

SECTION 4 CONSERVATION PROGRAM



4.0 CONSERVATION PROGRAM

Section 4.0 of this HCP describes the Conservation Program that has been developed to avoid and minimize the potential adverse effects of the Covered Activities on the Covered Species, and the mitigation measures that will fully mitigate for the unavoidable take of Covered Species. The goal of this Conservation Program is to minimize the potential adverse effects of the Covered Activities described in Section 3, and to enhance the overall quality of habitat at Stanford for the Covered Species. The implementation of this Conservation Program will provide an overall benefit to the Covered Species, despite the ongoing and future Covered Activities. This section also implements Stanford's Biological Goals and Objectives, which are described in Section 1.5.2.

All Stanford lands have been divided into management zones, based on their intrinsic value to the Covered Species. Additionally, the potential habitat areas for the Covered Species have been divided into three geographical areas: the San Francisquito/Los Trancos Creek Basin, the Matadero/Deer Creek Basin, and the California Tiger Salamander Basin. Stanford will establish three corresponding Preserved Areas to preserve large areas of biologically sensitive habitat within each of the Basins. The HCP also describes the Monitoring and Management Plans that will be implemented for each of the Preserved Areas, as well as minimization measures that will be used to reduce impacts (Figure 4-1).

4.1 CREATION OF 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 4-2 depicts the location of these zones.¹



¹ All of the spatial data presented in this document was projected into Stateplane Coordinate System, California Zone III, NAD 83, using Geographic Information Systems (GIS). Acreage calculations appearing in this HCP may be different than previously published data due to differences in the methods used to determine acreages. The HCP covers all Stanford University owned lands, including the SLAC National Accelerator Laboratory (SLAC) and land around SLAC that is subject to a federal lease for the facility.

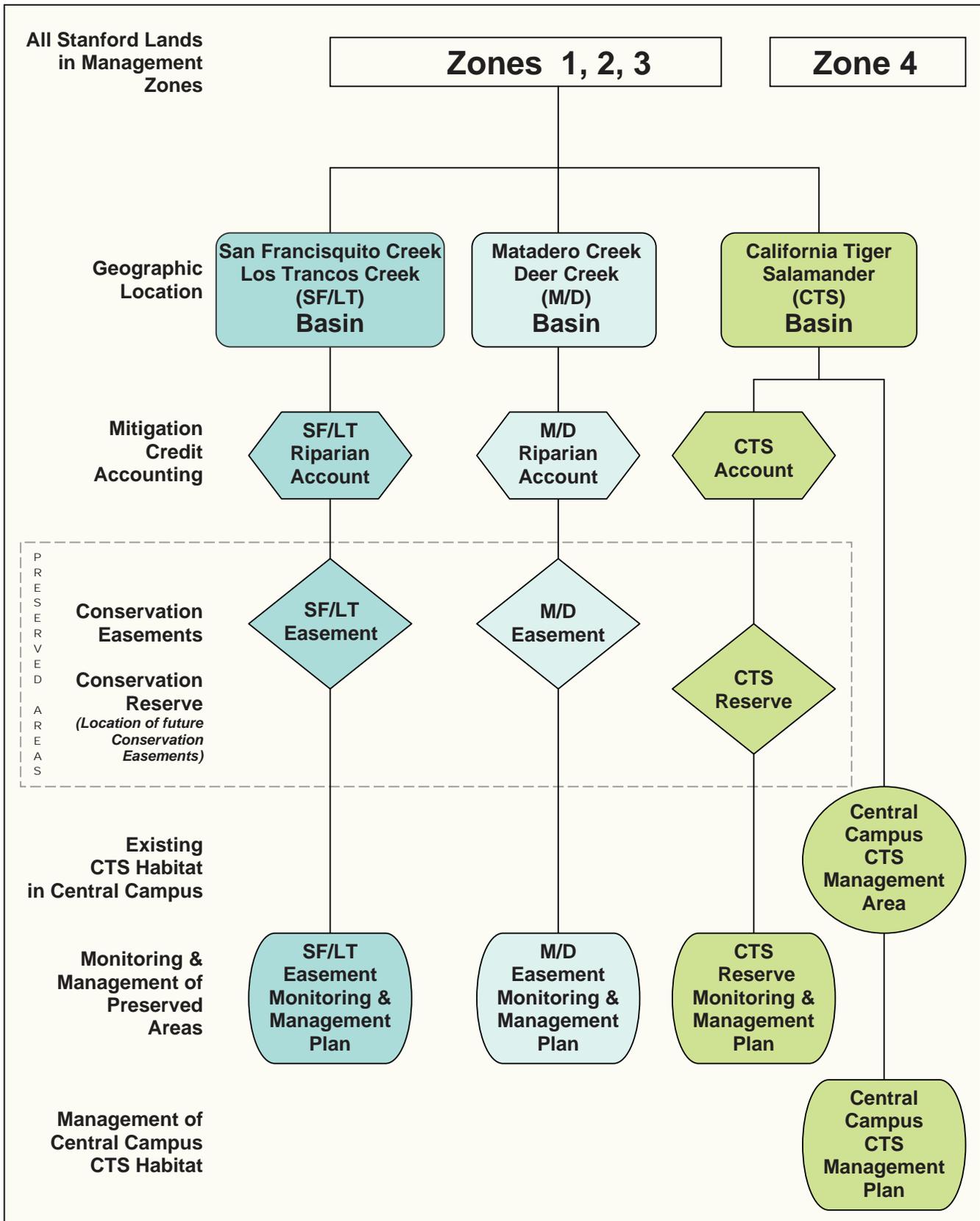
Zone 1: Areas classified as Zone 1 support one or more of the Covered Species or provide critical resources for a Covered Species. These areas are necessary for the local persistence of the Covered Species. A few areas that are currently degraded by the presence of a temporary land use also are included 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. Development in Zone 1 will be avoided to the maximum extent feasible. Some areas in Zone 1 will be subject to extensive restoration and enhancement. There are approximately 1,295 acres in Zone 1.

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 this Conservation Program, most of these areas will be maintained in a manner that will preserve their habitat values, and some portions of Zone 2 may be enhanced to more directly support Covered Species. When feasible, land in Zone 2 will not be developed. There are approximately 1,260 acres in Zone 2.

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. Under the Conservation Program, these areas will be operated and developed in a manner that does not adversely affect the Covered Species, but these lands are generally more desirable areas for future development than Zones 1 or 2. There are approximately 2,446 acres of land in Zone 3.

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, and 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 3,187 acres of land in Zone 4.

Stanford University Habitat Conservation Plan



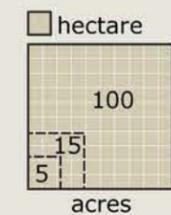
Conservation Program - Structure and Terms

Figure 4-1

Stanford University Habitat Conservation Plan

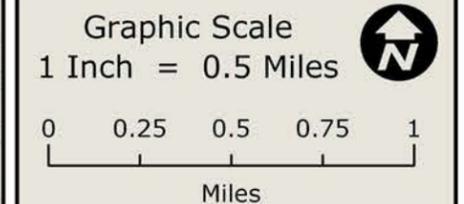
Management Zones

- Zone 1
- Zone 2
- Zone 3
- Zone 4



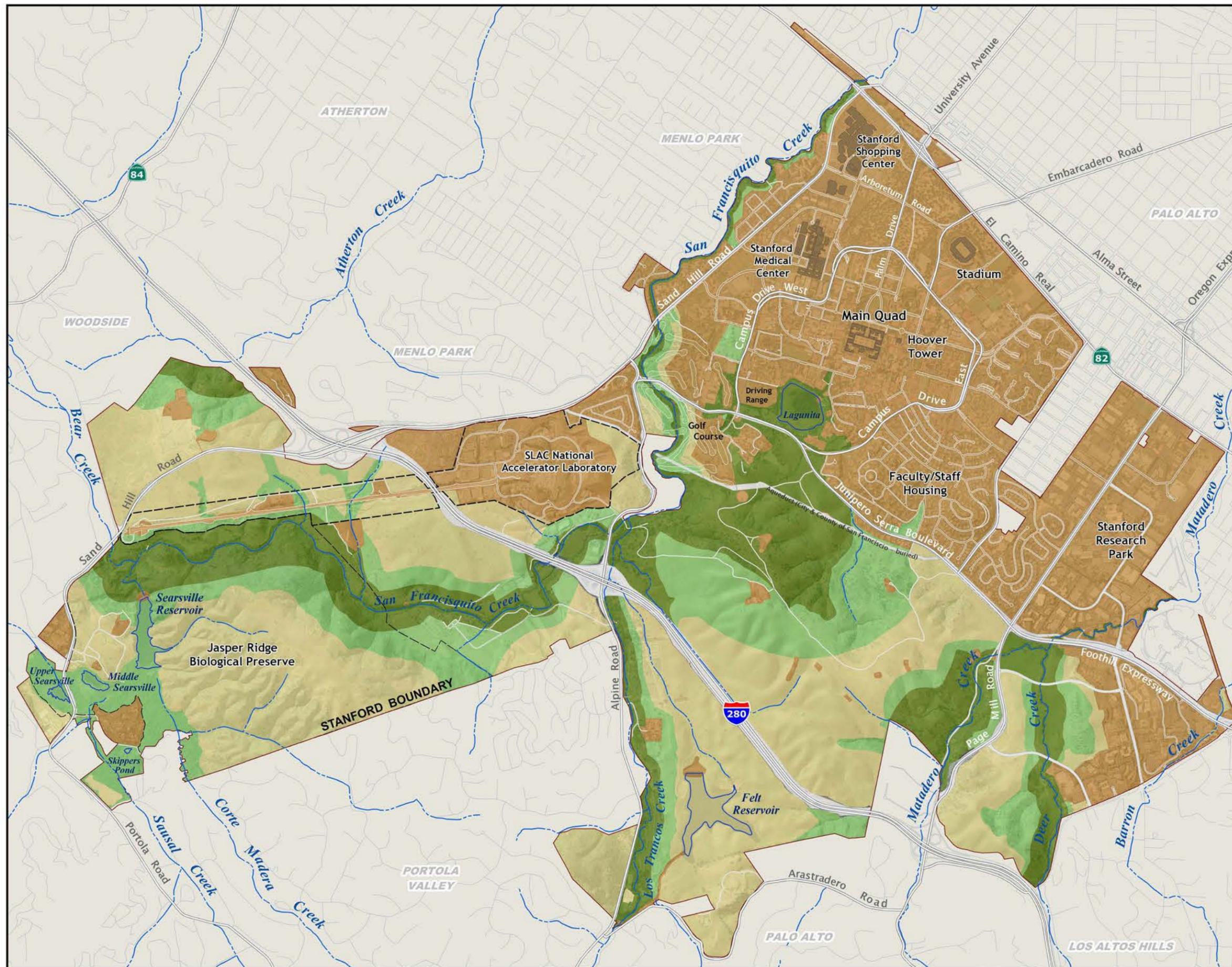
Sources:
 HCP Zones: Stanford University Campus Biologist, 2006
 Aerial photos: Aerotopia, 1999
 Creeks: US Geological Survey, 1991

Disclaimer:
 This map was produced by the SU Planning Office.
 While generally accurate, this map may not be
 completely free of error. The information is derived
 from a variety of sources deemed reliable, but subject
 to recurrent change and Stanford does not warrant
 the accuracy and completeness of these data.



Stanford University Planning Office
 Date Printed: December 2011

Figure 4-2



4.2 MEASURES TO MINIMIZE THE POTENTIALLY ADVERSE EFFECTS OF THE COVERED ACTIVITIES

Some of the University's structures and uses, particularly utility infrastructure and academic activities, are located in areas that support the Covered Species. These infrastructure systems will have to be maintained and improved during the life of the HCP. Likewise, the University engages in a number of ongoing activities that could affect the Covered Species. To avoid or minimize the impacts on Covered Species from these activities, Stanford will implement the following measures. **Unless specified otherwise, the Minimization Measures described below apply only to the Covered Activities when they occur in Zones 1 and 2.**

The HCP requires Stanford to undertake a wide range of conservation measures that will minimize the potential adverse effects on the Covered Species of operating the University. In a few instances, Stanford cannot predict at this time whether a particular conservation measure is necessary, or if a particular measure can be feasibly implemented. Therefore, in a few instances, the HCP requires Stanford, through the Conservation Program Manager, to determine the feasibility of undertaking certain conservation measures. For the purposes of this HCP, the terms "feasibility" or "when feasible" when discussing goals, objectives, and conservation measures, are defined as follows: The Conservation Program Manager's feasibility determination shall be made after taking into consideration, and balancing appropriately, existing technology, cost, and logistics in light of the overall purposes and goals of the HCP and the specific activity at issue. The Conservation Program Manager's responsibilities and role in implementing the HCP are described more fully in Section 6.3.2 of the HCP.

4.2.1 Water Management

Stanford conducts many water management activities. These include operating water diversion facilities, dams, reservoirs, deep wells, water and drainage piping,² and water quality monitoring. To avoid and minimize the impacts from these activities, Stanford will implement the following measures.

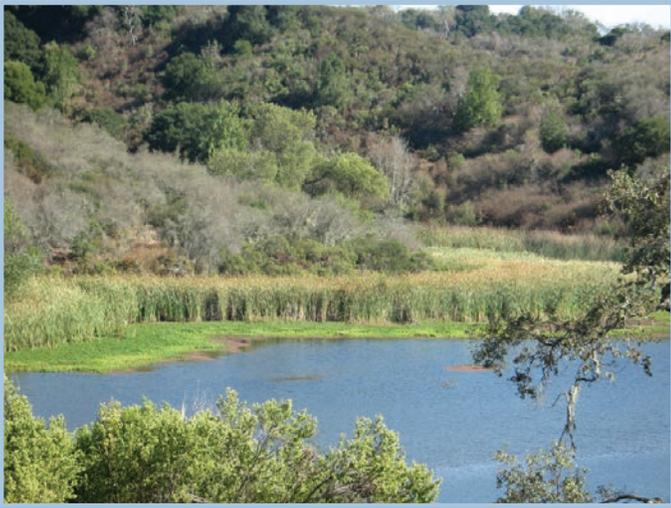
General Creek Protection Measures

- Whenever feasible, maintenance, repair, or construction of in-stream structures will be performed without the use of coffer dams or heavy equipment and will be conducted in the dry season.

² There are over 200 miles of water and drainage piping running across Stanford. Although these facilities generally are used for water management, minimization measures to reduce their potential effects are covered by the *Existing Utility Measures* and *New Utility Measures*.

- All projects in Los Trancos and San Francisquito creeks requiring dewatering will use coffer dams and only be conducted during the period between June 15 and October 15. De-watered reaches will not exceed 300 feet in channel length.
- Heavy equipment will only be operated on a dry creekbed. If feasible, heavy equipment will remain at the top of the creek bank or on a side bench. In the event that heavy equipment is required for in-stream activities, the Conservation Program Manager will conduct a visual survey along the transportation route to determine the least environmentally damaging route to the creek.
- When heavy equipment or coffer dams will be used, the Conservation Program Manager will be consulted and may assign measures that reduce the impact of the work on the Covered Species.
- During in-stream activities where fish are present, structures will be isolated from the waters of the creek with the use of coffer dams or netting. Any fishes at the structure will be collected and relocated to an appropriate location downstream or upstream from the construction site. The Conservation Program Manager will ensure that a qualified biologist will be on-site to conduct fish collections in a manner which minimizes potential risks to steelhead. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000³ (or then current guidelines).
- When in-stream activities are required, the amount of creek channel and bank impacted will be limited to the smallest area required to safely and efficiently complete the work.
- Upon completion of the work, any newly exposed surfaces will be stabilized with the appropriate ground cover (clean gravel if part of the creek channel is disturbed, geotextiles and plantings if a bank has been disturbed).
- An education program will be developed by the Conservation Program Manager and presented annually to maintenance workers. The education program will include discussion of the potential for steelhead, red-legged frogs, garter snakes and western pond turtles to be present near the in-stream facilities and actions that will encourage animals to disperse from the area prior to work.
- Erosion and pollution control measures will be implemented.

³ The guidelines may be viewed at: <http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf>.



Water Diversions. Stanford operates the Los Trancos diversion facility and the pump station on San Francisquito Creek below the confluence with Los Trancos Creek, which includes the Felt pumps and the Lagunita pumps. Stanford modified these facilities in the 1990s to accommodate environmental and operational concerns raised by the CDFG. The resulting structures and operating procedures significantly reduced the effects that these facilities have on fish and wildlife resources in San Francisquito Creek and Los Trancos Creek. However, Stanford again modified these facilities to further enhance steelhead habitat in 2009, as described in Appendix A. To further reduce potential effects of the water diversion facilities, while at the same time protecting Stanford's local water supply, Stanford will implement the following additional measures. In addition, Water Diversion activities will be subject to the *General Creek Protection Measures*.

Water Diversion Measure

- The bypass flow rates approved in the SHEP Biological Opinion and SAA will be implemented (see Appendix A).

Creek Monitoring Facilities. To avoid and minimize the impacts from maintenance of the creek monitoring facilities, Stanford will implement the *General Creek Protection Measures*.

Water Reservoirs. To avoid and minimize the impacts from maintenance and operation of the Felt Reservoir and Lagunita, Stanford will implement the following measures.

Felt Reservoir Measures

- A western pond turtle education program will be developed by the Conservation Program Manager and presented annually to Felt Reservoir maintenance workers. The education program will include a protocol notifying the Conservation Program Manager if any turtles are found. Western pond turtles that are believed to have been released at Felt Reservoir by a member of the public will be captured and quarantined to assess their general health conditions to ensure that they can survive in the wild and they will be tested for pathogens. If the turtles are healthy, they may be released into more appropriate habitat. If it is not appropriate to release the turtles, they may be donated to a wildlife education facility.
- Signs prohibiting the release of any wildlife species will be posted at Felt Reservoir.
- Any dredging of sediment from Felt Reservoir will be conducted between June 15 and October 15. An on-site biological monitor will be present during any dredging. The biological monitor will have the authority to stop work if a western pond turtle is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- The Conservation Program Manager will conduct a visual survey to locate high densities of treefrogs. If feasible, areas with high densities of treefrogs will not be dredged.

Lagunita Reservoir Measures

- Routine maintenance of the Lagunita drain or berm will be conducted when Lagunita is dry, in consultation with the Conservation Program Manager.
- A California tiger salamander education program will be developed by the Conservation Program Manager and presented annually to Lagunita maintenance workers. The education program will include restrictions on animal control programs and protocols for salamander identification, avoidance, immediate protection, and notification of the Conservation Program Manager. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.

Searsville Dam. Any major modification of Searsville Dam is not a Covered Activity and will not be permitted through this HCP and will require its own compliance with the ESA through Section 7 or a separate HCP. Likewise, the presence of the dam is not a Covered Activity. However, as part of the HCP, Stanford will perform the Searsville Dam Measure described below.

Searsville Dam Measure

- Stanford will commit to study the technical feasibility of fish passage alternatives at Searsville Dam within 10 years of approval of the HCP. Stanford will allocate \$100,000 to conduct the feasibility study in conjunction with any Stanford, local agency, state agency, or federal agency proposed project to modify Searsville Dam, or independently if no such dam modification project is proposed within the 10-year time frame. The scope of the fish passage study will be developed in coordination with NOAA Fisheries. Fish passage alternatives ranging from installing a fish ladder at the existing dam to completely removing the dam will be evaluated. The results reached in the technical feasibility study will be incorporated into any proposed future dam modification project. Cost, environmental impacts, and other factors will also be considered in the decision whether or not to include fish passage facilities in any future dam modification project.

Water Distribution System. To avoid and minimize the impacts from maintenance and installation of water distribution pipelines, the General Infrastructure Measures in Section 4.2.5 will be implemented. If coffer dams are necessary, Stanford will follow the General Creek Protection Measures.

Water Wells. To avoid and minimize the impacts from maintenance of the wells, Stanford will implement the following measure.

Water Wells Measure

- An education program will be developed by the Conservation Program Manager and presented annually to maintenance workers. The education program will include discussion of the potential for Covered Species to be present near wells and actions that will encourage animals to disperse from the area prior to maintenance work.

Non-Operating Lagunita Diversion. To avoid and minimize the impacts from the non-operating Lagunita Diversion facility, Stanford will implement the following measures.

Non-Operating Lagunita Diversion Measures

- Stanford will restore more natural adult and juvenile fish passage by removing the Lagunita diversion facility⁴ and restoring the creek channel to a more natural configuration. Stanford will initiate the removal project within 3 years of NOAA Fisheries'

⁴ Since the dam abutments are built into the surrounding stream banks, they could be left in place to prevent destabilization of the existing bank, or other bank stabilization structures may be needed; but, the dam, fish ladder, and concrete weir, which are of greatest concern to fish passage, would be removed.

approval of this HCP, and anticipates that it will take 2-4 years to prepare final plans, perform the necessary studies and environmental reviews and secure the applicable federal, state, and local permits.

- Until the existing facility is removed, maintenance and/or repairs of the existing facilities will be performed without the use of coffer dams or heavy equipment and conducted in the dry season. If it is not feasible to perform the maintenance or repair work without the use of heavy equipment or coffer dams, the General Creek Protection Measures will be followed.

4.2.2 Creek Maintenance Activities

To avoid and minimize the effects from creek maintenance activities, Stanford will implement the following measures. In addition, Creek Maintenance activities will be subject to the *General Creek Protection Measures*.

Creek Maintenance Measures

- Future creek bank stabilization efforts will be conducted only if a bank failure is a risk to public safety, roads and other structures, or is detrimental to steelhead, red-legged frogs, or western pond turtles. Areas of active bank collapse will be evaluated to determine the extent of the impact and if remedial actions are warranted. The Conservation Program Manager will determine the need, extent, and type of bank stabilization structure applied. The bank stabilization proposals will be submitted to NOAA Fisheries and the Service.
- When bank stabilization efforts are required, Stanford will use bioengineered structures. Rip-rap, rock, and other hardscape materials will only be used where required (e.g., areas of high scour). Gabions and treated wood may not be used in-channel or along the banks of Los Trancos or San Francisquito creeks.
- When feasible, bank failures may be addressed by grading and setting back creek bank and/or the extension or creation of flood benches consistent with the channel geometry to increase habitat diversity and increase the size of the creekside riparian zone. These more spatially invasive methods of creek bank stabilization (i.e., larger creek cutbacks) will be implemented if they are compatible with existing and future adjacent land uses and other natural resources.
- Woody debris in the creek channel and adjacent riparian zones is generally beneficial to steelhead and overall creek function, and will be left in place, unless it poses a flood or erosion hazard or is a barrier to steelhead dispersal. Except in an emergency, the Conservation Program Manager will be consulted if removal of woody debris becomes necessary. Removal will be conducted by hand unless circumstances require the use of machinery. Appropriate erosion and pollution control measures will be in effect during these removals.

4.2.3 Academic Activities

Research, teaching, and field studies are central to the University's existence. To avoid and minimize the impacts from current and future academic activities, Stanford will implement the following measures.

Academic Activities Measures

- Unless academic resources are located within sensitive biological areas (e.g., archaeological sites), academic activities that could adversely affect the Covered Species will be conducted in areas that do not contain sensitive resources.
- Open pits, trenches, and excavated areas shall be secured at the end of the daily excavation, in a manner that prevents Covered Species from entering them. The site will be secured with a solid barrier (e.g., silt fence, plywood, etc.) a minimum of 3 feet tall at the perimeter of the site, buried at least 4 inches into the ground. If the solid barrier coincides with a cyclone fence, the solid barrier will be attached to the outside of the cyclone fence. The barrier will be inspected by an appropriately trained person once a week, and repairs/replacement will be made as necessary. Smaller pits also shall be covered. If Covered Species are found within the excavation, the Conservation Program Manager will be contacted. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- If the academic resources to be studied are located in Zones 1 or 2, the Conservation Program Manager will review those activities that could adversely affect the Covered Species through ground disturbance, biological sampling, biological enclosures, clearing vegetation, and/or creek channel or pond disturbance.⁵ If necessary, use conditions may be imposed by the Conservation Program Manager. All disturbed sites will be restored in a manner approved by the Conservation Program Manager.
- An academic site disturbance lasting longer than 1 year will be considered a permanent loss of habitat for the purposes of the HCP and will be mitigated in accordance with Section 4.4 of the HCP.

⁵ The Conservation Program Manager does not have to be consulted before undertaking academic activities that are not likely to affect the Covered Species, such as walking around Lagunita, swimming/boating in Lagunita, walking on existing trails or roads, water sampling from the creeks/Lagunita, photography, counting plants, crossing the creeks, and walking off of trails/roads during the dry season.

4.2.4 Utility Installation and Maintenance

To accommodate the people and facilities at Stanford, the University campus has been developed with a significant amount of urban infrastructure. To avoid and minimize the impacts from utility installation and maintenance, Stanford will implement the following measures. In addition, Utility Installation and Maintenance activities will be subject to the *General Infrastructure Measures* and *General Creek Protection Measures*.



Existing Utility Measures

- Underground utilities maintenance activities will be limited to the existing utility corridors to the extent feasible. However, if it is infeasible to use an existing corridor due to changes in land uses, new technology, or because of safety concerns, new utility corridors may be constructed in accordance with the New Utility Measures.
- The Conservation Program Manager will be notified before any utility line maintenance or replacement occurs within Zones 1 and 2.
- An on-site biological monitor will be present during all ground-disturbing activity in Zones 1 and 2. The biological monitor will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- Heavy equipment will be used only if it is not feasible to excavate, clear vegetation, and expose the utilities by hand.
- After service, underground utility lines must be reburied as soon as possible, the original topsoil spread across the construction site, and the disturbed area seeded with native plant species.
- Erosion control devices must be implemented during underground utility maintenance activities that occur between October 15 and March 15.
- Any native trees or native shrubs that are removed will be replaced, but not necessarily in the same location.



- The disturbance to areas around existing above-ground utilities will be kept to a minimum.
- If feasible, and beneficial to the Covered Species, existing above-ground utilities will be placed underground, excluding storm drainage that may be conveyed in open ditches.
- The modification of any enclosed reservoir tank will be limited to the existing footprint of the structure to the extent feasible. Enclosed reservoir tanks may be expanded beyond the existing footprint or moved if it is not feasible to remain within the existing footprint. If it is not feasible to remain within the existing footprint, the Conservation Program Manager will be consulted and may assign measures that reduce the impact to Covered Species. Such measures may include restoration of temporarily disturbed areas. The expansion of an enclosed reservoir tank will be considered a loss of habitat requiring mitigation.⁶
- Utility trenching will be scheduled during the dry season. If utility trenching is required during the wet season (October 15-March 15), the Conservation Program Manager will be consulted and may assign measures that reduce or avoid the likelihood that the trenching areas will be a barrier and/or pitfall trap during species movement. Utility trenching in the streambed of creeks will be limited to the dry season and comply with the *General Creek Protection Measures*.
- A California tiger salamander education program will be developed by the Conservation Program Manager and presented annually to maintenance workers before any trenching or other underground maintenance work is done in Zones 1 or 2 of the California Tiger Salamander Basin. The education program will include protocols for identification, avoidance, immediate protection, and notification of the Conservation Program Manager.

⁶ Open water reservoirs are addressed by the *Felt and Lagunita Reservoirs Measures*.

New Utility Measures

- The Conservation Program Manager will be consulted before new utilities are installed.
- New utilities will be sited in existing utility corridors or existing road alignments. New utilities may be sited in new utility corridors only if it is not feasible to place new utilities in an existing corridor or roadway because, for example, an existing corridor or roadway is not available, or due to changes in land uses, technology, or safety concerns. New utility corridors also may be constructed irrespective of the feasibility of using an existing corridor or roadway if the Conservation Program Manager determines the new corridor will have fewer impacts on the Covered Species than the use of an existing corridor or roadway.
- An on-site biological monitor will be present during all ground-disturbing activity in Zones 1 and 2. The biological monitor will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- Any areas that are disturbed by the installation of new utilities will be restored in accordance with recommendations made by the Conservation Program Manager.
- Open pits, trenches, and excavated areas will be backfilled as soon as possible, and will be secured at the end of every work day in a manner that prevents Covered Species from entering them.
- The construction site will be secured with a solid barrier (e.g., silt fence, plywood, etc.) a minimum of 3 feet tall at the perimeter of the site, buried at least 4 inches into the ground. If the solid barrier coincides with a cyclone fence, the solid barrier will be attached to the outside of the cyclone fence. The barrier will be inspected by an appropriately trained person once a week, and repairs/replacement will be made as necessary.
- If a Covered Species is found during construction in Zones 3 and 4, the Conservation Program Manager or another biologist qualified by the Service will relocate the Covered Species to more suitable habitat in Zone 1 or 2.
- If new utility corridors are permanently cleared of vegetation (e.g., if vegetation is cleared and not replanted or allowed to naturally re-grow), it will be considered a permanent loss of habitat and mitigated in accordance with Section 4.4. Mitigation for the loss of habitat may be required for more than just the footprint of the cleared vegetation.

