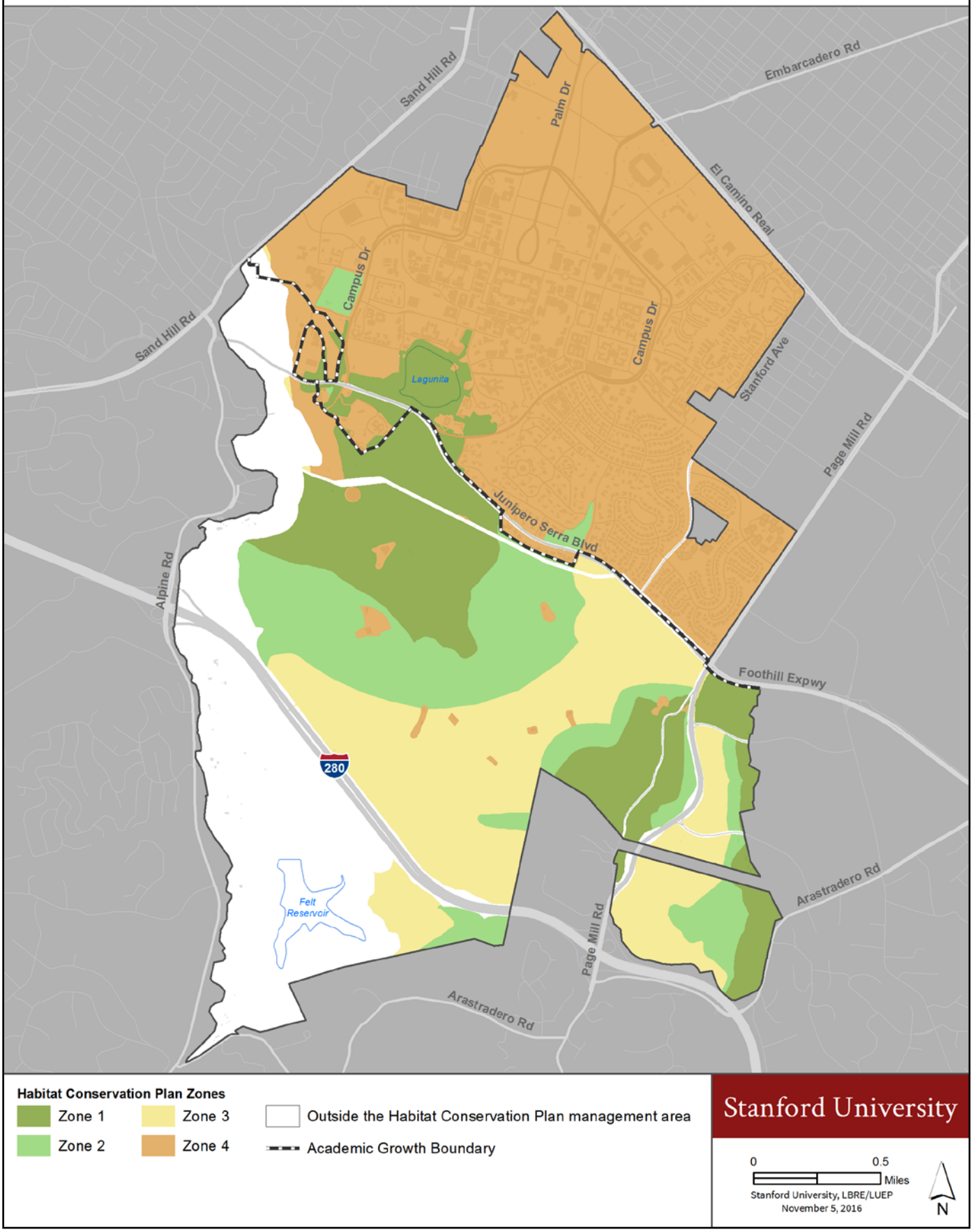
Zone 1

Areas classified as Zone 1 support one or more of the Covered Species or provide critical resources for a Covered Species. These areas are necessary for the local persistence of the Covered Species. A few areas that are currently degraded by the presence of a temporary land use also are included in Zone 1 if they are located in a place deemed critical for the long-term persistence of a Covered Species. If managed, or in some places enhanced, Zone 1 areas could support higher densities of the Covered Species. Some areas in Zone 1 will be subject to extensive restoration and enhancement. There are approximately 623 acres in Zone 1. A maximum of 28 acres of these 623 acres can be permanently altered by development. Any acres permanently altered by development will be mitigated, with the mitigation ratio being three HCP credits (typically acres of permanent conservation easement, but some enhancements can count as HCP credits) for each acre altered.

Zone 2

Zone 2 areas are occasionally occupied by a Covered Species and provide some of the resources used by the Covered Species. These areas generally do not support individuals of the Covered Species on a year-round basis, but they provide indirect support to the Covered Species by providing a buffer between Zone 1 areas and areas that are impacted by urban and other uses. Zone 2 does not include any breeding habitat for the Covered Species. Under the HCP's Conservation Program, most of these areas will be maintained in a manner that will preserve their habitat values; some portions of Zone 2 may be enhanced to more directly support Covered Species. There are approximately 517 acres in Zone 2. A maximum of 40 acres of this 517 acres can be permanently altered by development. Any acres permanently altered by development will be

Figure BIO.6: Habitat Conservation Plan Zones



mitigated, with the mitigation ratio being two HCP credits (typically acres of permanent conservation easement, but some enhancements can count as HCP credits) for each acre altered.

Zone 3

The lands in Zone 3 are generally undeveloped open space lands that have some biological value, but provide only limited and indirect benefit to the Covered Species. There are approximately 688 acres of land in Zone 3. A maximum of 62 acres of these 688 acres can be permanently altered by development. Any acres permanently altered by development will be mitigated, with the mitigation ratio being 0.5 HCP credits (typically acres of permanent conservation easement, but some enhancements can count as HCP credits) for each acre altered.

Zone 4

Zone 4 includes land that does not support or cannot sustain the Covered Species. This Zone includes urbanized areas that have been developed by the University or its ground lessees and those areas that are completely surrounded by urban development and/or roads, or are otherwise isolated from areas that support a Covered Species. Also designated as Zone 4 are generally small but highly developed facilities (such as the radio telescope) which are located within areas that otherwise support Covered Species. Zone 4 areas are population sinks for the Covered Species. The Conservation Program includes measures to reduce the likelihood that a Covered Species would enter Zone 4; if an individual is found in Zone 4, it will be relocated to a more environmentally sound location by an authorized biologist. The further development of Zone 4 areas would not adversely affect any of the Covered Species. There are approximately 2,544 acres of land in Zone 4. There are no HCP-related maximum limits of development in areas designated as Zone 4. The majority of the central campus is designated Zone 4.

5.5 Stanford Special Conservation Areas and the Special Conservation Area Plan

The Special Conservation Areas (SCA) designation in the Stanford Community Plan is for specific areas of high environmental sensitivity or areas designated as natural hazard areas on the lands south of Junipero Serra Boulevard, outside of the Academic Growth Boundary. This designation requires that no physical development, other than that which supports conservation efforts, may occur in these areas – plus maintenance of existing utilities and roads. SCAs are designated in areas of steep or unstable slopes, seismic or other geologic hazard zones, riparian areas extending 150 feet from the top of creek banks and sensitive habitat areas, particularly for special-status species. The Special Conservation Areas include 395 acres of land along Los Trancos Creek, areas within the Stanford foothills, and land along Matadero Creek and Deer Creek. In locations where Special Conservation Areas overlap with areas included in the Stanford HCP, the HCP requirements, are in effect. In areas where there is no overlap between the HCP and the SCA, management is guided by the County-approved Special Conservation Area Plan (2014), which states that the applicable minimization and management actions specified in the HCP are in effect.

In addition to the three species specifically covered by the Stanford Habitat Conservation Plan, one additional protected species is found on Stanford lands outside the Academic Growth Boundary (and not present in areas directly included in the HCP): steelhead (*Oncorhynchus mykiss*).[5] At Stanford, steelhead are found exclusively within the San Francisquito Creek watershed, and are in unincorporated Santa Clara County portions of Stanford lands, but not within the Academic Growth Boundary.

To protect this species and to address the designated hazard areas in locations designated by the Special Conservation Area Plan, several guidelines are followed:

- No fishing is allowed.
- If water quality conditions detrimental to steelhead or other wildlife are discovered, the Conservation Program Manager will coordinate investigation of the source and feasible measures to reduce the adverse effect.
- Stanford and its tenants will maintain riparian canopy.
- Any proposed removal of trees in the hazard areas should be reviewed and approved by County staff and Stanford biologists.
- Prior to construction of any utilities, roads or other structures or infrastructure within the hazard areas, Stanford will conduct site-specific geotechnical analyses to ensure slope stability both during and after construction.
- All work or maintenance should be scheduled outside the wet season (October 15 to March 15). If any work or maintenance must take place within the wet season, the Conservation Program manager must be consulted and may assign measures that reduce or avoid the risk of landslides.

