

## 5.0 ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the effects of issuing the ITPs and implementation of the HCP on the physical, biological, and socioeconomic environment. It describes the direct, indirect, and cumulative effects of the alternatives, including the Proposed Action, No Action, and HCP for CTS Only. Any of the alternatives could result in take authorization by the Services which in turn could result in physical, biological or socioeconomic impacts.

The list of activities covered by the Proposed Action is provided in Chapter 3 and in the HCP (Appendix B of the DEIS). The direct and indirect effects of the Proposed Action and two alternatives on the physical environment are addressed in Section 5.1; on the biological environment in Section 5.2; on the socioeconomic environment in Section 5.3; and on environmental justice in Section 5.4. A summary comparison of the alternatives is provided in Table 5-6 at the end of the chapter.

Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. They may include the physical effects of population growth or changes in land use.

The possible cumulative effects on each resource are evaluated in Section 5.5. Cumulative effects are the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Global climate change, for example, is addressed in this section.

Other NEPA required topics such as short-term uses versus long-term productivity and the irreversible or irretrievable commitment of resources are addressed in Sections 5.6 and 5.7.

### 5.1 PHYSICAL ENVIRONMENT

#### 5.1.1 Geologic Hazards and Soils

This section describes the effects on geologic hazards and soil resources caused by the Proposed Action or the alternatives. The effects related to geologic hazards and soils were analyzed qualitatively, and are based on a review of soils and geological information for the affected environment and on professional judgment. The impact assessment evaluates whether the Proposed Action or alternatives would cause slope instability, erosion, or other soil failure that could result in property damage, personal injury, or death. The effects on soil resources, which include the conversion of important farmland soils (see Chapter 4), are also analyzed qualitatively. The analysis assumes that Stanford would comply with State laws, current building codes, and local seismic safety standards and ordinances. This would normally include a geotechnical review of new construction in hazard-prone areas, the use of erosion controls when soil is disturbed, and possible conditions imposed as a result of permits required by other agencies for in-stream activities.

##### 5.1.1.1 Effects of the Proposed Action

**Conservation Program.** The proposed Conservation Program would not significantly affect geologic features or soils. None of the Minimization Measures or monitoring would require earth-moving of the scale that could trigger a geologic hazard or adversely affect soil resources. Management and enhancement activities could involve some earth-moving in hazard prone

areas, but would not involve moving large quantities of dirt that could trigger a geologic hazard. The implementation of certain management and enhancement activities within the San Francisquito/Los Trancos and Deer/Matadero easements such as removing riprap and other in-stream structures in San Francisquito Creek that create barriers to wildlife movement, have the potential to affect or be affected by geologic hazards. For example, the removal of riprap or gabions within creeks could result in unstable bank slopes and if the slopes are not adequately stabilized, they could fail. Likewise, management and enhancement activities in Zone 1 and Zone 2 riparian areas could disturb soils that are prone to erosion. Geotechnical protocols that are already in place for operations and maintenance work, including Stanford Design Facility Guidelines and Santa Clara Valley Water District Best Management Practices for work in and around creeks, would apply to all Conservation Program activities. In addition, the Conservation Program includes erosion control and bank stabilization measures that would stabilize areas that are currently prone to erosion. The removal of in-stream structures would be designed by a qualified engineer, and particularly unstable areas generally would be avoided or specific construction measures would be included to assure that geologic hazards are addressed properly. Therefore, the management and enhancement activities would be done in a manner that addresses the geologic site conditions, including slope stability, erodible soils, and local fault zones.

The implementation of existing geotechnical protocols, including consultation with a qualified engineer and review by local, State, and Federal agencies, would eliminate or minimize the possibility of slope failure caused by Conservation Program activities in unstable geologic areas.

Under the Proposed Action, conservation easements are proposed over lands in Zone 1 that contain geologic hazards, including unstable slopes, and areas with moderate to high potential for earthquake-induced landslides. Preserving these areas with a conservation easement would not adversely affect these geologic hazards. Should there be a geologic failure within a conservation easement, such as a landslide, the hazard could be remediated in accordance with the requirements set forth in Section 4.2 of the HCP.

Conservation Program activities would not induce a geologic event or cause slope instability, erosion, or soil failure, and therefore would not have an adverse effect on resources that are vulnerable to geologic or seismic events.

The San Francisquito/Los Trancos Easement would preclude agricultural land uses on about 10 acres of soil designated as Prime Farmland located along San Francisquito Creek upstream of Alpine Road and about 10 acres of soil designated as Unique Farmland on Los Trancos Creek upstream of I-280. This is a small area of Prime or Unique Farmland, and its preservation in a conservation easement (as opposed to being developed) would not result in an adverse effect on Prime or Unique Farmland.

**Ongoing Stanford Operations.** Some of the ongoing Covered Activities require ground disturbance, including 1) the maintenance of, repair, replacement and construction of new utilities, pipelines, roadways and bridges; 2) creek bank stabilization; 3) academic activities that involve digging test pits; 4) maintenance of fire breaks; 5) the use of existing and construction of new recreational trails; and 6) agricultural activities. In general, the ongoing Covered Activities would not trigger a geologic hazard. Further, geotechnical protocols already in place, including Stanford Design Facility Guidelines and Santa Clara Valley Water District Best Management Practices, assure that operations and maintenance work conducted throughout Stanford is done in a manner that reflects the geologic site conditions, including faults, unstable slopes, and erosive

soils. Where these activities occur in Management Zones 1 and 2, the HCP imposes additional erosion control measures. The agricultural lessees operate under a program of Best Management Practices that includes erosion and sediment control measures, such as vegetated filter strips between the agricultural use and the creeks, appropriate revegetation of eroded areas, and use of erosion control blankets. The erosion control, best management practices, and geotechnical protocols minimize the likelihood that the ongoing Covered Activities would result in erosion or that a geologic hazard would affect people or property. Therefore, although the ongoing operations and maintenance involve ground disturbance, they would not cause slope instability, erosion, or soil failure, and thus would not adversely affect geologic hazards.

**Future Development.** Construction-related activities, such as grading and new building improvements, would not have a significant geologic effect or pose a safety hazard in the event of an earthquake with the implementation of existing State and local building and construction regulations. The Uniform Building Code and California Building Code establish specific design requirements to prevent collapse and minimize structural damage during an earthquake, and each of the local jurisdictions requires geotechnical review or reports for projects in hazard-prone areas. The “National Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction Activity” specifies actions to be taken at all construction sites 1 acre or larger to prevent and minimize erosion during construction. Local grading ordinances also require measures to reduce erosion. This conclusion is consistent with prior review under the California Environmental Quality Act (CEQA) for development approved by the Santa Clara County under the 2000 GUP, which concluded the potential geologic and seismic impacts were less than significant with the application of existing regulations.

The exact location of future development that is not already allowed under the GUP is currently unknown; however, it would not occur within any of the conservation easements or in the CTS Reserve. This future development would undergo review under CEQA and may undergo site-specific geotechnical review under the local agencies’ building ordinances.<sup>1</sup> If any site-specific geologic concerns are identified that cannot be addressed through existing regulations, the local permitting agency could impose site-specific mitigation measures. Thus, with the implementation of existing State and local review and regulations, the effects of future development would not cause slope instability, erosion, or soil failure, and would not cause significant adverse geologic effects.

Future development is not likely to significantly affect Farmland soils. Nearly all of the soils designated as Prime or Unique Farmland are located in Zones 1 and 2. The HCP anticipates the future development of 5 to 15 acres in Zone 1 and 10 to 30 acres of development within Zone 2. Although no new development is currently proposed in areas that contain Prime or Unique Farmland soils, up to 45 acres of the approximately 200 acres of Prime or Unique Farmland on Stanford lands could be affected by future development. Any development that affects these soils would be subject to policies that protect farmland, such as the Farmland Protection Policy Act. The amount of Prime or Unique Farmland that could be converted is small relative to the amount of Prime or Unique Farmland in San Mateo and Santa Clara counties, and therefore the Proposed Action would not have an adverse effect on these resources.

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<sup>1</sup> Small permanent conversions of habitat resulting from the ongoing Covered Activities may be exempt from CEQA review, but such small activities should not have adverse geologic related effects.

### 5.1.1.2 Effects of the No Action Alternative

As described in Chapter 3, under the No Action alternative take authorization would be required for any activity resulting in the take of a federally listed species (e.g., red-legged frog, steelhead, tiger salamander or garter snake). Under this alternative, the individual take authorizations would likely incorporate take minimization measures similar to those defined in the HCP, with the same effect as the Proposed Action, but on a smaller scale in keeping with the level of impact.

**Conservation.** The No Action alternative would not implement a conservation program. Under this alternative, it is assumed that the activities in Zones 1 and 2 that require a permit would also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. Mitigation measures that could affect geologic hazards or soils would be subject to the same protection measures as described for the Proposed Action (e.g., Stanford Facility Design Guidelines, and Best Management Practices). The project-specific take minimization measures and Best Management Practices related to future permits under the No Action alternative would likely be similar to the minimization and mitigation measures proposed as part of the HCP, and like the Proposed Action, would not result in adverse effects to geologic hazards or soils. The amount of ground disturbance from conservation activities under the No Action alternative may be less than for the Proposed Action's Conservation Program because it would involve mitigation for project-specific impacts, whereas the Proposed Action's Conservation Program includes activities throughout Management Zones 1 and 2 as part of a comprehensive effort to improve Covered Species habitat.

Under the No Action alternative the conservation easements along San Francisquito/Los Trancos and Matadero/Deer creeks would not be immediately recorded, and the Monitoring and Management Plans would not be implemented. Whether future conservation easements would be recorded over Prime or Unique Farmland soils pursuant to a project-specific incidental take authorization is unknown.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate. The ongoing operations and maintenance would be the same as described for the Proposed Action, above, and would have the same effects on geologic hazards and soils as the Proposed Action. Although the ongoing operations and maintenance involve ground disturbance, they would not cause slope instability, erosion, or soil failure, and therefore would not adversely affect geologic hazards or soils.

**Future Development.** The future development under the No Action alternative would be the same as that under the Proposed Action; therefore, the effects of future development on geologic hazards and soils would be the same under the No Action alternative as described for the Proposed Action.

### 5.1.1.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The Conservation Program would be limited to activities outlined in the Central Campus CTS Management Plan and the CTS Reserve Monitoring and Management Plan. The activities in the CTS Reserve Monitoring and Management Plan, such as vegetation mowing and species monitoring, would result in little, if any, ground disturbance, and would not affect geologic hazards or soils. The Conservation Program prohibits development in the CTS Reserve. Similarly, the activities in the Central Campus CTS Management Plan address methods of vegetation and ground animal management, worker education, restriction of off-road vehicles, and monitoring. These activities would not require large-scale earth moving that might trigger a geologic hazard or adversely affect geologic hazards or soils. The Conservation Program under this alternative affects a smaller area and results in less ground disturbance than the Proposed Action alternative's Conservation Program, thus it has less effect on geologic hazards and soils than the Proposed Action. It would likely also have less effect on geologic hazards and soils than the No Action alternative because the No Action alternative may still result in mitigation measures that require more ground disturbance or ground disturbance in more geologically sensitive areas, such as stream banks.

**Ongoing Stanford Operations.** Specific ongoing activities that could not avoid take of steelhead, red-legged frog, or garter snake would require take authorization from the Service or NMFS. It is assumed that such authorization would require the same minimization measures as proposed in the HCP, and may also require mitigation such as habitat restoration or a conservation easement.

The ongoing operations and maintenance covered by this alternative are a subset of the activities that would be covered by the Proposed Action alternative. Because they are smaller in scope, they would have less effect on geologic hazards and soils than the Proposed Action or the No Action alternatives, however, Stanford operations outside of the Central Campus CTS Monitoring Plan area and the CTS Reserve area would still occur under this alternative, so it would not result in an overall lower effect on geologic hazards and soils. Ongoing operations and maintenance covered under the HCP for CTS Only alternative would not adversely affect geologic hazards or soils.

**Future Development.** Future development that could not avoid take of steelhead, red-legged frog, or garter snake would require take authorization from the Service or NMFS. Such authorization would likely require the same minimization measures as proposed in the HCP, and may also require a conservation easement as mitigation.

The future development under the HCP for CTS Only alternative would be the same as that under the Proposed Action and No Action alternatives; therefore, the effects on geologic hazards and soils of future development under this alternative would be the same as the effects described for the No Action and Proposed Action alternatives.

#### **5.1.1.4 Comparison of Alternatives**

The Proposed Action or the alternatives would not result in significant adverse effects to geologic hazards and soils (see Table 5-6 at the end of the chapter). The Conservation Program under the Proposed Action provides bank stabilization that may not otherwise be required, and this would reduce erosion and benefit water quality. The easements proposed in the Conservation Program would also protect Prime Farmland from development. In comparing the alternatives, none pose a significant adverse effect, but the Proposed Action provides a benefit related to geologic hazards and soils.

### 5.1.2 Cultural and Historic Resources

This section describes the effects of the Proposed Action and alternatives on cultural (archaeological and paleontological) and historic resources. The effects on cultural and historic resources were analyzed qualitatively, and are based on a review of the cultural and historic information for the affected environment and consultation with the University Archaeologist. The potential effects on cultural and historic resources is assessed based on the type of resource that could be affected, and whether the Proposed Action or alternatives would result in irretrievable damage to or the destruction of a resource that is considered a culturally or historically significant resource under Federal, State, or local laws. The analysis assumes compliance with State and Federal laws and Stanford's archaeological protocols. In addition, the Services must comply with the National Historic Preservation Act, and as part of that process a letter was sent to interested Native American organizations and the State Historic Preservation Officer. A telephone call was received by USFWS in response to the letter, and a recommendation was made that a Native American monitor be present during construction actions (J. Robles, USFWS, pers. comm.).