- Installation of new utilities within the streambed of creeks will be limited to the dry season and comply with the *General Creek Protection Measures*.
- Any area that is disturbed by new utility-related construction activities for longer than 1 year will be mitigated as a permanent loss of habitat in accordance with Section 4.4 of the HCP.

4.2.5 General Infrastructure

To accommodate the people and facilities at Stanford, the University campus has been developed with a significant amount of urban infrastructure. To avoid and minimize the impacts from current and future infrastructure, Stanford will implement the following measures. In addition, General Infrastructure activities will be subject to the *General Creek Protection Measures*.

General Infrastructure Measures

- Any new or existing general infrastructure activity within Zones 1 or 2 that is not covered by a specific measure will be reviewed by the Conservation Program Manager. The Conservation Program Manager will recommend specific measures that are consistent with the HCP to reduce or eliminate the potential adverse effects on the Covered Species. These measures may include, but are not limited to, seasonal limitations on maintenance activities, revegetation, and input on the location of new facilities.
- An education program will be developed by the Conservation Program Manager and presented annually to maintenance workers who regularly work in Zones 1 or 2 and contractor personnel before they begin work in Zones 1 or 2. The education program will address tiger salamanders, red-legged frogs, garter snakes, and western pond turtles and will include protocols for identification, avoidance, immediate protection, and notification of the Conservation Program Manager. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- All activities associated with the operation, maintenance, and installation of infrastructure improvements will be conducted in an environmentally responsible manner in accordance with practices outlined in current industry published manuals, such as FishNet4C (2007), Flosi et al. (1998), Lovett and Price (2007), and Pacific Watershed Associates (1994).

Paved Private Road Measures

- New paved roads within Zones 1, 2, and 3 will be considered a loss of habitat requiring mitigation, and will be sited only after input from the Conservation Program Manager. In general, no new paved road will be built in Zone 1 unless the increase in paved surfaces would benefit the Covered Species or if a new road is required for safety reasons.
- Road realignments in Zones 1 and 2 that benefit the Covered Species (e.g., moving an existing road further from a riparian zone and restoring the existing road) are considered an enhancement as described in Section 4.3. Realignments required to address safety concerns or for other reasons will require mitigation unless the Conservation Program Manager determines the new road alignment, with restoration of the old road, would serve as habitat enhancement.
- Maintenance activities on existing paved private roads will remain within the existing road footprint and will be performed consistent with industry standards for the conservation of resources.
- Vehicular access on paved private roads will be restricted to authorized personnel.
- These roads will be monitored periodically by Stanford for structural integrity, erosion, and to assess whether they are a potential barrier to wildlife dispersal.
- Proposed streetlights, drains, or curbs will be reviewed by the Conservation Program Manager, and if they would adversely affect the Covered Species, they may be approved only if they are required for safety reasons.
- Paved private roads will be “storm-proofed” to minimize runoff of sediments and contaminants from roads to riparian areas and creeks using principals, procedures, and prescriptions described in FishNet4C (2007) or then current guidance.
- Maintenance of paved private roads and shoulders will be conducted using principals, procedures, and prescriptions described in FishNet4C (2007) or then current guidance.

Unpaved Service Road Measures

- New unpaved roads within Zones 1, 2, and 3 will be considered a loss of habitat requiring mitigation, and will be sited only after input from the Conservation Program Manager. In general, no new unpaved road will be built in Zone 1, unless the increase in unpaved surface would benefit the Covered Species or if the new unpaved road is required for safety reasons.

- Re-surfacing with gravel or compacted dirt will be the preferred repair treatment. Any other materials must be approved by the Conservation Program Manager prior to use.
- Access on unpaved service roads will be restricted to authorized personnel.
- No streetlights or curbs will be constructed on unpaved service roads.
- Service roads will be monitored by Stanford at the end of the rainy season for structural integrity, erosion, and to assess whether they are a potential barrier to wildlife dispersal.
- Changes to road alignments and any new roads will be reviewed by the Conservation Program Manager and designed to meet appropriate conservation standards (e.g., Flossi et al. 1998, National Marine Fisheries Service 2000, Pacific Watershed Associates 1994).
- Unpaved private roads will be “storm-proofed” to minimize runoff of sediments and contaminants from roads to riparian areas and creeks using principals, procedures, and prescriptions described in FishNet4C (2004 and updated 2007) or then current guidance.
- Maintenance of unpaved private roads and shoulders will be conducted using principals, procedures, and prescriptions described in FishNet4C (2004 and updated 2007) or then current guidance.

Private Bridge Measures

- If a bridge becomes structurally unsound and must be replaced, the replacement bridge will be at maximum the same width, unless public safety, environmental, or other legal issues require an increase in size; and in the same location. Stanford will consider replacing an unsound bridge at a more environmentally appropriate location, if there is such a location and it is feasible. Future bridge designs will be consistent with NOAA Fisheries’ Guidelines for Salmonid Passage at Stream Crossings (National Marine Fisheries Service 2000).
- For bridge repairs and new bridges over creeks, construction will be limited to the dry season and comply with the General Creek Protection Measures.
- If an existing bridge is removed, the area will be restored under the supervision of the Conservation Program Manager.
- Vehicular and foot traffic on private bridges will be restricted to authorized uses.
- If a new bridge is needed, Stanford will consult with the Conservation Program Manager to de-

sign the new bridge in a manner that minimizes the effects of the bridge on riparian resources. Additional bridges are strongly discouraged; however, replacing culverts or low-water crossings with bridges is encouraged. Future bridge designs will be consistent with NOAA Fisheries’ Guidelines for Salmonid Passage at Stream Crossings (National Marine Fisheries Service 2000).

Fence Measures

- Any new fences will be designed in consultation with the Conservation Program Manager to minimize potential barriers to general wildlife dispersal. However, fences will allow dispersal by Covered Species except where such dispersal would be detrimental to the species.
- Derelict fences will be removed.

Detention Basin Measures

- After any major runoff producing event, the Conservation Program Manager will survey the storm water detention basins to verify that they are draining. If the ponding lasts longer than 2 days, the Conservation Program Manager will visually survey the basins for the presence of California tiger salamander, and if any California tiger salamanders are found, the Conservation Program Manager will relocate them to more suitable habitat.
- The Conservation Program Manager will be consulted before new off-channel flood control facilities (including any detention or retention basins) are installed. New in-stream facilities are not a Covered Activity.
- Any areas that are disturbed by the installation of new flood control facilities will be restored in accordance with recommendations made by the Conservation Program Manager.

Isolated Private Residence Measures

- No building additions or expansion of paved surfaces will be allowed in Zone 1.
- If a private residence located in Zone 1 within 150 feet of the creek is substantially damaged in a fire, earthquake, flood, or other calamity, it may be rebuilt in Zone 1, but farther from the creek; however, rebuilding in Zones 2, 3, or 4 is preferable. The original residential location will be restored to riparian habitat. If a private residence is rebuilt under this provision, the mitigation provisions set forth in Section 4.4 will not apply.

Academic Buildings Measure

- If a Covered Species is found during maintenance of academic buildings, the Conservation Program Manager will relocate the Covered Species to more suitable habitat in Zone 1 or 2.

4.2.6 Recreation and Athletics

The University has many recreational and athletic facilities that are used by students, faculty, and the public. The most well-known recreational facility is the Stanford golf course. However, in addition to the golf course and driving range, Stanford has miles of trails and pathways that are used for horseback riding, hiking, biking, jogging, and similar recreational activities. Measures to reduce or eliminate the potential effects of these facilities on the Covered Species are set forth below.

Stanford Golf Course. The Stanford golf course has been in place for nearly 80 years, and requires extensive ongoing management. To avoid and minimize the impacts from current and future golf course activities, Stanford will implement the following measures.

Golf Course Measures

- Potential effects on steelhead, red-legged frogs, and western pond turtles will be minimized by developing a vegetation trimming plan that minimizes the amount of vegetation that is removed from riparian areas.⁷ The trimming plan will be developed by the golf course staff and reviewed by the Conservation Program Manager.
- To further reduce human impacts on the creeks, riparian areas will be “out of play” and players will not be allowed to enter the creek channel (below the top of the bank) to retrieve lost balls or continue play.
- Any changes in golf course management or maintenance techniques that would have an effect on Covered Species will be reviewed by the Conservation Program Manager prior to implementation.
- Golf course modifications will be reviewed by the Conservation Program Manager. Modifications made to existing portions of the golf course are not an expansion of the golf course, provided such modification does not exceed the existing footprint.
- The ball collector on the golf course driving range will not be used on rainy nights during the California tiger salamander migration period (November to April).

- New plantings of non-native ornamental species (other than maintenance of the existing turf and landscaped areas) will not be permitted within 75 feet of the top of any creek bank, unless approved by the Conservation Program Manager.
- The addition of native plants along the riparian zone will be strongly encouraged.
- Impacts from biocides and fertilizers have been substantially reduced over the past 5 years, and Stanford will continue to minimize potential impacts from these substances by using spot treatment for pests where required and using slow-release fertilizers.
- New plantings at the golf course will not include species listed on the California Invasive Plant Council list then in effect.
- Feral cat feeding stations will not be allowed.
- A California tiger salamander education program will be developed by the Conservation Program Manager and presented annually to maintenance workers and staff at the golf course and driving range. The education program will include protocols for identification, avoidance, immediate protection, and notification of the Conservation Program Manager. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.

Recreational Activities. To avoid and minimize the impacts from recreational activities, Stanford will implement the following measures.

Recreational Activities Measures

- Recreational activities that the Conservation Program Manager determines are detrimental to the Covered Species will be restricted or eliminated.
- Recreational areas in Zones 1 and 2 may be used during the daytime only.
- Recreational activities will be limited to developed routes. Enforcement of this limitation will be provided through additions of appropriate signs and fencing, and continued or expanded patrol by Stanford's public safety personnel.
- Unauthorized trails will be reclaimed.
- No dogs will be allowed on recreational trails or routes in Zones 1 and 2 south of Junipero Serra Boulevard, except as allowed by public easement or local law or regulation.

⁷ The vegetation provides shade, which is important to many salmonids, including steelhead.

- No vehicles, except service vehicles (University, lessees, and utility companies) and emergency vehicles, will be allowed.
- No access to the creek channels will be allowed except for access by authorized Stanford or emergency personnel.
- New recreational routes⁸, including any trails, pathways, or roads, must be reviewed by the Conservation Program Manager. New recreational routes will avoid Zones 1 and 2 to the greatest extent feasible. If any are proposed, they may not be sited through, or within 150 feet of, any creek bank, except to cross bridges.
- No lights or vegetation trimming associated with recreational routes will be allowed in Zone 1 (except trimming activities associated with the golf course done in accordance with the *Golf Course Measures* or trimming associated with trails).
- No recreational hunting or fishing will be allowed.
- California tiger salamander and garter snake education programs will be developed by the Conservation Program Manager and presented annually to maintenance workers and staff at the Equestrian Center. The education program will include protocols for identification, avoidance, immediate protection, and notification of the Conservation Program Manager. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- The realignment of any recreational route will be reviewed by the Conservation Program Manager, and if the realignment would adversely affect the Covered Species, the realignment may be approved only if it is required for public safety purposes or otherwise legally required. Such realignments will require mitigation unless the Conservation Program Manager determines the new recreational route alignment, with restoration of the old route, would serve as habitat enhancement.

4.2.7 Grounds and Vegetation

Fire Control and Public Safety. To avoid and minimize the impacts from fire control and public safety activities, Stanford will implement the following measures. These measures do not apply to an unplanned fire or other public safety emergency, in which case, emergency personnel may use any methods that are deemed necessary to control and extinguish the fire, and protect human life and property.

⁸ New recreational routes do not include any routes that have been approved by Santa Clara or San Mateo County, including the portions of the C-1 and S-1 trails on Stanford land, before the approval of the HCP.

Fire Control and Public Safety Measures

- Firebreaks in Zone 1 will be limited to 10- to 15-foot-wide mown, not disced, strips, unless required by a regulatory authority for safety purposes. If a regulatory authority demands a wider firebreak in Zone 1, Stanford and the Service will confer to determine if mitigation for permanent loss of habitat is required.
- Mowing/discing in Zone 1 will be conducted either in the morning when it is still cool or during the hottest part of the day.
- Discing, if used, will be done with a shallow blade that is approximately 4-6 inches deep.
- Mowing or weed whacking will be done to a height of no less than 4 inches.
- New firebreaks must be reviewed by the Conservation Program Manager.
- Restoration efforts following a fire or other public safety emergency will be done under the supervision of the Conservation Program Manager.

Grounds Maintenance. Grounds maintenance activities that are not already covered by a more specific measure (such as those under the *General Infrastructure Measures* in Section 4.2.5), will be subject to the following measures.

Grounds Maintenance Measures

- The Conservation Program Manager will be notified before maintenance of existing landscaping located within Zone 1 is conducted.
- No new landscaping within Zones 1 and 2 will be allowed unless it benefits the Covered Species (e.g., to control invasive plant species) or is required for safety reasons.
- The Conservation Program Manager will be notified if any temporary stockpiling or staging area is required in Zone 1 and it will not be allowed unless associated with existing structures in that zone.
- If feasible, stockpiled materials will be covered in a manner that prevents Covered Species from entering them. The Conservation Program Manager or other qualified biologist will visually survey all stockpiled materials before moving them.
- Stockpiling materials for longer than 1 year constitutes a permanent loss of habitat.
- All ground animal control programs will be discontinued in Zone 1 areas of the California Tiger Salamander Basin, except for formal landscaped



or turf areas, or where animal control is necessary for public safety (e.g., squirrel control in the Lagunita berm that is necessary to maintain the dam).

- Vegetation management activities in Zone 1 areas of the California Tiger Salamander Basin will be restricted to mowing or weed whacking to a height of no less than 4 inches. The mowing or weed whacking will take place when the soil is the firmest, and never earlier than 5 days after a rain event. Mowing will be done by the lightest vehicle capable of mowing the area. Discing will be permanently discontinued in Zone 1 areas of the California Tiger Salamander Basin except where it is necessary for increased fire protection or in areas where it is not feasible to mow.

4.2.8 Agricultural and Equestrian Leaseholds

Stanford developed Best Management Practices (BMPs) for its equestrian and agricultural lessees to use for managing animal waste, compost, and sediment in creeks (Appendix B). In addition, Stanford includes requirements in its leases to prevent overgrazing. To further avoid and minimize the impacts from equestrian and agricultural activities to Covered Species, Stanford will implement the following measures.

Agricultural and Equestrian Lessee Measures

- New and renewed leases will include provisions that require lessees that engage in an activity that affects a Covered Species, as determined by the Conservation Program Manager, to update their Best Management Practices (BMPs) every 2 years. The BMPs will be reviewed and approved by the Conservation Program Manager.
- Lessees will be monitored semi-annually by Stanford for compliance with their BMPs. Lessees will be required to address identified problems within a reasonable period of time.

- Structures, crop fields, stables, equestrian creek crossings, and paddocks will be moved out of Zone 1 wherever moving such facilities is feasible.
- No new structures will be allowed in Zone 1.
- The *Recreational Activities Measures* that are applicable to equestrian uses (e.g., use of developed recreational routes) will apply to all equestrian lessees.

4.2.9 Commercial and Institutional Leaseholds

To avoid and minimize the impacts from current and future independent research institutional lessees activities, Stanford will implement the following measures. In addition, SLAC maintenance and the Independent Research Institutional Lessee activities will be subject to the Existing Utility Measures, New Utility Measures, *General Infrastructure Measures*, and *Grounds Maintenance Measures*.

SLAC and Independent Research Institutional Lessee Measures

- No new landscaping within Zones 1 and 2 will be allowed unless it benefits the Covered Species (e.g., to control invasive plant species), is required for safety reasons, or is mitigated as loss of habitat.
- Feral cat feeding stations will not be allowed.
- All ground animal control programs will be discontinued, unless they are required for safety reasons (e.g., within 10 feet of buildings).
- California tiger salamander and garter snake education programs will be developed by the Conservation Program Manager and presented annually to maintenance workers and staff. The education program will include protocols for identification, avoidance, immediate protection, and notification of the Conservation Program Manager. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.

Commercial Leases Measure

- If a Covered Species is found during maintenance of commercial leases in Zones 3 or 4, the Conservation Program Manager will be notified. The Conservation Program Manager will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.

4.2.10 Future Development

To avoid and minimize the impacts from future development, Stanford will implement the following measures. These measures apply to the development covered by the GUP, and to any other future development beyond the GUP (Table 4-1).

General Future Development Measures

- Future development will occur predominately in Zones 3 and 4.
- If development occurs in Zones 1 or 2, the appropriate surveys for Covered Species will be conducted prior to final site approval.
- For any development in Zones 1, 2, and 3, and areas of Zone 4 that are within 100 yards of Zone 1, pre-construction surveys for the Covered Species will be conducted in accordance with then-current Service protocols, and any located individuals will be salvaged and relocated to appropriate habitat.
- An on-site biological monitor will be present during all ground-disturbing activity in Zones 1 and 2. The biological monitor will have the authority to stop work if a Covered Species is encountered and may relocate the individual to a safer location within Zones 1 or 2.
- Any development in Zone 1 of the California Tiger Salamander Basin will be reviewed by the Conservation Program Manager to ensure that: New curbs will encourage migration where desirable, or discourage migration into hazardous areas; adverse lighting conditions are minimized; there are adequate garbage facilities; there will be a minimization of ground squirrel control (through, for example, the use of landscaping that does not require pesticides or fertilizers) except as required for public safety; and utility boxes will have as few openings to the surface as possible.
- Construction vehicles in Zones 1 and 2 will be limited to 10 mph, and any fuels stored during construction will be double-contained.

- Any excess asphalt used during construction will be removed upon the completion of construction.
- If a Covered Species is found during construction in Zones 3 and 4, the Conservation Program Manager or another biologist qualified by the Service will relocate the Covered Species to more suitable habitat in Zone 1 or 2.
- For any development in Zones 1, 2, and 3, and areas of Zone 4 that are within 100 yards of Zone 1, open pits, trenches, and excavated areas will be backfilled as soon as possible, and will be secured at the end of every work day in a manner that prevents Covered Species from entering them.
- For any development in Zones 1, 2, and 3, and areas of Zone 4 that are within 100 yards of Zone 1, the construction site will be secured with a solid barrier (e.g., silt fence, plywood, etc.) a minimum of 3 feet tall at the perimeter of the site, buried at least 4 inches into the ground. If the solid barrier coincides with a cyclone fence, the solid barrier will be attached to the outside of the cyclone fence. The barrier will be inspected by an appropriately trained person once a week, and repairs / replacement will be made as necessary



Table 4-1 Anticipated Loss of Habitat from Future Development

	Zone 1 (acres)	Zone 2 (acres)	Zone 3 (acres)	Total (acres)
Development under GUP	15	15	0	30
Development beyond GUP	5-15	10-30	35-105	50-150
Total Development	20-30	25-45	35-105	80-180
Total acres in Habitat Zone	1,295	1,260	2,446	5,001
Percent Developed	2%	2-4%	1-4%	2-4%

4.3 ESTABLISHMENT OF MITIGATION ACCOUNTS

Stanford will implement a “mitigation account system” that will (1) establish mitigation lands (and associated mitigation credits) at the outset of HCP implementation; and (2) continuously track the utilization of such mitigation credits over time.

To address impacts to Covered Species in riparian zones, Stanford will create two “Riparian Accounts”: the San Francisquito/Los Trancos Riparian Account; and the Matadero/Deer Riparian Account. Each of these Riparian Accounts will be funded at the outset of HCP implementation by recording permanent conservation easements over large areas of red-legged frog, western pond turtle, garter snake, and steelhead habitat. These lands will be managed in accordance with habitat Monitoring and Management Plans that are described in more detail in Sections 4.3.1.2 and 4.3.2.2. Each acre of preserved habitat will constitute 1 credit for mitigation accounting purposes.

To address impacts to California tiger salamanders and garter snakes, Stanford will create a CTS Account. At the outset of HCP implementation, Stanford will establish a large CTS Reserve, and will manage that Reserve in accordance with a habitat Monitoring and Management Plan, as described in Section 4.3.3.2. Stanford will not earn any mitigation credits for these Reserve lands at the outset of the HCP, but will earn credits later when it permanently preserves Reserve lands through recordation of conservation easements. In addition, Stanford will manage an area of the central campus for the benefit of the California tiger salamander and garter snake, as described in Section 4.3.3.4.

During the life of the HCP, Stanford can earn additional credits that will be held in the Riparian Accounts by permanently preserving additional habitat and by enhancing and/or creating additional habitat. Likewise, Stanford will earn credits by permanently conserving habitat in the CTS Reserve, and these credits will be held in the CTS Account. Specifically, Stanford will earn 1 credit for each additional acre of riparian habitat or upland California tiger salamander/garter snake habitat that it permanently preserves, and 25 credits for each acre of permanently preserved tiger salamander breeding habitat. “Breeding habitat,” for purposes of earning mitigation credits, is defined as a pond that supports successful California tiger salamander reproduction 3 years within a 6-year period (excluding years of below average rainfall)⁹ and includes metamorph dispersal habitat within 50 feet of the pond.

Stanford may increase the amount of credits in the Accounts by enhancing habitat and using the credits at a later date. In this

⁹ With the approval of the Service, Stanford may exclude years with average or above average rainfall from this calculation if rainfall patterns resulted in a situation where successful reproduction would not be expected to occur.

manner, Stanford can take advantage of habitat enhancement opportunities when they arise, and be assured that its efforts to promote the Covered Species may be used to offset later potential habitat losses. The Enhancement Options described in Table 4-2 allow Stanford to earn credits for performing habitat enhancements that are likely to benefit the Covered Species.

Table 4-2 is not an exhaustive list of possible enhancements. If other enhancements are identified during the life of the HCP, Stanford will earn credits for those enhancements that are consistent with the allocation of credits presented in Table 4-2. The number of credits that Stanford will earn for enhancing existing and potential habitat varies depending upon the benefit to the Covered Species, cost, and difficulty in implementing the enhancement.

Prior to performing any restoration or enhancements, Stanford will prepare a plan that describes the proposed enhancement and/or restoration, minimum and long-term success criteria, monitoring plan, and number of credits to be awarded. The plan will describe when and under what circumstances credits will be awarded; and, in general, credits or partial credits will be awarded when the minimum success criteria are achieved. This plan will be approved by the Service and/or NOAA Fisheries, depending on the Covered Species benefitted by the restoration or enhancements.

The credits earned through additional permanent preservation and habitat enhancements will be credited towards the Riparian Accounts depending upon the location of the habitat that is preserved or enhanced. Enhancements and preservation within the San Francisquito/Los Trancos Creek Basin will be credited to the San Francisquito/Los Trancos Riparian Account and enhancements and preservation within the Matadero/Deer Creek Basin will be credited to the Matadero/Deer Riparian Account. The boundaries of the Basins are shown on Figures 4-3 and 4-4.

Permanent land preservation within the CTS Reserve will be credited towards the CTS Account. Stanford may enhance tiger salamander habitat at any time, and has already constructed eight new potential breeding ponds. During the period 2005-2010, Stanford experienced average or above average seasonal rainfall during 5 of those 6 years. In that time California tiger salamanders bred successfully four times in Pond #1, twice in Pond #5, and once in Pond #2 (Figure 2-4). Pond #1 therefore meets the definition of “breeding habitat.” However, no credits will be awarded for these enhancements until a permanent conservation easement is recorded over the habitat. The boundary of the CTS Reserve is shown on Figure 4-5.

As described in Section 4.4, Stanford will withdraw credits from the Accounts whenever it permanently converts any land within Zones 1, 2, or 3. Permanent conversion will generally result from future development, but also may occur from other activities, such as landscaping or the construction of

Table 4-2 Preservation or Enhancement Activities

Preservation or Enhancement	Credits Earned	Account Credited
Record conservation easement over additional habitat within the Matadero/Deer Creek Basin	1 credit for each acre of habitat.	Matadero/Deer Riparian Account
Record conservation easement over additional habitat within the San Francisquito/Los Trancos Creek Basin	1 credit for each acre of habitat.	San Francisquito/Los Trancos Riparian Account
Record conservation easement over habitat within the CTS Reserve	1 credit for each acre of upland habitat. 25 credits for each acre of breeding habitat	CTS Account
Improve steelhead habitat by increasing the minimum bypass flow rates in Los Trancos Creek (above SHEP standards) by permanent changes to diversion operations	5-50 credits per cfs increase depending on the benefits (e.g., higher credit amount for increasing bypass after the attraction flow)	San Francisquito/Los Trancos Riparian Account
Improve steelhead habitat by increasing the minimum bypass flow rates in San Francisquito Creek (above SHEP standards) by permanent changes to diversion operations	5-50 credits per cfs increase depending on the benefits (e.g., higher credit amount for increasing bypass after the attraction flow)	San Francisquito/Los Trancos Riparian Account
Expand riparian areas around the creeks by removing existing structures and planting riparian vegetation	3 credits for each restored acre	San Francisquito/Los Trancos Riparian Account if enhancement is to Los Trancos, San Francisquito, Corte Madera, Sausal or Bear creeks Matadero/Deer Riparian Account if enhancement is to Matadero or Deer creeks
Remove partial in-stream barriers that have a net adverse affect on steelhead, such as preventing dispersal, outside of Stanford lands	5 credits for removals downstream of Stanford and 1 credit for upstream removals	San Francisquito/Los Trancos Riparian Account if enhancement is to Los Trancos, San Francisquito, Corte Madera, Sausal or Bear creeks Matadero/Deer Riparian Account if enhancement is to Matadero or Deer creeks
Repair and stabilize the creek banks using bio-engineered stabilization ⁹ methods to pro-actively remediate erosion and bank stabilization problems that are not associated with a new project or is not conducted to protect existing Stanford infrastructure	1 credit per 200 feet of fixed bank	San Francisquito/Los Trancos Riparian Account if enhancement is to Los Trancos, San Francisquito, Corte Madera, Sausal or Bear creeks Matadero/Deer Riparian Account if enhancement is to Matadero or Deer creeks
Restore the natural geomorphology of stream channels through replacement of existing hardscape with bio-engineered stabilization methods	1 credit per 200 feet of fixed bank	San Francisquito/Los Trancos Riparian Account if enhancement is to Los Trancos, San Francisquito, Corte Madera, Sausal or Bear creeks Matadero/Deer Riparian Account if enhancement is to Matadero or Deer creeks
Construct additional water quality monitoring stations along creek(s) and operate for 5 years ¹⁰	1 credit for each additional station	San Francisquito/Los Trancos Riparian Account if enhancement is to Los Trancos, San Francisquito, Corte Madera, Sausal or Bear creek Matadero/Deer Riparian Account if enhancement is to Matadero or Deer creeks
Create new off-channel California red-legged frog breeding ponds	25 credits for each pond (15 credits will accrue when the agreed short-term success criteria are met and an additional 10 credits will accrue when long-term success criteria are met)	San Francisquito/Los Trancos Riparian Account if enhancement if pond is created within the San Francisquito/Los Trancos Creek Easement Matadero/Deer Riparian Account if pond is created within the Matadero/Deer Creek Easement

⁸ Bioengineering techniques emphasize the use of natural and local building materials, e.g. stone, gravel, sand, soil, wood, branched logs, and native plants. Typical bioengineering practices include: brushlayering, brush mattresses, brush walls/bundles, hand seeding or hydro-seeding, incorporation of large woody debris, and live staking. Rip-rap, rock, and other hardscape materials will only be used where required (e.g., areas of high scour).

⁹ This enhancement includes the construction and operation of water quality monitoring stations in reaches of the creeks that are outside of Stanford's lands.

new roads. The Account from which Stanford will withdraw the credits depends upon the location of the converted land, and the amount of the withdrawal depends upon the Zone in which the converted land is located. For example, Stanford would withdraw credits from the CTS Account if a new project adversely affects any Zone 1, 2, or 3 habitat in the California Tiger Salamander Basin, which is shown on Figure 4-5. Alternatively, new development in Zone 1, 2 or 3 within the Matadero/Deer Creek Basin (Figure 4-4) would require Stanford to withdraw credits from the Matadero/Deer Riparian Account, and any development in Zone 1, 2 or 3 within the San Francisquito/Los Trancos Creek Basin (Figure 4-3) would require Stanford to withdraw credits from the San Francisquito/Los Trancos Riparian Account.