5 Following a working definition from the wildlife agencies, all *O. mykiss* from within a zone of anadromy, an area where at least some of the individuals are migratory, are considered steelhead. At Stanford, all O. mykiss downstream of Searsville Dam, including Los Trancos and Bear creeks, are classified as steelhead. All *O. mykiss* upstream of Searsville Dam are considered rainbow trout, because they never migrate between freshwater and marine environments. It is very likely that resident, non-migratory, rainbow trout are present in Los Trancos and San Francisquito creeks.

6.0 SIGNIFICANCE CRITERIA

Consistent with Appendix G of the CEQA Guidelines, the project would have a significant impact on biological resources if it would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.

c) Have a substantial adverse effect on federally protected or state-protected waters or wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

e) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

f) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

7.0 IMPACTS AND MITIGATION MEASURES

Impact BIO-1: Project construction activities could result in significant adverse effects on special-status and migratory birds. (Less than Significant Impact with Mitigation)

Habitat for nesting birds is present throughout the project area, both outside and within the Academic Growth Boundary. Raptors protected under the MTBA and California Fish and Game Code could nest in oaks and other large trees, and on buildings, throughout the project area. Many species of raptors are frequently observed at Stanford. Peregrine falcons (*Falco peregrinus*) have been observed within the Academic Growth Boundary but have never been documented to nest within the Academic Growth Boundary. Western burrowing owl (*Athene cunicularia*), bald eagle (*Haliaeetus leucocephalus*), northern harrier (*Circus cyaneus*) and golden eagle (*Aquila chrysaetos*) have been observed regularly outside of the Academic Growth Boundary, and occasionally fly over the lands within the Academic Growth Boundary. However, nesting of these species has never been observed within the Academic Growth Boundary. Many of the more regionally common species of raptors, including red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*B. lineatus*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), and great horned owl (*Bubo virginianus*) do frequently nest within the Academic Growth Boundary.

In addition to the above-mentioned raptors, many bird species covered by the federal Migratory Bird Treaty Act nest at Stanford, including on lands outside and within the Academic Growth Boundary

During construction, tree and shrub removal and grading could directly impact nesting birds by damaging nests, causing adults to abandon nests, or directly killing or injuring nesting birds. Additionally, elevated sound levels and vibrations from heavy construction equipment could cause adult birds to abandon nests, especially for larger bird species or birds that are accustomed to relative low ambient noise levels.

Project construction activities could result in potentially significant impacts to special-status and migratory birds.

The following mitigation measures would reduce impacts of project construction on nesting birds, including raptors and migratory bird species protected by the federal Migratory Bird Treaty Act, to a level that is less-than-significant.

1. *Avoid tree removal and commencement of outdoor construction activities during nesting season*. Tree removal or pruning associated with project construction and commencement of outdoor project construction activities shall be avoided from February 1 through August 31, the primary local bird nesting season, to the extent feasible. If no tree removal or pruning associated with project construction is proposed during the nesting period and outdoor project construction activities will commence outside the nesting period, no surveys for active bird nests are required.

2. *Survey for active bird nests within 250 feet of construction site.* If the timing of a construction project necessitates construction-related tree removal/pruning that occurs during the nesting season and/or commencement of outdoor construction activities during the nesting season, Stanford shall hire a qualified biologist to conduct a nesting bird survey within five days prior to the proposed start of construction activities, and Stanford shall provide the survey results to the County Planning Office

prior to commencement of construction. If active nests are not present, project construction activities can take place as scheduled. If more than five days elapse between the initial nest search and the start of project-related construction, another nest survey must be conducted (nest surveys are valid for only five days).

3. *Minimize impacts to active bird nests*. If any active nests are detected during the pre-construction survey, the project manager shall work with a qualified biologist to determine if a work-exclusion buffer zone can be designated around the active nest which would allow for both the successful fledging of the birds and initiation of work on some portions of the project site, and Stanford shall provide the work-exclusion zone(s) to the County Planning Office prior to commencement of construction. A qualified biologist shall monitor any occupied nest located in a protective buffer zone in order to determine if the designated buffer zone is effective and when the buffer zone is no longer needed. If the buffer zone is determined to be ineffective, its size shall be increased until it is effective or work shall be delayed until the nest is unoccupied.

4. *Delay activity.* If no such buffer is possible, then there shall be a delay in the start of construction until the active nest is no longer occupied. A qualified biologist shall monitor any occupied nest to determine when the nest is no longer used.

5. *Remove nest starts.* A qualified biologist can visit project sites at any time prior to tree removal or the initiation of outdoor construction work in order to find and remove nest starts which do not have eggs or nestlings present. This activity will minimize impacts to birds as they will generally move elsewhere and restart their nest building process.

Impact BIO-2: Project construction activities could result in adverse effects on special-status bats. (Less than Significant Impact with Mitigation)

Habitats within the project area have the potential to support roosting special-status bat species, including western small-footed bat (*Myotis ciliolabrum*), Yuma bat (*Myotis yumanensis*), little brown bat (*Myotis lucifugus*), long-legged bat (*Myotis volans*), fringed bat (*Myotis thysanodes*), long-eared bat (*Myotis evotis*), silver-haired bat (*Lasionycteris noctivagans*), desert red bat (*Lasiurus blossevilli*), hoary bat (*Lasiurus cinereus*), Townsend's long-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis*), and big free-tailed bat (*Nyctinomops macrotis*).

Project construction, building demolition, tree and shrub removal and grading could directly impact roosting special-status bats, and elevated sound levels from heavy construction equipment could cause adult bats to abandon maternity roosts. Indirect effects to bats during project operation would be unlikely because special-status bats roosting in or near existing campus buildings and facilities presumably would be acclimated to light, noise and activity associated with campus operations and events.

Project construction activities could result in potentially significant impacts to special-status bats.

The following mitigation measures would reduce impacts on special-status bats to a level that is less-than-significant. Similar measures were approved by the City of Palo Alto for the Stanford University Medical Center Facilities Renewal and Replacement Project.

1. *Conduct pre-project survey*. Prior to project construction, Stanford shall retain a qualified biologist (bat biologist) to conduct a pre-construction survey for roosting bats in trees to be removed or pruned and structures to be demolished. If no roosting bats are found, no further action is required. If a bat roost is found, Stanford shall implement the following measures to avoid impacts on roosting bats.

2. *Evict non-maternal roosts.* If a non-maternal roost of bats is found in a tree or structure to be removed or demolished as part of project construction, the individuals shall be safely evicted, under the direction of a qualified bat biologist, by opening the roosting area to allow airflow through the cavity. Removal or demolition should occur no sooner than at least two nights after the initial minor site modification (to alter airflow). This action allows bats to leave during darkness, thus increasing their chance of finding new roosts with a minimum of potential predation during daylight. Departure of the bats from the construction area will be confirmed with a follow-up survey prior to start of construction.

3. *Avoid maternal roosting areas*. If active maternity roosts are found in trees or structures that will be removed or demolished as part of project construction, tree removal or demolition of that structure shall commence before maternity colonies form (generally before March 1) or after young are flying (generally by July 31). Active maternal roosts shall not be disturbed.

4. *Develop and employ bat nest box plan*. If special-status bats are found in trees or structures to be removed or demolished as part of project construction, Stanford shall develop a bat nest box plan for the Stanford campus employing state-of-the-art bat nest box technology. The design and placement of nest boxes shall be reviewed by a qualified bat biologist.

Impact BIO-3: Project construction activities could result in adverse effects on the San Francisco dusky-footed woodrat. (Less than Significant Impact with Mitigation)

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), a California species of special concern, is found within the Academic Growth Boundary primarily in the Lathrop Development District and at Lagunita and its adjacent uplands. In addition, San Francisco dusky-footed woodrats are abundant outside of the Academic Growth Boundary.

Construction-related vegetation removal, grubbing, grading, or other ground disturbance activities in wooded or brushy habitats in the Lathrop Development District, in Lagunita and its adjacent uplands, in jurisdictional wetlands, and in lands outside the Academic Growth Boundary could result in direct impacts to dusky-footed woodrats. Direct impacts could include mortality of adults or young, as well as destruction of woodrat stick nests. Indirect impacts to dusky-footed woodrat would not occur because development of new buildings within the Academic Growth Boundary would occur in an urban environment, which would not increase predation caused by expanding the range of urban adapted predators, such as raccoon and coyote, into habitats that were previously inaccessible. Additionally the project would not introduce increased night time lighting, noise or other human disturbances in areas where such conditions do not already exist.