#### 5.1.2.1 Effects of the Proposed Action

**Conservation Program.** The HCP's Conservation Program monitoring, management, preservation, and enhancement activities would occur in Zones 1 and 2 where most of Stanford's 65 archaeological sites have been documented to occur. The implementation of certain management and enhancement activities has the potential to impact cultural resources through activities such as removal of the non-operating Lagunita Diversion which is more than 50 years old, moving a barn or a farmhouse away from the creek banks, bank stabilization within the San Francisquito/Los Trancos Easement and Deer/Matadero Creek Easement, and removing riprap and other in-stream structures that create barriers to wildlife movement. These activities could also unearth cultural or historic resources. In the event that previously unknown buried cultural resources are discovered, all work would stop within 50 feet of the discovery and the University Archaeologist would be notified to evaluate the find. If the resource is determined eligible for the National Register of Historic Places, a plan to mitigate impacts to the resource would be prepared prior to recommencement of work in the area.

Protocols already in place by the University Archaeologist would minimize the risk of damaging or destroying known cultural or historic resources. The protocols include having an archaeological monitor present during any activities that could disturb cultural resources, and if there is a possibility of uncovering human remains, having a Native American monitor present. Conservation activities would be subject to the protocols noted in DEIS Section 4.1.2, namely: the project or activity would be designed to avoid known resources; archaeological testing would be done for unknown resources; the project or activity would comply with the Secretary of Interior's standards for the treatment of historic properties; and site-specific mitigation measures would be developed. With these precautions, the Conservation Program would not significantly affect cultural or historic resources.

**Ongoing Stanford Operations.** Since the ongoing Covered Activities could involve ground disturbance anywhere on Stanford lands, there is potential for the activities to affect cultural and historic resources. Stanford operations have been ongoing since construction began in 1889. Stanford adopted policies to protect archaeological resources in 1986, and maintains a professional staff position (University Archaeologist), collections, and archives of its archaeological resources. As noted in Chapter 4, procedures have already been put in place to

assure that all ground-disturbing activities are conducted in a manner that avoids impacts to known cultural or historic resources. Although ongoing operations could inadvertently damage or destroy a cultural or historic resource, there would be no significant adverse effect because of the extent of documentation of existing resources, and the protocols used to protect known and anticipated resources.

**Future Development.** Development under the 2000 GUP was subject to environmental review by Santa Clara County. An EIR was prepared which addressed the specific impacts of the GUP development on cultural and historic resources.

The GUP EIR found that the development anticipated under the GUP would not have a significant unavoidable impact on prehistoric and archaeological resources, but that the impact on historic resources could not be mitigated to a less than significant level due to the lack of specific information as to where the development would take place. According to the GUP EIR, because the GUP permits development in areas that contain historic, or potentially historic, buildings it is possible that specific building projects would be proposed that would either remodel or demolish existing buildings that the County considers, or could consider, an historic resource. However, Stanford does not anticipate demolishing or remodeling the exterior of any historic buildings as part of the GUP development in Zones 1, 2, or 3. Therefore, the GUP development covered by the HCP would not result in adverse effects on historic resources.

The additional 150 acres of development contemplated beyond the GUP could occur in areas that contain cultural or historic resources, including historic buildings. Unless specifically exempt from review under the CEQA, the local land agencies would review any proposed future development. As part of CEQA review there would be an analysis of a future project's potential to impact cultural and historic resources and specific mitigation measures could be imposed. This review would be done when the specific nature and location of a project were known. Also, new development, including ongoing Covered Activities that result in the permanent conversion of habitat, would be subject to Stanford's protocols that protect cultural prehistoric, archeological, and historic resources. Therefore, known and anticipated resources would not be affected, although some buried resources could be inadvertently damaged or destroyed by future development. At this time, the HCP does not include activities that would involve remodeling or demolishing any historic buildings; however, there are feasible mitigation measures, including written and pictorial analysis of historic buildings, and exhibiting or reusing significant archeological features that would reduce the adverse effect of altering or demolishing historic buildings.

#### **5.1.2.2 Effects of the No Action Alternative**

Under the No Action alternative, the ITPs would not be issued and the HCP including a comprehensive Conservation Program would not be implemented. Future development and ongoing Stanford operations in Management Zones 1 and 2 that could impact federally listed species would require take authorization on a project-by-project basis, which is what happens now.

**Conservation.** Under this alternative, the activities in Zones 1 and 2 that require a permit are assumed to require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. The effects of any measures required by the Services through take authorization would be the same as the effects of the

Conservation Program described in the HCP, although at a smaller scale in keeping with the level of impact that has to be mitigated. The effects on cultural and historic resources would be the same under the No Action alternative as described for the Proposed Action; the resources would be protected by protocols used by the University Archaeologist and the alternative would have no adverse effect on historic or cultural resources.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate. Ongoing operations and maintenance work conducted throughout Stanford would continue to be done under Stanford's protocols for avoiding impacts to cultural and historic resources. As a result, the effects of the ongoing operation would be the same under the No Action alternative as those described for the Proposed Action. Thus, under the No Action alternative ongoing university operations would have no adverse effects on cultural or historic resources, the same as the Proposed Action.

**Future Development.** Under the No Action alternative, new development would occur. Future development would be subject to the GUP, and any new development that has not already been permitted by the GUP would require project-specific CEQA review that could include measures to reduce potential impacts to cultural and historic resources. As a result, the effects of future development would be the same under the No Action alternative as those described for the Proposed Action. Under the No Action alternative, future development would have no adverse effects on cultural or historic resources if Stanford continues its current practices to protect cultural or historic resources.

#### **5.1.2.3 Effects of the HCP for CTS Only Alternative**

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The activities in the CTS Reserve Monitoring and Management Plan, such as vegetation mowing and species monitoring, would result in little, if any, ground disturbance, and would not affect cultural or historic resources. The Conservation Program prohibits development in the CTS Reserve. Similarly, the activities in the Central Campus CTS Management Plan address methods of vegetation and ground animal management, worker education, restriction of off-road vehicles, and monitoring. These activities would not require large-scale earth moving that might adversely affect a cultural or historic resource. In addition, resources would be protected by protocols used by the University Archaeologist and the alternative would have no adverse effect on historic or cultural resources.

**Ongoing Stanford Operations.** Under this scenario, ongoing activities that could not avoid take of red-legged frog, garter snake and/or steelhead would require take authorization from the USFWS or NMFS on a project-by-project basis. The authorization would likely require the same minimization measures as proposed in the HCP.

Under the HCP for CTS Only alternative, Stanford would continue to operate. The effects of the ongoing operation of the Stanford would be the same as described for the Proposed Action.

**Future Development.** Under this alternative, future development that could not avoid take of red-legged frog, garter snake or steelhead would require take authorization from the USFWS or NMFS on a project-by-project basis. The authorization would likely require the same

minimization measures as proposed in the HCP, and possibly a conservation easement managed to benefit the species. The size of the easement would depend on the effects of the project.

Under the HCP for CTS Only alternative, future development would occur. Future development would be subject to the existing GUP, and any new development that has not already been permitted by the GUP would require project-specific CEQA review that could include measures to reduce potential impacts to cultural and historic resources. The effects from future development would be the same as described for the Proposed Action and the No Action alternative.

#### **5.1.2.4 Comparison of Alternatives**

The Proposed Action or the alternatives would not result in significant adverse effects to cultural resources. Protocols already in place by the University Archaeologist would minimize the risk of damaging or destroying known cultural or historic resources under the Proposed Action or alternatives. The Proposed Action or alternatives do not significantly differ in effects on cultural resources.

### **5.1.3 Hydrology and Water Quality**

This section addresses potential effects of the Proposed Action and alternatives on surface drainage, water diversions, groundwater hydrology, and water quality. The effects related to hydrology and water quality are based on a review of the hydrology and water quality information for the affected environment and an assessment of the activities associated with the Proposed Action and alternatives, including an estimation of the future amount of impervious surfaces. Effects associated with the Proposed Action or alternatives are analyzed in light of whether they would lead to an increase in run-off that could adversely affect surface or ground water quality, modify groundwater recharge, increase the risk of damage caused by flooding, or lead to the violation of applicable Federal, State or local laws.

#### **5.1.3.1 Effects of the Proposed Action**

**Conservation Program.** Under the Proposed Action, permanent conservation easements would be recorded over the most biologically sensitive portions of San Francisquito, Los Trancos, Matadero, and Deer creeks on Stanford lands. These easements would restrict activities within and adjacent to the creeks, and the easements would be monitored and managed in accordance with a San Francisquito/Los Trancos Easement Monitoring and Management Plan and Matadero/Deer Easement Monitoring and Management Plan. The easements and associated monitoring and management plans would contribute to the protection of surface water quality by minimizing soil disturbance where it could potentially introduce sediment or pollutants into the creek.

In addition, as part of the monitoring and management plans for the riparian easements, Stanford would maintain water quality monitoring stations in the creeks (Los Trancos, Bear, San Francisquito) for 5 years to determine if the data are valuable for conservation purposes. If useful, the monitoring stations could be used beyond 5 years. Stanford would also investigate the feasibility of installing water quality monitoring stations on Matadero and Deer creeks. Installation of additional water quality monitoring stations would not adversely affect the creeks' flow or water quality.

The monitoring and management plans for the riparian easements also call for control of existing erosion in riparian areas. This includes using bioengineering methods to stabilize stream banks

and adjacent upland areas, and revegetating areas where erosion is an existing problem. In addition, when it is feasible, Stanford would remove man-made structures in San Francisquito Creek (e.g., rip-rap, gabions) to improve fish passage. The removal methods would be subject to review by the Conservation Program Manager to reduce impacts to water quality and Covered Species. These actions would improve water quality by reducing erosion.

Any actions undertaken pursuant to the conservation easements' monitoring and management plans would be done in accordance with the Clean Water Act and applicable State water resource laws, including the State Fish and Game Code. The easements and monitoring and management plans do not anticipate filling any wetlands or other aquatic resources; however, permits could be required from Federal, State or local agencies before stream stabilization activities were undertaken or any structures were removed from the creeks.

The Conservation Program in the HCP also includes several Minimization Measures to protect water quality as a way to also protect the Covered Species. These measures are included in Chapter 4 of the HCP, apply to work in Management Zones 1 and 2, and include:

- performing maintenance or other construction in the creeks without heavy equipment and coffer dams;
- limiting maintenance activities in reservoirs to the dry season (Lagunita) or periods where there is no overflow (Searsville);
- conducting all activities associated with the operation, maintenance, and installation of infrastructure improvements in an environmentally responsible manner in accordance with practices outlined in current industry published manuals;
- monitoring of service roads periodically for structural integrity and erosion;
- placing riparian areas “out-of-play” at the Stanford Golf Course;
- minimizing the use of biocides and fertilizers at the Golf Course;
- prohibiting public access to creek channels;
- keeping new recreational routes out of Management Zones 1 and 2 and at least 150 feet away from the creek bank;
- removing structures, crop fields, stables and paddocks associated with the equestrian and agricultural leases in Zone 1;
- requiring fuels stored in Zone 1 and 2 to be double contained; and
- oversight of all work in Zone 1 and 2 by the Conservation Program Manager.

Overall, the proposed HCP's Conservation Program would improve surface water quality, and would not lead to the violation of any Federal or State water quality standards. No structures or enhancements are proposed by the HCP that would place impermeable surfaces over the unconfined zone and affect groundwater recharge. Likewise, the HCP's proposed Conservation Program would not increase the amount of impermeable surfaces, which could increase run-off and the risk of flooding. To the extent that the underlying activities that are subject to the Minimization Measures or the proposed conservation activities require Federal, State, or local

permits, the HCP would not affect the need to obtain such permits.<sup>2</sup> Thus, the HCP would not lead to the violation of any Federal, State, or local water laws. Because it prohibits development in the creek corridor in perpetuity, the Proposed Action provides greater protection of water quality than the No Action or HCP for CTS Only alternatives (described later below).

With regard to the “Lake” water system, the water diversions at Los Trancos and San Francisquito creeks are already subject to steelhead by-pass flow operations required by the CDFG and NMFS, and the HCP would incorporate these operational protocols. Specific operational measures for the Searsville, Los Trancos and San Francisquito creek water diversions are described in the HCP (Chapter 3, and Appendix A), and there are Minimization Measures associated with maintenance of the diversion facilities, which are described in Section 4.2.1 of the HCP.

Regional flood reduction is not a Covered Activity in the HCP. As noted in Chapter 2.0 *Purpose and Need*, this issue will be addressed at a later date, and by all of the stakeholders in the region, not just Stanford. Therefore, possible regional flood reduction activities, such as modifications to Searsville Dam, the construction of off-stream detention sites, or regional-flood-reduction-related widening of San Francisquito Creek, are not Covered Activities.

While the HCP does not expressly cover any future regional flood reduction activities, it does not inhibit regional flood reduction planning. The HCP does not propose any major modifications of Searsville Reservoir that would prevent its possible use as a flood reduction facility (e.g., removal or modification). Likewise, the HCP does not prevent future removal or modification of the Searsville Dam to enhance steelhead passage. The HCP requires Stanford to study the technical feasibility of fish passage alternatives at Searsville Dam; conducting a study would not affect flood reduction.