4.3.1 San Francisquito/Los Trancos Riparian Account

4.3.1.1 San Francisquito/Los Trancos Easement

Within 1 year of approval of this HCP and issuance of the Section 10(a) authorizations, Stanford will fund the San Francisquito/Los Trancos Riparian Account by recording a permanent conservation easement over approximately 270 acres of the most biologically sensitive portions of San Francisquito, Bear, and Los Trancos creeks and adjacent riparian lands.¹⁰ The easement area is shown on Figure 4-3. The 270-acre Los Trancos/San Francisquito Easement will cover portions of Zone 1, and include the creek banks and the creek channels. It also includes riparian woodlands and some annual grassland and oak woodlands and some degraded areas that are adjacent to existing urban land uses. The width of the easement varies from 70 to 400 feet depending upon whether Stanford owns both sides of the creek and the presence of existing improvements. These 270 acres will be actively managed in perpetuity for the benefit of the California red-legged frog, western pond turtle, garter snake, and steelhead in accordance with the San Francisquito/Los Trancos Monitoring and Management Plan discussed below. Preserving and actively managing these areas will foster important habitat linkages, and improve the existing habitat, particularly in areas that have become degraded.

The approximate boundary of the entire 270-acre San Francisquito/Los Trancos easement area is shown on Figure 4-3. Due to existing lease agreements, Stanford does not have exclusive control over approximately 10-15 acres that are shown within the 270-acre San Francisquito/Los Trancos easement area. The areas that are subject to existing lease agreements may

not be subject to the initial easement that Stanford will record within the first year of the HCP's approval, but will be phased into the easement area as the existing agreements expire.

4.3.1.2 San Francisquito/Los Trancos Easement Monitoring and Management Plan

Stanford will implement the following management and monitoring measures.

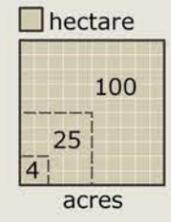
- Surveys for steelhead, red-legged frogs, garter snakes, and western pond turtles, and of their habitat, will be conducted in accordance with the monitoring program set forth in Section 4.6 for the term of this HCP.
- If the monitoring program results show the presence of non-native animal species that could adversely affect Covered Species within the Easement area, the non-natives will be removed, to the extent that Stanford can feasibly remove or control them. Before trapping is used to remove the non-natives in areas where any Covered Species may occur, Stanford will submit a plan to the Service and NOAA Fisheries for approval.
- If the monitoring program results show that non-native plant species could adversely affect Covered Species or their habitat within the Easement area, the non-natives will be removed, to the extent that Stanford can feasibly remove or control them.
- If the surveys determine that wildlife species have been placed within the Easement area, Stanford will post signs prohibiting the release of any wildlife species in the ponds and/or fence as necessary.
- If the steelhead habitat or gravel surveys identify sediment entering the creek from a point source, Stanford will try to identify the source of the sediment. If the sediment source is located on Stanford lands, Stanford will notify NOAA Fisheries and the Service and will remediate the situation. If the sediment source is located off Stanford lands, Stanford will notify NOAA Fisheries and the Service.
- If the steelhead surveys or other information find that the steelhead would benefit from a habitat enhancement such as the addition of woody debris and it can be done without increasing the potential for flooding, Stanford will place large woody debris into the creeks, anchored in place.
- If the creek surveys find that the turtles would benefit from the addition of natural basking platforms, Stanford will place anchored platforms, if it can be done without increasing the potential for flooding.
- If turtle habitat surveys find that the turtles would benefit from the addition of natural or artificial basking platforms, Stanford will place three anchored platforms each in Searsville Reservoir, Felt Reservoir, and Skippers Pond.

¹⁰ All conservation easements created pursuant to the HCP will comply with the California Civil Code, which permits the creation of a conservation easement through a deed restriction or other instrument that is perpetual in nature. Cal. Civ. Code §815.1. The conservation easements recorded as part of the HCP's Conservation Program will be consistent with the terms of the HCP. As such, the conservation easements will allow Stanford to engage in certain activities (such as ingress and egress through the easement areas for routine creek maintenance) that are permitted by the HCP.

Stanford University Habitat Conservation Plan

San Francisquito/ Los Trancos Creek Basin

-  San Francisquito / Los Trancos Creek Easement
-  Mitigation Basin



Sources:
Reserves: Stanford University Campus Biologist, 2006
Aerial photos: Aerotopia, 1999
Creeks: US Geological Survey, 1991

Disclaimer:
This map was produced by the SU Planning Office. While generally accurate, this map may not be completely free of error. The information is derived from a variety of sources deemed reliable, but subject to recurrent change and Stanford does not warrant the accuracy and completeness of these data.

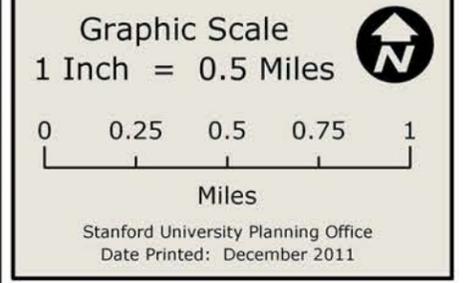
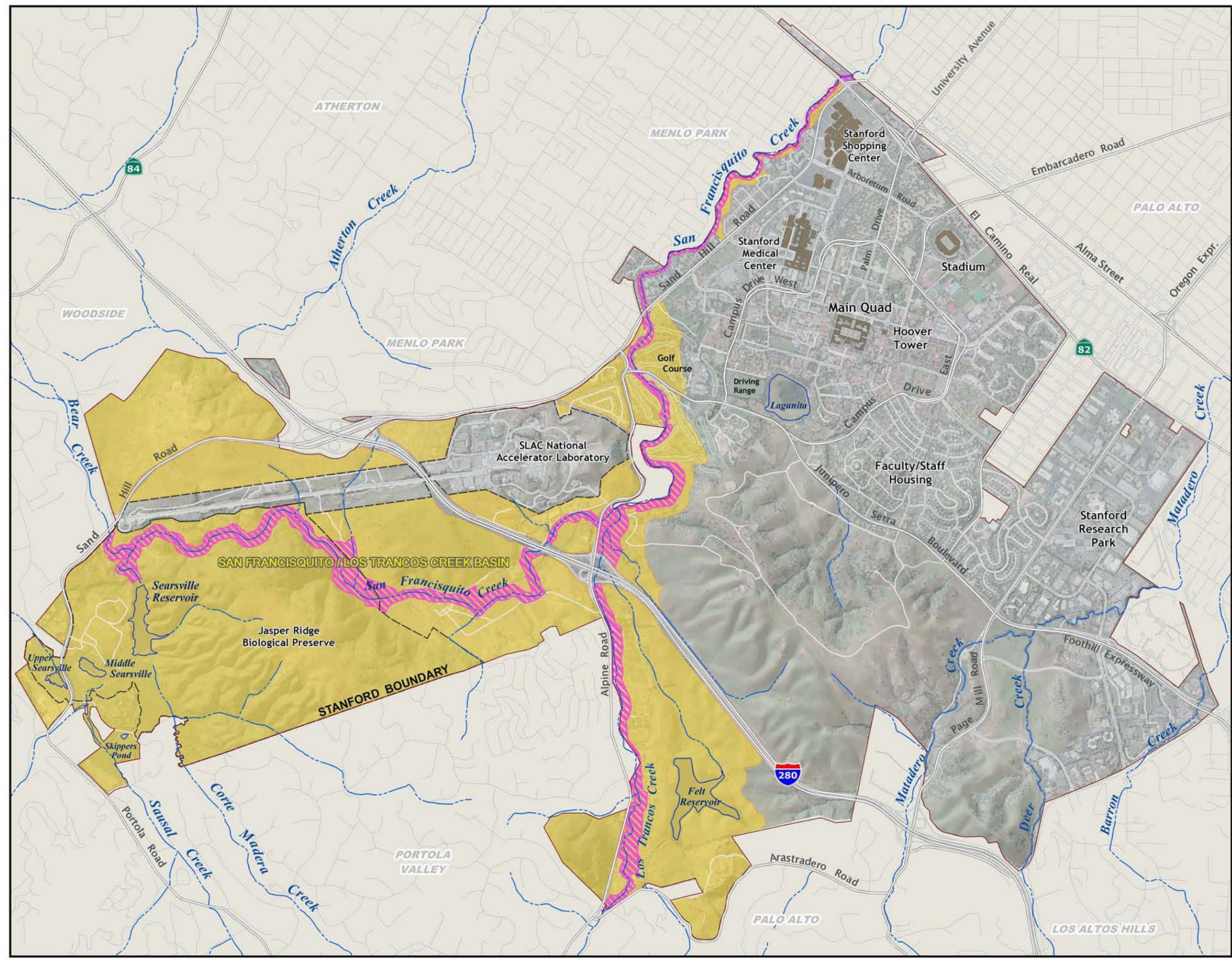


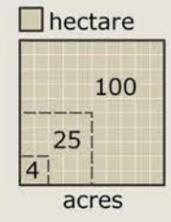
Figure 4-3



Stanford University Habitat Conservation Plan

Matadero / Deer Creek Basin

-  Matadero/Deer Creek Easement
-  Mitigation Basin



Sources:
Reserves: Stanford University Campus Biologist, 2006
Aerial photos: Aerotopia, 1999
Creeks: US Geological Survey, 1991

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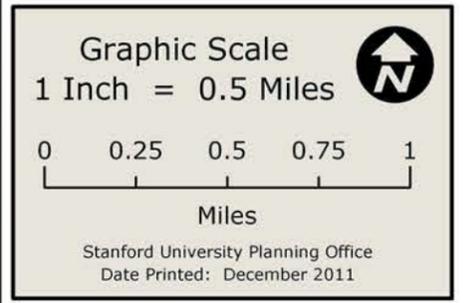
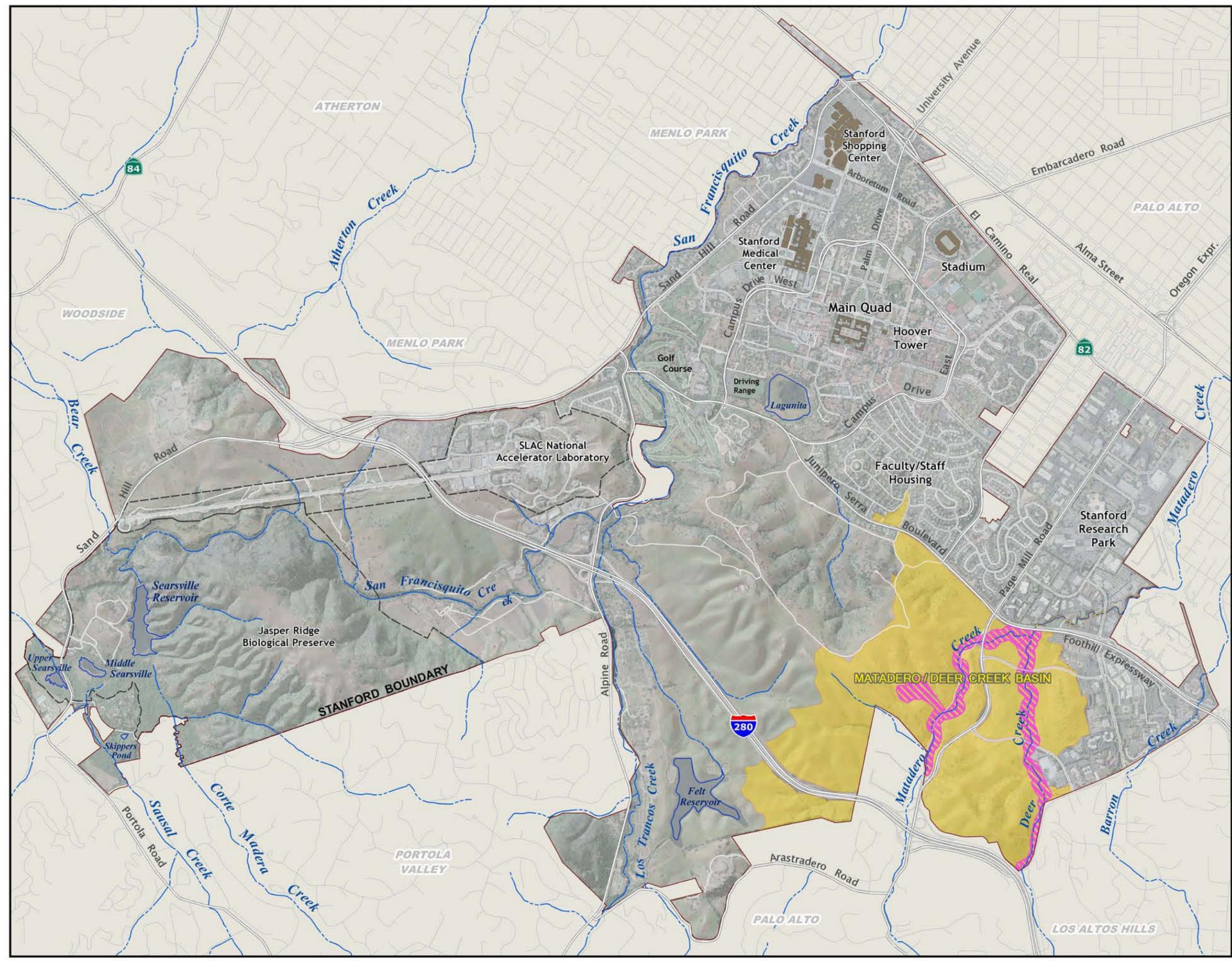


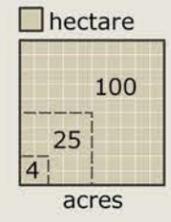
Figure 4-4



Stanford University Habitat Conservation Plan

CTS Basin

-  California Tiger Salamander (CTS) Reserve
-  Central Campus CTS Management Area
-  Mitigation Basin
-  Recently Established Pond



Sources:
Reserves: Stanford University Campus Biologist, 2006
Aerial photos: Aerotopia, 1999
Creeks: US Geological Survey, 1991

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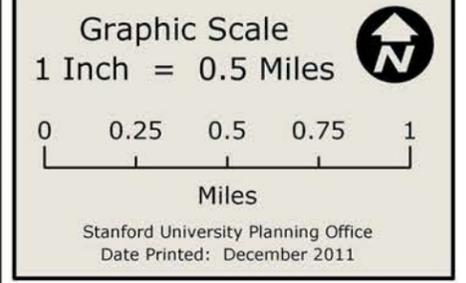
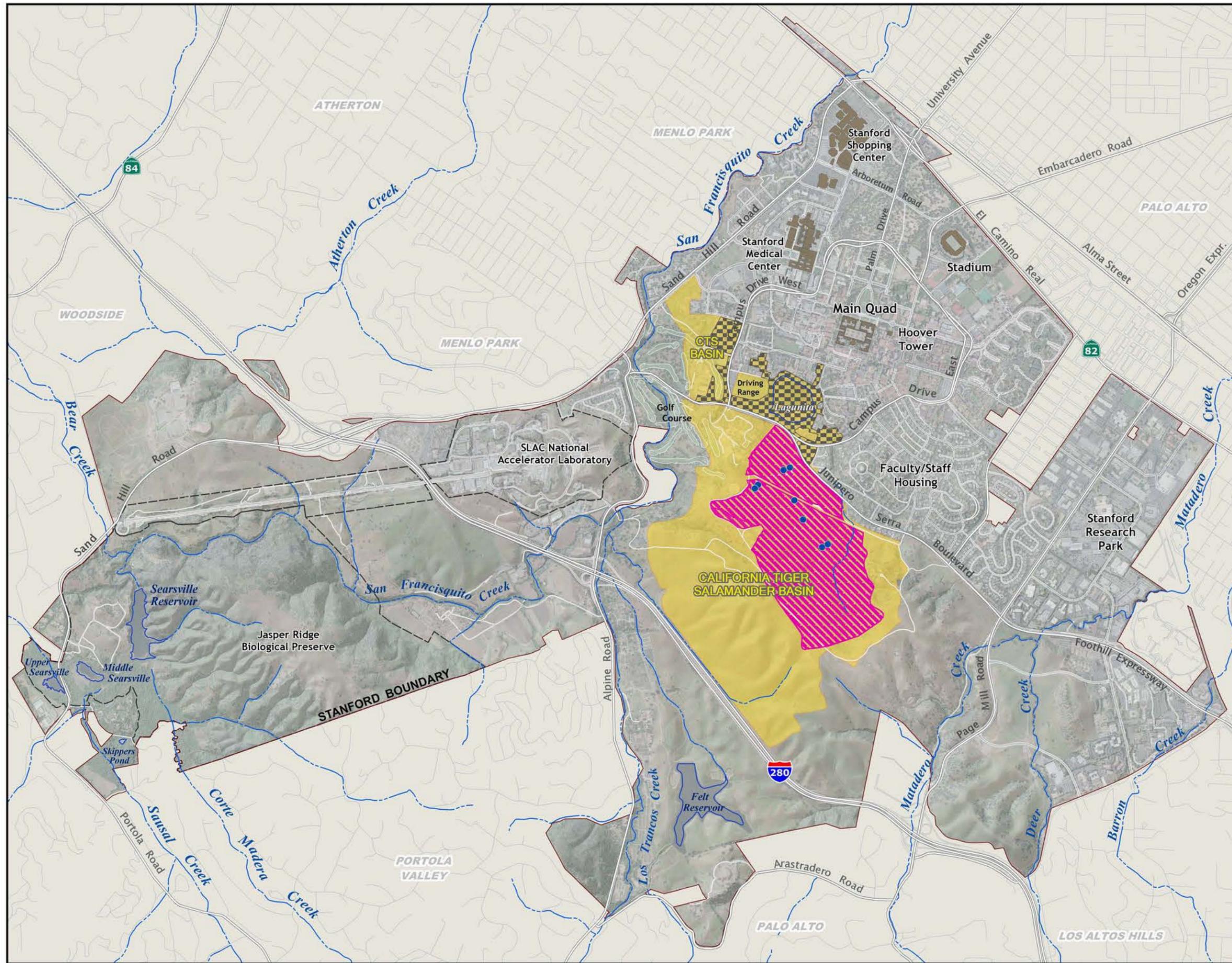
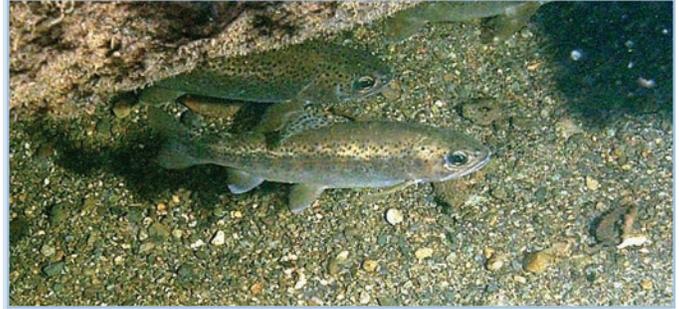


Figure 4-5



- In addition to providing annual results of the monitoring program to the Service and NOAA Fisheries, Stanford will share the monitoring results with other interested local, state and federal conservation agencies.
- Stanford will maintain the three existing water quality monitoring stations located in Los Trancos, Bear, and San Francisquito creeks for the first 5 years of the HCP and the resulting data will be reviewed for their value in conservation efforts. If the stations produce data that are useful to conservation planning, operation of the monitoring stations will continue beyond 5 years.
- If water quality monitoring data are found to be valuable in conservation efforts, Stanford will perform a study on the feasibility of expanding the network of water monitoring stations in San Francisquito Creek and Los Trancos Creek. If it is feasible, Stanford will expand the network of water monitoring stations.
- Stanford will ensure that one stream flow gaging station on San Francisquito Creek and one on Los Trancos Creek are operational year-round, and that the daily flow data are made available to NOAA Fisheries.
- Stanford will evaluate the creek corridor and identify at least two areas where two new off-channel California red-legged frog breeding ponds may be constructed. Stanford will provide the Service with a proposal to construct new seasonal ponds in these areas. The proposal will include the location, size, shape, and depth of the new ponds, short-term success criteria for the ponds (e.g., minimum ponding time and depth and vegetation cover), and long-term success criteria monitoring plan for the ponds. The long-term monitoring will be consistent with the California red-legged frog monitoring protocols outlined in Section 4.6.
- Stanford will remove undesirable items, such as trash, from the creeks.
- Stanford will initiate stabilization efforts along stream banks and adjacent upland areas that are subject to erosion (use of biological stabilization methods will be strongly encouraged), and create a pilot program for streambank protection that could be used as a community resource.
- Stanford will initiate revegetation efforts along stream banks and adjacent upland areas that are subject to erosion.
- If the annual stream surveys or other information find that structures such as rip-rap, gabions, and in-stream structures are impeding fish passage, Stanford will remove these structures, when feasible. Within 3 years of NOAA Fisheries' approval of the HCP and issuance of an incidental take permit, Stanford will assess the extent that fish passage is impeded by an existing concrete road crossing on



San Francisquito Creek immediately downstream of the confluence with Bear Creek and evaluate the feasibility of improving fish passage at this location.¹¹

- Stanford will implement the operational protocols for water diversion on Los Trancos Creek and at the San Francisquito Creek pumping station contained in the SHEP for the life of the HCP.
- Stanford will erect fences in the areas that the Conservation Program Manager determines they are needed to keep livestock and unauthorized persons out of the Easement.
- Feral cat feeding stations will not be allowed in the Easement area, or within 150 feet of the Easement.
- No new permanent structures may be erected on lands covered by the San Francisquito/Los Trancos Easement unless the structures are for the benefit of the Covered Species, are necessary for safety reasons, or are part of Stanford's existing water diversion system. This prohibition does not preclude maintenance and improvement of existing structures, including utilities, roads, and buildings. Structures used to study the geomorphological, hydrological, and biological characteristics of the creeks and surrounding uplands will be allowed if they provide information that contributes to the management of the Covered Species. New bridges are not precluded by the San Francisquito/Los Trancos Easement, but will require mitigation in accordance with Section 4.4 if the new bridge results in the permanent loss of habitat. In addition, an enhancement to increase steelhead habitat diversity and complexity (e.g., logs, root wads, and boulders) commensurate with the loss of habitat from the new bridge will be constructed. The Conservation Program Manager will be consulted before any permanent structures are erected, and such structures will be designed to minimize or avoid impacts to the Covered Species.
- Any new conservation easements within the San Francisquito/Los Trancos Creek Basin will be subject to the San Francisquito/Los Trancos Easement Monitoring and Management Plan. Stanford will consult with the Service and NOAA Fisheries before recording any new conservation easements within the San Francisquito/Los Trancos Creek Basin.

¹¹ This evaluation will not preclude Stanford from monitoring for other possible barriers to fish passage or removing/ minimizing other fish passage impediments during the first 3 years of the HCP's implementation.

- Five years before the expiration of the HCP and associated incidental take permits, Stanford will prepare a long-term monitoring and management plan that incorporates management and monitoring techniques that have been demonstrated to be the most successful. The long-term monitoring and management plan will include protocols for monitoring the abundance of Covered Species in the Easement area and the quality of preserved habitat, invasive species monitoring and management, an adaptive management provision, and any other monitoring or management techniques that Stanford deems necessary to fulfill the conservation purpose of the San Francisquito/Los Trancos Conservation Easement. This monitoring and management plan will survive the expiration of the incidental take permits and this HCP, and will be subject to review and approval by the Service and NOAA Fisheries.

4.3.1.3 San Francisquito/Los Trancos Riparian Account Credits

Stanford will earn 270 credits for recording the San Francisquito/Los Trancos Easement and implementing the San Francisquito/Los Trancos Easement Monitoring and Management Plan. These credits will be withdrawn from the San Francisquito/Los Trancos Riparian Account to mitigate for future development projects or other permanent land conversions. The number of credits that Stanford will earn for preserving additional land or performing habitat enhancements will be calculated in accordance with Table 4-2.

4.3.2 Matadero/Deer Riparian Account

4.3.2.1 Matadero/Deer Easement

Within 1 year of approval of this HCP and issuance of the Section 10(a) authorizations, Stanford will fund the Matadero/Deer Riparian Account by recording a permanent conservation easement over 90 acres of the most biologically sensitive portions of Matadero and Deer creeks and adjacent riparian lands. The easement area is shown on Figure 4-4. The 90-acre Matadero/Deer Easement will cover Zone 1 lands, and includes the riparian zone, which is all of the undeveloped land within 150 feet of the top of the creek bank, the creek channels, and a portion of small tributary of Matadero Creek that originates in an abandoned quarry. Part of the Matadero/Deer Easement is covered by annual grassland, oak woodland, and rock outcrops.

The Matadero Creek watershed, which includes Deer Creek, is relatively small, approximately 7.25 square miles. Matadero and Deer creeks are part of a single watershed, and display similar characteristics, thus forming a convenient and consistent management unit. The Matadero/Deer Easement will be managed for the benefit of the California red-legged frog and garter snake in accordance with the Matadero/Deer Easement Monitoring and Management Plan described below.

4.3.2.2 Matadero/Deer Easement Monitoring and Management Plan

Stanford will implement the following management and monitoring measures.

- Surveys for the red-legged frog and garter snake and of their habitat will be conducted in accordance with the monitoring plan set forth in Section 4.6 for the term of this HCP.
- If the monitoring program results show the presence of non-native animal species that could adversely affect Covered Species within the Easement area, the non-natives will be removed, to the extent that Stanford can feasibly remove or control them. Before trapping is used to remove the non-natives in areas where any Covered Species may occur, Stanford will submit a plan to the Service for approval.
- If the monitoring program results show that non-native plant species could adversely affect Covered Species or their habitat within the Easement area, the non-natives will be removed, to the extent that Stanford can feasibly remove or control them.
- If the surveys determine that wildlife species have been placed within the Easement area, Stanford will post signs prohibiting the release of any wildlife species in the ponds and/or fence as necessary.
- In addition to providing annual results of the monitoring program to the Service and NOAA Fisheries, Stanford will share the monitoring results with other interested local, state and federal conservation agencies.
- Stanford will evaluate the creek corridor and identify at least one area where two new off-channel California red-legged frog breeding ponds may be constructed. Stanford will provide the Service with a proposal to construct new seasonal ponds in these areas. The proposal will include the location, size, shape, and depth of the new ponds, short-term success criteria for the ponds (e.g., minimum ponding time and depth and vegetation cover), and a long-term monitoring plan for the ponds. The long-term monitoring will be consistent with the California red-legged frog monitoring protocols outlined in Section 4.6.
- Stanford will study the feasibility of installing water monitoring stations in Matadero and Deer creeks, and if it is feasible, Stanford will install water monitoring stations in the creek(s).
- Stanford will initiate revegetation efforts along stream banks and adjacent upland areas that are subject to erosion.
- Stanford will erect fences in the areas where the Conservation Program Manager determines they

are needed to keep livestock and unauthorized persons out of the Easement.

- Stanford will initiate stabilization efforts along stream banks and adjacent upland areas that are subject to erosion (use of biological stabilization methods will be strongly encouraged), and create a pilot program for streambank protection that could be used as a community resource.
- Feral cat feeding stations will not be allowed in the Easement area, or within 150 feet of the Easement.
- No new permanent structures may be erected on lands covered by the Matadero/Deer Easement unless the structures are for the benefit of the Covered Species or they are necessary for safety reasons. This prohibition does not preclude maintenance and improvement of existing structures, including utilities, roads, and buildings. Structures used to study the geomorphological, hydrological, and biological characteristics of the creeks and surrounding uplands will be allowed if they provide information that contributes to the management of the Covered Species. New bridges are not precluded from the Matadero/Deer Easement, but will require additional mitigation in accordance with Section 4.4 if the new bridge results in the permanent loss of habitat. The Conservation Program Manager will be consulted before any permanent structures are erected, and such structures will be designed to minimize or avoid impacts to the Covered Species.
- Any new conservation easements within the Matadero/Deer Creek Basin will be subject to the Matadero/Deer Easement Monitoring and Management Plan. Stanford will consult with the Service before recording any new conservation easements within the Matadero/Deer Creek Basin.
- Five years before the expiration of the HCP and associated incidental take permits, Stanford will prepare a long-term monitoring and management plan that incorporates management and monitoring techniques that have been demonstrated to be the most successful. The long-term monitoring and management plan will include protocols for monitoring the abundance of Covered Species in the Easement area and the quality of preserved habitat, invasive species monitoring and management, an adaptive management provision, and any other monitoring or management techniques that Stanford deems necessary to fulfill the conservation purpose of the Matadero/Deer Conservation Easement. This monitoring and management plan will survive the expiration of the incidental take permits and this HCP, and will be subject to review and approval by the Service.