Project construction activities could result in potentially significant impacts to San Francisco dusky-footed woodrat.

The following mitigation measures would reduce the impacts of project construction to San Francisco dusky-footed woodrats to a level that is less-than-significant.

1. *Surveys*. Prior to any clearing of vegetation within the Lathrop Development District, Lagunita and its adjacent uplands, jurisdictional waterways/wetlands, or lands outside the Academic Growth Boundary, a qualified biologist shall conduct a survey for San Francisco dusky-footed woodrat nests.

2. *Avoidance*. Where feasible, an exclusion buffer of at least 10 feet from these nests shall be established to avoid moving or bumping the nests or the logs or branches on which the nests rest.

3. *Mitigation*. If establishing a buffer and avoiding the nests is not feasible, the nests shall be dismantled and the nesting material moved to a new location outside the project's impact areas so that it can be used by woodrats to construct new nests. Prior to nest deconstruction, each active nest shall be disturbed by a qualified wildlife biologist to the degree that all woodrats leave the nest and seek cover out of the impact area. Whether the nest is on the ground or in a tree, the nest shall be slightly disturbed (nudged) to cause the woodrats to flee. For tree nests, a tarp shall be placed below the nest and the nest dismantled using hand tools (either from the ground or from a lift). The nest material shall then be piled at the base of a nearby tree or large shrub outside of the impact area.

Impact BIO-4: Project construction activities could result in adverse effects on special-status plant species. (Less than Significant Impact with Mitigation)

The lands outside the Academic Growth Boundary and the natural areas within the Academic Growth Boundary (the Lathrop Development District, Lagunita and its adjacent uplands, and jurisdictional waterways/wetlands) contain potentially suitable habitat for a number of rare, threatened or endangered plant species. Grading and ground-disturbing activity associated with construction activities in these locations could result in loss of rare, threatened or endangered plant species.

Project construction activities could result in potentially significant impacts to special-status plant species.

The following mitigation measures would reduce impacts to special-status plant species to a level that is less-than-significant:

1. *Surveys*. If development projects are proposed within any jurisdictional waterways/wetland areas, the Lagunita basin and its adjacent uplands, the Lathrop Development District, or lands outside the Academic Growth Boundary, a qualified biologist will conduct a focused survey for special-status plant species prior to construction. If feasible, these surveys should be conducted during the late winter/early spring period when most of the local native plant species are flowering.

2. *Avoidance*. To the extent feasible, construction activities shall avoid impacts to special-status plant species onsite by establishing a buffer zone around the individuals in question. The buffer shall be determined by a qualified biologist and shall be of sufficient size to avoid potential disturbance. The width of the buffer shall depend on a consideration of site-specific characteristics, including a consideration of the plant's ecological requirements (e.g., sunlight, moisture, shade tolerance, soils, physical and chemical characteristics) and adjacent uses (e.g., sprinkler irrigation or shading from buildings or other structures). The buffer zone shall be demarcated using exclusion fencing.

3. *Mitigation if avoidance is not feasible*. If establishing an avoidance buffer is not feasible, individual plants (including seeds) shall be transplanted to an area with suitable physical and biological conditions outside of the Academic Growth Boundary and monitored and adaptively managed for five years. Transplantation may be accomplished by relocating individual plants or through seed collection and dispersal, or a combination of both, to be determined based on the species.

Impact BIO-5: Project construction and operation would not result in significant effects on federal and state protected species covered by the Stanford HCP. (Less than Significant Impact)

As described above in Section 5.4, the USFWS-approved Stanford HCP creates a comprehensive conservation program that protects, restores, and enhances habitat; monitors and reports on Covered Species; and minimizes impacts on the Covered Species and their habitats. The Stanford HCP outlines what Stanford, as the landowner, will do to minimize or mitigate the impact of its activities on federally protected species. In turn, the USFWS has issued a long-term incidental take permit (ITP) that authorizes "take" of protected species associated with Stanford's activities related to academic uses, general campus management and maintenance, redevelopment, future development, and conservation programs. On August 13, Santa Clara County determined that the Stanford HCP provides at least as much habitat value and protection for the California tiger salamander as the County's adopted 2000 General Use Permit conditions of approval, and that the Stanford HCP supersedes 2000 General Use Permit Conditions J.1 through J.8. On May 4, 2016, CDFW issued a Consistency Determination, determining that the ITP issued by USFWS, including the incorporated measures in the HCP, is consistent with CESA, meeting the requirements set forth in California Fish and Game Code section 2081 for authorizing take of CESA-listed species (i.e., California tiger salamander). As a result, implementation of the Stanford HCP satisfies the requirements of both the federal and state endangered species acts. The three species covered by the Stanford HCP and ITP are: California red-legged frog (*Rana draytonii)*; California tiger salamander (*Ambystoma californiense)*; and San Francisco gartersnake (*Thamnophis sirtalis tetrataenia)*. Because Stanford is required by USFWS to implement the HCP, impacts to Covered Species from project construction and operation would be less-than-significant.

Impact BIO-6: Project construction and operation would not result in significant effects on steelhead. (Less than Significant Impact with Mitigation)

In addition to the three species specifically covered by the Stanford HCP, one additional federally protected species is found on Stanford lands outside the Academic Growth Boundary: steelhead (*Oncorhynchus mykiss*). At Stanford, steelhead are found exclusively within the San Francisquito Creek watershed, and are not within the Academic Growth Boundary. While no new buildings are proposed outside the Academic Growth Boundary, Stanford could construct water supply infrastructure improvements, habitat improvements, and conservation projects in the areas outside the Academic Growth Boundary. For example, under the 2000 General Use Permit Stanford undertook work in the creeks to remove barriers to steelhead migration. Similar types of conservation projects would continue to occur under the 2018 General Use Permit. As discussed in Section 5.5, the County has approved a Special Conservation Area Plan that includes the following guidelines to protect steelhead:

- No fishing is allowed.
- If water quality conditions detrimental to steelhead or other wildlife are discovered, the Conservation Program Manager will coordinate investigation of the source and feasible measures to reduce the adverse effect.
- Stanford and its tenants will maintain riparian canopy.
- Any proposed removal of trees in the hazard areas should be reviewed and approved by County staff and Stanford biologists.
- Prior to construction of any utilities, roads or other structures or infrastructure within the hazard areas, Stanford will conduct site-specific geotechnical analyses to ensure slope stability both during and after construction.
- All work or maintenance should be scheduled outside the wet season (October 15 to March 15). If any work or maintenance must take place within the wet season, the Conservation Program manager must be consulted and may assign measures that reduce or avoid the risk of landslides.

In addition to implementing the Special Conservation Area Plan, Stanford must obtain permits and approvals from applicable federal and state wildlife and water quality agencies to perform work in creeks that support steelhead.

Because construction of infrastructure, habitat improvement and conservation projects could adversely affect steelhead, construction activities would have a potentially significant impact on steelhead.

The following mitigation measures would reduce impacts to steelhead to a level that is less-than-significant:

1. Steelhead habitat avoidance. To the extent feasible, grading or ground-disturbing activities within 150 feet of the top of the bank of a creek that supports steelhead shall be avoided.
2. Protective measures. If avoidance of steelhead habitat is not feasible, Stanford shall obtain any required permits and approvals from federal and state wildlife agencies as well as a Streambed Alteration Agreement. Such permits and approvals shall specify the conditions under which construction activities may occur, including any applicable construction windows, installation of coffer dams or other measures necessary to protect steelhead.

Impact BIO-7: Project activities would not result in substantial loss or degradation of riparian habitat. (Less than Significant Impact)

Construction of infrastructure, habitat improvement and conservation projects including channel modifications and removal of man-made facilities and barriers to steelhead migration could occur within riparian habitat outside of the Academic Growth Boundary. Because Stanford's activities in riparian areas are subject to the USFWS-approved Stanford HCP and the County-approved Special Conservation Area Plan (as described in Sections 5.4 and 5.5), project impacts on riparian habitat would be less-than-significant.

Impact BIO-8: Project construction activities could result in the loss of native oak woodland habitat. (Less than Significant Impact with Mitigation)

Under California Public Resources Code §21083.4, counties are required to evaluate impacts to oak woodlands as part of the environmental analysis conducted in compliance with CEQA, and determine whether a project's impacts to oak woodlands are significant. In response to this statute, the County developed its own set of significance criteria for impacts to oak woodlands, whereby a decrease of 0.5 acre or more in the native oak canopy of an oak woodland is considered a significant impact.