The HCP protects 270 acres of the most biologically valuable portions of San Francisquito and Los Trancos creeks by placing conservation easements over them. This is a small fraction of the 45-square-mile watershed, and would not preclude the Corps and JPA from identifying viable, and possibly less environmentally sensitive, places to build flood reduction improvements.

The Proposed Action would not have a significant adverse effect on regional flood reduction as a result of either implementation of the Conservation Program or placement of a conservation easement in the San Francisquito Creek watershed. The Proposed Action would not require changes to operations and maintenance that would result in an increase in withdrawal of groundwater, or pose a threat to groundwater quality.

**Ongoing Stanford Operations.** Ongoing operations are described in Chapter 3 of the HCP (see Appendix B of the DEIS), and include water management, academic activities, infrastructure installation and maintenance (utilities, roads and bridges, fences, detention basins), residential land use, recreation and athletics, grounds and vegetation management, agricultural and equestrian leaseholds, and commercial and institutional leaseholds.

Ongoing Stanford operations do not adversely affect surface or ground water quality, modify groundwater quality or recharge, increase the risk of damage caused by flooding, or lead to the violation of applicable Federal, State or local laws. The operations are currently regulated in a

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<sup>2</sup> For example, the HCP does not authorize the fill of any wetlands or alteration of a creek or creek bed. These activities would still require permits under the CWA, Porter-Cologne Water Quality Control Act, or Fish and Game Code.

manner that protects water quality. Several measures are in place to prevent storm water (i.e., surface water) pollution. Stanford is required to comply with Palo Alto's Sewer Use Ordinance, which includes storm water requirements. Though not required by law, Stanford operates under its own campus Storm Water Pollution Prevention Plan (SWPPP) for ongoing operations. All new contracts for development at Stanford are required to include the Best Management Practices and requirements set forth in Stanford University's Special Conditions for Storm Water Pollution Prevention (Stanford University, 2005). The City of Palo Alto also conducts inspections each year to identify storm water issues.

Ongoing operations include maintenance activities to reduce obstructions in the creeks that could contribute to flooding. These maintenance activities are intended to reduce the risk of flooding.

The ongoing Covered Activities have not had an adverse effect on surface, drinking, or ground water quality, and have not significantly increased the risk of damage caused by flooding. The continuation of these activities would not adversely affect hydrology or water quality.

**Future Development.** Future development anticipated to occur during the 50-year term of the HCP/ITPs includes development permitted by the existing GUP, and development estimated to occur beyond the GUP. Development allowed under the existing GUP in Management Zones 1, 2 and 3 consists of 30 acres, and the impacts were addressed in the GUP EIR. Development anticipated in the HCP to possibly occur beyond what is currently allowed under the GUP is estimated to be between 50 and 150 acres. The HCP includes the following future development as a Covered Activity that could occur in Management Zones 1, 2 and 3: 1 to 3 million gross square feet of academic development, or 200 to 750 single family homes, or a combination of the two (e.g., 1 million gsf academic and 400 to 500 single family homes).<sup>3</sup>

The total amount of development addressed in the GUP EIR, including that in Management Zone 4, was 2,035,000 gsf of academic development and up to 3,018 housing units. Some of the development was proposed for vacant land and some was redevelopment. The GUP EIR found that the entire proposed development under the GUP would add an estimated 39 acres of impervious surfaces. Mitigation was required to prevent significant impacts related to flooding, groundwater supply and groundwater quality. Future development beyond the GUP would be reviewed by the county or city in which the development is proposed, and it likely would be subject to similar mitigation measures. The effects of future development beyond the GUP likely would have similar effects, but at a much smaller scale because of the level of development, and would be subject to similar mitigation measures.

*Flooding.* The GUP EIR determined that the entire proposed GUP development would result in a 39-acre increase in impervious surfaces, which could result in increased downstream flooding. During the EIR process, the Santa Clara Valley Water District indicated that any additional impervious area could increase downstream flooding. Mitigation included construction and operation of storm water detention facilities to ensure that peak 100-year storm runoff would not increase as a result of the development on campus.

It is estimated that 75 percent of future developed acreage beyond the GUP would be impervious surface (building, parking lots, and other paving). The remaining 25 percent would be permeable surfaces, such as landscaping. Therefore, the future development (50 to 150 acres)

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<sup>3</sup>This example of future development beyond the GUP assumes 150 acres of urban type development, and does not attribute any of this development to small conversions of habitat associated with the ongoing Covered Activities.

anticipated as part of the proposed action could result in an additional 37 to 113 acres of impervious surfaces over the 50-year term of the ITPs. This analysis assumes that all of the development would occur on vacant land and not include redevelopment of areas that already contain impervious surfaces. Since any increase in impervious surface could increase the risk of flooding, the future development anticipated in the HCP could increase the risk of flooding. Specific impacts would depend on the scope and nature of the future development, and would be addressed under CEQA review at the time that the development was proposed. Development that could result in an increased risk of downstream or local flooding would require improvements, such as detention basins or other storm water runoff controls to mitigate the effect. Based on the results of the current GUP, there are feasible measures that Stanford could implement so that the future development anticipated under the Proposed Action would not increase the risk of flooding.

*Groundwater Supply.* Impacts to groundwater supply from the development analyzed in the GUP EIR were found to be significant because 20 acres of new impervious area could occur in the unconfined zone (where groundwater recharge can occur) and could reduce groundwater volumes. Mitigation for this impact was the implementation of a groundwater recharge plan.

A small area of future GUP development included in the HCP as a Covered Activity is in the unconfined zone; this area is primarily around Lagunita. The effects of development allowed under the GUP in this area would be mitigated through the 2005 "Proposed Campus-wide Plan for Ground Water Recharge". The effects on groundwater of a specific development project that has not already been permitted by the GUP would be addressed in future environmental review under CEQA. Based on the results of the current GUP, there are feasible water measures that Stanford could implement so that future development anticipated under the HCP would not adversely affect groundwater recharge.

*Groundwater Quality.* The GUP EIR found that construction in the vicinity of improperly abandoned wells could result in adverse impacts to groundwater quality. This is because the wells could serve as a conduit for pollutants, such as oil and gasoline from construction equipment, into groundwater. The EIR and the Final Conditions of Approval require wells to be properly abandoned prior to construction. Because the location of development that has not already been permitted by the GUP is not known, future development could also adversely impact groundwater quality in this way. Groundwater quality protection and abandonment of wells would be addressed in future environmental review of specific development proposals on Stanford lands under CEQA. If necessary, wells would be abandoned properly, and as demonstrated by the GUP conditions of approval, there are feasible water quality measures that Stanford could implement so that development anticipated under the HCP would not pollute groundwater.

*Storm Water/Surface Water Quality.* Storm water pollution in San Mateo and Santa Clara counties is controlled through the National Pollutant Discharge Elimination System (NPDES) permits issued by the San Francisco Bay RWQCB and implemented through the Santa Clara Valley Urban Runoff Pollution Prevention Plan and San Mateo Countywide Water Pollution Prevention Program. To comply with the NPDES permit, local agencies address the protection of storm water quality during the development review process. All projects in Santa Clara and San Mateo counties must consider the incorporation of appropriate site design and source control measures as well as use best management practices (BMPs) to reduce the impacts of storm water discharges. Future development under the GUP, and that anticipated in the HCP, would be

required to include BMPs in project design. This would prevent adverse impacts to storm and surface water quality.

All construction sites that are open October through April are included in Stanford's Notice of Intent to qualify for the State's General Storm Water Construction Permit, with a SWPPP prepared for each project. All sites are monitored regularly by Stanford staff and site project managers. Stanford project managers receive annual training regarding storm water pollution prevention at construction sites.

The analysis done for the GUP development demonstrates that there are feasible mitigation measures that could be imposed on site-specific future development that would minimize or avoid adverse effects on hydrological resources and prevent an increased risk of flooding.

*Regulated Waters.* Because the exact location of future development is still unknown, Stanford does not know if its future development might result in the fill of wetlands or other aquatic resources regulated under the CWA, Porter-Cologne Water Quality Control Act, or Fish and Game Code. Any fill would require a permit from the Corps, RWQCB, and possibly CDFG, and may also be subject to review under CEQA. Compensatory mitigation for the fill could be required as a condition of those permits. Thus, future development would not violate any Federal, State, or local laws.

#### **5.1.3.2 Effects of the No Action Alternative**

**Conservation.** There would be no comprehensive Conservation Program under the No Action Alternative, and the easements and associated monitoring and management plans of the Proposed Action would not be recorded or implemented. Under this alternative, it is assumed that the activities in Zones 1 and 2 that require a permit would also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. Activities that result in ground disturbance would be subject to Best Management Practices as required under the applicable stormwater pollution prevention plan, and activities that affect waters or wetlands would be subject to protections required under the Clean Water Act and California Fish and Game Code. As with the Proposed Action, there would be no adverse effects on surface water quality, hydrology, surface or groundwater supply and quality, or regional flood reduction.

**Ongoing Stanford Operations.** Under the No Action alternative, ongoing Stanford operations would continue. These activities are subject to water quality protection requirements independent of any take authorization, and would have the same effects on water quality as the Proposed Action.

**Future Development.** Future development under the No Action alternative is the same as that described for the Proposed Action. Future development would be subject to Federal, State and local water quality regulations, and any new development that is not already allowed under the 2000 GUP would require project-specific building permits, CEQA review and possibly take authorization. Depending on its size and location, future development may affect storm water runoff, surface or ground water quality, ground water supply, flooding, or regulated waters, as described above for the Proposed Action. However, because of the project-specific review that is required for new development, these effects could be avoided or reduced through standard mitigation measures that are generally applicable to new urban development. This is the same effect as under the Proposed Action. The difference between the No Action alternative and the

Proposed Action is that the Proposed Action would establish permanent conservation easements within one year of ITP approval along the San Francisquito/Los Trancos and Matadero/Deer creek zones which would restrict development adjacent to sensitive water resources, and the Proposed Action includes a comprehensive Conservation Program that will reduce erosion and improve surface water quality in the creeks.

### **5.1.3.3 Effects of the HCP for CTS Only Alternative**

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The Conservation Program in the HCP for CTS Only alternative would not apply to the creek corridors, where water quality and hydrology issues are of greater concern. Conservation easements would not be immediately placed on the riparian corridors along San Francisquito/Los Trancos creeks and Matadero/Deer creeks although conservation easements could be placed as a result of future project-specific mitigation. The Conservation Program under the Proposed Action provides more comprehensive protection of water quality, including development restrictions in riparian corridors through conservation easements, and Minimization Measures that apply to activities occurring in and adjacent to the creeks.

The Conservation Program in the HCP for CTS Only alternative does not require activities near sensitive water resources and does not require ground disturbance that would adversely affect water quality or hydrology. In addition, measures to minimize ground disturbance, runoff, and erosion would be implemented in order to protect storm water quality. As with the Proposed Action and No Action alternative, there would be no adverse effects on surface water quality, hydrology, surface or groundwater supply and quality, or regional flood reduction.

Because it does not involve sensitive water resources, the Conservation Program in the HCP for CTS Only alternative has less potential for impact on water resources than the Proposed Action's Conservation Program, but it also does not have the beneficial effects of reducing erosion in the creek zones provided for in the Proposed Action's Conservation Program.

**Ongoing Stanford Operations.** Under the HCP for CTS Only alternative, Stanford would continue to operate. The same operations and maintenance activities would occur under the HCP for CTS Only alternative as for the Proposed Action. Thus, this alternative would have the same effects on hydrology and water quality as the Proposed Action.

**Future Development.** Future development under the HCP for CTS Only alternative is the same as that described for the Proposed Action. Future development would be subject to Federal, State and local water quality regulations, and any new development that is not already allowed under the 2000 GUP would require project-specific building permits, CEQA review and possibly take authorization. Depending on its size and location, future development may affect storm water runoff, surface or ground water quality, ground water supply, flooding, or regulated waters, as described above for the Proposed Action. However, because of the project-specific review that is required for new development, these effects could be avoided or reduced through standard mitigation measures that are generally applicable to new urban development. This is the same effect as under the Proposed Action and the No Action alternative. The difference between the HCP for CTS Only alternative and the Proposed Action is that the Proposed Action would establish permanent conservation easements within one year of ITP approval along the

San Francisquito/Los Trancos and Matadero/Deer creek zones which would restrict development adjacent to sensitive water resources, and the Proposed Action includes a comprehensive Conservation Program that will reduce erosion and improve surface water quality in the creeks. With regard to the impacts of future development, the HCP for CTS Only alternative has the same effects as the No Action alternative.

#### **5.1.3.4 Comparison of Alternatives**

The Proposed Action or the alternatives would not result in significant adverse effects to hydrology and water quality (see Table 5-6 at the end of the chapter). The Conservation Program under the Proposed Action provides bank stabilization that may not otherwise be required, and this would reduce erosion and benefit water quality. The easements proposed in the Conservation Program would also restrict development within the creek zones, in turn protecting surface water quality in the creeks. In comparing the alternatives, none pose a significant adverse effect, but the Proposed Action provides a benefit related to hydrology and water quality.

#### **5.1.4 Air Quality**

This section describes the impacts to air quality resulting from the implementation of the Proposed Action or the alternatives. The effects related to air quality are based on a review of air quality information for the affected environment and an assessment of the activities under the Proposed Action and alternatives that could affect air quality. Actions that result in violations of air quality standards or emissions that contribute substantially (as determined by the BAAQMD) to an existing or projected air quality violation would constitute a significant adverse effect on air quality.