4.3.2.3 Matadero/Deer Riparian Account Credits

Stanford will earn 90 credits for recording the 90-acre Matadero/Deer Easement and implementing the Matadero/Deer Easement Monitoring and Management Plan. These credits will be withdrawn from the Matadero/Deer Riparian Account to mitigate for future development projects or other permanent land conversions. The number of credits that Stanford will earn for preserving additional land or performing habitat enhancements will be calculated in accordance with Table 4-2.

4.3.3 CTS Account

Stanford has developed a comprehensive program to manage existing California tiger salamander and garter snake habitat, improve and enhance California tiger salamander and garter snake habitat, and mitigate for future losses of habitat for these species within the California Tiger Salamander Basin. This program includes the creation of a CTS Reserve and an accompanying Monitoring and Management Plan that are described in Sections 4.3.3.1 and 4.3.3.2, and the implementation of a Central Campus CTS Management Plan that is described in Section 4.3.3.4.

4.3.3.1 CTS Reserve

Within 1 year of approval of this HCP and issuance of the Section 10(a) authorizations, Stanford will create a CTS Reserve south of Junipero Serra Boulevard and implement a CTS Reserve Monitoring and Management Plan. The CTS Reserve includes approximately 315 acres of currently occupied and potential tiger salamander and garter snake habitat (Figure 4-5). The CTS Reserve contains eight California tiger salamander breeding ponds that Stanford constructed during the preparation of this HCP. California tiger salamander reproduction has already been documented in three of those ponds, and California tiger salamanders that breed at Lagunita already migrate to this area. The ponds, presence of amphibian prey, and grasslands in the CTS Reserve also provide high quality garter snake habitat.

The creation of the CTS Reserve implements two of the Biological Goals of the HCP, which are to stabilize the local California tiger salamander population and increase its chance of long-term persistence at Stanford, and to maintain CTS ponds to promote CTS reproduction in the Foothills. By so doing, Stanford will reduce California tiger salamander reliance on Lagunita, which requires supplemental water and extensive maintenance to support tiger salamander reproduction. Likewise, the CTS Reserve and accompanying Monitoring and Management Plan will benefit the garter snakes and reduce their reliance on Lagunita, which because of its urban location, has many threats to the garter snake population.

The CTS Reserve will also provide a means for mitigating the permanent loss of Zone 1, 2, and 3 habitat within the California Tiger Salamander Basin as described in Section 4.3.3.3.

4.3.3.2 CTS Reserve Monitoring and Management Plan

Stanford will preserve and enhance the quality of potential and existing tiger salamander and garter snake habitat within the CTS Reserve by implementing a CTS Reserve Monitoring and Management Plan. This Monitoring and Management Plan will consist of the following monitoring and management measures.

- Surveys for California tiger salamander and garter snake and of their habitat will be conducted in accordance with the monitoring program set forth in Section 4.6 for the term of this HCP.
- If the monitoring program results show that non-native wildlife species are adversely affecting the Covered Species, such as through direct kill or alteration of the habitat to the extent that it reduces its suitability, the non-natives will be removed, as allowed by law and to the extent that Stanford can feasibly remove or control them. Before trapping is used to remove the non-natives in areas where any Covered Species may occur, Stanford will submit a plan to the Service for approval.
- If the monitoring program results show that non-native plant species could adversely affect Covered Species or their habitat within the Reserve area, the non-natives will be removed, to the extent that Stanford can feasibly remove or control them.
- If the monitoring program results show that wildlife species have been placed in ponds within the Reserve area, Stanford will post signs prohibiting the release of any wildlife species in the ponds and/or fence the ponds as necessary.
- If monitoring determines that non-native species remain a threat to Covered Species despite Stanford's efforts at removal for 3 years, Stanford will consult with the Service to determine an appropriate plan of action.



- In addition to providing annual results of the monitoring program to the Service and NOAA Fisheries, Stanford will share the monitoring results with other interested local, state and federal conservation agencies.
- If the California tiger salamander habitat surveys find that the seasonal ponds are not facilitating tiger salamander breeding, the pond(s) will be modified or eliminated. Modifications to the pond(s) may include expanding or reducing the size of the pond, making the pond deeper or shallower, or providing a temporary water source. Stanford will consult with the Service regarding any proposed pond modifications.
- If there are 3 consecutive years of inadequate rainfall to sustain adequate larval development, Stanford will consult with the Service regarding ways to provide supplemental water to the constructed breeding ponds.
- If surveys indicate that tiger salamanders would benefit from the addition of cover or egg-laying substrate in the created ponds, Stanford will place suitable material in the ponds.
- Stanford will enhance tiger salamander and garter snake dispersal by mowing or grazing up to 2 acres of grassland adjacent to each of the newly created California tiger salamander breeding ponds annually during the summer. Mowing will be done either in the morning when it is still cool or during the hottest part of the day.
- If the California tiger salamander surveys find that the tiger salamanders would benefit from additional burrows, Stanford will enhance upland habitat adjacent to the newly created breeding ponds by creating cover piles to attract ground squirrels. Cover piles will typically be made of natural materials such as logs and rocks placed in a pit and backfilled with soil to create a mound, similar to those already created around existing ponds. Pits are generally up to 60 square feet and up to 4 feet deep. The cover piles will be located within 150 feet of the newly created breeding ponds. New cover piles will be created during the dry season, between June and September.
- The presence of oak woodland and savannah grasslands within 150 feet of the newly created

breeding ponds will be maintained, and Stanford will minimize the presence of chaparral grasslands (through hand removal, mowing, grazing, or spot application of pesticides if necessary).

- Stanford will maintain at least three amphibian tunnels across Junipero Serra Boulevard. If the results of the annual monitoring program show the amphibian tunnels are facilitating migration across Junipero Serra Boulevard and that additional tunnels would benefit tiger salamander migration, Stanford may install additional amphibian tunnels. Stanford would identify an appropriate location for the additional amphibian tunnel(s) based on the results of the annual monitoring program, and, before installing any new amphibian tunnels, obtain the Service's concurrence regarding the location of the new tunnel(s).
- Recreational access will be limited to existing service roads and restricted to daylight hours.
- No dogs will be permitted in the CTS Reserve.
- The Conservation Program Manager will review any proposed academic uses within the CTS Reserve, and if necessary, impose use conditions and restoration measures.
- Development, such as academic buildings, residential dwelling units, or commercial buildings, will be prohibited. Utilities and other general infrastructure improvements that would not adversely affect the tiger salamander habitat may be placed within the CTS Reserve. However, these improvements will be reviewed by the Conservation Program Manager, and if necessary, the Conservation Program Manager may impose use conditions and restoration measures.
- A California tiger salamander and garter snake education program will be developed by the Conservation Program Manager and presented to Stanford maintenance personnel and contractor personnel working in, or immediately adjacent to, the CTS Reserve. The education program will include protocols for identification, avoidance, immediate protection, and notification of the Conservation Program Manager.
- Feral cat feeding stations will not be allowed in the CTS Basin south of Junipero Serra Boulevard. Any feral cat feeding stations found in these areas will be removed.
- All ground animal control programs will be discontinued in the CTS Reserve.
- Vegetation management activities in the CTS Reserve will be conducted to achieve the goal of improving CTS habitat.
- Prior to recording the first conservation easement within the CTS Reserve, Stanford will prepare a CTS Easement Monitoring and Management Plan

that specifically describes (1) how Stanford will monitor and maintain a suitable hydroperiod of any preserved breeding habitat or potentially suitable breeding habitat, including measures Stanford will take to provide supplemental water if needed to support successful tiger salamander reproduction (if surveys indicate that tiger salamander larvae are present, but forecasts indicate insufficient rain to sustain tiger salamander breeding ponds through metamorphosis), (2) vegetation and sediment management measures, including suitable vegetation to facilitate tiger salamander dispersal between preserved breeding and upland habitat, (3) measures to maintain a suitable number of ground squirrel burrows within preserved upland habitat areas, and (4) an adaptive management plan. Stanford will submit a draft Easement Monitoring and Management Plan to the Service no less than 60 days prior to recording the first conservation easement within the CTS Reserve, and all future habitat preserved within the CTS Reserve will be subject to the approved plan.

- Five years before the expiration of the HCP and associated incidental take permits, Stanford will prepare a long-term monitoring and management plan for all habitat within the CTS Reserve that has been permanently preserved. The long-term monitoring and management plan will incorporate management and monitoring techniques that have been demonstrated to be the most successful. The long-term monitoring and management plan will include protocols for monitoring the abundance of California tiger salamanders and garter snakes in permanently preserved areas and the quality of preserved habitat, invasive species monitoring and management, an adaptive management provision, and any other monitoring or management techniques that Stanford deems necessary to fulfill the conservation purpose of the conservation easement(s) recorded during the term of the HCP. This monitoring and management plan will survive the expiration of the incidental take permits and this HCP, and will be subject to review and approval by the Service.

4.3.3.3 Use of CTS Reserve to Mitigate Future Development

Stanford will also use the CTS Reserve to mitigate for any future losses of Zone 1, 2 or 3 habitat within the California Tiger Salamander Basin (Figure 4-5). Currently, Stanford does not have any plans to develop any Zone 1, 2, or 3 land within the California Tiger Salamander Basin. However, if development occurs within the California Tiger Salamander Basin during the term of the HCP, Stanford would mitigate the loss of habitat by recording a permanent conservation easement over habitat within the CTS Reserve prior to groundbreaking in accordance with the ratios described in Section 4.4. Stanford may accrue mitigation credits by recording larger easements than are necessary to mitigate for a particular project. Surplus mitigation credits will be held in the CTS Account, and Stanford

may use them at a later date to mitigate for future development projects or other permanent land conversions.

By requiring Stanford to permanently conserve habitat within the CTS Reserve, the HCP ensures that the permanent loss of habitat will be mitigated by the permanent conservation of habitat. The permanent conservation easements would first be recorded in areas that contain breeding ponds and immediately adjacent upland habitat, and subsequently recorded easements would expand outward from there. All of the conservation easements would be contiguous, and over time a single large block of permanently preserved California tiger salamander breeding and upland habitat would be established. Before recording any conservation easements, Stanford will consult with the Service regarding the location of the new easement.

4.3.3.4 Central Campus CTS Monitoring and Management Plan

As discussed in Chapter 2, California tiger salamanders currently breed at Lagunita, an artificially created reservoir that is supported by diversions of water from San Francisquito Creek.

Governor Stanford began diverting water to Lagunita in the late 1800s to provide stock water and store irrigation water. Later, Stanford University diverted water to Lagunita to support aquatic recreational activities. However, Stanford no longer uses Lagunita for stock water, water storage, or recreational purposes, but has continued to divert water from San Francisquito Creek to sustain California tiger salamander reproduction. Lagunita also currently provides some flood control functions, and naturally retains some water during the rainy season. However, without the water diversions, in most years Lagunita would not naturally hold enough water for California tiger salamander reproduction. The practice of withdrawing water from San Francisquito Creek and diverting it to Lagunita to facilitate California tiger salamander reproduction can adversely affect biological resources (including steelhead) in the creek.

Lands north, east, and west of Lagunita are developed with urban facilities and do not provide sustainable upland habitat. Consequently, tiger salamanders that breed at Lagunita generally migrate south and across Junipero Serra Boulevard to upland habitat in the undeveloped foothills that will now be part of the CTS Reserve. Junipero Serra Boulevard is a heavily traveled County roadway, and numerous California tiger salamanders are killed annually while migrating across the roadway.

Garter snakes also are sometimes found around Lagunita. However, because Lagunita is regularly used by students, and other people, and lands north, east, and west of Lagunita are already developed with urban facilities including roads, the area does not provide long-term suitable habitat. Garter snakes, like the California tiger salamanders, also are likely killed while crossing roads, and would benefit from habitat management in the foothills.

Since much of Stanford's California tiger salamander population and garter snake population is currently concentrated around Lagunita, Stanford will implement a Central Campus CTS Monitoring and Management Plan that will govern the management of the approximately 95 acres of Zone 1 and 2 California tiger salamander and garter snake habitat north of Junipero Serra Boulevard, including Lagunita (i.e., the "Central Campus CTS Management Area" shown in Figure 4-5). This Central Campus CTS Monitoring and Management Plan will consist of the following monitoring and management measures.

- Surveys for the California tiger salamander and garter snake and their habitat will be conducted in accordance with the monitoring program set forth in Section 4.6 for the term of this HCP.¹²
- If the monitoring program results show that non-native species are adversely affecting Covered Species within the Central Campus CTS area, such as through direct kill or alteration of the habitat to the extent that it reduces its suitability to support the species, the non-natives will be removed, as allowed by law and to the extent that Stanford can feasibly remove or control them. Before trapping is used to remove the non-natives in areas where any Covered Species may occur, Stanford will submit a plan to the Service for approval.
- If the monitoring program results show that non-native plant species could adversely affect Covered Species or their habitat within the Central Campus CTS area, the non-natives will be removed, to the extent that Stanford can feasibly remove or control them.
- If the surveys determine that wildlife species have been placed in Lagunita, Stanford will post signs prohibiting the release of any wildlife species in Lagunita.
- Continue to operate Lagunita consistent with the Lagunita operations plan described in Section 3.1.3.
- Development, such as academic buildings, residential dwelling units, or commercial buildings, will be prohibited in the Lagunita area that is shown on Figure 5-1.¹³ Utilities and other general infrastructure improvements that would not adversely affect the tiger salamander habitat and tiger salamander dispersal may be placed within the Lagunita area. However, these improvements will be reviewed by the Conservation Program Manager, and if necessary, the Conservation Program Manager may impose use conditions and restoration measures.

¹² While the San Francisco garter snake is the Covered Species, monitoring will consider all garter snakes in order to gather data on the species and its subspecies. Because garter snakes have been found in Lagunita, surveys for the San Francisco garter snake will be performed in the Central Campus CTS Management Plan area.

¹³ If the HCP is amended or authorization is otherwise granted by the Service to allow development within the Lagunita area, Stanford will ensure that a minimum of three breeding ponds in the CTS Reserve have achieved the success criteria described in Section 4.3 before such development occurred.

- No biocides will be applied to Lagunita for schistosome cercarial dermatitis (swimmer's itch) without prior approval of the Conservation Program Manager.
- The bed of Lagunita will be mowed to not less than 4 inches, instead of being disced, for fire protection in the summer after consultation with the Conservation Program Manager. Mowing will be done by the lightest vehicle capable of mowing the area and will be done either in the morning when it is still cool or during the hottest part of the day.
- Ill-fitting utility box covers within 1,500 feet of Lagunita will be retrofitted to exclude California tiger salamanders.
- The use of off-road vehicles in Lagunita will be prohibited and the Conservation Program Manager will inspect Lagunita monthly to ensure compliance with the prohibition.
- Feral cat feeding stations will not be permitted in the Central Campus CTS Management Area, or within 150 feet of the Central Campus CTS Management Area.
- A California tiger salamander and garter snake education program will be developed by the Conservation Program Manager and presented annually to maintenance workers that regularly work in the Central Campus CTS Management Area and to contractor personnel before they begin work in the Central Campus CTS Management Area.

4.4 USE OF MITIGATION ACCOUNT CREDITS

The development or other conversion of existing Zone 1, 2, or 3 habitat will adversely affect the Covered Species. Credits will be withdrawn from the applicable Riparian Account in accordance with the ratios described below for any loss of habitat within Zone 1 or 2 or land in Zone 3 in the Matadero/Deer Creek Basin or San Francisquito/Los Trancos Creek Basin. Likewise, credits will be withdrawn from the CTS Account in accordance with the ratios described below for any loss of habitat within Zone 1 or 2, or land in Zone 3 in the California Tiger Salamander Basin. Zone 1, 2, or 3 habitat may be lost 1) directly through development, which would include the footprint of any new structure, landscaping, or new impervious surface commonly associated with development; and 2) indirectly if new development isolates areas beyond the footprint of the new development. For example, an indirect loss of habitat would occur if new development is sited in a manner that isolates breeding or upland habitat. Under the HCP, the isolated habitat is a loss of habitat that would require mitigation. The Conservation Program Manager will review all new development in Zones 1, 2, and 3 and determine the actual loss or conversion of habitat.

To mitigate for the loss of Zone 1, 2, or 3 habitat within the California Tiger Salamander Basin, mitigation will take the form of either a withdrawal of credits from the CTS Account (if credits have been accrued as discussed above), or by permanently recording a conservation easement over land within the CTS Reserve, in accordance with the ratios described below.

Every acre of Zone 1 habitat that is permanently converted will require three mitigation credits, every acre of Zone 2 habitat will require two mitigation credits, and every acre of Zone 3 land will require 0.5 mitigation credits. Development in Zone 4 will not adversely affect the Covered Species, because Zone 4 does not provide suitable habitat for the Covered Species. Therefore, no mitigation credits are required for development in Zone 4 (Table 4-3).

Table 4-3 Mitigation Ratios for each Habitat Management Zone

Management Zone	Credits Required Per Acre Of Converted Habitat
Zone 1	3
Zone 2	2
Zone 3	0.5
Zone 4	0

Under the HCP, Stanford will have to withdraw credits from the Riparian Accounts or CTS Account to offset habitat lost to development or other activity that results in the permanent conversion of land in Zone 1, 2, or 3. Stanford will offset the loss of habitat by withdrawing credits from the appropriate mitigation Account. By requiring Stanford to pay for development with existing credits, or to earn new credits before habitat is lost to development, mitigation will always stay ahead of development.

Any permanent conversion of Zone 1, 2, or 3 habitat must be paid for from the appropriate Account. Any development or permanent conversion of land in Zone 1, 2, or 3 within the Matadero/Deer Creek Basin (Figure 4-4) must be mitigated for by withdrawing credits from the Matadero/Deer Riparian Account. Any permanent conversion of Zone 1, 2, or 3 habitat within the San Francisquito/Los Trancos Creek Basin (Figure 4-3) must be mitigated for by withdrawing credits from the San Francisquito/Los Trancos Riparian Account, and any development within the California Tiger Salamander Basin (Figure 4-5) will be paid for from the CTS Account.

4.5 ADAPTIVE MANAGEMENT

4.5.1 Adaptive Approach

Adaptive management is an iterative system of decision making that is particularly useful in the face of uncertainty. Adaptive management employs a “learning by doing” approach to resource management that reduces the uncertainty that is inherent in resource management.

Adaptive management begins by using predictive modeling based on present knowledge to inform management and resource conservation decisions. As new knowledge is gained, the models are updated and management decisions adapted accordingly.

Key features of the HCP’s adaptive management are:

- Iterative decision-making (evaluating results and adjusting actions on the basis of what has been learned through monitoring);
- Feedback between monitoring and decisions (learning); and
- Measuring success of the Conservation Program in light of the HCP’s Biological Goals and Objectives.

Based on the best scientific information currently available, Stanford expects that the HCP’s Conservation Program will effectively achieve the HCP’s Biological Goals and Objectives. However, there is always some uncertainty with resource management techniques and a risk that habitat conditions will change in unexpected ways. It is also possible that new and different management techniques that are not identified in the HCP will prove to be more effective in achieving the Biological Goals and Objectives, and that scientific data will provide new information about the ecology of the Covered Species and their habitat needs.

Adaptive management is a process by which the Conservation Program for the HCP may be adjusted over time to reflect new information on the life history or ecology of the Covered Species generated through new information on the effectiveness of the various minimization and mitigation measures (in particular, enhancement and management activities). Moreover, the HCP recognizes that conditions at the University may change over the life of the HCP, and this provision provides Stanford with an opportunity to further benefit the Covered Species in the future in response to changed conditions. The adaptive management provision addresses the process for revising the Conservation Program, including changes to the enhancement and management techniques, the use of experimental techniques in enhancement and management activities, revising various plans adopted pursuant to the HCP, emergencies, and reintroducing Covered Species. Other protected species historically found in the region may be proposed for reintroduction at Stanford. Any reintroduction will require active



coordination between Stanford and the appropriate resource agency, and may require an amendment to this HCP.

4.5.2 Role of Monitoring in Adaptive Management

Stanford is responsible for monitoring the status of the Covered Species and the effectiveness of the Conservation Program. The monitoring program implemented under the HCP will evaluate:

- The success of management measures in preserving the quality of existing habitat;
- The success of enhancement measures;
- Species response to habitat conditions;
- Trends in habitat conditions and the Covered Species’ population

Monitoring is the cornerstone of adaptive management. Monitoring yields results that inform management decisions. It provides data that Stanford will rely on to identify successful management and monitoring techniques that are achieving the HCP’s Biological Goals and Objectives, and identify ineffective management and monitoring techniques. In this way, the monitoring program also provides valuable data for assessing the success of the Conservation Program in meeting the HCP’s Biological Goals and Objectives.

4.5.3 Modification to the Conservation Program

During the life of the HCP, Stanford may modify the Conservation Program to reflect new scientific or technical information (such as the adoption of a federally approved Species Recovery Plan described further in Section 6.9.4), the designation of Critical Habitat, or if the monitoring program shows that measures provided for in the HCP are ineffective or that Stanford is not progressing towards achieving the HCP’s Biological Goals and Objectives. Minor amendments may be required as management practices progress and improve. Likewise, as the University and technologies for running the University evolve, some of the Covered Activities may change to reflect that evolution. The minimization measure may change to adapt to those changes in the University’s Covered

Activities. Adaptive management may be used to modify the Conservation Program to reflect these changes. Modifications made through adaptive management would generally reflect changes to the management of the habitat or the performance of new conservation-related activities and will be limited to:

- changes to monitoring methodologies and timing, including those resulting from ongoing research on the Covered Species;
- changes to the monitoring methodologies or management techniques based on the adoption of a federally approved Species Recovery Plan or designation of critical habitat;
- decisions to develop population viability indices having to do with specific population monitoring techniques;
- any revisions of a minor or technical nature to the monitoring and management plans developed under this HCP;
- changes to Best Management Practices;
- changes to the Minimization Measures pursuant to Section 4.5.4, below;
- minor changes or additions to the Covered Activities that do not introduce significant new biological impacts into the San Francisquito/Los Trancos Easement, Matadero/Deer Easement, or CTS Reserve, or result in significant new or different environmental impacts; and
- any other revision of a technical nature that is consistent with the overall biological intent of the HCP and does not introduce significant new biological conditions into an area covered by the HCP or result in significant new or different environmental impacts.

Any changes made pursuant to this section will be described in the Annual Report (described in Section 6.4).



4.5.4 Revisions to the Conservation Measures

If the Annual Report (required under Section 6.4 of the HCP) or other biological monitoring reports indicate consistent population declines in a Covered Species when compared to population numbers provided in previous reports, and the best available scientific data indicate that the consistent population decline is attributable to an activity being performed by Stanford, then Stanford and the Service or NOAA Fisheries will meet and confer to determine if the minimization and/or land management and conservation measures described in Section 4.2 are inadequate or may be responsible for or contributing to the population declines. If the parties agree that the best available scientific information shows that the minimization measures are responsible in whole or in part for such population declines, and if new techniques of substantially equal cost are available for more effectively implementing the measures, then revisions to Section 4.2 of the Conservation Program will be made as soon as practicable. Any such changes will be reviewed and approved by the agency with jurisdiction over the particular Covered Species before any changes are implemented, and will be made in accordance with the process set forth in Section 6.7.2, under Minor Modifications.

4.5.5 Revisions to the Monitoring and Management Plans

Under the Conservation Program, Section 4.3, Stanford is required to implement multiple Monitoring and Management Plans for the benefit of the Covered Species. These Monitoring and Management Plans are intended to gauge the effectiveness of the HCP's Conservation Program in achieving the Biological Goals and Objectives, and to preserve and enhance the conservation value of the San Francisquito/Los Trancos Easement, Matadero/Deer Easement, CTS Reserve, or Central Campus CTS Management Area. However, if the Annual Report or other biological monitoring reports indicate a consistent population decline for a Covered Species when compared with previous reports, and the best available scientific data indicates that the consistent population decline is attributable to an activity being performed by Stanford, then Stanford and the Service or NOAA Fisheries, depending upon which agency has jurisdiction over the species (identified in text below as "appropriate agency", shall meet and confer to determine whether or not the management techniques (and if so, which management techniques) require adjustment to reverse the population declines.

If Stanford, with the concurrence of the appropriate agency, concludes that management techniques are either entirely or partially responsible for population declines of a Covered Species, then revisions will be made to the appropriate management techniques. Some examples of appropriate changes include:

- Replace techniques with a more effective technique: The preferable method for solving any problems with a management technique is to eliminate a management technique that has yielded little or no measurable benefits to the Covered Species and re-direct those resources to alternative strategies that are more likely or proven to provide enhanced benefits to the Covered Species. A new method will be employed if it is roughly equivalent in cost to the eliminated technique.
- Add new management techniques: In some cases, new management techniques may be essential to assist in maintaining the Covered Species populations but Stanford cannot implement the new techniques without raising the overall cost of managing the San Francisquito/Los Trancos Easement, Matadero/Deer Easement, CTS Reserve, or Central Campus CTS Management Area. In such cases, the new management techniques may be implemented, but only if funding sources (e.g., state or federal funds) are obtained such that the overall costs of implementing the HCP are not increased.

Alternatively, if new techniques that may improve habitat quality or Covered Species survival become available, even if no detectable Covered Species population decline has been noted, then Stanford may meet and confer with the appropriate agency to determine if the implementation of such new techniques is desirable.

Likewise, Stanford may find that the monitoring techniques are ineffective, or that more effective monitoring techniques may exist. For example, field surveys may fail to encounter the Covered Species or only rarely encounter remnant populations of a Covered Species such that the biological data gathered from the surveys fails to provide suitably reliable evidence of the success of the HCP. Similarly, Stanford may, from time to time, need to revise the methods and techniques for surveying or otherwise monitoring the Covered Species in order to provide meaningful data, to respond to new scientific information, or to respond to the results and experiences of current monitoring methodologies. If Stanford, with the concurrence of the appropriate agency, concludes that the monitoring techniques being used are inadequate or that better techniques are available, then revisions to the appropriate techniques may be made. Stanford will meet and confer with the appropriate agency regarding any new monitoring technique. The new techniques may be implemented if Stanford determines they are feasible, and the appropriate agency concurs that the new technique will provide more reliable or efficient data, without creating any new adverse effects on the Covered Species.

Any changes made pursuant to this section will be described in the Annual Report (Section 6.4).

4.5.6 Experimental Techniques

The HCP does not require the use of new or untested techniques. However, from time to time, Stanford may find that a new but untested or different technique has the potential to improve habitat quality or to improve the survival of the Covered Species. This section describes the requirements for incorporating such new or different techniques into the HCP.

If a management technique is new or untested at Stanford (and many are, since the art and science of natural land management and restoration are constantly changing), the technique should be treated as a new technique. The need for the technique should be carefully documented and reviewed by scientific peer review and should, if at all possible, be carried out on a small scale prior to treating large portions of land that might represent a significant percentage of habitat for a target Covered Species. If the technique proves successful, it may be used on a larger scale. At every stage, the actual methods used must be documented and the results monitored to test whether the anticipated effect on the habitat and the actual effect on the target Covered Species' populations are achieved.

Prior to undertaking an unproven enhancement or management technique in the San Francisquito/Los Trancos Easement, Matadero/Deer Easement, CTS Reserve, or Central Campus CTS Management Area, Stanford will meet and confer with the Service or NOAA Fisheries to determine appropriate methodologies and protocols, the total acreage that would be subject to the new techniques, and the success criteria which must be demonstrated by the new technique before the experimental technique may be extended. Implementation of such measures or new techniques shall require the concurrence of the agency with jurisdiction over the particular Covered Species that would be affected.

4.5.7 Introduction of Threatened or Endangered Species

Historical data indicate that three demographic units of the Bay checkerspot butterfly (*Euphydryas editha bayensis*) inhabited Jasper Ridge Biological Preserve, but became extinct at the Preserve by 1998. However, the Preserve still supports serpentine grassland habitat that has been designated by the Service as Critical Habitat for the butterfly. During the life of the HCP, Stanford may try an experimental reintroduction of the butterfly or other protected species, and study the persistence of the species. Prior to re-introducing any federally protected species, Stanford, with the concurrence of the Service and/or NOAA Fisheries, will determine the biological appropriateness of such a reintroduction, the timing of collection and reintroduction of this species, appropriate source population, requirements for encouraging survival of these animals, and other protocols and methodologies as appropriate. If the butterfly is introduced, the HCP may be amended in accordance with Section 6.7.1, to include the butterfly as a Covered Species.



4.6 HCP MONITORING PROGRAM

This section describes the HCP's monitoring program. However, it will likely evolve during the life of the HCP through the adaptive management process. Adaptive management will be employed to add new monitoring techniques, modify these monitoring methods or eliminate monitoring methods that prove ineffective or that have unanticipated impacts on the Covered Species. To maintain an internally consistent and comparable dataset, methods will be used as long as they are providing useful information and not having unanticipated impacts on the Covered Species, and any changes to the methods will be reported in the Annual Report.