As shown in Figure BIO.3, an Oak Woodland/Savannah community is present within the Academic Growth Boundary in the Lathrop Development District. Oak Woodland/Savannah communities also are present outside the Academic Growth Boundary.

Removal of oaks within the Oak Woodland/Savannah community for development of new buildings in the Lathrop Development District would have the potential to result in a significant direct impact to oak woodland. Project activities would not result in indirect impacts to oak woodland because project operations would not be expected to introduce non-native plant species that outcompete native oak trees, or introduce Sudden Oak Death into the oak woodlands.

Because there are no County-mapped Oak Woodland/ Savannah communities on Stanford's lands, the mitigation measures specified by the Santa Clara County Planning Office Guide to Evaluating Oak Woodlands Impacts (last updated July 28, 2011) do not directly apply to the project; however those measures provide a useful framework. The following mitigation measures, which are modeled on the Planning Office Guide to Evaluating Oak Woodlands Impacts, would reduce impacts to oak woodlands to a level that is less-than-significant:

1. Prior to oak tree removal within the Lathrop Development District, a tree removal plan and arborist report shall be submitted which identifies the species type, acreage, diameter, and amount of canopy of oak trees proposed for removal. The arborist report shall be prepared by an I.S.A. Certified Arborist, Registered Professional Forester, or another professional acceptable to the County Planning Office.

2. If the proposed oak tree removal would result in a decrease of 0.5 acre or more of native oak canopy on the project site, at least two of the following three mitigation measures shall be implemented:

   (A) Planting Replacement of Oak Trees. Pursuant to Public Resources Code §21083.4, the planting of oaks shall not fulfill more than 50 percent of the mitigation requirement for the project.

   Tree replacement can be dependent upon the size of the canopy of the removed trees, the number of trees to be removed, the size of trees to be removed, the type of trees to be removed, the steepness of the slope on which trees will be removed, or the amount of room on a parcel in which trees can be planted. The objective of tree planting shall be to restore former oak woodland at a ratio of 2:1 or 3:1 based on the condition of the oak woodland habitat. 2:1 restoration is recommended for medium quality oak woodland habitat, and 3:1 restoration is recommended for high quality oak woodland habitat.

The following standard mitigation ratios shall be used unless otherwise accepted by the Planning Office based on site specific characteristics:

- For the removal of one small tree (5-18 inches): two 24-inch boxed trees or three 15 gallon trees.
- For the removal of 1 medium tree (18-24 inches): three 24-inch boxed trees or four 15 gallon trees.
- For the removal of a tree larger than 24 inches: four 24-inch boxed trees or five 15 gallon trees.

All tree replacement shall be with in-kind species, unless alternate species are approved by the county (in some cases replacement in-kind is not the preferred option in terms of biological conservation objectives).

A Tree Planting and Maintenance Plan shall be submitted showing species, size, spacing and location of plantings and the location and species of established vegetation.

(B) Conservation Easement. Protect existing native oak trees on or off the project site from future development through a conservation easement or fee title dedication to the County or a land conservation group approved by the County.

Oak woodland offered as mitigation must be configured in such a manner as to best preserve the integrity of the oak ecosystem and minimize the ratio of edge to area. Priority should be given to conserving oak habitat adjacent to existing woodlands under conservation easements, public lands or open space lands.

As a general guide, the protection of existing oak woodlands through conservation easements should mitigate for the loss of oaks at a ratio equal to 2:1 or 3:1 based on the condition of the oak woodland habitat. 2:1 conservation is recommended for medium quality oak woodland habitat, and 3:1 conservation is recommended for high quality oak woodland habitat. Land proposed as mitigation, when viewed with adjacent conservation land, should not result in conserved parcels of less than one acre.

(C) Other Options. Oak woodland mitigation may occur in the form of in lieu fees paid to an agency, acceptable to the Planning Office, which shall use the fees for the preservation, restoration, or creation of oak woodland habitat. There must be a direct nexus between the amount of fees paid and mitigation required in terms of oak tree replacement and oak woodland preservation.

In lieu fees shall be paid to a natural resource agency or nonprofit organization (i.e. Open Space, Parks) for planting of oak trees to create oak woodland habitat located in Santa Clara County. If this option is selected by Stanford, Stanford must obtain documentation from the local agency or organization confirming receipt of the payment and that the funds will be used for planting of oak trees for preservation, restoration, or creation of oak woodland habitat at the required ratio.

Impact BIO-9: Project construction activities could result in substantial adverse effects on jurisdictional waters and wetlands through direct filling, hydrological interruption, or other means. (Less than Significant Impact with Mitigation)

Construction of new buildings, infrastructure, habitat enhancements/improvements and conservation projects could necessitate filling or altering jurisdictional waters and wetlands. For example, removal of barriers to steelhead migration would involve work within jurisdictional waters. Construction and enhancement of breeding ponds for California tiger salamander can require work within jurisdictional wetlands. While only a small quantity of jurisdictional waters or wetlands are located in areas upon which new buildings could be constructed, it is possible that infrastructure and habitat enhancement improvements could affect jurisdictional waters and wetlands in all locations in which such features are present outside and within the Academic Growth Boundary.

Project construction activities could result in potentially significant impacts to jurisdictional waters and wetlands.

Project impacts to jurisdictional waters and wetlands would be mitigated to less-than-significant levels through implementation of the following mitigation measures:

1. Jurisdictional waters and wetland identification. Stanford has provided a wetlands delineation that covers the lands within the Academic Growth Boundary. Prior to grading or ground-disturbing activities on lands outside the Academic Growth Boundary that have not been evaluated in the current delineation, a qualified wetland biologist shall delineate jurisdictional waters or wetlands within 250 feet of the construction site.

2. Jurisdictional waters and wetlands avoidance. To the extent feasible, grading or ground-disturbing activities within 250 feet of jurisdictional waters or wetlands shall be avoided.

3. Jurisdictional waters or wetland replacement. If avoidance of jurisdictional waters or wetlands is not feasible, Stanford shall obtain appropriate authorization from the USACE or Regional Water Quality Control Board. As specified by the USACE or Regional Water Quality Control Board, any jurisdictional waters or wetlands that are lost as a result of project development shall be replaced through the creation, preservation or restoration of jurisdictional waters or wetlands of equal function and value to those that are lost.

Impact BIO-10: Implementation of the project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant Impact)

Grassland, Oak Woodland/Savannah, Riparian Woodland and Creeks, Chaparral and Scrub, Seasonal Wetlands, and Perennial Standing Water areas outside of the Academic Growth Boundary can provide movement corridors and nursery sites for fish and wildlife. While construction activities associated with infrastructure and habitat enhancement improvements temporarily could impede wildlife movement, such improvements would not result in long-term substantial interference. Implementation of the USFWS-approved Stanford HCP and County-approved Special Conservation Area Plan further ensures that impacts to movement corridors and nursery sites for fish and wildlife on lands outside the Academic Growth Boundary would be less-than-significant.

Within the Academic Growth Boundary, the Oak Woodland/Savannah community within the Lathrop Development District and Lagunita and its adjacent uplands can provide movement corridors for the California tiger salamander. Implementation of the USFWS-approved Stanford HCP ensures that impacts to movement of the California tiger salamander would be less-than-significant.

Impact BIO-11: The implementation of the project would not fundamentally conflict with the provisions of any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. (No Impact)

The Stanford HCP authorizes "take" resulting from Stanford's activities related to academic uses, general campus management and maintenance, redevelopment, future development and conservation programs. The uses proposed under the 2018 General Use Permit are consistent with the uses addressed by the Stanford HCP. No impact would occur.

Impact BIO-12: Implementation of the project could conflict with local Santa Clara County tree preservation ordinance (Less than Significant with Mitigation).

Construction of project academic facilities, housing units and infrastructure improvements could result in the need to remove trees that are protected by the Santa Clara County tree preservation ordinance. The interpretation memorandum dated July 1, 2014 documents the manner in which the tree preservation ordinance has been applied at Stanford.

Project construction activities could result in potentially significant impacts to protected trees.

The following mitigation measures would ensure compliance with the County's tree preservation ordinance:

1. A "tree" is defined a woody plant having a single trunk measuring at least 37.7 inches in circumference (12 inches or more in diameter) or in the case of multi-trunk trees, a trunk size of 75.4 inches in circumference (24 inches in diameter). A protected tree on the Stanford campus is a:

    - heritage tree (if included on the County's heritage resource inventory adopted by resolution of the Board of Supervisors);
    - a tree planted or retained as required by conditions of approval of County permits;
    - and a tree located within County rights-of-way and easements.