##### **5.1.4.1 Effects of the Proposed Action**

**Conservation Program.** Some of the proposed HCP's habitat management and enhancement activities would involve ground disturbance or the use of construction equipment or vehicles causing air emissions. These activities may include the use of a backhoe or a bobcat tractor, and the ground disturbance would be minimized in order to protect biological resources. The equipment and type of work is similar to everyday activities that could occur in the air basin, and would not result in violations of air quality standards or emissions that would contribute substantially to an existing or projected air quality violation. Therefore, the implementation of the Conservation Program would not result in significant adverse effects on air quality.

**Ongoing Stanford Operations.** Stanford's ongoing activities would not markedly change due to the HCP. Therefore, the Proposed Action would not result in changes to air quality from ongoing university operations.

**Future Development.** The Stanford GUP EIR described the regional climate and physiographic, regional air quality, and State and Federal air quality standards. It was determined that the proposed development would result in significant impacts from diesel exhaust, a toxic air contaminant. These impacts were reduced to less than significant by implementing a mitigation measure requiring contractors to properly maintain their equipment and use "clean fuel" equipment and control technologies where feasible. All other impacts were considered less than significant.

Except for small projects that are exempt from CEQA, future development anticipated beyond that addressed in the GUP EIR would undergo independent environmental review and would be

governed by the constraints set forth by State and Federal law, and local ordinances and air quality plan. The Bay Area Air Quality Management District CEQA Guidelines outline feasible measures to reduce construction emissions of dust and diesel exhaust and establishes thresholds of significance for emissions from project operations including indirect sources of emissions from land use development (mobile emissions from cars at office parks, shopping centers, residential areas), and for plan (general, regional or air quality plan) impacts. Future development would have similar effects as the GUP development on air quality and based on the GUP CEQA analysis, there are feasible mitigation measures to reduce emissions and avoid the violation of air quality standards. Future development anticipated in the Proposed Action would therefore not have any significant adverse effects on air quality.

#### **5.1.4.2 Effects of the No Action Alternative**

**Conservation.** Under the No Action alternative, the proposed ITPs would not be issued and the HCP, including a comprehensive Conservation Plan, would not be implemented. Future development and ongoing Stanford operations in Management Zones 1 and 2 that could result in take of federally listed species would require take authorization on a project-by-project basis, which is what happens now. Under this alternative, activities in Zones 1 and 2 that require a permit are assumed to also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. Air quality effects would result from the use of construction equipment or vehicles, as described for the Proposed Action, but the amount of restoration work involving the equipment may be less under the No Action alternative. There could be fewer emissions generated under the No Action alternative than described for the Proposed Action, but neither would result in an adverse effect on air quality.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate and the No Action alternative would not result in additional emissions beyond current emissions from ongoing university operations. This is the same as under the Proposed Action.

**Future Development.** Under the No Action alternative, new development would occur. Future development would be subject to the GUP, and any new development that has not already been permitted by the GUP would require project-specific CEQA review that could include measures to reduce potential effects on air quality. As demonstrated by the GUP conditions of approval, there are feasible air quality mitigation measures that would reduce potential effects on air quality. The effect of future development would be the same as described for the Proposed Action.

#### **5.1.4.3 Effects of the HCP for CTS Only Alternative**

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The HCP for CTS Only alternative would have no effects on air quality. The conservation program would be limited to activities outlined in the Central Campus CTS Management Plan and the CTS Reserve Monitoring and Management Plan. The activities in the CTS Reserve Monitoring and Management Plan are restricted to vegetation mowing and species monitoring, and except for the creation of new tiger salamander breeding ponds within

the CTS Reserve, do not differ significantly from existing vegetation management activities. The conservation program prohibits development in the CTS Reserve, and the creation of new breeding ponds would not have significant long-term effects on air quality by resulting in violations in AAQS. Similarly, the activities in the Central Campus CTS Management Plan address methods of vegetation and ground animal management, worker education, restriction of off-road vehicles, and monitoring and also would not affect air quality. These activities would not require soil disturbance or a significant change in equipment use that would affect air quality. Activities outside of the CTS Basin would be subject to measures that protect air quality as described for the Proposed Action and No Action alternatives.

**Ongoing Stanford Operations.** Under the HCP for CTS only alternative, Stanford would continue to operate, and the alternative would not result in changes to air quality from ongoing university operations. This is the same as described for the Proposed Action.

**Future Development.** Under the HCP for CTS Only alternative, new development would occur. Future development would be subject to existing State and local regulations pertaining to air quality, and any new development that has not already been permitted by the GUP could require project-specific CEQA review. The effects of future development would be the same as described for the Proposed Action.

#### 5.1.4.4 Comparison of Alternatives

The Proposed Action or the alternatives would not result in significant adverse effects to air quality. Although the Proposed Action's Conservation Program may require more hours of equipment use than the other alternatives in order to implement restoration activities, the Proposed Action or alternatives do not significantly differ in effects on air quality.

#### 5.1.5 Noise

This section describes the effects of the Proposed Action and alternatives on the existing noise environment. The assessment of the noise effects is based on local noise regulations, and whether local noise ordinances would be violated.

##### 5.1.5.1 Effects of the Proposed Action

**Conservation Program.** The Conservation Program's monitoring, management, and enhancement activities would occur in Management Zones 1 and 2, which are located away from residential neighborhoods that contain sensitive noise receptors. Conservation activities would mostly take place in the foothills and along creek corridors. Such measures include creek restoration to remove impediments, bank stabilization, exotic vegetation removal, vegetation management through mowing, and pond management. These activities are discrete and short-term, and do not represent a new source of significant noise.

Existing noise ordinances regulate unwanted sound and prevent or minimize adverse noise effects. Conservation program activities would not exceed the noise ordinance limitations and would not result in adverse noise effects.

**Ongoing Stanford Operations.** A few of the activities conducted for ongoing Stanford operations such as those related to the creeks, utilities, roads, bridges, and storm water detention and other general improvements could require the use of machinery or heavy equipment such as a backhoe, bobcat tractor and dump truck.

Noise from ongoing Stanford operations is subject to the restrictions in applicable city or county noise ordinances. The HCP would not result in a change in ongoing operations and maintenance and would not result in the violation of a noise ordinance.

**Future Development.** Development under the 2000 GUP was subject to environmental review by Santa Clara County. The Stanford GUP EIR addressed the impacts of GUP development on sensitive noise receptors for both construction-related noise and operational noise (ongoing use after construction). The Stanford GUP EIR found that the impacts of construction noise on residential locations outside of the campus (e.g., residences on Stanford Avenue) were significant because construction-related noise would exceed Santa Clara County noise standards. Although the EIR included several mitigation measures to reduce construction-related noise impacts, the EIR concluded that the impacts were significant even with the mitigation measures. Mitigation measures included requiring the use of a noise-attenuating jacket around jackhammers; using state-of-the-art technology to mitigate construction equipment noise (i.e., engine enclosures, intake and exhaust silencers, etc.); constructing 8- to 10-foot-high temporary walls along the property lines of the project site adjacent to residential areas; and scheduling the construction such that the absolute minimum number of machines would be operating at the same time.

The GUP EIR found that operational noise impacts due to the GUP development were not significant with specific mitigation measures incorporated. The mitigation measures included requiring that mechanical equipment and new facilities incorporate state-of-the-art noise reduction components (mufflers, enclosures, parapets), that all operational noise sources comply with the County noise ordinance, that the project incorporate design measures to locate noise sources such as loading zones, trash bins, and mechanical equipment as far away from the noise sensitive receptor locations as possible, and that residential uses be separated from parking structures by at least 150 feet.

In addition to the development proposed in the Stanford University GUP, the development of up to 150 acres of Zone 1, 2 and 3 lands over the next 50 years is a Covered Activity in the HCP. Although the exact location of any future development, including small conversions of habitat from ongoing activities, is currently unknown, future development would have noise impacts similar to the GUP development. The specific impacts would depend on the exact location of the development and its proximity to land uses outside of Stanford with a high sensitivity to noise (e.g., residential). The areas that the GUP EIR concluded would experience unavoidable significant noise impacts are located in Management Zone 4, or in off-site locations adjacent to Zone 4. The EIR found that only sensitive noise receptors outside of Stanford could be significantly impacted by development activities that exceeded local noise ordinances. The same would be true for future development beyond the GUP. Any development that is located adjacent to sensitive off-site noise receptors could, even with mitigation, exceed a local noise ordinance. In addition, noise sensitive areas that are not directly affected by construction activities could experience elevated noise levels due to increased vehicular traffic and construction equipment transport, although these activities are not likely to exceed local noise ordinances or regulations.

Regardless of the location or source of the noise, any proposed new development could be subject to future CEQA review which would address both construction-related and operational noise. Future development could result in adverse effects related to noise even with mitigation measures, as evidenced by the GUP EIR findings, because noise ordinance violations during

construction could still occur. Operational noise due to future development could be mitigated to prevent violation of a noise ordinance, and should not result in a significant adverse effect.

#### 5.1.5.2 Effects of the No Action Alternative

**Conservation.** Under the No Action alternative, the proposed ITPs would not be issued and the HCP would not be implemented. Under this alternative, activities in Zones 1 and 2 that require a permit are assumed to also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. Conservation activities would mostly take place along creek corridors, and in the foothills where tiger salamander are found. Such measures could include creek restoration to remove man-made impediments, bank stabilization, exotic vegetation removal, vegetation management through mowing, and pond management. These activities are discrete and short-term, and do not represent a new source of significant noise. The noise effects of possible conservation activities under the No Action alternative would be similar to the noise that would be generated by the conservation activities under the Proposed Action.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford operations would continue and would be subject to existing and future noise ordinances. This alternative would not result in changes to noise from ongoing university operations. This is the same as described for the Proposed Action.

**Future Development.** Under the No Action alternative, new development would occur. Future development would be subject to existing State and local noise regulations, and any new development that has not already been permitted by the GUP could require project-specific building permits and CEQA review. Thus, the effects from future development would be the same under the No Action alternative as those described for the Proposed Action. Depending on the location of future development relative to sensitive receptors, construction noise could be significant even with mitigation measures. The operational noise should not be significant after mitigation is implemented.

#### 5.1.5.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than the tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The specific activities that would be included in the conservation program for this alternative are described in Chapter 4 of the HCP (see Appendix B). In general, they include surveys, mowing/grazing, monitoring, and education programs. None of these activities are significant sources of noise. The noise effects of the implementation of a conservation program under the HCP for CTS Only would be similar to the noise associated with the Proposed Action.

Conservation activities similar to those identified in the Proposed Action could also occur as a result of individual take authorizations for projects affecting listed species outside of the CTS Basin (red-legged frog, garter snake and/or steelhead). Such measures include creek restoration to remove impediments, bank stabilization, exotic vegetation removal, vegetation management through mowing, and pond management. These activities are discrete and short-term, would not result in violations of applicable noise ordinances because they would be done by hand or with

commonly-used construction machinery (such as a mower or bobcat, as opposed to a loud pile-driver), and do not represent a new source of significant noise.

**Ongoing Stanford Operations.** Under the HCP for CTS Only alternative, Stanford operations would continue as at present under existing noise ordinance restrictions. This alternative would not result in changes to noise from ongoing university operations. This is the same as described for the Proposed Action.

**Future Development.** The future development anticipated in the Proposed Action and the No Action alternatives could still occur under this alternative, although it may require individual take authorizations. Hence, this alternative would result in the same noise effects as the Proposed Action.

#### 5.1.5.4 Comparison of Alternatives

The Proposed Action or the alternatives would not result in significant adverse effects to noise, with the exception of construction noise associated with future development. Depending on the location of future development relative to sensitive receptors, construction noise could be significant even with mitigation measures. The operational noise should not be significant after mitigation is implemented. The Proposed Action or alternatives do not significantly differ in effects on noise.

#### 5.1.6 Traffic

This section describes the impacts to traffic resulting from implementation of the Proposed Action or the alternatives. Traffic effects were assessed by using the GUP EIR, reviewing the information in the affected environment, and by calculating the trips that could be generated by future development using standard trip rates published by the Institute of Transportation Engineers (ITE), which is described in more detail under the Proposed Action, below. Effects on traffic were assessed to see if the Proposed Action or alternatives would cause any intersection to fall below an accepted Level of Service (LOS). This depends on the intersection, and is usually LOS D or better.

##### 5.1.6.1 Effects of the Proposed Action

**Conservation Program.** No activities are proposed in the Conservation Program that would permanently alter existing traffic patterns or result in an increase in vehicle trips. Conservation activities would mostly take place in the foothills and along creek corridors. Such measures include creek restoration to remove impediments, bank stabilization, exotic vegetation removal, vegetation management through mowing, pond management, and monitoring for the Covered Species. These activities could result in temporary traffic delays as personnel and equipment are moved to and from the sites, but would not affect long-term traffic levels or patterns by worsening intersection LOS.

**Ongoing Stanford Operations.** Existing traffic from the ongoing Covered Activities is part of the existing traffic affected environment (see Chapter 4.1.6). Continuation of the ongoing activities would not significantly affect existing traffic patterns by worsening intersection LOS.