As discussed in Section 4.5, the monitoring program has been developed, in part, to measure the Conservation Program's success in achieving the HCP's Biological Goals and Objectives, and monitoring is an important component in the adaptive management process. The monitoring program outlined below will provide data on the distribution and abundance of the Covered Species, their habitats, and potential threats. Using these data, Stanford will be able to assess changes in the quality and quantity of the specific habitat of the Covered Species, identify significant changes in the populations of the Covered Species, measure progress towards meeting the HCP's Biological Goals and Objectives, and decide if changes in management or monitoring are warranted. The results of the annual monitoring activities will also inform management decisions, including restoration efforts and invasive species removal.

The monitoring program has been organized by species, although monitoring activities will be aggregated during the implementation of the HCP for several species that use the same habitat. For example, San Francisquito Creek provides habitat for steelhead, red-legged frogs, western pond turtles, and garter snakes, so several of the monitoring activities that pertain to these species may be done at the same time. In this way, Stanford will minimize the potential impacts of these monitoring activities on the species.

The Conservation Program Manager will serve as the primary responsible individual for the taking of any Covered Species that may occur during the course of implementing the HCP's monitoring program. All monitoring activities will be performed under the Conservation Program Manager's guidance and supervision, or under the guidance and supervision of an agency-approved assistant Conservation Program Manager. Stanford will ensure that the lead or assistant Conservation Program Manager is onsite during all monitoring activities. Prior to the implementation of the HCP, Stanford will provide the Service and NOAA Fisheries with resumes for the Conservation Program Manager and any assistant Conservation Program Manager(s) for approval. Stanford will notify the Service and NOAA Fisheries no less than 14 days in advance of any monitoring activities if there is a new lead or assistant Conservation Program Manager, and provide them with a resume or similar description of qualifications. Stanford University scientists and students will generally assist the lead or assistant Conservation Program Manager with implementing the HCP's monitoring activities.

Prior to the implementation of the HCP, the Conservation Program Manager will prepare a training program to ensure that all individuals performing monitoring activities have qualifications, knowledge and experience relevant to the type of research and monitoring activities that are being performed. A list of all individuals who participated in the monitoring activities and copies of training materials will be submitted to the Service and NOAA Fisheries with the Annual Report (described in Section 6.4).

The Conservation Program Manager may engage third parties (such as biological consultants with specific technical expertise regarding a Covered Species) who are qualified and authorized by the Service or NOAA Fisheries to conduct, or to directly supervise, activities conducted under the HCP's monitoring program without the on-site presence or supervision of the Conservation Program Manager. Prior to delegating any monitoring activities to a third party, Stanford will notify the Service or NOAA Fisheries, depending on the species affected, and will not delegate any monitoring activities to a third party without the applicable agency's approval.

Monitoring results will be included in the Annual Report.

4.6.1 California red-legged frog monitoring



California red-legged frogs have been surveyed annually at Stanford since the mid-1990s. Prior to the initiation of these annual surveys, specimens of California red-legged frogs were collected at Stanford, but the species was not the focus of specific field efforts. Night surveys have proved to be the most useful technique for monitoring the frogs at Stanford, but day surveys also have been found to yield information

useful to conservation planning efforts. Recent records of red-legged frogs at Stanford indicate that the local frogs reproduce mainly in slow-flowing portions of Deer, Matadero, and San Francisquito creeks. Some reproduction also occurs in a small pool located in an old quarry near Matadero Creek. Surveys for egg masses in these creeks have not yielded consistent results. The following monitoring program is based, in part, on Stanford's experience with various monitoring techniques, prior survey results, historical records, and the presence of potentially suitable California red-legged frog habitat.

Night surveys of areas recently occupied¹⁴ by California red-legged frog

- ✦ Three times a year, occurring from late spring to early fall, Stanford will perform visual night surveys of portions of San Francisquito, Los Trancos, Matadero (including the "Quarry Pond"), and Deer creeks that have recently been occupied by California red-legged frogs. The survey areas will bracket the recently occupied areas by at least 500 feet.
- ✦ The night surveys will assess the number of adult and juvenile California red-legged frogs, and larval frogs (tadpoles) and non-native species such as bullfrogs. The location, size, and sex of the frogs will be recorded. The presence of any egg masses also will be noted; however, it is anticipated that all California red-legged frog eggs will have hatched by the time these surveys performed.
- ✦ The surveys will be performed under the guidance of the Conservation Program Manager, and will typically include two persons walking through the creek and along the adjacent riparian zone with headlamps and/or flashlights.
- ✦ If there is inconclusive evidence that suggests an area is occupied (e.g., a ranid frog unidentified to species or hearing a "plop"), at least two follow-up surveys will be conducted.

Night surveys of potentially occupied areas

- ✦ Every 2 years Stanford will perform a night time visual survey along reaches of San Francisquito, Bear, Matadero, and Los Trancos creeks that are not included in the annual night time survey. Any of the small unnamed, seasonal tributaries which are deemed potential red-legged frog habitat along with Felt and Searsville reservoirs, and Skippers Pond, will also be surveyed every 2 years.

- ✦ The night surveys will assess the number of adult and juvenile California red-legged frogs and larval frogs (tadpoles). The presence of any egg masses also will be noted; however, it is anticipated that all red-legged frog eggs will have hatched by the time these surveys are performed.
- ✦ The surveys will be performed under the guidance of the Conservation Program Manager, and will typically include two persons walking through the creeks and tributaries and along the adjacent riparian corridors with flashlights and/or headlamps.
- ✦ If red-legged frogs are observed during these surveys, the sites will be considered occupied areas will be added to the areas surveyed annually.
- ✦ If there is inconclusive evidence that suggests an area is occupied (e.g., a ranid frog unidentified to species or hearing a "plop"), at least two follow-up surveys will be conducted.

Day surveys of suitable habitat

- ✦ At least once a year, occurring during late spring to early fall, Stanford will visually survey all reaches of San Francisquito, Los Trancos, Bear, Deer and Matadero (upstream from Foothill Boulevard, including the "Quarry Pond") creeks passing through Stanford lands, the adjacent riparian zone, Felt and Searsville reservoirs, and Skippers Pond to assess the overall condition of the waterways and adjacent riparian zone.
- ✦ While not the primary focus of this effort, these day surveys will assess the number of adult and juvenile California red-legged frogs, and larval frogs (tadpoles) and non-native species such as bullfrogs and centrarchid fishes. The presence of any egg masses also will be noted, however, it is anticipated that all California red-legged frog eggs will have hatched by the time these surveys are performed.
- ✦ The surveys will be performed under the guidance of the Conservation Program Manager and will include snorkel surveys and walking through the creeks and adjacent riparian zones.
- ✦ If red-legged frogs are observed during these surveys, these locations will be considered occupied and will be added to the areas surveyed annually (see night surveys of areas recently occupied, above).
- ✦ If there is inconclusive evidence that suggests an area is occupied (e.g., a ranid frog unidentified to species or hearing a "plop"), at least two follow-up surveys will be conducted.

¹⁴ For purposes of this HCP, "recently occupied" means that the species in question has been recorded from the particular location within the last 5 years.

Habitat monitoring

- The physical condition of the waterways and surrounding vegetation will be assessed during annual field visits, noting significant tree loss or falls, declines that may be attributable to disease, and presence of non-native plant species.
- Ten riparian transects will be established in appropriate areas to determine habitat quality for frogs and will be surveyed every 5 years.
- Baseline conditions will be determined within 2 years of the issuance of an incidental take permit by the Service.

Day surveys of other areas

- Every 3 years Stanford will visually survey the portions of creeks found on its lands which are not included in the annual surveys. These reaches include Matadero Creek downstream of Foothill Boulevard, relatively limited portions of Corte Madera, Dennis Martin, Sausal, and Alambique creeks, and any of the unnamed seasonal tributaries which are considered potentially suitable California red-legged frog habitat.
- These surveys will be conducted between late spring and early fall.
- The surveys will be performed under the guidance of the Conservation Program Manager and will include snorkel surveys and walking in shallow areas of the creek/tributaries and along the adjacent riparian corridors.
- If California red-legged frogs are found during these surveys, these areas will be added to locations addressed by the annual night surveys (see protocol for “night surveys of areas recently occupied”).
- If there is inconclusive evidence that suggests an area is occupied (e.g., a ranid frog unidentified to species or hearing a “plop”), at least two follow-up surveys will be conducted.
- The physical condition of the waterways and surrounding vegetation will also be assessed during these field visits.

Day surveys of created off-channel ponds

- Stanford will survey the constructed ponds and the surrounding upland areas every 3 weeks beginning in January and continuing through July in order to locate egg masses and track their progression as tadpoles and metamorphs.

- Pond surveys will include dip netting, visual observations, and use of metering equipment.
- Surveys will include four transects every 3 years to determine open water, emergent vegetation, shoreline vegetation, and upland vegetation.
- Basic water quality parameters will be measured during each interval (e.g., water level, conductivity, clarity).

4.6.2 Steelhead monitoring

Surveys of the creeks and bodies of standing water have been conducted annually at Stanford since the late 1990s. The majority of this work has been conducted during the low-flow period of summer, with few spring and fall field activities. These field efforts have included visual day and night surveys, snorkel surveys, electrofishing, and trapping (mainly targeting non-native fishes and crayfish). Extensive electrofishing was conducted from 1997 to 2001. During these years, virtually all of the San Francisquito Creek system on Stanford property was electrofished multiple times annually, with intensive single-pass sweeps. Recent work has focused on snorkel surveys, and approximately 50 percent of the reaches with sufficient depth and clarity were snorkeled annually during the last few seasons. Redd surveys have not been conducted on a regular basis in the relatively small creeks at Stanford. Stanford has concluded that because of the dense vegetation surrounding the active creek channel, large changes in flow, and relatively small redd size, redd surveys at Stanford would provide limited information and would be potentially detrimental to the species. The following monitoring program is based, in part, on Stanford’s experience with various monitoring techniques, prior survey results, historical records, and the location of steelhead spawning and rearing habitat.

Surveys of reference reaches

- Three times a year, Stanford will survey no less than 10 percent of the total length of Bear, San Francisquito, and Los Trancos creeks on Stanford property to estimate the abundance and age classes of fish species present. The survey reaches will be chosen on the basis of previous surveys and include areas with historically high and low steelhead densities, different types of physical parameters (channel morphology, substrate, etc.), and different adjacent land uses. Generally, the same reaches will be monitored each year, but if warranted by significantly changed conditions, such as major reshaping of creek channel or an

extended drought, the specific reaches surveyed will be altered.

- ✦ Survey methods will include electrofishing where possible, snorkeling, and walking in areas that are too shallow to snorkel. Electrofishing will only be used in reaches not recently occupied by California red-legged frogs, and will be conducted in accordance with NOAA Fisheries' "Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act, June 2000"¹⁵. Electrofishing will include the appropriate use of block netting.
- ✦ Surveys will assess the physical condition of the creek, including type and location of barriers and critical riffles, the location of pools sufficient to provide rearing habitat, the distribution and abundance of instream cover such as large woody debris, substrate characteristics, and water quality.
- ✦ The number of steelhead within the different age-classes will be estimated for the reference reaches.
- ✦ The surveys will occur roughly equally spaced during the period from late spring to early fall and will be performed under the guidance of the Conservation Program Manager.
- ✦ These surveys will also provide information on the distribution and abundance of native and non-native species.

Day surveys of suitable habitat

- ✦ At least once a year, Stanford will visually survey all reaches of San Francisquito, Los Trancos, Bear, Deer and Matadero (upstream from Foothill Boulevard) creeks passing through Stanford lands and the adjacent riparian zone to assess the overall condition of the creeks and adjacent riparian zone (areas not included in the reference reaches).
- ✦ These surveys will:
 - identify barriers to fish dispersal,
 - identify areas for potential instream habitat enhancement projects such as the addition of woody debris,
 - be used to assist in the identification of point sources of sediment entering creeks,
 - be used to evaluate aquatic habitat conditions for steelhead on Stanford lands and

provide gross information on the distribution and abundance of steelhead, other native species, and non-native species, and

- be used to evaluate the effects of non-native plant and animal species on steelhead and steelhead habitat.
- ✦ These surveys will occur between late spring and early fall.
- ✦ Once every 5 years, Stanford will conduct a habitat typing survey. The habitat typing survey will classify habitats as pool, glide, run, riffle, cascade, dry, and other types of habitat found in the stream reaches using techniques such as found in Flosi et al. (1998 and updated 2005). This includes the assessment of the quality of habitat for salmonids by measuring common parameters of habitat quality including gravel permeability, gravel composition, and pool filling by fine sediment. The quantity of habitat currently available for salmonids will then be calculated.

Fish monitoring/counting devices¹⁶

- ✦ Stanford will install an automated fish counting device in Los Trancos Creek.¹⁷ The location of the counting device will be determined by physical requirements of the selected model, access, creek channel structure, and security. A location near the downstream end of Los Trancos Creek, at or near the Piers Lane Bridge, is preferable, but final site selection will be determined by further analyses and discussions with NOAA Fisheries.
- ✦ Stanford will maintain, at least seasonally, two underwater video cameras in Los Trancos and San Francisquito creeks. At least one camera will be maintained in each creek, and the locations will be selected based on water clarity, ease of installing/removing the cameras, and availability of a power source for the cameras. Ideally, the video cameras in the creeks will be maintained all year, but it is likely that they will need to be removed during storm events and periods of very low visibility. Stanford will provide NOAA Fisheries, the Service, and other interested local, state, and federal agencies with copies of recorded material,

¹⁶ The installation of automated fish monitoring or counting devices may require additional local, state, or federal permits. The installation of these devices is, therefore, subject to Stanford's ability to obtain these other necessary permits.

¹⁷ The installation and long-term operation of instream monitoring devices may be difficult due to the often rapid and large fluctuations in flow rate, and frequently, the large amount of debris. A previous attempt at installing an automated fish counting device on the Los Trancos diversion fish ladder was short-lived because the device was destroyed by debris during a sudden storm event.

¹⁵ <http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf>

or preferably, internet access to streaming video. Streaming video systems are preferred, but physical constraints of the creeks and riparian zone may prohibit such a set-up (simple recording systems are much easier to install and maintain, and will be used if streaming video systems are not feasible).

- Stanford will conduct a pilot trapping program to be initiated within 3 years of the approval of the HCP, with one trap on Los Trancos near the confluence with San Francisquito Creek and a second trap on San Francisquito Creek in order to determine numbers and timing of downstream migrating steelhead. Funnel/Fyke-type traps or screw traps will be utilized. Traps will be set in early March and operated through late May for 4 days per week. High-flow events may preclude some sampling. Adult fish captured will be released immediately downstream of the trap. After five seasons of trapping or sooner, Stanford will review the pilot program with NOAA Fisheries to determine the effectiveness of the pilot program and determine whether the trapping program will continue.

4.6.3 California tiger salamander monitoring



California tiger salamanders have been studied at Stanford and in the vicinity of Stanford for more than 100 years, with major research by Professor Twitty in the 1930s and 1940s. Since the early 1990s, the local tiger salamanders have

been monitored annually and many techniques have been tried. At Stanford, the most productive monitoring methods are night surveys during the late fall/early winter migration season, and larval surveys during spring (using either minnow traps or dip nets). Occasionally, visual surveys for eggs were successful, depending on water clarity. Egg frames, drift fences, pitfall traps, cover boards, and a number of other techniques have also been tried during these annual efforts, but the value of the results were low, and did not warrant the effort. The following monitoring program is based, in part, on Stanford's experience with various monitoring techniques, prior survey results, historical records, and the presence of suitable breeding habitat.

Rainy season night surveys of salamander dispersal routes

- Stanford will visually survey each of the following areas five times per year, between October and February: (1) Junipero Serra Boulevard, from Campus Drive West to 300 feet south of the Gerona Gate to the foothills; (2) along Campus Drive West, from Junipero Serra Boulevard to Santa Teresa Street; (3) along Campus Drive East, from Junipero Serra Boulevard to the en-

trance of the Sigma Alpha Epsilon fraternity parking lot; (4) along the foothills service road, from Junipero Serra Boulevard to Reservoir 2 (enclosed water reservoir), and from Junipero Serra Boulevard to the drainage adjacent to the faculty housing, and (5) the pathway circling Lagunita.

- The surveys will assess the distribution and abundance of migrating tiger salamanders, and the locations and approximate numbers of vehicle-caused mortality.

Rainy season night surveys of areas only rarely traversed by salamanders

- Stanford will visually survey each of the following areas at least three times per year, between October and February: (1) Links Road; (2) Governor's Avenue from Campus Drive West to Santa Teresa Street; (3) Electioneer Road, and (4) Lomita Drive, from Santa Teresa Street to its end just past the Knoll, including Lomita Court.
- The surveys will assess the distribution and abundance of migrating tiger salamanders, and the locations and approximate rate of vehicle-caused mortality.
- If five or more salamanders are observed in any of these areas during a given year, that area will be added to the list of more frequently surveyed sites.

Egg mass surveys

- Stanford will visually survey the shallow portions of Lagunita and the constructed ponds in the foothills for tiger salamander egg masses. Visual surveys for egg masses will be done three times between late December and mid-February.

Larval surveys

- The purpose of the larval surveys is to determine whether breeding has been successful and whether the larvae persist and eventually metamorphose. The larval surveys will be used to verify whether successful reproduction has occurred (i.e., whether a larva has transformed into the terrestrial stage). For the purposes of this HCP, once a larva has begun to exhibit the morphological features indicating metamorphosis to the terrestrial stage, it will be assumed that successful reproduction has occurred as long as the pond retains water an additional 2 weeks.

- Stanford will place sets (groups) of minnow traps (1/8 inch mesh), as described below, in Lagunita and the constructed ponds in the foothills every 3 to 4 weeks starting in late February/early March and ending when water temperature/quality becomes suboptimal. A set of traps will consist of 15 collapsible minnow traps. This should produce three to five rounds of trapping per year.
- Traps will be deployed in the late afternoon and retrieved by mid-morning the next day.
- In Lagunita, nine sets will be deployed each round of sampling, with eight sets placed in the shallows around the perimeter of the reservoir, and one set placed at the center of reservoir location. This will result in 135 total trap nights per round of sampling.
- In the foothill ponds, single sets of traps will be deployed in each pond per sampling round. The traps will be placed such that they are located across the depth range of the individual ponds (with the shallowest sited traps being just barely completely submerged).
- If trapping is halted due to temperature increases, monitoring by way of dip netting will occur until the ponds are dry.

General wetland and upland surveys

- Stanford will survey Lagunita, the constructed ponds in the foothills, and the surrounding upland areas every 3 weeks beginning in January and continuing until the ponds and Lagunita dry.
- During each survey, Stanford will determine the: density of mid-water invertebrates; distribution and abundance of amphibians, predominantly eggs masses and larvae; and basic water quality parameters, including water level, conductivity, and clarity.
- Ponds will be surveyed to ensure that there is sufficient cover and substrate suitable for egg mass attachment.
- Surveys of the upland areas will include walking through the grasslands and noting the condition and type of surrounding vegetation (e.g., species composition, rough percent cover, etc.), presence of ground squirrels, and extent of areas of disturbance. The distribution and condition of cover-providing features, such as the constructed cover piles, will also be recorded. Surveys will include four transects every 3 years to determine open water, emergent vegetation, shoreline vegetation, and upland vegetation.

4.6.4 Western pond turtle monitoring



Surveys of the creeks and bodies of standing water have been conducted annually at Stanford since the late 1990s. These field efforts include visual day and night surveys, snorkel surveys, electro-fishing, and trapping (mainly targeting non-native fishes and crayfish). During these activities, western pond turtles have been consistently, albeit in low numbers, observed in portions of San Francisquito Creek. They have also been observed less consistently during the repeated annual surveys of Felt Reservoir. The visual day and snorkel surveys have contributed the most data on the distribution of turtles at Stanford, and trapping has been useful in conducting work on known individuals. The following monitoring program is based on prior surveys, historical records, and the presence of potentially suitable western pond turtle habitat.



Habitat monitoring

- The physical condition of the waterways and surrounding vegetation will be assessed during annual field visits, noting significant tree loss or falls, declines that may be attributable to disease, and presence of non-native plant species.
- Ten riparian transects will be established in appropriate areas to determine habitat quality for turtles and will be surveyed every 5 years.
- Baseline conditions will be determined within 2 years of the issuance of an incidental take permit by the Service.
- During turtle surveys the presence of suitable basking platforms along San Francisquito Creek, Searsville Reservoir, Felt Reservoir, and Skippers Pond will be determined.

Day surveys of areas recently occupied by western pond turtle

- Three times a year, occurring from late spring to early fall, Stanford will perform visual surveys of the portions of San Francisquito Creek and Felt Reservoir that have recently been occupied by western pond turtles. Surveys will be conducted 1,500 feet up- and downstream from occupied areas. Searsville Reservoir and Skippers Pond will also be surveyed.
- The surveys will assess the number of adult and juvenile western pond turtle and non-native species such as bullfrogs.
- The creek surveys will include snorkel surveys, and walking in areas that are too shallow to snorkel (visual surveys). The surveys of the reservoirs will be visual surveys.
- Turtles will be captured when possible, either by hand, nets, or with the use of turtle traps. Captured individuals will be photographed, measured, and released at the point of capture.
- These surveys include a visual assessment of the presence and distribution of non-native crayfish, bullfrogs, and fishes.
- If the initial survey cannot conclusively establish that an area is occupied, but there is evidence that suggests an area is occupied (e.g., an unidentified turtle species is found) at least two additional surveys will be conducted.

Day surveys of all creeks and waterways

- Once a year, in the late spring to early fall, Stanford will visually survey all reaches of San Francisquito, Los Trancos, Bear and Deer creeks and all reaches of Matadero Creek upstream from Foothills Boulevard that pass through Stanford lands to assess the overall health of the creeks, including the presence of non-native crayfish, bullfrogs, fishes and the presence of western pond turtles. Visual surveys will include snorkeling, and walking in shallow areas and adjacent riparian habitat.
- Every 3 years, Stanford will visually survey all reaches of Matadero Creek on Stanford lands downstream from Foothill Boulevard to assess the overall health of the creeks, including the presence of non-native crayfish, bullfrogs, fishes, and the presence of western pond turtles.
- If western pond turtles are encountered, they will be captured, if possible, photographed and measured, and released at the point of capture.

- If western pond turtles are found during these surveys, these areas will be added to locations addressed by the annual surveys of occupied areas (see above).

4.6.5 San Francisco garter snake¹⁸ monitoring



Surveys for garter snakes at Stanford and in the vicinity of Stanford have been performed sporadically since Stanford University was founded. Surveys conducted since the 1970s have focused on Lagunita, San Francisquito Creek, and near the SLAC National Accelerator Laboratory. The results of these surveys and other historical information are described in Section 2.4.5. Generally, small numbers of garter snakes are found annually at Lagunita, but are very infrequently encountered elsewhere on Stanford lands. Historical data indicate that garter snakes may have occupied other areas at Stanford. More recent riparian surveys, in areas that provide suitable garter snake habitat, focused on steelhead, California red-legged frogs, and western pond turtles, and did not look for garter snakes. The following monitoring program is based, in part, on prior surveys, historical records, and the presence of potentially suitable garter snake habitat.

Baseline distribution surveys

- Within 1 year of the Service issuing an Incidental Take Permit, Stanford will prepare a draft baseline distribution survey plan to establish the distribution of garter snakes.
- The draft plan will identify locations for visual surveys and trapping, and will include, but not be limited to, the following areas:
 - Matadero/Deer creek riparian zone
 - Searsville Reservoir (upper, middle and lower portions)
 - San Francisquito Creek riparian zone
 - Sausal Creek/Skippers Pond
 - Lower foothills (constructed CTS ponds and natural wetlands)
 - Parcel located between Sand Hill Road and the SLAC National Accelerator Laboratory
 - Lagunita

¹⁸ While the San Francisco garter snake is the Covered Species, monitoring will consider all garter snakes in order to gather data on the species and its subspecies.

- The Service will have 60 days to comment on the draft baseline distribution survey plan, and if Stanford does not concur with the Service's recommendations, Stanford and the Service will confer to develop a mutually agreeable solution and provide a final baseline distribution survey plan within 45 days.
- Stanford will implement the plan.

Final Monitoring Plan

- Following the completion of the baseline distribution survey plan, Stanford will submit a draft monitoring plan to the Service.
- The Service will have 60 days to comment on the draft monitoring plan, and if Stanford does not concur with the Service's recommendations, Stanford and the Service will confer to develop a mutually agreeable solution and provide a final monitoring plan within 45 days.
- Stanford will implement the monitoring plan.

SECTION 5

POTENTIAL BIOLOGICAL IMPACT/TAKE ASSESSMENT



5.0 POTENTIAL BIOLOGICAL IMPACT/TAKE ASSESSMENT

5.1 DEFINITION OF TAKE

Under the Federal Endangered Species Act (ESA), take of wildlife species listed as threatened or endangered is illegal, unless authorized by an incidental take permit or other means. 16 USC §1539(a). The ESA defines the term “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” 16 USC §1533(19). By regulation, the Service and NOAA Fisheries have defined the terms “harm” and “harass” in the definition of “take.” “Harm” means “an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.”¹ “Harass” means “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, or sheltering.” 50 CFR §17.3.

5.2 IMPACTS CONSIDERED UNDER THE HABITAT CONSERVATION PLAN

Under Section 10(a)(2) of the ESA, an HCP must identify the incidental take of listed species that is anticipated, and the impacts that will likely result from such taking. Before the Service or NOAA Fisheries can approve an HCP and issue the requested incidental take permit, they must conduct an internal Section 7 consultation on the HCP, which will lead to a Biological Opinion as to whether implementation of the incidental take permit and HCP will (1) result in “jeopardy” to any listed species of plant or animal, or (2) result in the “destruction or adverse modification” of designated Critical Habitat. In doing its Section 7 consultation, the Service and NOAA Fisheries must look not only at the direct effects (i.e., anticipated incidental take resulting from the HCP) but also indirect and cumulative effects.

Following the preparation of a Biological Opinion, the Service and NOAA Fisheries will issue an incidental take permit upon a finding, in addition to other criteria, that the Covered Activities will not appreciably reduce the likelihood of the survival and recovery of the species in the wild, and that Stanford has minimized and mitigated the effects of their activities to the maximum extent practicable. The Minimization Measures and Conservation Program described in Section 4.0 have the ability to fully mitigate impacts to the Covered Species and there-

fore reduce the direct, indirect, and cumulative effects of the Covered Activities, and provide benefits to the Covered Species, such that the Service and NOAA Fisheries should be able to make a finding that meets the two most critical criteria above.

To meet the requirements of Section 10(a)(2), and facilitate the Biological Opinion and incidental take process, this HCP evaluates anticipated incidental take, and associated direct, indirect, and cumulative effects.

5.3 ANTICIPATED TAKE OF EACH COVERED SPECIES

Stanford University was established more than 100 years ago, on the site of Governor Stanford’s famous Palo Alto stock farm. The type and frequency of the activities needed to run the University have evolved over the past 100 years, and will continue to evolve. However, the University has substantial information about its modern operations and anticipated future operations, and a substantial amount of information about the distribution and population of the Covered Species at Stanford, and based on the available data, evaluated the projected future take of the Covered Species by Stanford. Although direct and indirect take is not defined in the ESA, for the purposes of describing the anticipated impacts to the Covered Species, the HCP uses these terms as defined below.

Direct take as used in the HCP refers to the harm, harassment, and loss of individuals of the Covered Species. This includes losses from direct actions, such as stepping on an individual of a Covered Species; construction machinery harassing, injuring or killing an individual during development; or accidental harm, harassment or death of a species during the course of activities such as non-native species control efforts. Direct take also includes harassment, harm, or the death of a species that occurs during ongoing activities that disrupt the species’ habitat for a short time, such as maintaining buried utilities that are occasionally excavated and subsequently reburied. Individual Covered Species may not be directly killed by the habitat disruption, but such disruptions can significantly alter the species’ behavior and cause a temporary increase in the rate of mortality caused by some secondary factor, such as predation or desiccation. Species such as the western pond turtle and steelhead are more susceptible to disruption of their habitat than other species. For example, female turtles will discontinue seeking nest locations if they are scared by human activity and steelhead may strand themselves in shallow waters or even flip themselves onto the bank when people are working in the creek. Conversely, California tiger salamanders are less easily disturbed, and temporary disturbances to their habitat generally do not result in increased rates of mortality for these species. A summary of the anticipated level of incidental mortality is provided in Table 5-1.