    Stanford shall not remove a protected tree except as follows:

    a. Removal of the protected tree is authorized by a County land use approval for which a grading or building permit has been issued.
    b. Removal of the protected tree is authorized by a County-issued administrative permit or encroachment permit for tree removal; or
    c. Removal of the protected tree is exempt. In addition to trees removed pursuant to a County land use approval, the ordinance currently exempts removal of a protected tree in the following circumstances:
        - the tree is diseased, dead, or dying or substantially damaged from natural causes;
        - tree cutting is needed to remove a hazard to life and personal property; and
        - maintenance work within public utility easements

2. Issuance of a land use permit, administrative permit or encroachment permit that authorizes removal of a protected tree shall be conditioned as follows:

    a. Protected trees shall be replaced at a ratio of 3:1 for oaks and 1:1 for other protected trees; or
    b. Stanford may submit a Vegetation Management Plan for the entire campus to the County Planning Office for review and approval. This plan must provide for the same or greater level of tree protection as the measures described in subsection (a) above.

8.0 APPENDICES

- Appendix A Summary Table from Stanford Data and RareFind Search
- Appendix B Preparers' Resumes

APPENDIX A

Summary Table from Stanford Data and RareFind Search

Potential for Special-Status Plant Species to Occur Within the Academic Growth Boundary (AGB) (as determined from RareFind and Stanford records, including Thomas' Flora of the Santa Cruz Mountains)

Botanical Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
Acanthomintha duttonii	San Mateo thorn-mint	FE, SE	Not recorded from Stanford; nearest known occurance is at Edgewood County Park (~5.3 miles northwest of Stanford).
Androsace elongata acuta	California rockjasmine		Historically recorded from Stanford, but not observed in decades.
Allium peninsulare franciscanum	Franciscan onion		Not recorded and not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Amsinckia lunaris	bent-flowered fiddleneck		Not recorded from Stanford.
Arabis blepharophylla	coast rock cress		Historically recorded from Stanford, but not observed in decades.
Centromadia parryi congdonii	Congdon's tarplant		Not recorded from Stanford.
Chorizanthe robusta robusta	robust spineflower	FE	Not recorded from Stanford.
Cirsium fontinale fontinale	Crystal Springs fountain thistle	FE, SE	Not recorded from Stanford.
Cirsium praeteriens	lost thistle		Not recorded from Stanford.
Collinsia corymbosa	round-headed Chinese-houses		Not recorded from Stanford.
Collinsia multicolor	San Francisco chinese houses		Historically recorded from Stanford area, but not observed for many decades.
Cypripedium montanum	Mountain lady's slipper		Historically recorded from Stanford area, but not observed for many decades.
Dirca occidentalis	western leatherwood		Not recorded and not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB and historically from near Los Trancos Creek.

Botanical Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
Eryngium aristulatum hooveri	Hoover's button-celery		A different varieity of this species, Eryngium aristulatum var. aristulatum, is recorded from Stanford. The variety E. aristulatum var. hooveri has not been verified from Stanford.
Fritillaria liliacea	Fragrant fritillary		This species has been historically recorded from Stanford, but has not been observed for decades. It is known from grasslands ~4.0 miles to the northwest.
Hemizonia congestacongesta	congested-headed hayfield tarplant		A different variety of this species, Hemizonia congesta ssp. luzulifolia, occurs at Jasper Ridge. The variety H. congesta var. congesta is present at Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Horkelia cuneata sericea	Kellogg's horkelia		Not recorded from Stanford.
Lasthenia conjugens	Contra Costa goldfields	FE	Not recorded from Stanford.
Lathyrus jepsonii jepsonii	Delta tule pea		A different variety of this species, Lathyrus jepsonii var. californicus has been historically recorded from Stanford. The variety L. jepsonii var. jepsonii has not been recorded from Stanford.
Lessingia hololeuca	wooly-headed lessingia		This is found at Stanford, not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Lessingia tenuis	spring lessingia		This is found at Stanford, not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Linanthus acicularis	bristly linanthus		Historically present in area, but not recorded for many decades.
Linanthus ambiguus	serpentine linanthus		Not recorded and not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Lilium maritimum	coast lily		Not recorded from Stanford.
Malacothamnus arcuatus and Malacothamnus hallii	arcuate bush-mallow		The records on these species are combined, and it is unclear if both species are present. Neither has been recorded and not are expected within the AGB; at least one has been recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Malacothamnus clementinus	San Clemente Island bush-mallow	FE, SE	Not recorded from Stanford.
Malacothamnus davidsonii	Davidson's bush-mallow		Not recorded from Stanford.
Microseris paludosa	marsh scorzonella		Not recorded from Stanford.

Botanical Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
Monolopia gracilens	woodland monolopia		Not recorded and not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Pedicularis dudleyi		SR	Not recorded from Stanford.
Pentachaeta bellidiflora	white-rayed pentachaeta	FE, SE	Not recorded from Stanford; nearest known occurance is at Edgewood County Park (~5.3 miles northwest of Stanford).
Perideridia gairdneri gairdneri	Gairdner's yampa		Present at Stanford.
Piperia michaelii	Michael's piperia		This is found at Stanford, not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Plagiobothrys chorisianus chorisianus			A different variety of this species, Plagiobothrys chroisianus var. hickmanii is found at Stanford. The variety Plagiobothrys chroisianus var. chorisianus has not been recorded from Stanford.
Plagiobothrys chorisianus hickmanii			This is found at Stanford, not expected within the AGB; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the AGB.
Plagiobothrys diffusus		SE	Not recorded from Stanford.
Polemonium carneum			Not recorded from Stanford.
Senecio aphanactis			Not recorded from Stanford.
Stylocline amphibola	Mount Diablo cottonseed		Historically recorded from Stanford area; Coyote Hill in 1990s.
Stuckenia filiformis alpina			Not recorded from Stanford.
Trifolium amoenum	showy indian clover	FE, SE	Historic record (1950s), but not recorded since.
Triphysaria floribunda			Not recorded from Stanford.

Notes:

1 United States Fish and Wildlife Service and California Department of Fish and Wildlife listing status definitions:

FE = Federally listed as endangered

FT = Federally listed as threatened

SE = State endangered

ST = State listed as threatened

SC (T) = State candidate for listing as threatened

SR = State listed as rare

Potential for Special-Status Animal Species to Occur in the GUP Study Area (as determined from RareFind and Stanford records)

Zoological Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
INVERTEBRATES			
Anodonta species (likely *A. californiensis* and/or *A. oregonensis*)	freshwater mussel		Uncommon, but present in the San Francisquito Creek watershed and historically found in Felt Reservoir
Bombus species (*B. caliginosus*, *B. crotchii*, and *B. occiddentalis*)	bumble bee		Recorded from region, but precise distribution and conservation status unknown
Callophrys mossii bayensis	San Bruno elfin butterfly	FE	Not recorded from Stanford, and well outside of known range (San Bruno Mountain and immediate vicinity)
Euphydryas editha bayensis	Bay checkerspot butterfly	FT	Not recorded and not expected in the Stanford GUP area; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the GUP area, but extinct at Jasper Ridge since 1997. Critical Habitat for the subspecies is designated at Jasper Ridge.
Speyeria callippe callippe	Callippe silverspot butterfly	FT	Not recorded from and not expected at Stanford; well outside of the known range of this subspecies.
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	FE	Not recorded from and not expected at Stanford; well outside of the known range of this subspecies.
FISH			
Hypomesus transpacificus	delta smelt	FT, SE	Not recorded from and not expected at Stanford.
Oncorhynchus kisutch	coho salmon	FE, SE	This species may have been historically present in San Francisquito watershed, but no known verified or recent reports exist.
Oncorhynchus mykiss	steelhead (CCC DPS)	FT	Present in San Francisquito Creek and Los Trancos Creek. These creeks are designated Critical Habitat for this entity.
Spirinchus thaleichthys	longfin smelt	FC, ST	Not recorded from and not expected at Stanford.
AMPHIBIANS			
Ambystoma californiense	California tiger salamander	FT, ST	Present. Subject of Stanford HCP.
Aneides flavipunctatus niger	Santa Cruz black salamander	SSC	Not recorded and not expected in the Stanford GUP area; recorded from Stanford's Jasper Ridge (San Mateo County), 1.75 miles west of the GUP area