**Future Development.** The traffic impact attributable to development beyond that covered by the GUP is uncertain because the exact locations, timing, and sizes of future developments are not known at this time. The trip generation potential was estimated for a range of future development (beyond the GUP) as specified in Chapter 3 of the DEIS. The estimate includes

AM and PM peak hour vehicle trips. Standard trip rates published by the ITE were used to estimate trips associated with new housing development. This is a conservative estimate because potential housing development for Stanford employees on its lands would likely have an alternative transportation component included to reduce vehicular trips. The previously prepared trip generation estimates from the GUP traffic study were used to develop similar projections for traffic attributable to future academic development anticipated in the HCP.

As described in Chapter 3, Stanford provided estimates of the future development potential, beyond that already approved by the GUP, over the 50-year term of the ITPs and HCP. Their estimates are general projections based on current campus planning principles of density and building efficiency. Assuming a typical suburban campus development density of 0.25 Ground Area Coverage and two-story buildings, 1 to 3 acres could support 20,000 to 60,000 square feet of academic development. Assuming a housing density of 4 to 5 single-family units per acre, 1 to 3 acres could support 4 to 15 housing units each year. Therefore, during the term of the ITPs up to approximately 1,000,000 to 3,000,000 square feet of academic development, or 200 to 750 single-family housing units, or some combination of the two (e.g., 1,000,000 square feet of academic development and 400-500 housing units) could occur.<sup>4</sup>

Under the maximum possible housing development scenario, there could be as many as 141 new inbound trips and 422 new outbound trips during the AM peak hour, and 477 new inbound trips and 280 new outbound trips during the PM peak hour. Under the maximum possible academic development, there could be as many as 190 new inbound trips and 268 new outbound trips during the AM peak hour, and 512 new inbound trips and 663 new outbound trips in the PM peak hour. Under the mid-range combination, there could be a total of 184 new inbound trips and 401 new outbound trips in the AM peak hour, and 558 new inbound trips and 510 new outbound trips in the PM peak hour. The low range combination could result in 133 new inbound trips and 247 new outbound trips in the AM peak hour and 383 new inbound trips and 407 new outbound trips in the PM peak hour (Tables 5-1 and 5-2).

The GUP traffic study concluded the projected traffic impacts from the GUP development were significant and unavoidable, because some local intersections would fall below acceptable levels of service (LOS D). This traffic analysis has determined that future development under the HCP would result in additional traffic that would presumably further impact these already congested intersections. Thus, traffic attributable to future development anticipated in the HCP could result in traffic that would adversely affect traffic levels of service. However, it is important to note that a definitive determination of effects on traffic is not possible considering the uncertainty of changes that could affect traffic over the next 50 years. Improvements to the road system or transit in and around Stanford unrelated to Stanford development could change the affected environment compared to what is being evaluated here. Each new development that is proposed would undergo separate environmental review which would address traffic impacts and mitigation on a case-by-case basis.

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<sup>4</sup> This example of future development beyond the GUP assumes 150 acres of urban type development, and does not attribute any of this development to small conversions of habitat associated with the ongoing Covered Activities.

**Table 5-1. Traffic Projections for Stanford HCP Development Scenarios**

**Traffic Projections for Stanford HCP Development Scenarios**

Land Use	Size	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
<b>Housing Development</b>							
Maximum Possible Development	750 sfdu's	141	422	563	477	280	758
<b>Academic Development</b>							
Maximum Possible Development	3,000,000 s.f.	190	268	458	512	663	1175
<b>Low-Range Combination</b>							
Housing Development	200 sfdu's	38	113	150	127	75	202
Academic Development	1,000,000 s.f.	95	134	229	256	332	588
Low-Range Totals		133	247	379	383	407	790
<b>Mid-Range Combination</b>							
Housing Development	475 sfdu's	89	267	356	302	178	480
Academic Development	1,500,000 s.f.	95	134	229	256	332	588
Mid-Range Totals		184	401	585	558	510	1,068

Notes:

/a/ Trip generation rates for single-family homes (ITE Land Use #210) used for housing development; taken from *ITE Trip Generation, Seventh Edition*.  
 /b/ Trip generation for academic development is based on the ratio of HCP development divided by GUP development.

**Table 5-2. Traffic Rates Comparison between Stanford GUP and Habitat Conservation Plan**

**Comparison Between Stanford General Use Permit and Habitat Conservation Plan**

Land Use	Size	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
<b>Housing Development</b>							
Maximum Possible Development	750 sfdu's	141	422	563	477	280	758
GUP Trips		129	182	311	347	450	797
Total Estimated Trips (GUP+HCP)		270	604	874	824	730	1555
<b>Percent Increase</b>		<b>52.16%</b>	<b>69.86%</b>	<b>64.40%</b>	<b>57.90%</b>	<b>38.38%</b>	<b>48.73%</b>
<b>Academic Development</b>							
Maximum Possible Development	3,000,000 s.f.	190	268	458	512	663	1175
GUP Trips		129	182	311	347	450	797
Total Estimated Trips (GUP+HCP)		319	450	769	859	1113	1972
<b>Percent Increase</b>		<b>59.58%</b>	<b>59.58%</b>	<b>59.58%</b>	<b>59.58%</b>	<b>59.58%</b>	<b>59.58%</b>
<b>Low-Range Combination</b>							
Housing Development	200 sfdu's	38	113	150	127	75	202
Academic Development	1,000,000 s.f.	95	134	229	256	332	587
Low-Range Totals		133	247	379	383	407	789
GUP Trips		129	182	311	347	450	797
Total Estimated Trips (GUP+HCP)		262	429	690	730	857	1,586
<b>Percent Increase</b>		<b>50.69%</b>	<b>57.54%</b>	<b>54.94%</b>	<b>52.47%</b>	<b>47.49%</b>	<b>49.76%</b>
<b>Mid-Range Combination</b>							
Housing Development	475 sfdu's	89	267	356	302	178	480
Academic Development	1,500,000 s.f.	95	134	229	256	332	587
Mid-Range Totals		184	401	585	558	510	1,067
GUP Trips		129	182	311	347	450	797
Total Estimated Trips (GUP+HCP)		313	583	896	905	960	1,864
<b>Percent Increase</b>		<b>58.81%</b>	<b>68.80%</b>	<b>65.31%</b>	<b>61.66%</b>	<b>53.11%</b>	<b>57.25%</b>

Notes:

/a/ Trip generation rates for single-family homes (ITE Land Use #210) used for housing development; taken from *ITE Trip Generation, Seventh Edition*.  
 /b/ Trip generation for academic development is based on the ratio of HCP development divided by GUP development.

### 5.1.6.2 Effects of the No Action Alternative

**Conservation.** Under the No Action Alternative, the HCP would not be implemented. Under this alternative, activities in Zones 1 and 2 that require a permit are assumed to also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. As with the Proposed Action, these activities could result in temporary traffic delays as personnel and equipment are moved to and from the sites during conservation activities. No long-term effects to traffic levels or patterns would occur.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford operations would continue. This alternative would not result in changes to traffic from ongoing university operations, which is the same as described for the Proposed Action. Existing traffic from the ongoing Covered Activities is part of the existing traffic affected environment (see Chapter 4.1.6). Continuation of the ongoing activities would not significantly affect existing traffic patterns by worsening intersection Levels of Service.

**Future Development.** Under the No Action alternative the projected future development described for the Proposed Action would still occur, but incidental take authorization would be granted on a project-specific basis. Thus, the effects on traffic from the ongoing activities and future development would be the same under the No Action alternative as described for the Proposed Action. Mitigation for future development currently anticipated in the GUP is in place, and future development anticipated in the HCP would be subject to project-specific environmental review; however, future mitigation may not be enough to prevent adverse traffic effects from new development.

### 5.1.6.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation.** The conservation program of the HCP for CTS Only alternative would be limited to activities in the CTS Basin that entail short-term construction or maintenance and do not result in long-term traffic impacts. The individual take authorizations issued on a project-specific basis for red-legged frog, garter snake or steelhead would likely require minimization measures and mitigation such as conservation easements and creek restoration. These would be similar to those proposed in the HCP, but probably more limited in scope in accordance with the impacts of the individual project. The traffic effects of the HCP for CTS Only alternative would be the same as the Proposed Action, because the conservation activities are similarly short-term, cover a small area, and like everyday construction activities in the area.

**Ongoing Stanford Operations.** The HCP for CTS Only alternative would not result in changes to ongoing Stanford operations, or to traffic associated with ongoing operations, which is the same as described for the Proposed Action. Existing traffic from the ongoing Stanford operations is part of the existing traffic affected environment (see Chapter 4.1.6). Continuation of these activities would not significantly affect existing traffic patterns by worsening intersection Levels of Service.

**Future Development.** The projected future development described for the Proposed Action would also still occur under the HCP for CTS Only alternative. Thus, the effects on traffic from future development would be the same under the HCP for CTS Only alternative as for the Proposed Action. Mitigation for future development currently anticipated in the GUP is in place, and future development anticipated in the HCP would be subject to project-specific environmental review; however, future mitigation may not be enough to prevent adverse traffic effects caused by new development.

#### **5.1.6.4 Comparison of Alternatives**

The Proposed Action or the alternatives would not result in significant adverse effects to traffic, with the exception of traffic associated with future development. Because development under the GUP EIR was found to have an unavoidable traffic impact by adversely affecting the LOS at some intersections, the analysis in this DEIS assumes that any future development under the Proposed Action or alternatives would also have an unavoidable adverse effect on traffic. However, a definitive determination of effects on traffic is not possible considering the uncertainty of changes that could affect traffic over the next 50 years. Improvements to the road system around Stanford or project-specific mitigation may prevent adverse traffic effects. The Proposed Action or alternatives do not significantly differ in effects on traffic.

#### **5.1.7 Hazardous Materials/Waste**

This section describes the hazardous materials and hazardous waste impacts resulting from the implementation of the Proposed Action or the alternatives. Effects related to hazardous materials and wastes are analyzed qualitatively, and are based on Stanford's current hazardous materials and waste protocols and policies, and the nature of the activities that would occur. The analysis focuses on the potential for public and environmental exposure to hazardous materials as a result of the implementation of the Proposed Action or alternatives or from the continuation of the ongoing Covered Activities and new development anticipated in the HCP.

The Stanford GUP EIR determined that requiring the preparation of a Risk Management Plan for projects under the GUP that trigger the California Accidental Release Prevention Law would reduce significant impacts to less than significant for future projects. The California Accidental Release Prevention Law is triggered when chemicals are held in certain quantities, generally such quantities that would affect areas beyond the room or building where an accidental release occurred.

##### **5.1.7.1 Effects of the Proposed Action**

**Conservation Program.** There are no hazardous waste sites within Management Zones 1, 2, and 3. Conservation Program activities such as bank stabilization and instream structure removal which could require the use of heavy equipment would involve the use of small amounts of hazardous materials (fuels, motor oils, lubricants, antifreeze etc.) in order to run the equipment. In these instances, Stanford would employ standard operating procedures such as using equipment that is regularly maintained and refueling in safe areas. Compliance with applicable laws and regulations pertaining to handling of heavy equipment and associated hazardous materials substantially reduce the risk of accidental release of hazardous materials or exposure to hazardous materials, and the implementation of the Conservation Program would not have an adverse effect related to hazardous materials or waste. Potential effects on water quality from activities that require the use of hazardous materials in the creek zones are also not significant, and are addressed in Section 5.1.3.

**Ongoing Stanford Operations.** Hazardous materials and hazardous waste use, handling, storage, and disposal occur only in Management Zone 4, and are done according to State, Federal, county and local laws as implemented through various Stanford environmental health and safety department programs and policies. Hazardous materials that could be used in Management Zones 1, 2, and 3 include materials associated with mechanical equipment, such as fuels, motor oils, antifreeze, etc. There are no effects from ongoing operations complying with all applicable laws and regulations, and the risk of an accidental release or hazardous materials exposure is very small. Therefore, the ongoing operation of Stanford under the HCP would not have a significant adverse effect related to hazardous materials and waste.

**Future Development.** There are no known hazardous waste sites at Stanford within Management Zones 1, 2, or 3. Thus, future development in these areas would have no effect on known hazardous waste sites. Future development in any Management Zone would be subject to State, Federal, county and local laws regarding the storage, handling, and use of hazardous materials and waste. Hence, the risk of accidentally releasing hazardous materials or hazardous waste is very small and would not result in significant adverse effects.

If future development at Stanford involved the construction of a building that would store, use or dispose of hazardous materials in quantities great enough to trigger the California Accidental Release Prevention law, the law would require the preparation of a Risk Management Plan. The Risk Management Plan would include a hazard assessment, and specify preventative measures and emergency response procedures. Therefore, the risk for accidental release of hazardous materials would be minimized, and the potential adverse effect would not be significant.

#### **5.1.7.2 Effects of the No Action Alternative**

**Conservation.** There would be no comprehensive Conservation Program under the No Action Alternative. Under this alternative, activities in Zones 1 and 2 that require a permit are assumed to also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. Such measures do not generally require handling of hazardous materials although some hazardous materials (e.g., fuel) could be associated with heavy equipment used to implement some of the activities. As long as the equipment and materials are handled according to applicable laws, adverse effects would not occur. There are no known hazardous waste sites that could be disturbed. Because the activities under any alternative must comply with applicable laws, the effects of the No Action alternative are the same as the Proposed Action

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate in compliance with State, Federal, county and local laws as implemented through various Stanford environmental health and safety department programs and policies. Hazardous materials that could be used include materials associated with mechanical equipment, such as fuels, motor oils, antifreeze, etc. There are no effects from ongoing operations complying with all applicable laws and regulations, and the risk of an accidental release or hazardous materials exposure is very small. Therefore, the ongoing operation of Stanford under the No Action would not have a significant adverse effect related to hazardous materials and waste. Since the ongoing operations are the same under each alternative, the effects on hazardous materials and waste under the No Action alternative are the same as the Proposed Action.