¹ NOAA Fisheries has a very similar definition of harm that also includes spawning, rearing, and migration as essential behavioral patterns. 50 CFR 222.

Indirect take as used in the HCP describes the permanent loss of habitat that is not expected to result in the mortality or direct harm or harassment of a species. Reducing the amount of available habitat may reduce the future maximum size of the species' populations. This reduction in the potential maximum size of the population can affect a local population's persistence or may inhibit efforts to recover the species. The permanent loss of habitat can be more of a threat to a species' local persistence than the occasional loss of a few individuals, and is therefore considered take under the HCP. A summary of the anticipated loss of habitat is provided in Table 5-2. Potential locations and amount of habitat loss are provided in Figure 5-1.

The anticipated levels of take described below, and the anticipated incidental mortality shown in Table 5-1 reflect the current population levels. The implementation of the HCP's Conservation Program will likely increase the population of the Covered Species during the life of the HCP. As the population increases, the number of individuals that are harassed, harmed, or killed may increase numerically. However, the impact to the population as a whole will decrease because a numerically robust population has a much better chance at survival or recovery. Thus, increases in the absolute number of individuals subject to take each year will be more than compensated for by the elevated overall population levels, and the overall percentage of the population that is subject to take is not expected to increase.

Table 5-1 Summary of Estimated Incidental Mortality of Individuals

	Estimated annual incidental mortality	Minimum population level	Maximum incidental mortality (percent)	Maximum population level	Minimum incidental mortality (percent)
California red-legged frog	3	25	12 percent	250	1 percent
Juvenile steelhead	120	1,500	8 percent	9,000	1 percent
California tiger salamander	20	400	5 percent	4,000	1 percent
Western pond turtle	0	10	0 percent	40	0 percent
Garter snake	0	20	0 percent	100	0 percent

Population estimates are based on studies conducted at Stanford: 1992 to present (most variation is based on annual fluctuations)

Table 5-2 Summary Estimated Loss of Zone 1 and 2 Habitat

	Annual estimated short-term habitat disruption	Total estimated short-term habitat disruption	Annual estimated permanent loss of habitat	Total estimated permanent loss of habitat
California red-legged frog	2.0 acres	100 acres	0.6 acres	30 acres
Steelhead ²	600 feet (max. in one year)	15,000 feet	40 feet	2,000 feet
California tiger salamander	2.0 acres	100 acres	1.4 acres	68 acres
Western Pond turtle	1.6 acres	80 acres	0.3 acres	15 acres
Garter snake	4.0 acres ³	200 acres	1.9 acres	98 acres

Permanent loss of habitat totals are not identical to the values shown in Table 4-1 because some of the habitat is shared by multiple species and some permanent loss of habitat is associated with Covered Activities other than future development, such as maintenance of existing utilities.

² The steelhead numbers represent temporary and permanent habitat loss only within the creek channels.

³ In addition, there would be approximately 76 acres of grassland that would be mowed each year for fire break and CTS conservation purposes.

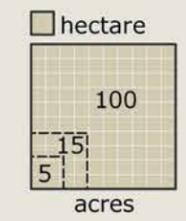
Stanford University Habitat Conservation Plan

Possible Location of Assumed Development

- Zone 1, 20-30 acres could be developed within zone
- Zone 2, 25-45 acres could be developed within zone
- Zone 3, 35-105 acres could be developed within zone

- No Build Areas
- CTS No Build areas for term of HCP
 - Conservation Easement

Note: Assumed development cannot occur in either the CTS No Build areas or the Conservation Easements



Sources:
HCP Zones: Stanford University Campus Biologist, 2006
Aerial photos: Aerotopia, 1999
Creeks: US Geological Survey, 1991

Disclaimer:
This map was produced by the SU Planning Office. While generally accurate, this map may not be completely free of error. The information is derived from a variety of sources deemed reliable, but subject to recurrent change and Stanford does not warrant the accuracy and completeness of these data.

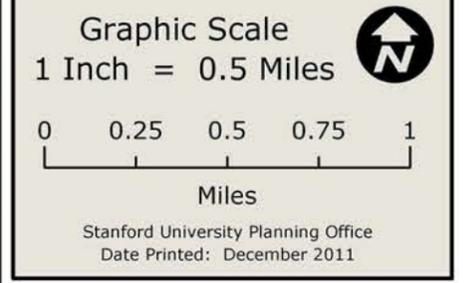
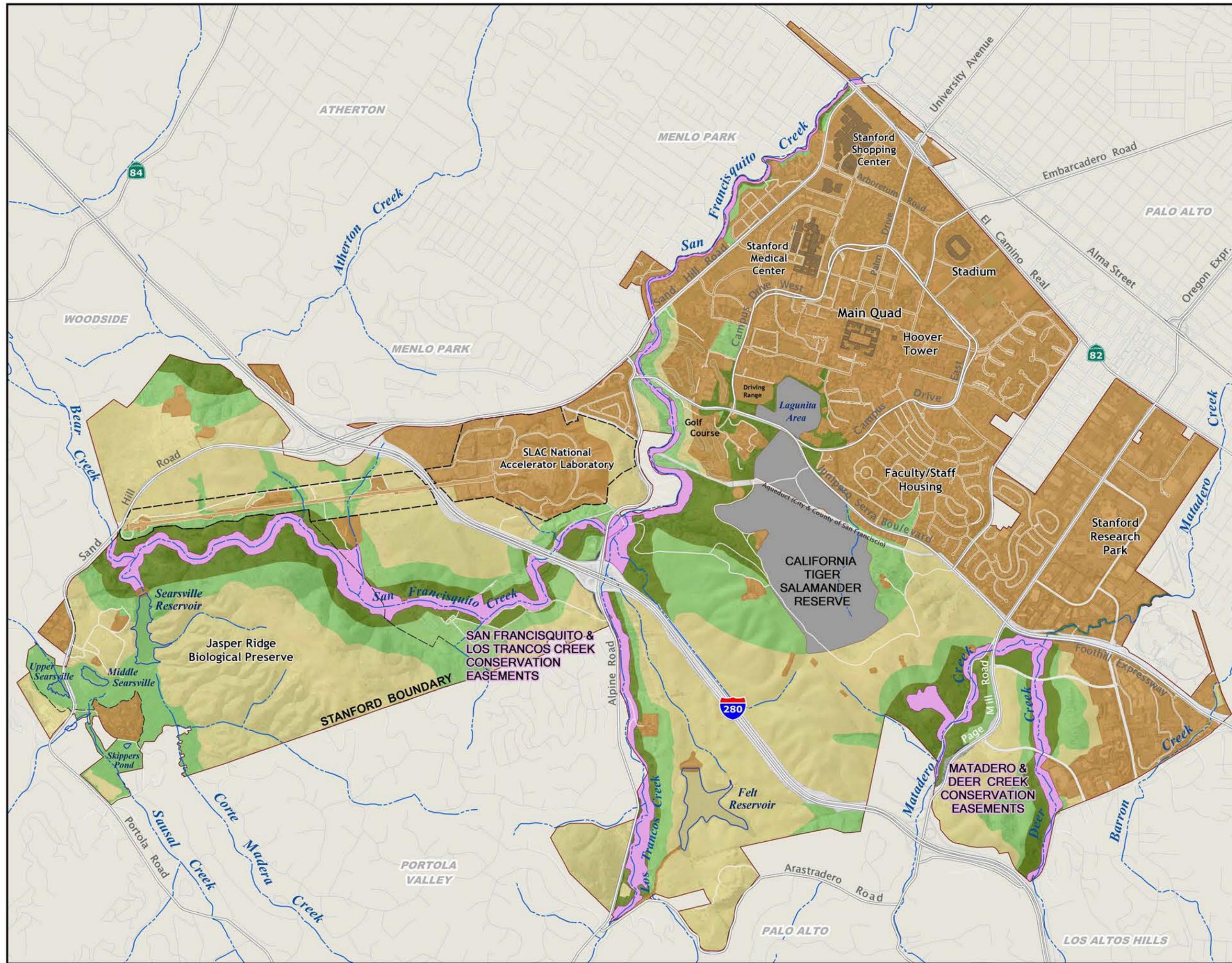


Figure 5-1



For example, recent population estimates for California tiger salamanders at Stanford range from 400 to 4,000 adults and juveniles. The Covered Activities are projected to result in the incidental mortality of an average of 20 adult and juvenile tiger salamanders per year. This represents an annual loss of between 1 percent and 5 percent of the current population. If successful implementation of the Conservation Program increases the number of tiger salamanders to 10,000, a loss of 1 percent to 5 percent per year of the increased population would be between 100 and 500 adult and juvenile California tiger salamanders. The significance of this annual loss of 1 percent to 5 percent of the population is reduced as the overall population increases because as populations increase in size, they become less susceptible to the multitude of risks associated with small populations. Therefore, a population's chance of long-term persistence is greatly enhanced when the overall number of individuals increases.

Take generally occurs only in Zones 1 and 2, and Table 5-2 provides a summary of the estimated loss of areas designated Zone 1 and 2. These areas contain habitat for the Covered Species, and are either occupied by the Covered Species or provide the species with habitat that is necessary for their survival, including buffers between occupied habitat and disturbed areas, food sources, and dispersal routes. Zone 3 is comprised of undeveloped open space that benefits the local flora and fauna, including the Covered Species. This benefit, however, is very diffuse and is not linked to any specific population of the Covered Species. Zone 4 includes urbanized areas, and incidental mortality only occurs in Zones 3 or 4 when a species strays from its habitat.⁴

For purposes of this analysis, Stanford estimated the number of Covered Species at Stanford. The population estimates used for this analysis are based on 15 years or more of site-specific work on the Covered Species. However, accurate population estimates are difficult to attain especially when invasive methods are not used. The population estimates in this analysis therefore provide a range of population levels for each of the Covered Species, and the analysis relies on the low end of the range to assess the maximum potential impact to the species. The estimated population levels and potential maximum level of incidental mortality are shown in Table 5-1.

5.3.1 California red-legged frog

The estimated number of California red-legged frogs at Stanford are based on annual surveys conducted since the mid-1990s. These surveys include day and night field activities. While eggs and tadpoles were routinely observed during these field activities, the estimates are for juvenile and adult frogs only. Repeated visits to areas known to support red-legged frogs were used to estimate the number of unseen frogs, which



is based on the likelihood of observing an individual known to be in the area on a specific site-visit. This information, along with precise information on the spatial distribution of sightings, was then used to estimate the number of unseen frogs. In this case, the surveys concluded that for every individual red-legged frog that was observed during the surveys, there were another 2 to 3 individuals in the area. Other methods, most notably toe-clipping or pit-tagging, could yield more quantitatively precise estimates, but gathering data in this manner could cause the take of red-legged frogs. Based on the data available, over the last decade the number of California red-legged frogs at Stanford has ranged from 25 to 250.

Direct Impacts. Agricultural activities, cattle grazing, academic field work, vegetation management, and activities within the riparian areas and creek banks, such as cleaning the water diversion facilities, and bank stabilization, may result in the take of red-legged frogs. In addition to direct harassment, harm, or mortality from these activities, approximately 2 acres per year of red-legged frog habitat will be temporarily disturbed. This disturbance will cause individual red-legged frogs to alter their behavior, which may increase their level of mortality, either by increased risk of predation or by dispersing frogs to inhospitable locations. Although the Minimization Measures will reduce the amount of take associated with the Covered Activities, the Covered Activities could result in the incidental mortality of an average of three frogs per year, and represents 1 to 12 percent of the recent population estimates.

Indirect Impacts. Permanent loss of Zone 1 and 2 habitat will reduce the number of California red-legged frogs that Stanford can support. Approximately 30 acres of red-legged frog habitat is anticipated to be lost during the life of the HCP.

Net Effects. During the life of the HCP, the overall red-legged frog population is expected to increase. The Conservation Program, particularly the riparian easements, construction of new off-channel breeding ponds, control of non-native species, and bank stabilization should result in a net increase in the quality of red-legged frog habitat and decrease in mortality rates, which will lead to an increase in the red-legged frog population. As discussed above, an increase

⁴ California tiger salamanders are occasionally found in the urbanized areas of the campus. Curbs and other improvements trap the tiger salamanders and prevent them from returning to suitable habitat.

in the species' population will lead to a greater distribution of the red-legged frog at Stanford and greatly reduce the chance of local extinction. It will also lead to an increase in the absolute number of frogs that are harmed or killed. While the number of red-legged frogs subject to incidental mortality may increase, the overall percentage of the population that is impacted will not increase.



5.3.2 Steelhead

Steelhead population estimates are based on field surveys conducted annually since 1997. Summer electrofishing surveys were conducted annually in the late 1990s and early 2000s, and snorkel surveys have been conducted in years with appropriately high water since the early 2000s. These surveys calculated the number of individual juvenile steelhead per 750-foot reach, per mile, and in the entire Stanford portion of Los Trancos, San Francisquito (downstream of Searsville dam), and Bear creeks.⁵ Different years frequently yielded different estimates, which were used to develop an estimated range in population level. Rainy season surveys for redds or migrating adults in the San Francisquito watershed were not conducted. Narrow channels, abundant debris, murky water, and very erratic flow rates make working in the creeks during the rainy season dangerous for both researchers and steelhead. Such conditions also reduce the reliability of the data. Based on the best available data, the number of juvenile steelhead annually present during the summer field season at Stanford over the last decade has ranged from 1,500 to 9,000 individuals.

Direct Impacts. Maintenance of the diversion facilities, bridge repairs, creek bank stabilization, and other instream

⁵ The steelhead surveys do not include information on migratory adults, eggs, alevin, or small fry because these life history stages are absent during the summer field season. There are no estimates, therefore, on the impacts of Covered Activities on any of these life history stages. However, the vast majority of potential impacts by Stanford occur in the dry season, during the period when reasonable population estimates are available.

activities that occur from time to time may result in take of steelhead. The instream work typically requires dewatering a short reach of creek and relocating steelhead. Dewatering sections of the creek and handling individual steelhead will unavoidably result in take. In most years, Stanford does not dewater the creek in connection with a Covered Activity. However, the HCP would allow a maximum of 600 feet of creek to be dewatered in a single year. If this occurred, it is estimated that a maximum of 300 juvenile steelhead would be relocated. The maximum annual incidental mortality associated with dewatering activities is estimated to be approximately 10 juvenile individuals.

In addition, conservation program activities such as electrofishing and trapping will result in direct take of steelhead. Annual electrofishing is estimated to collect up to 2,000 juvenile steelhead, and downstream migrant trapping may collect up to an estimated 1,000 juvenile steelhead. All collected fish will be measured and returned to the creek. The incidental mortality associated with these collection activities is estimated to be up to 90 juvenile steelhead.

In addition, the water diversion structures and their operations could result in take of steelhead. While this take has not been observed, and the population has continued to thrive in the existing environment, it is possible that diversions and operations could strand steelhead, increase rate of predation, or inhibit dispersal. It is estimated that the diversion operations with the SHEP operating protocols could result in the annual incidental mortality of 20 juvenile steelhead. Incidental mortality associated with maintenance of these diversion facilities is included in the estimates associated with dewatering described above.

Indirect Impacts. Approximately 7 acres of Zone 1 and 2 riparian or adjacent upland habitat will be developed during the life of the HCP.⁶ Of this amount, up to 2,000 feet of creek channel habitat could be lost to bank stabilization and/or infrastructure maintenance/improvements. Other indirect impacts to steelhead include water diversions at the Los Trancos diversion facility and San Francisquito Creek pump station that occur during the winter and spring, which reduce the suitability of habitat for steelhead migration and spawning. The Covered Activities will not result in the adverse modification of steelhead Critical Habitat. Except for some existing utility and transportation facilities, all of Stanford's portion of the steelhead Critical Habitat will be protected under a permanent conservation easement, which will limit activities in the easement area.

Net Effects. Some of the Covered Activities that will result in the take of steelhead also will benefit steelhead. For ex-

⁶ The 7 acres is included in the estimated acreage lost for red-legged frogs and western pond turtle. The total amount of habitat for steelhead, red-legged frogs, and western pond turtles is 30 acres, and the majority of this habitat is Zone 2 upland red-legged frog habitat.



ample, monitoring activities will result in incidental mortality but will provide information important to the conservation of the species. Overall, the HCP will improve and protect steelhead habitat, and likely increase the population of steelhead at Stanford.

5.3.3 California tiger salamander

Although Stanford has conducted rainy night surveys for nearly 2 decades, it is difficult to estimate the number of tiger salamanders at Stanford. California tiger salamanders have a secretive nature, and the landscape at Stanford is a complex mix of urban facilities, roads, and undeveloped academic lands. The presence of a large number of people, including residents, visitors, and college students, renders traditional surveys, which include fencing and pit-fall traps, too difficult to conduct. The wildlife agencies have recommended against toe-clipping and pit-tagging, and Stanford has therefore relied primarily on visual surveys.

Despite these difficulties in surveying for California tiger salamanders, rainy night surveys since the early 1990s have produced an abundance of data on the number of migrating adult and juvenile salamanders. During most years, fewer than 50 salamanders are observed, either as live migrating individuals or as road-kill. During years with appropriately timed fall rains, however, approximately 500 individual salamanders have been observed. Although not all of the populations' adult and juvenile salamanders migrate during these mass migrations, and observers undoubtedly did not encounter every migrating salamander, these mass migrations provide valuable data on the size of the local population. To determine the estimated number of tiger salamanders at Stanford, this analysis assumed that at least 50 percent of adult and juvenile salamanders migrate during mass migrations, and based on the spatial configuration of the campus, concluded that approximately 25 percent of those migrating are observed. Based on these assumptions, Stanford concluded that over the last 15 years, there was a maximum of approximately 4,000 adult and juvenile tiger salamanders at Stanford.

There has not been a mass migration of salamanders at Stanford for nearly a decade. During the past decade,

California tiger salamander migration has been much less synchronized, although tiger salamander reproduction has been observed regularly. In these years, the percentage of individuals migrating is well below 50 percent, and salamander migration is not frequently observed. This results in less precise estimates of the population size, and likely leads to an underestimation of the size of the population. Based on the data provided during these years, Stanford estimates that the California tiger salamander population could be as low as 400 individuals.⁷

Direct Impacts. Most of the take will occur because the majority of Stanford's California tiger salamander population breeds in and resides near Lagunita, which is located adjacent to the urbanized portion of the campus. Take of California tiger salamanders may also occur in the foothills south of Junipero Serra Boulevard in areas where there are urban facilities, such as the radio telescope and student observatory or areas where existing utility corridors exist. (The population sinks in the foothills are shown on Figure 2-4). Landscaping, pipe repair, road maintenance, development and redevelopment, and other routine activities needed to operate the University therefore all affect the California tiger salamander. On average, approximately 2 acres of tiger salamander habitat will be temporarily disturbed per year. This short-term disruption of habitat does not result in a permanent reduction of habitat, but may increase the level of mortality for those salamanders that inhabit the disturbed area. The take of tiger salamanders during the course of day-to-day operations has been reduced since the mid-1990s when a range of educational and conservation measures were implemented, and will be further reduced through the implementation of the HCP. However, the Covered Activities could cause the incidental mortality of up to 20 tiger salamanders per year, which is approximately 1 percent to 5 percent of the current tiger salamander population at Stanford.

Indirect Impacts. Approximately 68 acres of Zone 1 and 2 California tiger salamander habitat could be developed during the life of the HCP. As part of the Conservation Program, Stanford is actively creating new tiger salamander breeding habitat south of Junipero Serra Boulevard. The location of these new ponds will allow tiger salamanders to more readily occupy larger portions of the undeveloped foothills. The HCP will create a 315-acre CTS Reserve that will initially include the eight tiger salamander breeding ponds built in 2003. Three of these ponds already support tiger salamander breeding. The Conservation Program will effectively shift the center of the local tiger salamander population from Lagunita, located at the edge of the developed main campus, to the largely undeveloped lower foothills. Thus, the habitat quality of grassland and oak woodland available for upland

⁷ Estimates of the tiger salamander population do not include eggs and larvae, which are monitored every year. The Covered Activities generally affect only the adult and juvenile tiger salamanders, and therefore direct effects to the eggs and larvae were not included.

habitat for tiger salamanders will increase if the Conservation Program is successful. However, up to 1.4 acres of upland tiger salamander habitat per year or 68 acres over the duration of the HCP could be permanently lost at Stanford.

Net Effects. Several of the ongoing Covered Activities, including maintenance and operation of Lagunita, mowing, and cattle grazing, benefit California tiger salamanders. Lagunita is an artificial flood control and water storage facility that supports tiger salamander breeding. Mowing the bed of Lagunita for fire control and grazing in the foothills facilitate California tiger salamander dispersal. The implementation of the Conservation Program, which includes a 315-acre CTS Reserve and newly constructed breeding ponds away from developed areas, will substantially increase the quality of tiger salamander habitat at Stanford. Overall, the HCP will have a beneficial effect on the California tiger salamander, and the overall population is expected to increase substantially. As discussed above, an increase in the species' population may result in an increase in the number of individual salamanders that are subject to incidental mortality. However, the overall percentage of the population that is affected (1 to 5 percent of the population) will not increase.



5.3.4 Western pond turtle

The population of western pond turtles at Stanford is currently very low. Surveys from the mid-1990s to the present identified very few turtles, and fewer than ten turtles have been seen since 2000. Records show that there were very few turtles at Stanford during the 1990s; however, there were more turtles at Stanford in the 1990s than there are now. Current estimates are between 10 and 40 western pond turtles at Stanford.

Direct Impacts. Fewer than ten western pond turtles have been found at Stanford during the past 5 years, and the Covered Activities have very little effect on the turtles. Because of the nature of the Covered Activities, and the extremely low existing population of western pond

turtles, Stanford will not kill any of the individual turtles. Approximately 1.5 acres of potential turtle habitat will be unavoidably disturbed annually. This disturbance is primarily the result of maintenance of the diversion facilities, bridge repairs, creek bank stabilization, and other instream activities that occur from time to time. Given the scarcity of turtles and the frequency of the Covered Activities, it is not anticipated that these activities will harm or harass the turtles.

Indirect Impacts. Approximately 15 acres of potential western pond turtle habitat is anticipated to be lost during the life of the HCP. The local western pond turtle population is significantly below its carrying capacity and there is more than enough suitable habitat to support any reasonably foreseeable increase in the western pond turtle population. Therefore a slight reduction in this carrying capacity due to the permanent loss of habitat will not affect the turtle.

Net Effects. The implementation of the Conservation Program, particularly the riparian easements and creek maintenance, will improve and expand western pond turtle habitat. However, the population likely will not increase during the life of the HCP, even with the successful implementation of the Conservation Program. The low number of western pond turtles at Stanford is due to several historic factors, including the development of the surrounding communities. Overall, the HCP will improve habitat for the western pond turtle, but this may have little effect on the population.

5.3.5 San Francisco garter snake

Stanford currently supports a small garter snake population. A few individual garter snakes are encountered at Lagunita every year, but specimens from other locations at Stanford are only very infrequently observed. Recent observations indicate that fewer than 100 garter snakes currently live at Stanford. However, the number of garter snakes at Stanford may be increasing, primarily due to recent salamander-related changes in land management (e.g., Lagunita is no longer disced for fire control).



Direct Impacts. Approximately 80 acres of potential garter snake habitat⁸ will be unavoidably disturbed annually. This disturbance is primarily the result of dry season vegetation management. However, dry season mowing generally has very little effect on the garter snakes, and since the population density of garter snakes at Stanford is very low, all lethal take of garter snakes will be avoided. These activities may harass any garter snake that happens to be present. By avoiding the lethal take of all garter snakes, Stanford will avoid any potential lethal take of the protected San Francisco garter snake.

Indirect Impacts. Approximately 98 acres of potential garter snake habitat is anticipated to be lost during the life of the HCP. Suitable habitat areas could support a larger garter snake population. Therefore, a slight reduction in the amount of suitable habitat will not have an adverse effect.

Net Effects. The implementation of the Conservation Program, particularly the riparian easements and the Central Campus CTS Management Plan will protect and improve potentially suitable habitat. It is unclear whether the local garter snake population will continue to increase during the life of the HCP, even with the successful implementation of the Conservation Program. The low number of garter snakes at Stanford is due to several historic factors, including the development of the surrounding communities and now discontinued land management practices. Overall, the HCP will improve habitat conditions.

5.4 CUMULATIVE IMPACTS

As described above, the impacts of the Covered Activities were assessed relative to the existing conditions at Stanford. Chapter 3 of the HCP defines the Covered Activities as broadly as possible to encompass a wide variety of University-related activities and future development. Development in the surrounding communities, which is outside the scope of this HCP, may contribute to cumulative impacts on the Covered Species. Thus, other activities and projects in the region that are not covered by this HCP may, in conjunction with this HCP, affect the Covered Species. Specific projects not covered in this HCP that may impact the Covered Species are described below. Additional potential cumulative impacts are described in the EIS for the HCP.

The cumulative impact analysis addresses a relatively local geographic area that includes San Mateo and Santa Clara counties on the San Francisco Peninsula. For purposes of this HCP, the geographic limit for steelhead was expanded to include the Central California Coast Distinct Population Segment.

⁸ This habitat is suitable for all local garter snakes, and the effects apply to all local garter snakes at Stanford, whether or not they are considered San Francisco garter snakes.

5.4.1 Steelhead Habitat Enhancement Project (SHEP)

Stanford worked with the CDFG and NOAA Fisheries to develop the Steelhead Habitat Enhancement Project at Los Trancos Creek Diversion Facility, San Francisquito Creek Pump Station and Felt Reservoir (SHEP). This project addresses in-stream structures and diversion from San Francisquito Creek and Los Trancos Creek. The SHEP was developed independently of the HCP, and construction activities were permitted separately. The SHEP facilities were constructed in the summer and fall of 2009, and Stanford's water diversion facilities on Los Trancos and San Francisquito creeks continue to operate as described in the SHEP.

The goals of the SHEP are to enhance fish passage conditions at the in-stream structures and to reduce diversion without adversely impacting Stanford's water supply. The SHEP includes:

- Physical modifications at the Los Trancos Diversion/Ladder Facility;
- Operational modifications at the Los Trancos Fish ladder diversion facility;
- Physical modifications at the San Francisquito Creek Pump Station;
- Operational modifications at the San Francisquito Creek Pump Station.

(See Appendix A for a project description in the Biological Opinion and the Streambed Alteration Agreement). The SHEP will improve steelhead habitat and decrease the incidental mortality of steelhead associated with the diversion facilities.

5.4.2 The San Francisquito Creek Bank Stabilization and Revegetation Master Plan

Another project related to habitat in San Francisquito Creek is a master plan developed by the Santa Clara Valley Water District (SCVWD) to address bank stabilization and revegetation. The master plan defines the range of bank stabilization and revegetation techniques that are most appropriate for San Francisquito Creek and describes them at a conceptual level. The primary goal of the master plan is to develop stabilization methods for eroding banks that allow vegetation establishment for habitat development, streamside shading, and fisheries enhancement.

The master plan describes steps involved in planning habitat restoration that may or may not follow bank stabilization attempts, such as vegetation restoration and fisheries and wildlife protection and enhancement guidelines. These guidelines aim to reduce the level of bank erosion and failure along the

lower reaches of the creek while also restoring the riparian corridor to a more native plant assemblage.

The master plan should improve San Francisquito Creek's riparian habitat for steelhead, red-legged frogs, garter snakes, and western pond turtles. The conservation activities proposed in the master plan may result in some take. However, improving habitat outside of Stanford, in conjunction with Stanford's conservation efforts, will improve habitat for these species.

5.4.3 San Francisquito Creek Study

The U. S. Army Corps of Engineers (USACE) and San Francisquito Creek JPA initiated a Feasibility Study in April 2006 that is intended to identify and evaluate ways to alleviate flooding, address environmental degradation, and identify recreational opportunities in the San Francisquito Creek watershed. The USACE anticipates that the feasibility study will take approximately 7 years to complete and any project selected for implementation will require Congressional approval and further NEPA review. The Notice of Intent (NOI) for the Feasibility Study identified several potential alternatives that could affect Stanford lands, including the construction of new detention basins, modifications to Searsville Dam, or the removal of Searsville Dam. These were just a few of several potentially viable alternatives identified in the NOI. At this time, the Feasibility Study has not identified a preferred alternative or even determined whether any of the alternatives identified in the NOI are feasible.

Any modifications to Searsville Dam or San Francisquito Creek could affect steelhead, red-legged frogs, garter snakes, and western pond turtles. However, the effects on these species are currently unknown, because no specific improvements have been identified. Before any flood control actions are taken, they would be subject to review under NEPA, at which time the direct, indirect, and cumulative effects of the project would be addressed.