Zoological Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
Rana draytonii	California red-legged frog	FT, SSC	Present in Matadero and Deer creeks. Formerly found in the Stanford portion San Francisquito and Los Trancos creeks…but not observed during annual surveys in those creeks since 2007 and 1996, respectively. Subject of Stanford HCP.
REPTILES			
Actinemys marmorata	western pond turtle	Federal Proposed, SSC	Present in Felt Reservoir, and scattered throughout the San Francisquito watershed.
Thamnophis sirtalis tetrataenia	San Francisco gartersnake	FE, SE, FP	Stanford University is part of long-identified intergrade zone between San Francisco gartersnake and red-sided gartersnake. Intergrade individuals are present in Lagunita and immediate vicinity. The San Francisco gartersnake is not found at Stanford. The intergrade form is subject of Stanford HCP.
BIRDS			
Aquila chrysaetos	golden eagle	FP	Not uncommon at Stanford, but not documented to nest in the GUP area.
Asio otus	long-eared owl	SSC	Known from area, but not known to nest in GUP area.
Athene cunicularia	burrowing owl	SSC	Known to overwinter at Stanford. No evidence of recent nesting.
Brachyramphus marmoratus	Marbled murrelet	FT, SE	Not recorded from and not expected at Stanford.
Buteo swainsoni	Swainson's hawk	ST	Not recorded nesting at Stanford.
Charadrius nivosus nivosus	western snowy plover	FT	Not recorded nesting at Stanford.
Coccyzus americanus	yellow-billed cuckoo	FT, SE	Not recorded from Stanford, and not expected.
Elanus leucurus	white-tailed kite	FP	Present
Falco peregrinus anatum	American peregrine falcon	FP	Not uncommon at Stanford; despite persistent rumors peregrine falcons have not been documented to nest on Hoover Tower (or anywhere else at Stanford).
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	SSC	Not recorded and not expected in the Stanford GUP area; recorded from Stanford's Jasper Ridge

Zoological Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
			(San Mateo County), 1.75 miles west of the GUP area and along San Francisco Bay.
Gymnogyps californianus	California condor	FE, SE, FP	Individuals of this species were historically occasionally observed at Stanford, until at least the late 1960s. Recent sightings in the area are presumed to be of individuals originating from Pinnacles National Park. Condors have never been recorded to nest at Stanford.
Haliaeetus leucocephalus	bald eagle	SE, FP	A pair successfully nested at Felt Reservoir in 2016.
Laterallus jamaicensis coturniculus	California black rail	ST	Not recorded and not expected in the Stanford GUP area; recorded from along San Francisco Bay.
Melospiza melodia pusillula	Alameda song sparrow	SSC	Thie subspecies is not recorded and not expected in the Stanford GUP area; recorded from along San Francisco Bay.
Rallus lobsoletus	Ridgway's rail	FE, SE, FP	Not recorded and not expected in the Stanford GUP area; recorded from along San Francisco Bay.
Sterna antillarum browni	California least tern	FE, SE, FP	Not recorded nesting at Stanford.
MAMMALS			
Antrozous pallidus	pallid bat	SSC	Historically present at Stanford, but no observations of a maternal roost have been made for several decades.
Corynorhinus townsendii	Townsend's big-eared bat	SC	Occasionally observed in the area, but no known maternal roosts have been recorded from Stanford.
Dipodomys venustus venustus	Santa Cruz kangaroo rat		Historically recorded from area, but no recent obsevations in the GUP area
Lasiurus cinereus	hoary bat		Recorded from the region, but given their aversion to humans, they are not expected in the Stanford GUP area.
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	SSC	Present
Reithrodontomys raviventris	salt marsh harvest mouse	FE, SE, FP	Not recorded and not expected in the Stanford GUP area; recorded from along San Francisco Bay.
Sorex vagrans halicoetes	salt-marsh wandering shrew	SC	Not recorded and not expected in the Stanford GUP area; recorded from along San Francisco Bay.

Zoological Name	Common Name	Federal and State Status	Potential to Occur within the Academic Growth Boundary
Taxidea taxus	American badger	SSC	Formerly very rare, but apparently increasing in distribution and abundance. Not recorded from the Stanford GUP area, but observed at Jasper Ridge in 2015.

Notes:

*Species has low potential to occur and no reported occurrences within 1 mile of the project footprint. The species will not be further discussed in this technical memorandum.

Abbreviations:

CCC – Central California Coast

DPS – Distinct Population Segment

FC – Federal candidate

FD – Federally delisted

FE – Federally endangered

FP – California Department of Fish and Wildlife Fully Protected

FT – Federally threatened

APPENDIX B

Preparers' Curriculum Vitae

- Dr. Alan Launer
- Dr. Esther Cole Adelsheim

ALAN EUGENE LAUNER

Land Use and Environmental Planning
Stanford University
3160 Porter Drive
Palo Alto, CA 94304

work (650) 714-4807
fax (650) 725-8598
aelauner@stanford.edu

EDUCATION

1982-1989 HARVARD UNIVERSITY
DEPARTMENT OF ORGANISMIC AND EVOLUTIONARY BIOLOGY
Ph.D. (1989) and A.M. (1986) degrees in biology, with emphasis on functional morphology, ontogeny, and ecology of centrarchid fishes.

1977-1982 STANFORD UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES
M.S. (1982) and B.S. (1982) degrees in biology, with emphasis on population biology and evolutionary ecology of *Euphydryas* butterflies.

PROFESSIONAL APPOINTMENTS AND POSITIONS

1991-present STANFORD UNIVERSITY
Land, Buildings, and Real Estate
Associate Director, Conservation Planning (continuation of job progression from former positions of Campus Biologist, and Conservation Program Manager). Provide University with technical support on conservation issues concerning preservation of biotic diversity, conduct surveys, inventories, and monitoring for plant and animal species of conservation concern on Stanford lands, develop and implement University-wide conservation plans (including Stanford's HCP and California Tiger Salamander Management Agreement), develop appropriate mitigation for University projects, hire, train, and supervise program personnel, write technical reports, participate in University committees and meetings, represent the University at meeting with the public and wildlife conservation agencies.

1989-present **Independent Consultant**. Conduct surveys and inventories for plant and animal species of
1980-1982 conservation concern, develop habitat management plans, provide recommendations for mitigation, hire, train, and supervise field assistants, write technical reports, and present results and recommendations in public and private forums. Recent activities include working for Santa Clara County (via Jones and Stokes) on the south Santa Clara County HCP, conducting field work and analyses on the callippe silverspot butterfly in Pleasanton (for Robert Harris Associates), reviewing materials and preparing conservation alternatives for Delta smelt conservation plans (for Nossaman, Guthner, Knox & Elliott), reviewing materials and contributing the Sharp Park Golf Course conservation program (for San Francisco Parks and Recreation Department).

1995-2012 STANFORD UNIVERSITY
1991-1993 PROGRAM IN HUMAN BIOLOGY
Instructor/lecturer. Developed and taught upper-level undergraduate course in conservation biology (Conservation Biology, listed in Biological Sciences as Biology 144 and in Human Biology as Human Biology 112).

1994-2006 STANFORD UNIVERSITY
CENTER FOR CONSERVATION BIOLOGY, DEPARTMENT OF BIOLOGICAL SCIENCES
Research Associate. Conducted research in conservation biology. Responsibilities included design and completion of field and laboratory projects, writing technical reports, hiring, training, and supervision of research assistants, preparation and submission of grant proposals, and writing of manuscripts for peer-reviewed journals. Also obtained permits for Center work on protected organisms and access to reserves, and advised graduate and undergraduate research.

1989-1994 STANFORD UNIVERSITY
CENTER FOR CONSERVATION BIOLOGY, DEPARTMENT OF BIOLOGICAL SCIENCES
Postdoctoral Fellow. Conducted research in conservation biology. Responsibilities included design and completion of field and laboratory projects, hiring and supervision of research assistants, and writing of manuscripts for peer-reviewed journals.

1987-1988 HARVARD UNIVERSITY
1982-1985 DEPARTMENT OF ORGANISMIC AND EVOLUTIONARY BIOLOGY
Teaching Fellow. Conducted laboratory and discussion sections, and supervised undergraduate research projects for courses in introductory biology, ichthyology, evolutionary biology, and ethology.

1986 NORTHEASTERN UNIVERSITY
MARINE SCIENCE CENTER
Lecturer. Designed and taught summer-session course in ichthyology.

1984-1986 HARVARD UNIVERSITY
DEPARTMENT OF ORGANISMIC AND EVOLUTIONARY BIOLOGY
Tutor. Designed and taught seminar course in ecological morphology and evolution.

1981, 1988 STANFORD UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES
Teaching Assistant. Conducted discussion sections for courses in introductory biology and evolutionary ecology.

1978-1982 STANFORD UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES
Research Assistant. Conducted research on the population biology and community ecology of *Euphydryas* butterflies and *Anolis* lizards. Field work was conducted throughout the western United States and in the Lesser Antilles.

FELLOWSHIPS, HONORS, and COMMITTEES

2004-2005 Scientific Advisory Committee, City of Santa Cruz Habitat Conservation Plan.