**Future Development.** Future development would be subject to existing State and local regulations, and any new development that has not already been permitted by the 2000 GUP would require project-specific CEQA review. The anticipated future development would be the same under the Proposed Action and the alternatives. Thus, the effects of the ongoing operation of Stanford and future development would be the same under the No Action alternative as described for the Proposed Action.

### 5.1.7.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The conservation program under this alternative would be limited to activities outlined in the Central Campus CTS Management Plan and the CTS Reserve Monitoring and Management Plan. That includes vegetation mowing, pond building and species monitoring, and the plan prohibits development in the CTS Reserve. Similarly, the activities in the Central Campus CTS Management Plan address methods of vegetation and ground animal management, worker education, restriction of off-road vehicles, and monitoring. Conservation Program activities such as mowing and pond building could involve the use of mechanical equipment that requires fuel, oil, etc. As with the Proposed Action, the risk of an accidental release or hazardous materials exposure is very small through the use of standard operating procedures when handling these materials. The risk to waterways is less than the Proposed Action because the conservation activities would be limited to grassland areas away from riparian zones.

Take authorization for other federally listed species would have the same effects related to hazardous materials as the Proposed Action. As long as the equipment and materials are handled according to applicable laws, adverse effects would not occur.

**Ongoing Stanford Operations.** Under the HCP for CTS Only alternative, Stanford would continue to operate. Stanford operates according to all State, Federal, and local laws related to hazardous materials and hazardous waste as implemented through various Stanford environmental health and safety department programs and policies. There are no adverse effects from ongoing operations complying with all applicable laws and regulations, and the risk of an accidental release or hazardous materials exposure is very small. The effects of ongoing operations of Stanford under the HCP for CTS Only Alternative would be the same as those described for the Proposed Action.

**Future Development.** Development in the CTS Basin would be covered by the HCP for CTS Only alternative, whereas other development that adversely affects red-legged frog, garter snake or steelhead would need separate take authorization. Regardless, future development would be subject to existing State and local regulations pertaining to handling of hazardous materials, and any new development that has not already been permitted by the GUP could require project-specific CEQA review. The amount of future development would be the same under each of the alternatives and the effects of future development on hazardous materials and hazardous waste under this alternative would be the same as the Proposed Action.

#### 5.1.7.4 Comparison of Alternatives

The Proposed Action or the alternatives would not result in significant adverse effects to hazardous materials/waste. Protocols already in place by Stanford would minimize the risk of exposure to hazardous materials/waste under the Proposed Action or alternatives. The Proposed Action or alternatives do not significantly differ in effects on hazardous materials/waste.

#### 5.1.8 Public Services

This section describes the potential effects of the Proposed Action and the alternatives on public services such as police, fire, schools, solid waste, water, wastewater services, and electricity/gas. The effects related to public services are based on a review of information about the affected environment and the activities associated with the Proposed Action or alternatives that could require public services. This assessment analyzes whether the Proposed Action or alternatives would result in a need for public services that could not be met by existing providers or entitlements, or require an expansion of services that would adversely affect the environment (such as a new wastewater plant).

##### 5.1.8.1 Effects of the Proposed Action

**Conservation Program.** The activities relate to protection and management of habitat for the Covered Species and do not require additional police, fire, schools, solid waste, water, wastewater services, or electricity/gas services.

**Ongoing Stanford Operations.** The ongoing Covered Activities are already covered by existing public services and would not require additional public services.

**Future Development.** Development under the GUP was subject to environmental review by Santa Clara County. The EIR required Stanford to provide the funding or negotiate services to provide adequate levels of fire and police services. Stanford was also required to upgrade waste water collection system infrastructure if additional development required additional capacity. Solid waste disposal capacity was determined adequate for the proposed GUP development given an existing comprehensive and successful recycling program. By law, the only mitigation that can be required to maintain school capacities is to impose statutory school fees for additional development.

In addition to the development proposed in the Stanford University GUP, the ITPs cover the development of up to an additional 150 acres of Stanford lands over the next 50 years. Future development could undergo independent environmental review under CEQA and would be governed by State and Federal law, city and county General Plans, and local ordinances. It is unknown if levels of police, fire, school, and similar public services would be adversely affected by future development. The need and type of mitigation would depend on the conditions existing at the time of future development and on the type of project that was proposed. It is anticipated that the precise impacts of future development would be assessed when it is proposed. Future development could be constrained by inadequate capacity or level of service if additional funding, physical improvements, or negotiations of service are not made. Small conversions of habitat associated with the ongoing Covered Activities may be exempt from CEQA, but these would not affect public services.

As noted in DEIS Chapter 4, Stanford uses water from several sources, and currently operates under a water conservation plan. The maximum future development anticipated in the HCP could require as much as 0.33 mgd of water<sup>5</sup>. This number does not take into account possible conservation measures. However, current conservation efforts under the Water Reuse and Conservation Plan have reduced average campus domestic water use by 0.5 mgd from 2.7 mgd in 2000-2001 (Stanford 2003) to 2.31 mgd in 2007-2008 (Santa Clara County, June 2009) leaving future usage for the GUP development at 0.723 mgd, which is within the SFPUC's current water allocation.

Development beyond the GUP could raise Stanford's demand for water from the SFPUC up to 3.14<sup>6</sup> mgd, which would exceed the SFPUC's current allocation of 3.033 mgd. Currently, the SFPUC could not meet Stanford's expected water demand for development beyond the GUP. If the SFPUC's water allocation does not increase, future development beyond the GUP would need to include water conservation measures in order to remain within the SFPUC's allocation, or Stanford would need to either augment its water allocation or acquire other sources of water. Whether Stanford could sufficiently reduce its water use through additional water conservation measures or augment its water supply is not known at this time. However, Stanford could not require the SFPUC to exceed its allocation or build new facilities to provide additional water supplies. Rather, Stanford's ability to develop would be constrained, and Stanford would be required to stay within the SFPUC's water allocation. Thus, future development could be limited by the availability of public services, but future development would not adversely affect any public services.

#### **5.1.8.2 Effects of the No Action Alternative**

Under the No Action alternative, the proposed ITPs would not be issued and the HCP, including a comprehensive Conservation Program would not be implemented. Separate take authorization would be required for each activity resulting in take of a federally listed species.

**Conservation.** Under this alternative, activities in Zones 1 and 2 that require a permit are assumed to also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. These would not require new public services which is the same as the Proposed Action.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate. Ongoing operations do not alter the need for public services; therefore the effect would be the same as the Proposed Action.

**Future Development.** Future development would be subject to existing State and local regulations, and any new development that has not already been permitted by the GUP could require project-specific building permits and CEQA review. Regardless of the issuance or non-issuance of the ITPs, maintaining adequate public services would be required of all future activities and development on Stanford lands. The effects of the ongoing operation of Stanford

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<sup>5</sup> This is calculated by multiplying 3,000,000 sf of academic space (the maximum anticipated in the HCP) by 0.11 gpd/sf (the amount of water consumed per square foot for existing campus academic and other space per the 2000 GUP EIR).

<sup>6</sup> This is calculated by adding the current 2007-2008 water usage (2.31 mgd), plus water use anticipated under GUP development (0.609 mgd) (Parsons 2000), plus water use anticipated under future development defined in the HCP.

and of future development would be the same under the No Action alternative as those described for the Proposed Action.

### 5.1.8.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than the tiger salamander would require project-specific incidental take permits.

**Conservation Program.** Impacts to public services under the HCP for CTS Only alternative are the same as the Proposed Action because the conservation activities proposed would not require new public services. The implementation of any conservation program would have no effect on public services.

**Ongoing Stanford Operations.** Under the HCP for CTS Only alternative, Stanford would continue to operate. Ongoing operations do not alter the need for public services; therefore the effect would be the same as the Proposed Action.

**Future Development.** As noted above, future development could not occur without adequate levels of public services, and any new development that has not already been permitted by the GUP would require project-specific CEQA review that would address public service impacts. The effects of future development on public services would be the same as described for the Proposed Action.

### 5.1.8.4 Comparison of Alternatives

The Proposed Action or the alternatives would not result in significant adverse effects to public services. Future development could be limited by the availability of public services, such as water supply, but future development would not adversely affect any public services. The Proposed Action or alternatives do not differ in effects on public services.

## 5.1.9 Land Use

This section addresses the effects of the Proposed Action and alternatives on land use, and analyzes whether the HCP would conflict with existing land uses or land use designations. The effects of the Proposed Action and alternatives were assessed by analyzing whether the Proposed Action or alternatives are consistent with existing general plan designations and zoning ordinances. If implementation of the Proposed Action or an alternative would be inconsistent with the land uses anticipated by the applicable general plans and zoning ordinances, it could have a significant adverse effect on land use.

### 5.1.9.1 Effects of the Proposed Action

**Conservation Program.** The Conservation Program includes the establishment of permanent conservation easements along creek corridors and restrictions on the development of upland tiger salamander habitat.

The HCP would prohibit the development of tiger salamander habitat and would place permanent conservation easements over a portion of the most biologically sensitive Zone 1 lands in the San Francisquito/Los Trancos Creek Basin (see Figure 3-2) and the Matadero/Deer Creek Basin (see Figure 3-3). These easements would generally preclude any new development. Because these lands are adjacent to the creeks their development potential is already limited by

local zoning that protects riparian corridors. For example, the Special Conservation Area in Santa Clara County covers portions of Zone 1 lands along Los Trancos, San Francisquito, Matadero and Deer creeks and portions of the CTS Reserve. This designation generally prohibits development. The conservation easements would not change existing land use, and would be consistent with the Special Conservation Area designation.

The area designated in the HCP as the CTS Reserve is designated by the County of Santa Clara in the Stanford Community Plan as a Special Conservation Area, and the surrounding area is Open Space/Field Research. The HCP's restriction of development in this area during the life of the HCP and recording permanent easements in the CTS Reserve would not conflict with existing general plan designations.

Areas in Santa Clara County adjacent to the proposed conservation easements for Zone 1 are designated as Open Space and Field Research. Expansion of the easement areas, which could occur under the HCP, would not conflict with this land use designation. Conservation Program activities which primarily promote habitat restoration are also compatible with the land use designation.

In addition to the conservation easements, Section 4.2 of the HCP includes a number of measures that would minimize potentially adverse effects of the Covered Activities in Zones 1 and 2 and sometimes in Zone 3. These measures restrict or condition activities allowed in the Management Zones, but do not modify the land use designations. These Minimization Measures guide activities pertaining to the land use, but do not change the underlying use.

The Minimization Measures would regulate the Covered Activities when they occur in certain Management Zones. None of the measures change existing land uses or affect the applicable general plan designations or zoning. Restrictions set by the HCP reflect the protection of sensitive species, and similar restrictions would apply to the land regardless of the HCP/ITPs. Thus, the implementation of the HCP would not adversely affect land use.

**Ongoing Stanford Operations.** Ongoing operation of Stanford, including maintenance, academic activities, recreation, athletics, residential, agricultural, equestrian, commercial and institutional land uses are already established land uses that would not be changed by the Proposed Action, and would therefore not adversely affect land use.

**Future Development.** The HCP anticipates future development that is included in the existing GUP and other development that could also reasonably occur within the 50-year term of the HCP/ITPs. Future development is anticipated to include academic and residential uses. There are lands available with the appropriate land use designation for these uses.

If in the future Stanford proposes a development that is not consistent with the local land use designations or zoning, the proposed development would require a general plan amendment and a change in zoning. If a general plan amendment or zoning amendment were denied, the future development would not be permitted. Thus, any future development would have to be consistent with the applicable general plan designation and zoning before it is approved. Hence, any future development would be consistent with the applicable land use designation and zoning, and would not have an adverse effect on land use.

#### **5.1.9.2 Effects of the No Action Alternative**

Under the No Action alternative, the proposed ITPs would not be issued and the HCP would not be implemented along with a comprehensive Conservation Program. Activities at Stanford that

result in take of federally listed species (red-legged frog, tiger salamander, garter snake, steelhead), would require take authorization issued on a project-by-project basis.

**Conservation.** Under this alternative, activities in Zones 1 and 2 that require a permit would be assumed to also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. Future development in Zones 1 and 2 would also be subject to mitigation, such as dedication of conservation easements, to offset permanent losses of habitat in Zones 1 and 2. The extent of conservation activities would likely be less than that in the proposed HCP, in keeping with the level of project-specific impact. With regard to land use, this means that less area would likely be placed under permanent conservation easements, so there would be less area subject to the additional land use restriction of a conservation easement than under the Proposed Action. Otherwise, the No Action alternative would have the same effects as the Proposed Action, and there would not be an adverse effect on land use.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate. The effect on land use under the No Action alternative resulting from ongoing activities would be the same as the Proposed Action, and there would not be an adverse effect on land use.

**Future Development.** Future development is anticipated to include academic and residential uses. Land with the appropriate land use designation for these uses is available for development. If in the future Stanford proposes a development that is not consistent with the local land use designations or zoning, the proposed development would require a general plan amendment and a change in zoning. If a general plan amendment or zoning amendment were denied, the future development would not be permitted. Thus, any future development would have to be consistent with the applicable general plan designation and zoning before it is approved. Hence, any future development would be consistent with the applicable land use designation and zoning, and would not have an adverse effect on land use. This is the same under each of the alternatives, so the effects of the No Action alternative on future development are the same as the Proposed Action, and would not cause an adverse effect on land use.