5.4.4 Santa Clara Valley Draft HCP/NCCP

The Santa Clara Valley HCP/NCCP is a regional partnership between the County of Santa Clara; Santa Clara Valley Transportation Authority; Santa Clara Valley Water District; the cities of San Jose, Gilroy and Morgan Hill; the CDFG; and the Service. The HCP/NCCP will cover approximately 520,000 acres in southern Santa Clara County, and will address the California tiger salamander, California red-legged frog, western pond turtle, western burrowing owl, Bay checkerspot butterfly, and other plant and animal species. The draft HCP/NCCP identifies a broad range of activities, including urban development, major capital improvements, and instream operations, maintenance, and projects. The draft finds that the Covered Activities will result in the take of the Covered Species and in habitat loss and degradation. However, the draft also includes a conservation strategy that recommends

preserving approximately 45,000 acres of habitat. Thus, the Santa Clara Valley HCP/NCCP in conjunction with the Stanford HCP should provide regional protection for the Covered Species.

5.4.5 Urban Growth

Future non-Stanford development in San Mateo and Santa Clara counties will continue during the life of the HCP. Continued development will have a cumulative effect on all of the Covered Species. For example, the loss of wetlands in Santa Clara County from future development will reduce breeding habitat for the California tiger salamander, storm water runoff from urban landscapes in both counties that includes pesticides and human use of creek habitats for recreation alter California red-legged frog, steelhead, and western pond turtle habitat. Recreational trails in upland areas can degrade California red-legged frog and California tiger salamander habitat. Urban development outside Stanford, coupled with Stanford's future development, will reduce the amount of existing habitat for the Covered Species. Some or all of these losses may be offset by mitigation. However, it is unknown at this time whether mitigation will make up for the lost functions and values of the existing habitat. Therefore, the precise impact of cumulative future growth is unknown.

5.4.6 Ongoing and Routine Agriculture

Ongoing and routine agricultural activities off of Stanford lands may have some cumulative impacts on the Covered Species. Ongoing grazing may limit or degrade riparian habitat for the western pond turtle, California red-legged frog, and steelhead. Unregulated grazing can also degrade upland habitat for the California tiger salamander, garter snakes, and California red-legged frog, and individuals may be trampled by cattle. Since the impacts of ongoing and routine agriculture are generally unregulated, and mitigation is therefore not required for impacts associated with these activities, some adverse effects on the Covered Species is expected. However, the precise impacts of ongoing and routine agriculture, and their cumulative effects, are unknown.

SECTION 6

PLAN IMPLEMENTATION



6.0 PLAN IMPLEMENTATION

Section 6.0 describes how the HCP will be implemented and the persons and entities responsible for its implementation.

6.1 PLAN PARTICIPANTS

6.1.1 Stanford University — Permittee

Stanford University has been in existence for nearly 120 years, which is longer than many Bay Area cities, and consistent with the Founding Grant, intends to be a permanent academic institution. Over the last century, a city-sized academic campus has been established on Stanford lands, as well as several commercial and retail businesses that financially support the University. The campus also includes thousands of acres of open space lands, some of which are leased for agriculture, horticulture, grazing, and equestrian uses.

6.1.2 Subpermittees

Much of the land south of Junipero Serra Boulevard and areas within San Mateo County are leased for agricultural and equestrian related uses.¹ These are considered interim uses to generate income for the University, while preserving these lands for future academic uses. Most of the agricultural leases are short-term and can be terminated annually, although some of the leases are for longer terms. The HCP will regulate some of the lease holders' activities, and Stanford, through the Conservation Program Manager, will require the lease holders' compliance with the terms of the HCP and related permits. The lease holders will be covered by the incidental take permits, and Stanford may issue Certificates of Inclusion making the lease holders subpermittees under the HCP.

Several entities, including Pacific Gas and Electric Company (PG&E), the San Francisco Public Utilities Commission (SFPUC), the Santa Clara Valley Water District (SCVWD), and the San Francisquito Creek Joint Powers Authority (JPA) own or operate utilities and other facilities located throughout the University. These facilities provide Stanford and the surrounding community with public utility, and other, services. Operation and maintenance of these facilities may be covered by the incidental take permits through Certificates of Inclusion, and Stanford may issue a Certificate of Inclusion to any entity that owns or operates facilities on Stanford's lands if the entity agrees to comply with the terms of the HCP and related permits. These entities would be considered subpermittees under the HCP.

Stanford will be responsible for requiring the subpermittees' compliance with the HCP, take permits, Implementing Agreement (IA), and Certificates of Inclusion. Stanford, as a

¹ The 12 agricultural and equestrian leases comprise approximately 2,200 acres in the following categories: six horse boarding facilities, one nursery, one vineyard, and four multiple-use ranches that include cattle grazing.

condition of the Certificates of Inclusion and any future leases, will require the subpermittees to take remedial measures in the event the terms of the HCP, Certificates of Inclusion, incidental take permits, or IA are not adhered to by a subpermittee. Stanford, as the primary permittee under the incidental take permits, will be responsible for ensuring any and all necessary remedial measures are taken, and will undertake any required remedial measures if the subpermittees fail to do so.

6.1.3 Wildlife Agencies

The Service and NOAA Fisheries have the authority to issue Section 10(a)(1)(B) incidental take permits under the ESA and are responsible for enforcing the provisions of the HCP and all permits issued under the HCP subject to Stanford's responsibility for enforcing the provisions of the HCP, permits, and IA against its lease holders, and for reviewing annual status reports and responding to requests for amendments. The Service has jurisdiction over terrestrial species and resident aquatic species, and NOAA Fisheries has jurisdiction over migratory aquatic species, such as steelhead. The Service and NOAA Fisheries also will maintain and provide information regarding current survey protocols.

Once the wildlife agencies have issued an incidental take permit, primary responsibility for implementing the HCP will rest with Stanford. However, the wildlife agencies will receive reports concerning the HCP's implementation and they will provide input on Stanford's implementation of the HCP's conservation program, and guidance on how to respond to changed circumstances (described below).

6.2 TERM OF PERMIT

Stanford is seeking incidental take permits from the Service and NOAA Fisheries with terms of 50 years. The incidental take permits issued under Section 10(a)(1)(B) of the ESA and the associated HCP would each be in effect for a period of 50 years from the date of issuance of the permits. Upon expiration of the incidental take permits, Stanford will not have take authorization under the ESA. However, prior to permit expiration, Stanford may apply to renew the incidental take permits and associated HCP, and rollover its unused credits. Stanford anticipates that it may seek renewals of up to 10 years, subject to mutual review and agreement by the parties. To give the parties adequate time to review and process permit renewals, the parties will initiate the permit renewal review 5 years prior to the expiration of the initial 50-year period, and 1 year prior to the expiration of any renewal.

In choosing an appropriate permit term, Stanford considered several factors consistent with the "five-point policy" described in Section 1.2.3, including the duration of the covered activities, the effects to species, and the relationship between the permit duration and the HCP's conservation program. Fifty years was chosen as the permit duration because it is a reason-

able timeframe for Stanford to forecast its operational and infrastructure needs, as well as to anticipate future development that could affect Covered Species habitat. As discussed in Section 1.1, Stanford has more than 120 years of hindsight and experience in operating the University, and forecasting its future needs. Many of Stanford's operational, maintenance, and academic activities have changed very little during this time, and will continue for at least the next 50 years. Major infrastructure, such as domestic water pipelines, roads, and bridges, are relatively permanent, and the maintenance and operation of these facilities does not typically change over time. Likewise, Stanford will have to continue to engage in fire and public safety actions, such as maintaining fire breaks and removing debris from the creeks that could result in flooding of urbanized areas. The 50-year timeframe is also expected to be necessary to use up the credits that Stanford will earn from its initial preservation of 360 acres of habitat and other habitat enhancements. A 50-year time frame also provides a reasonable conservation planning horizon, and will allow Stanford to achieve important conservation measures, particularly the goal of stabilizing its tiger salamander population by reducing the tiger salamander's reliance on Lagunita and transitioning the population to more appropriate, newly created habitat in the foothills.

6.3 ESTABLISHMENT OF IMPLEMENTATION ENTITIES

6.3.1 HCP Authorities and Responsibilities

The University's Board of Trustees (BoT) establishes land use policy and will ultimately approve the HCP and authorize the President or Vice President for Land Buildings and Real Estate (VPLB&RE) to apply for an incidental take permit from the Service and NOAA Fisheries, to sign agreements implementing the HCP, and grant the permanent conservation easements described in Section 4.3 of the HCP. Likewise, the VPLB&RE will obtain funding from the University to implement the HCP, and when the BoT approves the HCP, it will commit to authorize annual funding for the HCP.

When the BoT approves the HCP, Stanford will establish an HCP Conservation Program Manager position to oversee the day-to-day implementation of the HCP. The Conservation Program Manager will also communicate directly with the Service and NOAA Fisheries as needed. More information about the Conservation Program Manager position is provided in Section 6.3.2, below.

A separate, non-profit land trust organization will be formed pursuant to Section 815 of the California Civil Code to hold the San Francisquito/Los Trancos Easement, Matadero/Deer Easement and any subsequent conservation easements granted in accordance with Section 4.3 of the HCP. More information about the land trust is provided in Section 6.3.3, below.

6.3.2 Conservation Program Manager

As described above, Stanford will create and fund a Conservation Program Manager position for the life of this HCP. The Conservation Program Manager will have the day-to-day implementation responsibilities for Stanford University's HCP. Generally, these responsibilities fall into five areas.

Minimizing Impacts from Ongoing Operations

The conservation program described in Section 4.0 identifies many minimization measures that require involvement by the Conservation Program Manager. Generally, these measures have the following requirements for the Conservation Program Manager:

- Develop a protocol for submission of any plans or activities that require consultation with or review by the Conservation Program Manager,
- Review various ground-disturbing activities in Zones 1 and 2,
- Assess habitat value, and
- Identify design or operation alterations to reduce the potentially adverse effects of the Covered Activities on the Covered Species.

In addition, the Conservation Program Manager will be consulted when existing operations require relocation, so that such relocation can be beneficial to the Covered Species.

Input on University's Future Development

Many factors are considered when the University sites a new academic facility. The most important factor is the intended use of the building and its relationship to other buildings. In a university setting, the adjacency of related buildings can greatly affect the success of programs housed within those buildings. Once several potentially suitable sites have been identified, other factors such as existing infrastructure, environmental impacts, and cost are used to select the final site.

The Conservation Program Manager will be involved in the University's site selection process, identifying potential impacts to the Covered Species at each of the alternative sites. If the University selects a site that would result in loss of habitat in Zones 1, 2, or 3, the Conservation Program Manager will identify the mitigation requirements of the development (e.g., how many mitigation credits would need to be deducted from which account, and whether Stanford would have to earn more credits to offset the impacts).

Coordination with Wildlife Agencies

Stanford will seek guidance from the Service and NOAA

Fisheries regarding the implementation of the HCP. The Conservation Program Manager will seek guidance from the wildlife agencies regarding:

- The location of future conservation easement areas;
- Habitat enhancements;
- Potential fish passage improvements at Searsville Dam if a major modification of the dam is proposed;
- The design of any new bridges spanning San Francisquito or Los Trancos creeks;
- Any bank stabilization structures;
- Appropriate remedial or restoration efforts to address changed circumstances;
- Methods for addressing invasive species if current methods prove ineffective;
- The cause of any downward species population trends that are inconsistent with normal population variations and appropriate adaptive management techniques;
- Other changes to the conservation program made as a result of the adaptive management process.

In addition, Stanford will provide the Service and NOAA Fisheries with a copy of all applications, including pre-construction notifications (PCN), that Stanford submits to the Department of the Army, U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act. Stanford will transmit a copy of the application/PCN to the Service and NOAA Fisheries within 3 days of submitting it to the Corps. When Stanford transmits the Section 404 permit application/PCN to the Service and NOAA Fisheries, Stanford will also identify the applicable HCP Covered Activity and the associated minimization and mitigation measures for the Service and NOAA Fisheries.

General Biological Activities

In addition, the Conservation Program Manager will have general biological responsibilities, which include:

- Coordinate and review biological enhancement activities;
- Coordinate the management and monitoring activities described in this HCP;
- Collect and analyze data gathered during the implementation of this HCP;
- Coordinate the adaptive management and biological monitoring efforts described in this HCP;

- Keep abreast of current scientific methods and concepts;
- Communicate with other scientists at Stanford and external scientists, including wildlife agency staff.

Administrative Activities

The Conservation Program Manager will be responsible for the ongoing administrative tasks that will be required in order to implement the HCP. They include:

- Coordinate implementation of the HCP;
- Coordinate the preparation and submission of the Annual Report (Section 6.4) to the Service and NOAA Fisheries;
- Develop an annual budget to ensure adequate funding on an annual basis;
- Monitor compliance with the HCP and any plans or programs that are developed under the HCP; and
- Develop, review, and approve, as required, all plans or programs Stanford or its lease holders are required to develop under the Conservation Program.

To ensure the Conservation Program Manager is qualified for the position and able to effectively implement this HCP, the person holding this position will have been awarded no less than a Masters of Science in a field related to conservation biology, and will be familiar with the habitat needs of the Covered Species. Other biologists and staff may assist the Conservation Program Manager in carrying out the activities that the Conservation Program Manager is responsible for under this HCP. The Conservation Program Manager and other biologists that might handle Covered Species will comply with the appropriate federal and state regulations.

6.3.3 Entity to Hold Conservation Easements (Land Trust)

Stanford will be responsible for implementing the HCP, including the implementation of the Matadero/Deer Easement Monitoring and Management Plan, San Francisquito/Los Trancos Easement Monitoring and Management Plan, CTS Reserve Monitoring and Management Plan, Central Campus CTS Monitoring and Management Plan, and any subsequent perpetual monitoring and management plans. As described above, Stanford will form a non-profit land trust organization that is qualified under Section 815 of the California Civil Code to hold the conservation easements that the University will grant in accordance with Section 4.3 of the HCP.

The land trust will consist of a board of directors, with no less than five and no more than seven directors; and a non-voting ex officio member of the board who will provide administrative support to the board of directors. At least two members

of the board of directors will be selected from the public at large. The public-at-large members will be individuals who are or have been associated with environmental organizations focused on habitat, species, and land conservation purposes (for example, the Peninsula Open Space Trust, the California Council of Land Trusts, the California Nature Conservancy, and others). The President of Stanford will appoint the initial board of directors to a 2-year term. Future members of the board of directors will be selected as follows: The two public-at-large members will be selected by the board, and Stanford's President will appoint the remaining members of the board of directors.

The permanent conservation easements that Stanford grants pursuant to this HCP will give the land trust the right to enforce the terms and conditions of the conservation easement deeds (and these terms and conditions shall be reviewed and approved by the Service and/or NOAA Fisheries prior to recordation) and the HCP's Monitoring and Management Plans. The Service and NOAA Fisheries will be third-party beneficiaries of the conservation easements. As third-party beneficiaries, they also will be able to enforce the terms of the conservation easements.

In addition to holding the conservation easement deeds, the land trust will monitor Stanford's compliance with the HCP's Monitoring and Management Plans and the terms of the conservation easement deeds granted pursuant to the HCP. During the term of the HCP and associated permits, the Service and NOAA Fisheries will have primary responsibility for determining whether Stanford is complying with the terms of the HCP and the conservation easement deeds dedicated pursuant to the HCP. If Stanford is not in compliance, the Service and NOAA Fisheries will have the authority to suspend, revoke, and enforce the terms of the HCP and the associated permits in accordance with the IA and federal law. As such, if, during the term of the HCP and permits, the land trust determines that Stanford is not in compliance with the conservation easement deed or the HCP's Monitoring and Management Plans and the Service or NOAA Fisheries finds that Stanford is in compliance, the finding by the Service or NOAA Fisheries will prevail and the land trust will have no further recourse against Stanford or the Service and NOAA Fisheries, except as otherwise provided for in the conservation easement deeds. Following the expiration of the HCP and permits, the land trust entity will have primary responsibility for enforcing the terms of the conservation easements and the associated long-term monitoring and management plans, and the land trust will have the authority to legally enforce the terms of the easements. As third-party beneficiaries of the conservation easement deeds, the Service and NOAA Fisheries also will have the ability to enforce the terms and conditions of the conservation easement deeds after the permits expire.

Stanford will provide the land trust with copies of the Annual Report described in Section 6.4. In addition, the Conservation

Program Manager will provide the board of directors for the land trust with a mid-year written status report. This report will be provided to the board of directors at a regularly scheduled meeting, and will describe (i) the land conservation, monitoring, management, enhancement or other actions that have occurred within the easement areas since the most recently submitted Annual Report; (ii) monitoring, management, enhancement or other actions Stanford plans to take before the end of the annual reporting period; and (iii) Stanford's plans to conserve additional lands. At least once a year, Stanford will give the land trust the opportunity to visit the easement areas and thoroughly monitor compliance with the terms of the easement deeds.

6.4 ANNUAL REPORTING

Every year beginning after the first full year of the HCP's implementation, Stanford will submit an Annual Report to the Service and NOAA Fisheries that documents permit compliance (including impacts, land preservation and enhancements, and studies), management actions, monitoring results, and any changed or unforeseen circumstances that occurred. Annual Reports will include synthesis of data and reporting on important trends such as changes in habitat conditions² and the distribution and abundance of the Covered Species. The Annual Report will describe any enhancements planned for the upcoming year, any plans Stanford has to preserve additional land during the upcoming year,³ any anticipated changes in management techniques that Stanford plans to make and an explanation of why those changes are needed, confirmation that funding has been committed for the next year, and disclose any difficulties Stanford encountered in implementing the HCP.

The Annual Report is due on October 1, or the first business day in October if the first day of the month falls on a non-business day, each calendar year, or portion of a calendar year, during which the permits will be in effect. If Stanford cannot provide the Annual Report by the first business day in October, it can request an extension. The Service and NOAA Fisheries will provide Stanford with comments on the Annual Report within 60 days of receipt of the report. If either agency cannot respond within the 60-day period, it can request an extension. At the end of the comment period, Stanford and the wildlife agencies will confer about any comments the agencies have about the report. Stanford will incorporate, to the extent feasible, agency comments into the Annual Report at the time they are received.

Every 5 years Stanford will prepare an overview report that describes trends in species' distribution and abundance, and habitat quality. The 5-year report will synthesize data provided

² For example, drought conditions could result in habitat changes, and any actions taken in response to drought conditions will be described in the Annual Report.

³ Stanford may, at any time, preserve additional lands or make habitat enhancements even if the preservation or enhancement was not anticipated by the Annual Report.

in the previous Annual Reports (and any relevant data from the previous biological monitoring results that was not specifically included in an Annual Report) and include data about regional changes, such as climate change, flood control activities, urban development, major wildfires, floods, and droughts, that have affected the Covered Species.

The third 5-year report (i.e., 15 years after permit issuance) also will report on the status of Searsville Dam if no fish passage around Searsville Dam has been made pursuant to Section 4.2.1. The report will address potential opportunities during the remainder of the HCP to improve fish passage.

6.4.1 Accounting of Mitigation Land

The HCP establishes the San Francisquito/Los Trancos Riparian Account, Matadero/Deer Riparian Account, and CTS Account to account for the benefits to the Covered Species. The Riparian Accounts will initially be “funded” by the preservation of large portions of land that provide habitat for the Covered Species (Section 4.3). The Conservation Program includes measures to ensure the San Francisquito/Los Trancos Easement, Matadero/Deer Easement and CTS Reserve are established in a timely fashion, and to ensure that Stanford always maintains a sufficient number of credits in the San Francisquito/Los Trancos Riparian Account, Matadero/Deer Riparian Account, and CTS Account. (The CTS Reserve and easements are referred to collectively in this Chapter as the Preserved Areas.)

In the Annual Report, Stanford will include an accounting of all lands contained within habitat Zones 1 through 3 that have been subject to permanent conversion along with the acreage, location, and management status of lands required to be set aside as mitigation for the conversion. Specifically the report will include:

- (1) Conversion: The annual incremental and cumulative area converted to urban development in Zones 1, 2, and 3.
- (2) Mitigation: The annual incremental and cumulative area of mitigation lands preserved, and a description of which of the lands constitute Zones 1 and 2 habitats.
- (3) Net Acreage: The overall acreage of preserved land and a breakdown of acreage in the:
 - i. San Francisquito/Los Trancos Easement
 - ii. Matadero/Deer Easement
 - iii. CTS Reserve
 - iv. Other or newly created easement or preservation area
- (4) Net Credits: The annual incremental and cumulative

number of credits in the accounts, and an explanation of how any new credits were earned (e.g., by land preservation or enhancement activity as defined by Table 4-2). This will include a breakdown of the current number of credits in the:

- i. San Francisquito/Los Trancos Riparian Account
- ii. Matadero/Deer Riparian Account
- iii. CTS Account
- iv. Other or newly created account

6.5 FUNDING ASSURANCES

Stanford is responsible for ongoing habitat conservation, monitoring, and management as described in the HCP for the life of the permits. Stanford University is financially solid and derives income from rents, financial investments, tuitions, and private contributions. Stanford has sufficient revenue to cover the cost of implementing the measures proposed in the HCP. By resolution, Stanford’s Board of Trustees will approve the HCP and the IA, which will bind the University to carrying out the terms and conditions and funding requirements of the HCP.

Under the HCP, Stanford will manage 675 acres of habitat within the Preserved Areas, and an additional 95 acres will be managed under the Central Campus CTS Management Plan. In addition, Stanford may preserve and manage additional habitat for the benefit of the Covered Species during the life of the HCP. Implementation costs for the central campus area and Preserved Areas, and additional habitat enhancements for the Covered Species are estimated to be \$500,000 - \$600,000 per year. These estimates were derived from a review of current open space and habitat management expenditures in other comparable areas, and include:

- Salary for the Conservation Program Manager and other support staff;
- Field work staff, including graduate students and consultants;
- Support equipment such as vehicles and storage facilities;
- Enhancement projects such as new ponds or restoration, with budgets likely accrued annually and conducted periodically;
- Ongoing management of the Preserved Areas that includes non-native species management and removal; and
- Monitoring and preparation of annual reports.

Land acquisition costs are unnecessary because Stanford owns the land that is included in the HCP. As a result, the annual

funded amount identified above also does not include the fair market value of the land permanently dedicated to conservation.

Based on these cost estimates, Stanford will commit to including a line item for HCP implementation into its annual operating budget for the life of the HCP. That budget item will be sufficient for all aspects of the HCP implementation including funding of the Conservation Program Manager position (or a similar entity responsible for Plan implementation).

In accordance with the Conservation Program, Stanford will prepare long-term monitoring and management plans for the habitat that is protected through a conservation easement deed pursuant to the HCP. These monitoring and management plans, which will be subject to review and approval by the Service and NOAA Fisheries, will survive the expiration of the incidental take permits and this HCP, and Stanford will be responsible for ensuring that the long-term easement-related management and monitoring actions are funded after the HCP and associated incidental take permits expire. Funding for these future monitoring and management actions will therefore also be addressed in each of the long-term monitoring and management plans.

6.6 CHANGED AND UNFORESEEN CIRCUMSTANCES

Federal regulations define the concepts of “changed and unforeseen circumstances” and describe potential future responsibilities based on whether changes in circumstances could have reasonably been foreseen and whether they have been addressed by the HCP. This section of the HCP addresses changed and unforeseen circumstances in accordance with the regulations.

Generally, a changed circumstance is a change in the circumstances affecting a Covered Species that can be reasonably anticipated, which allows a plan to be developed in advance to accommodate the change. Changed circumstances include relatively predictable, but unplanned events, such as fires, flooding, and other natural occurrences such as an invasion of pests or non-native plants. It also includes occurrences such as an illegal or accidental spill of toxic materials. The wildlife agencies are required to ensure changed circumstances are identified and planned for in the HCP. Anticipating and addressing these changed circumstances adds to the conservation value of the HCP by reducing the potential risks associated with the changed circumstance. It also provides the agencies with additional assurance that Stanford will take certain actions if such an event occurs, and it gives Stanford the assurance that it will not be held accountable to fully compensate for impacts of natural events or events that are outside of its control. Changed circumstances are identified and addressed in Section 6.6.2.

In the event that a Preserved Area is threatened by fire, flood, or similar emergency, the HCP will not prohibit access by

emergency response personnel, and all emergency personnel shall have access to the Preserved Areas. In the event that disturbance of a Preserved Area is necessary to protect life or to prevent the catastrophic loss of property, emergency personnel shall, where time permits, attempt to contact the Service and/or NOAA Fisheries for input on how best to respond to the emergency to maximize preservation of plant, fish, and wildlife values while preserving life and preventing the catastrophic loss of property. If time does not permit such consultation, Stanford is authorized to permit emergency personnel to disturb the Preserved Areas as necessary to preserve life and prevent the catastrophic loss of property.

After the emergency relief process begins, Stanford will meet and consult with the Service and/or NOAA Fisheries in accordance with Sections 6.6.1 and 6.6.2 below to determine the need for and schedule for rehabilitating the Preserved Area(s).

Unforeseen circumstances, on the other hand, are events that could not be reasonably anticipated during the development of the HCP and response measures are therefore not included in the HCP. Unforeseen circumstances are addressed under the “No Surprises” rule, which is described in Section 6.6.1, below.

The difference between an unforeseen and a changed circumstance may depend upon the severity of the event. For example, a flooding event up to a 100-year event may qualify as changed circumstances whereas an even larger storm would be an unforeseen circumstance. Likewise, a small fire that affects only a few or tens of acres could be a changed circumstance, but a large fire that destroys hundreds or thousands of acres, would be considered unforeseen. To the extent practicable, the difference between a changed and unforeseen circumstance is identified.

6.6.1 Unforeseen Circumstances

Unforeseen circumstances are events affecting a species or geographic area covered by the HCP that could not reasonably have been anticipated by the participants during the development of the HCP, and that result in a substantial and adverse change in the status of a Covered Species.

If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the Service or NOAA Fisheries may require additional measures where the HCP is being properly implemented; but, such additional measures are limited to modifications within the Easement Areas or to the Conservation Program for the affected species. The original terms of the HCP will be maintained to the maximum extent possible.

Additional conservation and mitigation measures will not involve the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources otherwise available for devel-

opment or use under the original terms of the HCP without Stanford's consent. 50 CFR 17.22(b)(5)(iii)(B)(C), and 50 CFR 222.308(g)(3).

The Service and NOAA Fisheries will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. A finding of unforeseen circumstances must be clearly documented considering certain specific factors.⁴ If such a finding is made and additional measures are required, Stanford will work with the Service and/or NOAA Fisheries to appropriately redirect resources to address the unforeseen circumstances.

No Surprises Rule. The No Surprises rule (50 CFR Part 17, 1998) provides that once an incidental take permit has been issued pursuant to an HCP, and its terms and conditions are being fully implemented, the federal government will not require additional conservation or mitigation measures, including land, water, money, or restrictions on land.⁵ If the status of a species addressed under an HCP unexpectedly declines, the primary obligation for undertaking additional conservation measures rests with the federal government, other government agencies, or other non-federal landowners who have not yet developed an HCP.

6.6.2 Changed Circumstances

The term "changed circumstances" is defined by the regulations as "changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the [Service /NOAA Fisheries] and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)." Natural phenomena such as wildfires, floods, and prolonged drought, which depend to a large extent on Stanford's location and the history of such events in the region, and the listing of new species, were identified by Stanford and the agencies as the most relevant changed circumstances. In addition, the HCP identifies other, less likely occurrences such as invasive pests and toxic contamination.

Fire. Certain areas of Stanford contain highly flammable vegetation, and although fire management will reduce the risk of catastrophic fires, there is still a possibility that a major fire could occur. A fire that consumes less than half of any Preserved Area or if more than one Preserved Area is affected, less than 30 percent of the total amount of the Preserved Areas identified in the last Annual Report, would be considered

changed circumstances. In the event of a major fire, Stanford will notify the wildlife agencies by telephone and email within 48 hours. Stanford will prepare a damage assessment report that assesses the extent of the damage to the Covered Species and the Preserved Area(s) and any known or suspected effects on the Covered Species occupying such lands, and identifies appropriate remedial measures, which would include active or passive habitat restoration measures for the affected Preserved Area(s) to facilitate native revegetation. This report will be submitted to the Service and NOAA Fisheries for review within 60 days after the fire. The agencies will then have 45 days to comment on the report, and if Stanford does not concur with the wildlife agencies' recommendations, Stanford and the wildlife agencies will confer to develop a mutually agreeable solution. Stanford may begin implementing remedial measures before submitting a report to the Service and NOAA Fisheries or receiving comments on the report to prevent further loss of habitat. Stanford will be responsible for funding and implementing any remedial measures.