2001-2003 Scientific Advisory Committee, East Contra Costa County Habitat Conservation Plan.

1998-1999 Board of Directors, Coyote Creek Riparian Station.

1990-1994 Stanford University Postdoctoral Fellowship.

1987 Certificate of Distinction in Teaching, Harvard University Committee on Undergraduate Education.

1984-1989 Harvard University Graduate Fellowship.

1982-1984 National Institutes of Health Musculo-Skeletal Training Grant Fellowship.

1984 Harvard University Richmond Fund Graduate Research Grant Award.

PUBLICATIONS

Iwasa, Y., F. J. Odendaal, D. D. Murphy, P. R. Ehrlich, and A. E. Launer. 1983. Emergence patterns in male butterflies: a hypothesis and a test. Theoretical Population Biology. 23: 363-379.

Murphy, D. D., A. E. Launer, and P. R. Ehrlich. 1983. The role of adult feeding in egg production and population dynamics of the checkerspot butterfly *Euphydryas editha*. Oecologia 56: 257-263.

Ehrlich, P. R., A. E. Launer, and D. D. Murphy. 1984. Can sex ratio be defined or determined? The case of a population of checkerspot butterflies. American Naturalist 124: 527-539.

Launer, A. E. 1989. Ontogenetic changes in the kinematics of prey capture in centrarchid fishes. Doctoral dissertation, Harvard University.

Launer, A. E., D. D. Murphy, J. M. Hoekstra, and H. R. Sparrow. 1992. The endangered Myrtle's silverspot butterfly (*Speyeria zerene myrtleae,* Nymphalidae): present status and initial conservation planning. Journal of Research on the Lepidoptera 31: 132-146.

Fleishman, E., J. F. Baughman, A. E. Launer, and P. R. Ehrlich. 1993. The effect of fluorescent pigments on butterfly copulation. Ecological Entomology 18: 165-167.

Launer, A. E., D. D. Murphy, C. L. Boggs, J. F. Baughman, S. B. Weiss, and P. R. Ehrlich. 1993. Puddling behavior by Bay checkerspot butterflies (*Euphydryas editha bayensis*). Journal of Research on the Lepidoptera 32: 45-52.

Launer, A. E. and D. D. Murphy. 1994. Umbrella species and the conservation of habitat fragments: a case of a threatened butterfly and a vanishing grassland ecosystem. Biological Conservation 69: 145-153.

Fleishman, E., A. E. Launer, K. R. Switky, and S. B. Weiss. 1994. Multi-level monitoring of the endangered plant *Cordylanthus palmatus* at the Springtown Alkali Sink. Western Wetlands: Selected Proceedings of the 1993 Conference of the Society of Wetland Scientists, Western Chapter. Pages 20 to 32.

Launer, A. E., and D. D. Murphy. 1994. The decline of Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*). Tideline 14: 1-3.

Sisk, T. D., A. E. Launer, K. R. Switky, and P. R. Ehrlich. 1994. Identifying extinction threats. BioScience 44: 592-604.

Sisk, T. D., A. E. Launer, K. R. Switky, and P. R. Ehrlich. 1995. Reassessing threats to biodiversity: two replies. BioScience 45: 380.

Hoekstra, J. M., R. Bell, A. E. Launer, and D. D. Murphy. 1995. Soil arthropod abundance in Coast redwood forests: effect of selective timber harvest. Environmental Entomology 24: 246-252.

Sisk, T. D., A. E. Launer, K. R. Switky, and P. R. Ehrlich. 1996. Identifying extinction threats. Pages 53 to 68 *in*: Ecosystem Management. Selected Readings, F. B. Samson and F. L. Knopf, editors, Springer-Verlag New York, Inc., New York. (Reprinted from BioScience 44: 592-604.)

Austin, G. T., N. M. Haddad, C. Mendez, T. D. Sisk, D. D. Murphy, A. E. Launer, and P. R. Ehrlich. 1996. Annotated checklist of the butterflies (Lepidoptera) of Tikal National Park and vicinity (Peten, Guatemala). Tropical Lepidoptera 7: 21-37.

Blair, R. B. and A. E. Launer. 1997. Butterfly diversity and human land use: species assemblages along an urban gradient. Biological Conservation 80: 113-125.

Austin, G. T., C. Mendez, and A. E. Launer. 1998. A preliminary checklist of Guatemala butterflies: Hesperiidae (Lepidoptera: Hesperioidea). Tropical Lepidoptera 9 (Supplement 2): 8-19.

Fleishman, E., G. H. Wolff, C. L. Boggs, P. R. Ehrlich, A. E. Launer, J. O. Niles, and T. H. Ricketts. 1999. Conservation in practice: overcoming obstacles to implementation. Conservation Biology 13: 450-452..

Johnson, P. T. J., K. B. Lunde, E. G. Ritchie, and A. E. Launer. 1999. Trematode infection causes severe limb abnormalities and reduced survivorship in frogs. Science 284: 802-804.

Fleishman, E., A. E. Launer, S. B. Weiss, J. M. Reed, C.L. Boggs, D. D. Murphy and P. R. Ehrlich. 2001. Effects of microclimate and oviposition timing on prediapause larval survival of the Bay checkerspot butterfly, *Euphydryas editha bayensis* (Lepidoptera: Nymphalidae). Journal of Research on the Lepidoptera 36: 31-44.

Fleishman, E., A. E. Launer, K. R. Switky, U. Yandell, J. Heywood, and D. D. Murphy. 2001. Rules and exceptions in conservation genetics: genetic assessment of the endangered plant *Cordylanthus palmatus* and its implications to management planning. Biological Conservation 98: 45-53.

Fellers, G. M., A. Launer, G. Rathbun, S. Bobzien, J. Alvarez, D. Sterner, R. Seymour, M. Westphal. 2001. Overwintering tadpoles in the California red-legged frog (*Rana aurora draytonii*). Herptological Review 32:156-157.

Johnson, P. T. J., K. B. Lunde, E. G. Ritchie, J. A. Reaser, and A. E. Launer. 2001. Morphological abnormality patterns in a California amphibian community. Herpetologica 57: 336-352.

Hartel, K. E., D. B. Halliwell, and A. E. Launer. 2002. Inland Fishes of Massachusetts. Massachusetts Audubon Society Press.

Hellman, J. J., S. B. Weiss, J. F. McLaughlin, C. L. Boggs, P. R. Ehrlich, A. E. Launer, D. D. Murphy. 2003. Do hypotheses from short-term studies hold in the long-term? An empirical test. Ecological Entomology 28: 74-84.

Austin, G. T., D. D. Murphy, J .F. Baughman, A. E. Launer, and E. Fleishman. 2003. Hybridization of checkerspot butterflies in the Great Basin. Journal of the Lepidopterists' Society 57:176-192.

Hellman, J. J., S. B. Weiss, J. F. McLaughlin, P. R. Ehrlich, D. D. Murphy, and A. E. Launer. 2004. Structure and dynamics of *Euphydryas editha* populations. Chapter 3 *in*: On the wings of checkerspots. A model system for population biology. Edited by P. R. Ehrlich and I. Hanski; Oxford University Press.

Ayres, D. R., E. Fleishman, A. Launer, A. K. Lee, and D. Zippen. 2015. Genetic structure and demography of *Chloropyron palmatum, an endangered* annual plant. Madrono 62: 139-149.

More than 100 technical reports on the status of species of conservation concern at proposed development sites, on potential impacts of development on threatened and endangered species, on potential mitigation options, on development, management and implementation of monitoring activities, and on reserve design and management. Reports have focused on invertebrates, lower vertebrates, and plants of the San Francisco Bay area. Reports have been prepared for Stanford University, U.S. Fish and Wildlife Service, U.S. Park Service, California Department of Fish and Game, San Mateo County, Santa Clara County, Mid-Peninsula Regional Open Space District, and The Nature Conservancy, major corporations (including Waste Management Inc., Shea Homes, Pebble Beach Company, Marin Coast Golf Ranch Associates, Cerro Plata Development, and Hix Rubenstein Companies), and consulting firms (including Thomas Reid Associates, H. T. Harvey and Associates, Harding Lawson Associates, Zander Associates, L.S.A. Associates, Inc., CH2MHILL, Jones and Stokes, and Nolte Associates).

ESTHER M. COLE ADELSHEIM

ecolea@stanford.edu
650-492-3044

CURRENT POSITION:
Conservation Program Manager (September 2014 – Present)

EDUCATION
Ph.D. Ecology, University of California, Davis. June 2014
B.S. Biology, University of Oregon Clark's Honors College. Spring 2005. GPA 3.95

PUBLICATIONS
Meek, M.H., C. Wells, K. Tomalty, J. Ashander, E.M. Cole, D.A. Gille, B.J. Putman, J. Rose, M.S. Savoca, L. Yamane, J.M. Hull, D.L. Rodgers, R.R. Swaisgood, and B. Mae. (2015) Fear of failure in conservation: The problem and potential solutions to aid conservation of extremely small populations. Biological Conservation 184:209-217.