### **5.1.9.3 Effects of the HCP for CTS Only Alternative**

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** The conservation program under this alternative would be limited to activities outlined in the Central Campus CTS Management Plan and the CTS Reserve Monitoring and Management Plan, which are summarized in DEIS Chapter 3 and detailed in HCP Chapter 4 (see Appendix B). These activities would not conflict with the future land uses that are reflected in Santa Clara County's current general plan designations and zoning. Areas of tiger salamander habitat are designated by Santa Clara County as Campus Open Space and Special Conservation Areas. The HCP for CTS Only conservation program would prohibit residential, commercial, and land altering academic land uses in the CTS Reserve. These restrictions on future development would not conflict with the applicable land use designations or zoning, and would not cause adverse land use effects.

Under this alternative, projects that affect red-legged frog, garter snake, or steelhead must obtain separate take authorization. Such authorization could require conservation actions similar to those proposed in the HCP, but would likely be more limited in scope than the Proposed Action, in keeping with the scale of the specific project. It is likely that less area would be placed under permanent conservation easements, so there would be less area subject to the additional land use restriction of a conservation easement than under the Proposed Action. Otherwise, the HCP for CTS Only alternative would have the same effects as the Proposed Action on land use.

**Ongoing Stanford Operations.** Under this alternative, Stanford would continue to operate. This is the same for each of the alternatives. Continued operations do not require changes in land use, therefore the HCP for CTS Only alternative would have the same effects as the Proposed Action, and there would not be an adverse effect on land use.

**Future Development.** Future development would be subject to the general plans and zoning regulations of the six jurisdictions that regulate Stanford's land uses. Any new development that has not already been permitted by the GUP would require project review for compliance with the applicable general plans and zoning regulations. The effects of the ongoing operation of Stanford and from future development would be the same as described for the Proposed Action.

#### **5.1.9.4 Comparison of Alternatives**

The Proposed Action or the alternatives would not result in significant adverse effects to land use. Land use is governed by local general plans and zoning ordinances, and any future changes in land use would comply with those or would require approval for a change in land use designation. The Proposed Action or alternatives do not significantly differ in effects on land use.

## **5.2 BIOLOGICAL ENVIRONMENT**

This section of the DEIS analyzes the potential effects of the Proposed Action and alternatives on biological resources. The analysis addresses the effects of implementing the Conservation Program, of ongoing operations and maintenance, and of future development on biological resources in Zones 1, 2 and 3. The analysis identifies the potential effects on plant communities, the Covered Species, non-listed plant and animal special-status species that are likely to be present, and on biological resources in general. The effects on biological resources were evaluated both qualitatively and quantitatively, including potential effects on species' populations, long-term survival, and the quality and quantity of habitat. The analysis is based on a review of biological resources information for the affected environment, analysis provided in the HCP, including the HCP's quantitative analysis of take, and professional judgment.

### **5.2.1 Effects of the Proposed Action Alternative**

The Proposed Action is described in Chapter 3. It is the issuance of ITPs and the implementation of a Conservation Program that is intended to meet the following biological goals stated in chapter 1 of the HCP (see Appendix B):

- Maintain and enhance natural communities so that they benefit the Covered Species;
- Stabilize the local tiger salamander population and increase its chance of long-term persistence at Stanford;
- Maintain ponds to promote tiger salamander reproduction in the Foothills;

- Increase the local red-legged frog population and its chance of long-term persistence at Stanford;
- Maintain or improve hydrologic and terrestrial conditions that presently support steelhead and increase the chance of long-term persistence for the local steelhead population;
- Maintain and improve habitat for pond turtle to increase its chance of long-term persistence at Stanford;
- Maintain or improve habitat that could support the San Francisco garter snake and continue to contribute to the body of information about garter snakes at Stanford.

### **Conservation Program**

*Plant Communities.* Conservation Program activities under the San Francisquito/Los Trancos Easement Monitoring and Management Plan, Matadero/Deer Easement Monitoring and Management Plan, CTS Reserve Monitoring and Management Plan and Central Campus CTS Management Plan would occur in Zones 1 and 2, where they could affect riparian, oak woodland, and grassland plant communities, however, none of the effects would be adverse, and most would be beneficial effects. In addition, the proposed conservation easements would permanently protect and provide management for the riparian zones and could provide permanent protection and management of grassland habitat south of Junipero Serra Boulevard in the CTS Reserve.

Some native vegetation could be removed during non-native plant species removal, enhancement projects, or creek bank stabilization activities, however, the amount of native vegetation removed is expected to be minor as the Conservation Program is intended to protect and retain native vegetation. This non-native plant removal could permanently reduce the amount of non-native plant species and provide the opportunity to restore native plant species so that there could be a net increase in native plant cover. For example non-native Scotch broom shrubs removed along the creeks could be replaced with native shrub vegetation, such as willows. Enhancement and bank stabilization completed under the Conservation Program could result in a small amount of native plant removal. However, no significant changes in vegetation type would occur as a result of the Monitoring and Management Plans. No jurisdictional wetlands would be affected by the Conservation Program because the activities would not remove or fill existing wetlands. Temporary effects on waters of the U.S. (e.g., increased turbidity) may occur during bank stabilization work.

The creation of new tiger salamander breeding ponds as part of the CTS Reserve Monitoring and Management Plan would not affect native grasslands because the CTS Reserve does not contain native grasslands; however, it may convert a small amount of non-native grassland to wetland habitat. This would not result in a significant adverse effect on the vegetation community.

*Covered Species.* The implementation of the Management and Monitoring Plans in the HCP's Conservation Program could result in the take, or impacts to, some of the Covered Species and could temporarily disturb some of their habitat, but the long-term effects would be minor (See Table 5-3). The Conservation Program is a comprehensive program that would have an overall benefit to the Covered Species. The following activities under the Conservation Program could result in take of the Covered Species. For example:

- Monitoring activities, including the use of electrofishing, block netting, hand nets, funnel/fyke traps or rotary screw traps, minnow traps, turtle traps, snorkeling, hand

capture, walking in the habitat, dipnets, metering equipment, trapping and visual methods. These activities could kill a small number of individual steelhead, red-legged frogs, tiger salamanders, or pond turtles. Likewise, monitoring could harm or harass the Covered Species and temporarily disturb their habitat.

- Mowing to improve habitat. Mowing may harass grassland species that are present during the mowing, but timing and mower height are controlled to minimize the likelihood that a species is present during mowing (see below).
- Constructing new breeding ponds. Construction activities could kill, harm or harass a small number of tiger salamanders or red-legged frogs that are not detected in underground burrows and relocated prior to construction.
- Relocating salvaged individuals from urbanized areas to suitable habitat. Relocating salvaged tiger salamanders, red-legged frogs, or pond turtles could result in the death of a species, or harm, and would require capture of the species.
- Surveys for non-native species. These activities disrupt breeding or foraging behavior of a small number of Covered Species.
- Removal of in-stream barriers. This activity could kill a small number of individual steelhead when equipment is in the stream or when the stream is dewatered. Likewise relocating steelhead prior to dewatering could harm or harass individual steelhead, and dewatering would temporarily disturb steelhead habitat.
- Revegetation and stabilization of stream banks for erosion control or to improve shade. This activity could kill or disrupt breeding or foraging behavior of a small number of steelhead or red-legged frogs when equipment is in the creek and riparian zone.

The effects of these activities, which are described above, are generally temporary, and would not adversely affect the species' long-term persistence (Table 5-3). Moreover the effects would be minimized by:

- Combining surveys for Covered Species to reduce the amount of time spent in the habitat
- Mowing during the dry season and during the time of day when tiger salamander and garter snake are least likely to be present
- Oversight by the Conservation Program Manager
- Conducting night surveys for red-legged frog every two years rather than annually
- Electrofishing would only be used in reaches not historically occupied by red-legged frog, and would be done in accordance with NMFS guidelines
- Conducting pre-activity surveys and relocating individuals in harm's way

Monitoring activities would provide important data on the success of the Conservation Program, whether adaptive management is needed to improve the Conservation Program, and contribute to the general body of scientific knowledge about the species. In the long run, this knowledge would benefit the Covered Species, and aid in the recovery of the species.

For example, removal of the existing barriers to steelhead passage at the non-operating Lagunita Diversion could temporarily disturb steelhead and their designated Critical Habitat during construction activities, but improved passage would provide a long-term benefit to steelhead

migration, which could increase spawning opportunities and reproductive success. Similarly, constructing new breeding ponds in the foothills could temporarily disturb upland tiger salamander habitat, but providing additional breeding opportunities in the foothills could reduce the importance of Lagunita (which is hazardous for tiger salamander to reach because of Junipero Serra Boulevard), and increase the likelihood of the persistence of the tiger salamander population at Stanford.

The estimated loss of habitat and the estimated take of individuals from the Covered Activities including the conservation program, ongoing Stanford operations and future development are provided in Tables 5-4 and 5-5.

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
<b>1.0 San Francisquito/Los Trancos Easement Monitoring and Management Plan<sup>7</sup></b>	
1.1 Surveys for steelhead, red-legged frog, garter snake and pond turtle, and of their habitat, will be conducted in accordance with the monitoring program set forth in Section 4.6 for the term of the HCP.	1.1 Beneficial effect on steelhead, red-legged frog, garter snake and pond turtle. Surveys may harass steelhead, red-legged frog, pond turtle, and garter snakes but would result in data that could improve species and habitat management. No effect on tiger salamander.
1.2 If the monitoring program shows 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 feasible. Before trapping is used to remove the non-natives in areas where any Covered Species may occur, Stanford will submit a plan to the USFWS and NMFS for approval. If monitoring shows that wildlife species have been placed within the Easement area, Stanford will post signs prohibiting the release of any wildlife in the ponds and/or fence as necessary.	1.2 Beneficial effect. Removal of non-native species that are adversely affecting the Covered Species would benefit both the Covered Species and other more common plants and animals. Dip-netting, trapping, or other invasive methods could harm or harass a small number of steelhead, red-legged frog, pond turtle, or garter snakes, but would help to monitor and control competing, predator and habitat-damaging species.
1.3 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.	1.3 Beneficial effect. Could benefit the Covered Species by fostering habitat diversity.
1.4 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 remediate the situation. If the sediment source is located off Stanford lands, Stanford will notify NMFS and the USFWS.	1.4 Beneficial effect on steelhead, red-legged frog, pond turtle and garter snake by improving water quality and on steelhead by reducing sediment impacts on spawning beds. No effect on tiger salamander.

<sup>7</sup> The implementation of the San Francisquito/Los Trancos Monitoring and Management Plan will not affect tiger salamanders.

<b>Activity</b>	<b>Net Effect</b>
1.5 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.	1.5 Beneficial effect. This enhancement would be specifically designed to benefit steelhead by enhancing its habitat.
1.6 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.	1.6 Beneficial effect on pond turtle by enhancing its habitat. May also provide basking sites for garter snake and red-legged frog. No effect on steelhead or tiger salamander.
1.7 If the creek surveys find that the turtles would benefit from the addition of natural basking platforms, Stanford will place three anchored platforms each in Searsville Reservoir, Felt Reservoir, and Skippers Pond.	1.7 Beneficial effect. This enhancement is specifically designed to benefit pond turtle.
1.8 In addition to providing annual results of the monitoring program to the USFWS and NMFS, Stanford will share the monitoring results with other interested local, State and Federal conservation agencies.	1.8 Beneficial effect. Sharing data could result in regional benefits by informing other management programs.
1.9 Maintain the three existing water quality monitoring stations located in Los Trancos, Bear, and San Francisquito creeks for the first five years of the HCP and review the resulting data for its value in conservation efforts. If the stations produce data that are useful to conservation planning, operation of the monitoring stations will continue beyond five years. 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 NMFS.	1.9 Beneficial effect. Water quality data could provide useful scientific information for management of steelhead, red-legged frog, pond turtle, and garter snakes. Maintenance of the stations requires little incursion into the creek, but could harass a small number of steelhead, red-legged frog, pond turtle, and garter snakes. Sharing of data would assist regional conservation efforts.
1.10 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, the network of water monitoring stations will be expanded.	1.10 Beneficial effect. Would provide more data to inform management decisions pertinent to steelhead, red-legged frog, pond turtle, and garter snakes. Expansion and maintenance of network may require short-term incursion into creek that could harass a small number of steelhead, red-legged frog, pond turtle, and garter snakes.
1.11 Stanford will identify at least two areas where two new, off-channel red-legged frog breeding ponds may be constructed. Stanford will provide a specific design proposal to USFWS.	1.11 Beneficial effect. This enhancement is specifically designed to benefit red-legged frog, and could provide habitat for pond turtle and tiger salamander.
1.12 Stanford will remove undesirable items, such as trash, from the creeks.	1.12 Beneficial effect, although trash removal may have temporary water quality impacts over the long term it could reduce the impacts of water pollution on the covered species.
1.13 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 on stream bank protection that could be used as a community resource.	1.13 Beneficial effect. Would reduce sediment load into creeks that adversely affects habitat for steelhead, red-legged frog, pond turtle, and garter snakes by causing turbidity. Work along the creek banks could harm or harass a small number of steelhead, red-legged frog, pond turtle, or garter