If 50 percent or more of a Preserved Area, or 30 percent or more of the Preserved Areas cumulatively, are consumed by a fire, it will be treated as an unforeseen circumstance and addressed in accordance with Section 6.6.1, above.

Floods. The effect of a flood or prolonged periods of heavy rainfall on the Covered Species and on the Preserved Areas depends on several factors, including the severity of the flood event, its duration, and the type of habitat affected. Overall, the adverse effects of flood events on the Covered Species could be substantial. For example, floods could adversely affect steelhead or California red-legged frog reproduction by destroying larvae. Thus, flooding in successive years could have a long-term effect on steelhead or California red-legged frog populations. Moreover, in some cases flood damage could be significant, and could include pond damage, sedimentation, downed trees and shrubs, deposits of debris into creeks, bank de-stabilization, etc. Alternatively, because much of the Preserved Areas are riparian corridors, wetlands, and some grasslands and woodlands that naturally experience periodic flooding, these areas may be capable of absorbing the effects of flooding with minimal or transient damage.

If flooding adversely affects the Covered Species, Preserved Areas, or any facilities in a Preserved Area in a manner that requires an expenditure of funds in excess of those required for normal maintenance and management activities, or a 100-year flood event occurs, Stanford will notify the wildlife agencies by telephone and email within 48 hours. Stanford will prepare a damage assessment report that assesses the extent of the damage to the Covered Species and the Preserved Area(s) and any known or suspected effects on the Covered Species occupying such lands, and identifies appropriate remedial measures. Appropriate remedial measures would include active or passive habitat restoration measures for the affected Preserved Area(s) to facilitate native revegetation, repair or replacement of no less

⁴ These factors include the following: size of the current range of the affected species; percentage of the range adversely affected; percentage of the range conserved by the HCP; ecological significance of that portion of the range; level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP; whether the HCP was originally designed to provide an overall net benefit; and whether the failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

⁵ The No Surprises rule was promulgated jointly by the Department of the Interior (Service) and the Department of Commerce (NOAA Fisheries).

than 50 percent of any damaged or destroyed California tiger salamander ponds, and creek bank stabilization measures. This report will be submitted to the Service and NOAA Fisheries for review within 60 days of the cessation of the flooding. The agencies will then have 30 days to comment on the report, and if Stanford does not concur with the wildlife agencies' recommendations, Stanford and the wildlife agencies will confer to develop a mutually agreeable solution. Stanford may begin implementing remedial measures before submitting a report to the Service and NOAA Fisheries or receiving comments on the report to prevent further loss of habitat or other adverse effects to the Covered Species. Stanford will be responsible for funding and implementing any remedial measures.

The potential damage from a storm event larger than a 100-year event is not foreseeable or predictable. Therefore, a flood and the damage resulting from an event greater than a 100-year event is considered an unforeseen circumstance and would be addressed in accordance with Section 6.6.1.

Drought. Defining when a drought occurs is difficult because there is no universal definition of the conditions that constitute a drought. A generic definition might be a "persistent and abnormal moisture deficiency having adverse impacts on vegetation, animals, or people." A drought is generally perceived as a serious departure from normal water conditions. The California Department of Water Resources (DWR) has used two primary criteria to evaluate the occurrence of a drought: runoff and reservoir storage. A drought threshold is considered to be runoff for a single year or multiple years in the lowest 10 percent of the historical range and reservoir storage for the same time period at less than 70 percent of average. However, even with these criteria, conditions often vary from region to region, or within a region, and potential changes in rainfall conditions due to climate change are still unknown. For purposes of this HCP, a drought of less than 6 years is a changed circumstance, and a drought of 6 years or longer is an unforeseen circumstance and would be addressed in accordance with Section 6.6.1.

Stanford will prepare a damage assessment report that assesses the effects on the Covered Species and the Preserved Area(s) (including the California tiger salamander ponds) and any known or suspected effects on the Covered Species occupying such lands, and identifies appropriate remedial measures. Remedial measures for the effects of drought are difficult to identify. Remedial measures may include temporary artificial water sources to sustain the California tiger salamander ponds or a reduction in the amount of water diverted from Los Trancos Creek.⁶ Although Stanford may temporarily reduce water diversions to reduce the effects of a drought on the

Covered Species, Stanford will not be required to reduce creek water diversions or otherwise relinquish any of its water rights to reduce such adverse effects. Adaptive management would be employed after drought conditions subside to facilitate breeding in ponds or creeks that were adversely affected by a drought.

If DWR declares 5 consecutive drought years, Stanford will prepare a damage assessment report. The damage assessment report will be submitted to the Service and NOAA Fisheries within 90 days of the declaration of 5 years of consecutive drought. The agencies will then have 30 days to comment on the report, and if Stanford does not concur with the wildlife agencies' recommendations, Stanford and the wildlife agencies will confer to develop a mutually agreeable solution. Stanford may begin implementing remedial measures before submitting a report to the Service and NOAA Fisheries or receiving comments on the report to prevent further loss of habitat or other adverse effects to the Covered Species. Stanford will be responsible for funding and implementing any remedial measures.

Droughts are not uncommon and historically have occurred about once every 30 years. Drought conditions may become more frequent due to changes in climate, although some predictions expect increased rainfall as a result of global climate change. As such, an increase or decrease in future drought conditions cannot be predicted at this time, and the potential damage from a prolonged drought is not foreseeable or predictable. Therefore, a drought and the damage resulting from a drought lasting 6 years or longer is considered an unforeseen circumstance and would be addressed in accordance with Section 6.6.1.

Non-Native Invasive Species. The Monitoring and Management Plans for the Preserved Areas are designed to control non-native plant and animal species that could harm the Covered Species or their habitat within the Preserved Areas, and Stanford will regularly monitor for any changes in invasive plant or animal species. The Preserved Areas could become infested with non-native plant or animal species that adversely affect the Covered Species or the quality of their habitat. For example, an uncontrollable infestation of fast-growing weed species could severely restrict water movement in the California tiger salamander ponds and reduce habitat quality. Large infestations of weedy species can become extremely expensive to control and could impose a financial burden on Stanford beyond that contemplated for the HCP. Similarly, there may be an invasion of non-native animal species that either prey on the Covered Species or degrade their habitat. A control program to eliminate the problem species also can be expensive.

If a non-native plant or animal infestation that adversely affects the Covered Species, Preserved Areas, or facilities within a Preserved Area requires an expenditure of funds in excess of those required for normal maintenance and management activities, or an infestation by any plant that is listed in the federal noxious weed list or California Department of Food and

⁶ In the event of a drought, Stanford would assess which of the California tiger salamander ponds would benefit most from temporary artificial sources of water. In the case of a drought, where water resources may be limited, Stanford would not artificially sustain all of the ponds, but would choose at least one pond in consultation with the Service to artificially sustain, provided a water source is available.

Agricultural noxious weed list occurs in the Preserved Areas, Stanford will prepare a damage assessment report that assesses the extent of the damage to the Covered Species and the Preserved Area(s) and any known or suspected effects on the Covered Species occupying such lands, and identifies appropriate remedial measures, which would include control/removal of the invasive species and active or passive habitat restoration measures for the affected Preserved Area(s) to facilitate native revegetation. This report will be submitted to the Service and NOAA Fisheries for review within 60 days of discovering the infestation. The agencies will then have 45 days to comment on the report, and if Stanford does not concur with the wildlife agencies' recommendations, Stanford and the wildlife agencies will confer to develop a mutually agreeable solution. Stanford may begin implementing remedial measures before submitting a report to the Service and NOAA Fisheries or receiving comments on the report to prevent further loss of habitat or other adverse effects to the Covered Species. In the event Stanford finds a previously undocumented invasive species, such as fire ants, quagga mussels, or snapping turtles, that is having or could have an immediate significant adverse impact on the Covered Species, Stanford will notify the wildlife agencies by telephone and email within 48 hours.

If the cost of controlling invasive species exceeds 10 percent of the average annual conservation budget for 3 consecutive years, it will be treated as an unforeseen circumstance and addressed in accordance with Section 6.6.1, above.

Disease. The Monitoring and Management Plans for the Preserved Areas are designed to control and identify plant and wildlife diseases that could harm the Covered Species or their habitat within the Preserved Areas. Sudden oak death has been found at Stanford, including within the San Francisquito/Los Trancos Easement area, and has contributed to the death of several oak trees. Sudden oak death is also located on properties adjacent to Stanford lands. At this time, sudden oak death is not adversely affecting the Covered Species or their habitat, and the presence of sudden oak death on Stanford lands is considered minimal. However, many more oak and other trees may become infected with sudden oak death. There also may be an infestation of other pathogens, such as chytrid fungus, which could affect both California red-legged frogs and California tiger salamanders.

If Stanford finds that the spread of sudden oak death or a new disease in the Preserved Areas is adversely affecting the Covered Species or their habitat, or could adversely affect the Covered Species in the immediate future, Stanford will prepare a damage assessment report that assesses the extent of the damage to the Covered Species and the Preserved Area(s) and any known or suspected effects on the Covered Species occupying such lands, and identifies appropriate remedial measures, which would include control of the disease or removal of diseased species or plants, and active or passive habitat restoration measures for the affected Preserved Area(s). This report will

be submitted to the Service and NOAA Fisheries for review within 60 days of discovering the infestation or spread of sudden oak death or new disease. The agencies will then have 45 days to comment on the report, and if Stanford does not concur with the wildlife agencies' recommendations, Stanford and the wildlife agencies will confer to develop a mutually agreeable solution. Stanford may begin implementing remedial measures before submitting a report to the Service and NOAA Fisheries or receiving comments on the report to prevent further loss of habitat or other adverse effects to the Covered Species. If Stanford finds a previously undocumented disease that is having or could have immediate significant adverse impacts on the Covered Species, Stanford will notify the wildlife agencies by telephone and email within 48 hours.

If an infestation by a new disease affects more than 25 percent of the Covered Species or their habitat within a Preserved Area, or more than 15 percent of the Covered Species or their habitat within the Preserved Areas cumulatively, it will be treated as an unforeseen circumstance and addressed in accordance with Section 6.6.1. Likewise, if the spread of sudden oak death affects more than 25 percent of the trees in a Preserved Area (not including trees that are already affected by sudden oak death) or more than 15 percent of the trees in the Preserved Areas cumulatively, it will be treated as an unforeseen circumstance and addressed in accordance with Section 6.6.1.

Toxic Substance Release and Illegal Dumping. Stanford employs best management practices that substantially reduce the chance of a toxic substance release and security precautions in the main campus to prevent trespassing. However, toxic substance releases and illegal dumping may occur on Stanford lands.⁷ Undeveloped open space areas that are not fenced and are not regularly patrolled by the University are particularly vulnerable to illegal dumping. The release or dumping may directly or indirectly affect the Covered Species and their habitat.

Household garbage, construction materials from residential remodeling, and personal electronic equipment such as computers and printers are sometimes illegally dumped on Stanford lands. The dumping of these kinds of items in the Preserved Areas is therefore considered reasonably likely to occur during the permit term and is considered a changed circumstance.

Toxic substances, even in very small quantities, can be extremely expensive to remediate and responsible parties are often difficult to identify. If a toxic substance is found in a Preserved Area, or the Conservation Program Manager determines that a toxic substance located elsewhere is adversely affecting the Covered Species within a Preserved Area, Stanford will notify the wildlife agencies by telephone and email within 24 hours and prepare and submit to the wildlife agencies a damage as-

⁷ "Toxic" substances or materials include all "hazardous materials" defined by 42 U.S.C. §9601(14) and the regulations promulgated pursuant to 42 U.S.C. §9601 *et seq.*

assessment report within 45 days. The damage assessment report will identify the party responsible for releasing the toxic substance, if known; appropriate remedial measures, including ways in which future toxic releases can be prevented; the extent of the damage to the Covered Species and the Preserved Area(s); and any known or suspected effects on the Covered Species occupying such lands. The agencies will have 30 days to comment on the report, and if Stanford does not concur with the wildlife agencies' recommendations, Stanford and the wildlife agencies will confer to develop a mutually agreeable solution. Stanford may begin implementing remedial measures before submitting a report to the Service and NOAA Fisheries or receiving comments on the report to control the toxic substance or prevent further damage.

If the toxic substance was released by any person or entity other than Stanford, and it costs no more than \$200,000 to remediate (in 2009 dollars, adjusted for inflation), it will be treated as a changed circumstance that Stanford is responsible for remediating. If the toxic substance release costs in excess of \$200,000 to remediate, it will be treated as an unforeseen circumstance and addressed in accordance with Section 6.6.1.

If Stanford released the toxic substance that adversely affects the Covered Species, then Stanford is responsible for remediating all of the damage to the affected Preserved Area(s).⁸ As such, any release of a toxic substance by Stanford is considered a changed circumstance.

Listing of New Species. If currently unlisted species that are addressed in this HCP as a Covered Species are subsequently listed, no action is required by Stanford or any subpermittee that is covered by a Certificate of Inclusion. All of the Covered Species will be named on the federal permits and, under the terms of the permits, any currently unlisted Covered Species will automatically be covered effective upon the final listing of any such species under the ESA. Therefore, if the Service lists a Covered Species during the permit term, take coverage will become effective for that species at the time of listing. No changes to the terms and conditions of the IA or modifications to conservation measures are required. However, currently unlisted species that are not Covered Species in the HCP will not be included in the incidental take permits and therefore will not automatically be covered if listed. The HCP, IA, and incidental take permits may be amended, in accordance with Section 6.7.1 below to include any unlisted species that is not a Covered Species under the HCP.

Take Authorization for Additional Species. If a currently listed species, such as the Bay checkerspot butterfly, or newly

listed species that is not addressed in the HCP is found at Stanford, and Stanford, the Service, or NOAA Fisheries determines that Stanford is engaging in activities that will result in the take of the listed species, the HCP, IA and incidental take permit may be amended in accordance with Section 6.7.1. Although portions of the Jasper Ridge Biological Preserve at Stanford provide Critical Habitat for the Bay checkerspot butterfly, the species has not been documented at Stanford for more than a decade, and is therefore not included as a Covered Species. If the Bay checkerspot butterfly or other listed species is found at Stanford, the occurrence will be reported in the Annual Report, and the Conservation Program Manager will assess whether Stanford's activities are likely to affect the species. The agencies will have 30 days following receipt of the Annual Report to comment on the documented occurrence and on whether, in the responsible agency's opinion, an amendment to the HCP, IA and incidental take permit is warranted. If Stanford concludes that its activities may affect the listed species, Stanford may initiate an amendment in accordance with Section 6.7.1 at any time.

6.7 AMENDMENTS AND MINOR MODIFICATIONS

Amendment of a Section 10(a)(1)(B) permit is required when the permittee wishes to significantly modify an activity or a conservation program described in the original HCP. Such modifications may include the addition of a species to the permit that was not addressed in the original HCP, significant adjustments to the HCP necessitated by unforeseen circumstances, or alterations in funding. A permit amendment generally requires the permittee to follow the same process as the original permit application, and requires an amendment to the HCP addressing the new circumstances. However, the documentation required, especially for compliance with the National Environmental Policy Act (NEPA), is generally much less for a permit amendment than for the original application. (See 40 C.F.R. 1502.20.)

Alternatively, some amendments commonly needed over the life of an HCP are minor and can be done in an expedited fashion, without public notice and review. This includes certain modifications to the HCP, such as adaptive management changes discussed above. The process for both formal amendments and minor modifications are addressed below.

6.7.1 Amendments

Amendments to Stanford's incidental take permits, HCP, or the IA may be proposed by Stanford, the Service, or NOAA Fisheries. The party proposing the amendment shall provide the other parties with a written statement of the reasons for the amendment and an analysis of the effect of the amendment on the environment, Covered Species, and the implementation of the HCP. The permits may be amended in accordance with all

⁸ Stanford's responsibility for the release of a toxic substance extends to any Stanford employee that releases a toxic substance during the course of performing his or her job, but does not include contractors, subcontractors, lessees, or others who are not employees of Stanford University.

applicable legal requirements, including, but not limited to, the ESA, NEPA, and regulations issued by the Service and NOAA Fisheries in effect at the time of the proposed amendment.

6.7.2 Minor Modifications

Minor modifications may be made to the incidental take permits, HCP, or IA by Stanford, the Service, or NOAA Fisheries. Minor modifications may include, but are not limited to, the following: 1) correction of typographic, grammatical, and similar editing errors that do not change the intended meaning, 2) correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes, 3) minor changes to survey, monitoring, or reporting protocols and similar revisions, 4) the addition of new Covered Activities provided the activity will not result in an adverse effect on the environment that is new or significantly different from those analyzed in connection with the original HCP, or result in the additional take of a Covered Species, and (5) the addition of CDFG as a reviewing, consulting, participating, or approving party for any action that could result in take of a Covered Species, or benefit a Covered Species, listed as threatened or endangered under CESA. All minor modifications must be approved by Stanford and the wildlife agency that has jurisdiction over the species that will be affected by the modification.

The Service and/or NOAA Fisheries will not approve a minor modification if either agency determines that such modification would: 1) result in operations under the HCP that are significantly different from those analyzed in connection with the original HCP, 2) result in adverse effects on the environment that are new or significantly different from those analyzed in connection with the original HCP, or 3) allow significant additional take not analyzed in connection with the original HCP. Stanford will not approve a minor modification if it determines the modification would: 1) affect the cost of implementing the HCP, incidental take permits, or IA, 2) restrict development of Stanford lands beyond the restrictions imposed by the original HCP, incidental take permits, or IA, or 3) result in operations under the HCP that are significantly different from those permitted by the original HCP.

The party proposing a minor modification shall provide the other parties with a statement of the reasons for the proposed modification and an analysis of its environmental effects, its effects on the implementation of the HCP and on the Covered Species. The parties must respond to proposed modifications within 45 days of receipt of such notice. Proposed minor modifications will become effective upon the written approval of the other parties, or upon expiration of the 45-day time period if no written objection is made by another party. If a receiving party objects to a proposed minor modification within the 45-day time period, the proposed modification must be processed as an amendment pursuant to Section 6.7.1.

6.7.3 Land Use Changes

During the life of the HCP, the counties of San Mateo and Santa Clara and the cities of Palo Alto, Menlo Park, Portola Valley, and Woodside may adopt or amend their general plans, specific plans, community plans, zoning ordinances, and similar land use regulations, and may grant Stanford land use entitlements pursuant to these land use regulations. Such land use matters are within the sole discretion of these counties and cities, and shall not require amendments to the HCP or IA or require the approval of the Service or NOAA Fisheries. However, any land use entitlement granted to Stanford must be implemented in a manner that is consistent with the HCP, IA, and incidental take permits, or they must be modified to be consistent.

6.8 ENFORCEMENT OF SECTION 10(a)(1)(B) PERMITS

The provisions of the HCP are enforceable through the terms and conditions of the Section 10(a)(1)(B) permits issued by the Service and NOAA Fisheries and the IA.

6.8.1 Suspension/Revocation

The Service or NOAA Fisheries may suspend or revoke their respective permits if Stanford fails to implement the HCP in accordance with the terms and conditions of the permits or if suspension or revocation is otherwise required by federal law. Suspension or revocation of a Section 10(a)(1)(B) permit, in whole or in part, must be in accordance with 50 CFR 13.27-29, 17.22 (b)(8), and 17.32 (b)(8) and the IA.

6.8.2 Certificates of Inclusion

Take authorization may be provided to Stanford's subpermittees by the issuance of Certificates of Inclusion. Stanford may issue Certificates of Inclusion to each subpermittee only after:

- Stanford enters into a contract with the subpermittee binding the subpermittee to the relevant terms of the HCP;
- Stanford finds that the subpermittee's proposed activity complies with all terms and requirements of the HCP, related permits, and the IA;
- The impacts of the proposed activity fall within those analyzed in the HCP in general type, magnitude, and effects; and
- The subpermittee has implemented all of the relevant Minimization Measures, and any additional Best Management Practices the Conservation Program Manager deems necessary.

Take authorization also may be provided to entities such as PG&E, SFPUC, and the Santa Clara Valley Water Department

that own facilities on Stanford's lands. Certificates of Inclusion will be issued only to those entities that agree to abide by the provisions of the HCP, IA, and incidental take permits. In the event that the Service or NOAA Fisheries suspends or revokes a permit issued to Stanford, the take authorizations afforded subpermittees holding Certificates of Inclusion will remain in effect provided the subpermittee(s) continues to comply with the terms and conditions of the permits. If the Conservation Program Manager determines a subpermittee is not in compliance with the HCP, IA, or incidental take permits, the Conservation Program Manager, Service, or NOAA Fisheries may revoke the Certificate of Inclusion. The revocation of such Certificate of Inclusion shall not affect Stanford's take authorization provided Stanford continues to comply with the terms and conditions of the permits and undertakes any remedial actions necessary to remediate any violation by the holder of the Certificate of Inclusion.

6.8.3 Notice

Any notice required under the HCP or IA must be given in writing and delivered by personal delivery or certified mail/return receipt requested, unless the HCP specifically authorizes an alternative form of delivery (such as electronic mail delivery).

6.9 RELATIONSHIP OF THE HCP TO OTHER ESA POLICIES AND REQUIREMENTS

6.9.1 Relationship of HCP to Future Section 7 Consultations

The Service and NOAA Fisheries will evaluate the direct, indirect, and cumulative effects of the activities covered by the HCP in its internal Biological Opinion issued in connection with the HCP and the issuance of Section 10(a)(1)(B) permits. The HCP is not intended to alter the obligation of a federal agency to consult the Service or NOAA Fisheries pursuant to Section 7 of the ESA. However, if Stanford undertakes a project after issuance of the Section 10(a) permits under the HCP, such as an enhancement measure, that involves a federal action subject to Section 7 of the ESA concerning a Covered Species, the Service and/or NOAA Fisheries shall ensure to the extent permitted by law that the Biological Opinion issued in connection with the proposed project is consistent with the Biological Opinion for the HCP. The proposed project must be consistent with the terms and conditions of the HCP, IA and permits. Any reasonable and prudent measures included under the terms and conditions of a Biological Opinion issued subsequent of the effective date of the HCP shall be consistent with the implementation of the HCP, IA, and permits unless otherwise required by law or regulation. Subject to the laws and regulations then in effect, if the measures required under the HCP, IA, and permits will adequately ensure the proposed

project will not jeopardize the continued existence of the Covered Species affected by the project, only those measures will be imposed as reasonable and prudent measures under the Biological Opinion, and unless otherwise required by law or regulation, the Service and/or NOAA Fisheries will not impose measures beyond those required under the HCP, IA, or permits. Before completing a Section 7 consultation for a Covered Activity in which the Service or NOAA Fisheries proposes to require a measure in excess of the requirements of the IA, HCP, or permits, the Service and/or NOAA Fisheries will meet and confer with Stanford to discuss alternatives to the imposition of the measures that would meet the applicable legal or regulatory requirements.

Based on the information processed during the preparation of this HCP, the Service and NOAA Fisheries have concluded that their approval of the HCP and IA and issuance of incidental take permits are not likely to jeopardize the continued existence of the Covered Species or result in adverse modification of any Critical Habitat. Moreover, these approvals would not jeopardize the continued existence of any other species or plants listed as threatened or endangered under the ESA.

6.9.2 Relationship to Other HCPs and Non-Stanford Related Activities

Several public agencies, including the City of Palo Alto, County of Santa Clara, County of San Mateo, and the Santa Clara Valley Water District, have facilities and easements on Stanford lands. For example, the City of Palo Alto maintains utilities that are located in Matadero Creek, and the Santa Clara Valley Water District performs routine maintenance, including trash removal, fence and access repair, and removal of downed trees or other blockages, within all of the creeks in the area. As discussed in other portions of the HCP, Stanford has no control over the activities of these public agencies, and their activities are not covered under the HCP. Some of the facilities owned by these agencies are located on Stanford's lands and have been identified under the Covered Activities section of the HCP. The presence of the facilities is covered under the HCP. One or more of these public agencies may seek permits from the Service and/or NOAA Fisheries and to include facilities or activities located on Stanford's lands in such permit or HCP. Any measures included under the terms and conditions of any subsequent permit or HCP developed pursuant to such permit that affects Stanford's lands shall be consistent with the implementation of this HCP and IA. The Service and/or NOAA Fisheries will not impose measures on Stanford beyond those required under this HCP.

6.9.3 Critical Habitat

Critical Habitat identifies specific areas, both occupied and unoccupied, that are essential to the conservation of a listed species and that may require special management considerations or protection. Pursuant to federal regulations, the Service

issued final rules designating Critical Habitat for the California tiger salamander, Bay checkerspot butterfly, and California red-legged frog, and NOAA Fisheries issued a final rule designating Critical Habitat for steelhead. None of Stanford's lands were designated as Critical Habitat for the California tiger salamander (70 Fed. Reg. 41183-41186 (August 23, 2005)), or California red-legged frog (71 Fed. Reg. 19244-19346 (April 13, 2006)) and the Covered Activities will therefore not result in the destruction or adverse modification of Critical Habitat for these species. The Service has not designated Critical Habitat for the San Francisco garter snake, and the HCP will therefore not affect any San Francisco garter snake Critical Habitat. San Francisquito Creek, Bear Creek and Los Trancos Creek, including the portions of the creeks that flow through Stanford's lands were designated as Critical Habitat for steelhead. 70 Fed. Reg. 52488, 52563 (September 2, 2005). Implementation of the HCP will not adversely affect Critical Habitat in the creeks. Part of the Jasper Ridge Biological Preserve was proposed as Critical Habitat for the Bay checkerspot butterfly. 73 Fed. Reg. 50405-50452 (August 26, 2008). Implementation of the HCP will not adversely affect Critical Habitat within the Preserve.

Critical Habitat for the western pond turtle has not been proposed because the turtle is not a listed species under the ESA. If the western pond turtle is listed during the life of the HCP and any portion of the land subject to this HCP are designated as Critical Habitat for the species, the provisions set forth in this HCP will adequately preserve and enhance the western pond turtle and any Critical Habitat designated for the species. The Adaptive Management Provision described in Section 4.5 allows for revisions to management strategies to incorporate new management strategies, such as those included in recovery plans. However, any changes to the management strategies set forth in the Conservation Program should be considered in light of the entire HCP, and the overall purpose and goals of the HCP. A specific purpose of the HCP is to establish a conservation program that benefits all of the Covered Species, by, in part, implementing Monitoring and Management Plans that protect and enhance western pond turtle habitat. Implementation of the Monitoring and Management Plans will ensure the Covered Activities do not adversely affect any western pond turtle habitat (whether or not it is listed as Critical Habitat) that is within the San Francisquito/Los Trancos Easement or Matadero/Deer Easement. In the event that any land outside of the San Francisquito/Los Trancos Easement or Matadero/Deer Easement is designated as Critical Habitat for the western pond turtle, the San Francisquito/Los Trancos Easement Monitoring and Management Plan or Matadero/Deer Easement Monitoring and Management Plan, depending on the location of the Critical Habitat designation, will be used to manage those Critical Habitat areas as well. Thus, no additional measures will be required in the event any of Stanford's lands are designated as Critical Habitat for the western pond turtle.

6.9.4 Recovery Plans

Recovery plans under the ESA identify actions deemed necessary to recover a federally listed species. The HCP is consistent with the provisions of the California Red-Legged Frog Recovery Plan, and the Recovery Plan for Serpentine Grassland Species in the Bay Area. However, recovery plans do not obligate permittees to undertake specific tasks.

At the time of approval of the HCP, a recovery plan had not been adopted by the Service for the California tiger salamander and no recovery plan had been adopted by NOAA Fisheries for steelhead. However, during the life of the HCP, recovery plans may be adopted for these Covered Species. The Adaptive Management Provision allows for revisions to management strategies to incorporate new management strategies, such as those included in recovery plans. However, it is necessary to define the scope of such revisions with respect to the HCP's purpose and goals. A specific purpose of the HCP is to establish a conservation program that minimizes and mitigates the effects of projected urban and other development on the Covered Species, and provides the Covered Species with a net benefit. With respect to the recovery of the Covered Species, it is the intent of the HCP to contribute to such recovery to the maximum extent feasible consistent with the HCP's other goals and purposes. It is the intent of the HCP not to preclude or undermine recovery efforts for any of the Covered Species.

Therefore, the HCP will incorporate recommendations contained in future recovery plans when such recommendations:

- Are expected to increase the effectiveness of the HCP's conservation and mitigation programs by identifying relevant new information, approaches, techniques, or species protection needs,
- Can be achieved without any greater cost to Stanford, and
- Fit within the overall intent, framework, and funding levels of the HCP.

All such recovery plan revisions will be subject to the Adaptive Management Provision described in Section 4.5, and Minor Modifications process described in Section 6.7.2.