Cole, E.M., Hartman, R, and M. P. North (2015) Hydroperiod and Cattle Use Associated with Lower Recruitment in an r-selected Amphibians with a Declining Population Trend in the Klamath Mountains, CA. Journal of Herpetology.

Cole, E.M. and M.P. North (2014) Environmental Influences on Amphibians Assemblages Across Subalpine Wet Meadows in the Klamath Mountains, CA. Herpetologica 70:135-148.

Piovia-Scott, J, K.L. Pope, E.M. Cole, J. Foley, and S.P. Lawler (2011). Factors related to the distribution and prevalence of the fungal pathogen *Batrachochytrium dendrobatidis* in *Rana cascadae* and other amphibians in the Klamath Mountains. Biological Conservation 144:2913-2921.

Cole, E.M. and A. Stephenson (2010) Population Status of Mountain Yellow-legged Frogs. Sequoia and Kings Canyon National Park Species Assessment.

Cole, E.M. and M. Skear (2010) Population Status of Slender Salamanders. Sequoia and Kings Canyon National Park Species Assessment.

Pfeifer-Meister, L, E.M. Cole, B.A. Roy, and S.D. Bridgham. (2007) Abiotic constraints on the competitive ability of exotic and native grasses in a Pacific Northwest prairie. *Oecologia*.

Cole, Esther M. (2005) Competitive Dynamics of Four Willamette Valley Grass Species. Senior Honor's Thesis. Biology Department, University of Oregon.

PRESENTATIONS
Trends in site occupancy by California red-legged frog (Rana draytonii) and American bullfrog (Rana catesbiana). August 12, 2015. Ecological Society for America. Esther M Cole, Alan Launer.

Shorter hydroperiod and cattle impact associated with lower recruitment in an R-selected species with a declining population trend. July 15, 2014 North America Congress for Conservation Biology. Esther Cole, Malcolm North.

Spatial and Temporal Variation in Population Dynamics of Andean Frogs: Effects of Forest Disturbance and Evidence for Declines. January 15th 2014 Ecology Graduate Student Symposium. Esther Cole, Martin Bustamante, Diego Almieda, Chris Funk.

Population Dynamics of Leaf Litter Frogs in an Ecuadorian Cloud Forest. June 2013. Society for Conservation Biology Bay Area Chapter Meeting. Esther Cole, Chris Funk.

Symposium Organizer: Conservation of Extremely Small Populations. University of California, Davis, February 10-11, 2012 http://animalscience.ucdavis.edu/savesmallpops/symposium_site/Welcome.html

Incidence of a fungal pathogen in *Rana cascadae* and other amphibian species in the mountains of Northern California. January 15th 2009 Declining Amphibian Populations Task Force Annual Meeting. Jonah Piovia-Scott, Karen Pope, Esther Cole, Janet Foley, and Sharon Lawler.

Testing the Effectiveness of Site Preparation for Wetland Prairie Restoration. April 6th 2005. Society of Ecological Restoration Pacific Northwest Chapter. Laurel Pfeifer-Meister, Jeff Krueger, Esther Cole, Bart Johnson, Bitty Roy, Scott Bridgham.

HONORS/AWARDS

NSF Bridge Fellowship (2012)
Fulbright Scholarship (2008)
Henry A. Jastro and Peter J. Shields Graduate Research Fellowship (2007)
Declining Amphibian Population Task Force (DAPTF) seed grant (2006)
Magna cum laude, Honors in Biology Department (2005)
University of Oregon Presidential Scholar (full-tuition, 2001-2005)

STATISTICAL COMPETENCIES (SOFTWARE USED)

- Geospatial analyses (ArcGIS, ArcMap)
- Occupancy and population parameter estimation (MARK, DISTANCE, PRESENCE)
- ANOVA, ANCOVA, GLMs, GAMs, mixed models, regression tree analyses (R, SPLUS, SPSS, SAS)
- Ordination and Cluster Analyses (PCORD)

LANGUAGE SKILLS

- Intermediate proficiency in oral and written Spanish

SPECIES MANAGEMENT/RESEARCH EXPERIENCE

Invasive Aquatics Intern (Jun 2012–June 2014) The Nature Conservancy Cosumnes River Preserve

- Monitored volunteer motivations, participation, and retention. Evaluated the effect of the invasive Creeping Water Primrose (*Ludwigia hexapetala)* on the Giant Garter Snake (*Thamnophis gigas*) and its prey.

Dissertation Research (Jun.2008–June 2014) Klamath Mountains University of California, Davis

- Studied the drivers of amphibian population dynamics in remote, high elevation wet meadows. Managed field crews of 2 to 4 individuals.

Graduate Student Researcher (Feb.2008–Mar.2012) USFS University of California, Davis

- Prepared and analyzed tree cookies for fire history in the Sierra Nevada. Used ArcGIS to evaluate truffle density and aggregation in Pacific Northwest forests.

Graduate Student Researcher (Jun 2008–Dec 2008) UC Davis University of California, Davis

- Monitored amphibian population dynamics in Klamath Mountains, surveyed for the presence of Chytridiomycosis, extracted DNA from samples in preparation for QPCR analysis.

Independent Research (Dec–Aug. 2007) SEED Grant (DAPTF) Yanayacu Biological Station

- Studied the impact of human activity on population dynamics and reproductive biology of amphibians and aquatic macroinvertebrates in an Ecuadorian cloud forest.

Scientific Aid (Aug-Oct. 2006) California Department of Fish and Game Bishop, CA

- Conducted restoration work and monitored populations of Mountain Yellow-legged Frogs. Organized field gear and trained new field technicians. Wrote reports of field work completed.

Wildlife Biological Technician (Apr-Aug. 2006) Oregon State University Pasco, WA

- Conducted research of breeding and feeding behavior and population dynamics of Caspian Terns, American White Pelicans, Double Crested Cormorants, and Forester's Terns. Scheduled and instructed 3 interns in field techniques. Wrote weekly reports of research activities.

Botany Biological Technician (Oct-Dec. 2005) National Park Service Lodgepole, CA

- Flagged and planted native species from detailed map codes based upon fire gap dynamics. Surveyed site aspect and area to construct topographical map.

Aquatic Biological Technician (Jul-Sept. 2005) National Park Service Kings Canyon National Park, CA

- Conducted restoration work for the Mountain Yellow-legged Frog and studies of population resiliency. Duties included frog surveys, removal of exotic trout, and public education.

Asst. Land Steward (Dec 2004-Jun05) The Nature Conservancy Eugene, OR

- Mapped rare native plant using transect grids, assisted with native planting and seed harvesting.

Research Assistant (Jun-Sept 2004) University of Oregon Eugene, OR

- Conducted Soil Nutrient Analyses, restoration work, and below-ground plant productivity assessments in the field and in the lab.

Research Assistant (Jun-Sept. 2001) Oregon State University Corvallis, OR

- Monitored diversity and abundance of fish in the Willamette Basin in Oregon.

Student Volunteer (Jan 2000 - Jan 2001) Bureau of Land Managament Ashland, OR

- Completed visual surveys for Steelhead redds, snorkel surveys for steelhead adults, and monitored smolt traps in streams in Southern Oregon.

Student Volunteer (Jan 1999 - Jan 2000) The Nature Conservancy Medford, OR

- Monitored native plant populations. Assisted with invasive weed removal and native seed harvest.

OUTREACH/TEACHING EXPERIENCE

Graduate Teaching Assistant (2008, 2010, 2011) University of California, Davis Davis, CA

- Taught 3 academic quarters of Introductory Ecology and Evolution lab section
- Taught 1 academic quarter of a discussion section for Molecular Genetics

Naturalist Guide Instructor (May-Aug 2007) Yanayacu Biological Station Cosanga, Ecuador

- Assisted with the instruction and training of students learning to become naturalist guides in Ecuador. Including instruction of natural history, career development, and English classes.

English Instructor (Dec. – Jul. 2007) Yanayacu Biological Station Cosanga, Ecuador

- Taught course focusing on beginning English speaking and writing skills to 10 native Spanish or Quechan speakers in rural Ecuador.

Undergraduate Teaching Assistant (Sept.-Dec2004) University of Oregon Eugene, OR

- Led lab sections exploring organisms and system processes of forest ecosystems. Included leading several plant identification walks. Also was responsible for holding review sessions and grading exams and homework.