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
	snakes.
1.14 Revegetate stream banks and adjacent upland areas that are subject to erosion.	1.14 Beneficial effect. Revegetation would improve streamside habitat for red-legged frog, pond turtle, and garter snakes and maintain shade needed by steelhead. Revegetation activities could have short-term impacts on a small number of red-legged frog, pond turtle, garter snakes and steelhead due to encroachment into habitat and possible take of red-legged frog, pond turtle, and garter snakes.
1.15 Remove structures such as rip-rap and gabions, and in-stream structures that are partial barriers when feasible.	1.15 Beneficial effect. Would improve in-stream migration for steelhead, red-legged frog, pond turtle, and garter snakes. Could harm or harass a small number of steelhead, red-legged frog, pond turtle, and garter snakes, however the work would be monitored and take minimization measures used.
1.16 After the SHEP improvements are operational, Stanford will implement the operational protocols contained in the SHEP for the life of the HCP.	1.16 Beneficial effect. Would provide adequate flows in Los Trancos and San Francisquito creeks for steelhead migration and modifications of fish ladders to reduce barriers to migration. Water diversions could harm or harass steelhead, red-legged frog, pond turtle, and garter snakes.
1.17 Erect fences in the areas that the Conservation Program Manager determines they are needed to keep livestock and unauthorized persons out of the Easement.	1.17 Beneficial effect. Would protect riparian areas from the long-term effects of intruding cattle and humans that could harm or harass steelhead, red-legged frog, pond turtle, or garter snakes. Fence installation could harm or harass a small number of red-legged frog, pond turtle or garter snakes, but this would be short-term.
1.18 Feral cat feeding stations will not be permitted in Zones 1 and 2 within the San Francisquito/Los Trancos Basin or in Zones 3 and 4 that are within 150 feet of those areas.	1.18 Beneficial effect. Would reduce predation by domestic/feral cats.
1.19 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 geomorphologic, hydrologic, and biologic characteristics of the creeks and surrounding uplands are allowed because they provide information that contributes to the management of the Covered Species. New bridges also are not precluded by the San Francisquito/Los Trancos Easement, but may require mitigation in accordance with Section 4.4 of the HCP. 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.	1.19 Beneficial effect. Limiting development and minimizing the permanent loss of riparian habitat would benefit steelhead, red-legged frog, pond turtle, and garter snakes.

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
1.20 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 USFWS and NMFS before recording any new conservation easements within the basin.	1.20 Beneficial effect. This measure assures that all conservation easements that could affect the riparian Covered Species are managed in a consistent way to benefit the Covered Species.
1.21 Five years before the expiration of the HCP and associated ITPs, 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. This plan will survive the expiration of the ITPs and HCP and will be subject to review and approval by the USFWS and NMFS.	1.21 Beneficial effect. Insures that valid conservation practices would be carried out in perpetuity.
<b>2.0 Matadero/Deer Easement Monitoring and Management Plan<sup>8</sup></b>	
2.1 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.	2.1 Beneficial effect. Surveys may harass red-legged frog and garter snakes but would result in data that could improve species and habitat management.
2.2 If the monitoring program shows 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 feasible. Before trapping is used to remove the non-natives in areas where any Covered Species may occur, Stanford will submit a plan to the USFWS and NMFS for approval. If monitoring shows that wildlife species have been placed within the Easement area, Stanford will post signs prohibiting the release of any wildlife in the ponds and/or fence as necessary.	2.2 Beneficial effect. Removal of non-native species that are adversely affecting the Covered Species would benefit both the Covered Species and other more common plants and animals. Dip-netting, trapping, or other invasive methods could harm or harass a small number of red-legged frog or garter snake, but would help to monitor and control competing, predator and habitat-damaging species.
2.3 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.	2.3 Beneficial effect. Could benefit red-legged frog and garter snake by fostering habitat diversity. No effect on tiger salamander, pond turtle or steelhead.
2.4 In addition to providing annual results of the monitoring program to the USFWS and NMFS, Stanford will share the monitoring results with other interested local, State and Federal conservation agencies.	2.4 Beneficial effect. Sharing data could result in regional benefits by informing other management programs.
2.5 Stanford will identify at least one area where two new, off-channel red-legged frog breeding ponds may be constructed. Stanford will provide a specific design proposal to USFWS.	2.5 Beneficial effect. This enhancement is specifically designed to benefit red-legged frog, and could provide habitat for pond turtle and tiger salamander.
2.6 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	2.6 Beneficial effect. Would provide more data that could improve red-legged frog, pond turtle, and garter snake habitat management decisions.

<sup>8</sup> The implementation of the Matadero/Deer Easement Monitoring and Management Plan will not affect tiger salamanders.

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
creek(s).	Construction and maintenance of stations could require short-term incursion into creek that could harass a small number of red-legged frog, pond turtle, and garter snakes. No effect on steelhead.
2.7 Stanford will initiate revegetation efforts along stream banks and adjacent upland areas that are subject to erosion.	2.7 Beneficial effect. Revegetation would improve streamside habitat for red-legged frog, pond turtle, and garter snakes. Revegetation activities could result in short-term impacts on a small number of red-legged frog, pond turtle, garter snakes due to encroachment into habitat and possible take of red-legged frog, pond turtle, and garter snakes by impacting nesting or harboring sites. No effect on tiger salamander or steelhead.
2.8 Erect fences in the areas where the Conservation Program Manager determines they are needed to keep livestock and unauthorized persons out of the Easement.	2.8 Beneficial effect. Would protect riparian areas from the long-term effects of intruding cattle and humans that could harm or harass steelhead, red-legged frog, pond turtle, or garter snakes. Fence installation could harm or harass a small number of red-legged frog, pond turtle, or garter snakes, but this would be short-term.
2.9 Stabilize 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 on streambank protection that could be used as a community resource.	2.9 Beneficial effect. Would reduce sediment load into creeks that adversely affects habitat for red-legged frog, steelhead, pond turtle, and garter snakes by causing turbidity. Work along the creek banks could harm or harass a small number of steelhead, red-legged frog, pond turtle, or garter snakes.
2.10 Feral cat feeding stations will not be allowed in the Easement area, or within 150 feet of the Easement.	2.10 Beneficial effect. Would reduce predation on red-legged frog and garter snake by domestic/feral cats.
2.11 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 geomorphologic, hydrologic, and biologic characteristics of the creeks and surrounding uplands are allowed because they provide information that contributes to the management of the Covered Species. New bridges also are not precluded from the Matadero/Deer Easement, but would likely require additional mitigation in accordance with Section 4.4 of the HCP. 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.	2.11 Beneficial effect. Limiting development and minimizing the permanent loss of riparian habitat would benefit red-legged frog, pond turtle, and garter snakes.
2.12 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 USFWS and NMFS before recording any new conservation easements within the basin.	2.12 Beneficial effect. This measure assures that all conservation easements that could affect the riparian Covered Species are managed in a consistent way to benefit the Covered Species.

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
2.13 Five years before the expiration of the HCP and associated ITPs, 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. This plan will survive the expiration of the ITPs and HCP and will be subject to review and approval by the USFWS and NMFS.	2.13 Beneficial effect. Insures that valid conservation practices would be carried out in perpetuity.
<b>3.0 CTS Reserve Monitoring and Management Plan <sup>9</sup></b>	
3.1 Annual tiger salamander and garter snake surveys in accordance with the monitoring program set forth in section 4.6 of the HCP.	3.1 Beneficial effect. Minnow traps could harass or harm tiger salamander, and trapping (if implemented) could harass or harm the garter snake but would provide scientific data and inform management decisions.
3.2 If monitoring shows 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 it is feasible. Before trapping is used where it could affect Covered Species, Stanford will submit a plan to the USFWS for approval. If monitoring shows that wildlife species have been placed in ponds within the Reserve area, Stanford will post signs prohibiting the release of any wildlife in the ponds and/or fence the ponds as necessary.	3.2 Beneficial effect. Removal of non-native species that are adversely affecting the Covered Species would benefit both the Covered Species and other more common plants and animals.
3.3 If monitoring shows 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.	3.3 Beneficial effect. Could benefit the Covered Species by fostering habitat diversity.
3.4 If the seasonal ponds are found to not facilitate tiger salamander breeding, the pond(s) will be modified or eliminated. Stanford will consult with the USFWS regarding any proposed pond modifications.	3.4 Beneficial effect. Would insure that the breeding ponds are facilitating breeding and are not creating population sinks.
3.5 If there are three consecutive years of inadequate rainfall to sustain larval development of tiger salamander in the breeding ponds, Stanford will consult with the USFWS regarding ways to provide supplemental water to the constructed breeding ponds.	3.5 Beneficial effect. If supplemental water is provided as needed during a drought, breeding success is more likely, and the population may be sustained through a prolonged drought.
3.6 If surveys indicated 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.	3.6 Beneficial effect. Could increase population size by improving breeding success and providing cover that could protect tiger salamanders from predators.
3.7 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 tiger salamander breeding ponds annually during the summer. Mowing will be done when salamanders are least likely to be present, either	3.7 Beneficial effect. Reducing the vegetation height would facilitate tiger salamander and garter snake migration. Would be completed when tiger salamander and garter snake are underground or in the shade or water and would not be directly

<sup>9</sup> The implementation of the CTS Reserve Monitoring and Management Plan will not affect red-legged frogs, steelhead, or pond turtles.

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
in the morning when it is still cool or during the hottest part of the day.	harmed.
3.8 If the tiger salamander surveys find that the tiger salamander 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 and will be up to 60 square feet in size and 4 feet deep. They will be located within 150 feet of the newly created breeding ponds and will be created during the dry season, between June and September.	3.8 Beneficial effect of enhancing tiger salamander and garter snake habitat. Physical manipulation of tiger salamander habitat, if required to study methods, has the remote possibility of harming tiger salamander, but would be done seasonally, when tiger salamander are underground. Could also disturb garter snakes. No effect on red-legged frog, pond turtle or steelhead.
3.9 Stanford will maintain oak woodland and savannah grasslands within 150 feet of the newly created breeding pond, and will remove chaparral (shrub) species in this area.	3.9 Beneficial to tiger salamander. Maintains tiger salamander upland habitat. May facilitate tiger salamander and garter snake migration.
3.10 Stanford will maintain at least three amphibian tunnels across Junipero Serra Boulevard. If annual monitoring shows that additional tunnels would benefit tiger salamander migration, Stanford may install additional tunnels with USFWS concurrence.	3.10 Beneficial to tiger salamander. Provides a safe route between upland habitat and the Lagunita breeding site. Unknown benefit to garter snake, red-legged frog, and pond turtle. No effect on steelhead.
3.11 Limit recreational access to existing service roads and restricted to daylight hours.	3.11 Beneficial effect. Would minimize human intrusion into tiger salamander habitat.
3.12 No dogs will be permitted in the CTS Reserve.	3.12 Beneficial effect. Would prevent impacts to tiger salamander from dogs entering ponds.
3.13 The Conservation Program Manager will review any proposed academic uses within the CTS Reserve, and if necessary, the CPM may impose conditions on use and restoration measures.	3.13 Beneficial effect. Would prevent adverse effects on tiger salamander caused by academic uses.
3.14 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.	3.14 Beneficial effect. Would prevent adverse effects caused by loss of habitat to development or infrastructure.
3.15 A 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.	3.15 Beneficial effect. Would increase worker awareness of tiger salamander and garter snake ecology and procedures if tiger salamander or garter snake is encountered.
3.16 Feral cat feeding stations will not be permitted in those portions of Zones 1 and 2 in the CTS Basin, or in Zones 3 and 4 that are within 150 feet of those areas.	3.16 Beneficial effect. Would reduce predation on tiger salamander, garter snake, and possibly red-legged frog by domestic/feral cats. No effect on pond turtle or steelhead.

<b>Table 5-3. Effects of Implementation of the Monitoring and Management Plans on Covered Species</b>	
<b>Activity</b>	<b>Net Effect</b>
3.17 All ground animal control programs will be discontinued in the CTS Reserve.	3.17 Beneficial effect. Lack of control of ground animals in Zone 1 would result in additional burrow habitat for tiger salamander, garter snake, and red-legged frog. No effect on pond turtle or steelhead.
3.18 Vegetation management activities in the CTS Reserve will be conducted to achieve the goal of improving tiger salamander habitat.	3.18 Beneficial effect on tiger salamander. Likely to also benefit garter snake by facilitating migration. May benefit red-legged frog. No effect on pond turtle or steelhead.
3.19 Five years before the expiration of the HCP and associated ITPs, Stanford will prepare a long-term monitoring and management plan for all habitat within the CTS Reserve that has been permanently preserved. The plan will incorporate management and monitoring techniques that have been demonstrated to be the most successful. It will include protocols for monitoring the abundance of 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 plan will survive the expiration of the ITPs and HCP and will be subject to review and approval by the USFWS and NMFS.	3.19 Beneficial effect on tiger salamander and garter snake. Insures that valid conservation practices would be carried out in perpetuity. Could also benefit red-legged frog and pond turtle, if these species eventually occur in the CTS Reserve. No effect on steelhead.
<b>4.0 Central Campus CTS Management Plan<sup>10</sup></b>	
4.1 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 of the HCP.	4.1 Beneficial effect. Minnow traps could harass or harm tiger salamander, and trapping (if implemented) could harass or harm the garter snake but would provide scientific data and inform management decisions.
4.2 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 feasible. Before trapping is used where it could affect Covered Species, Stanford will submit a plan to the USFWS for approval. If monitoring shows that wildlife species have been placed in Lagunita, Stanford will post signs prohibiting the release of any wildlife species in Lagunita.	4.2 Beneficial effect on tiger salamander and garter snake, and on red-legged frog if it occurs in the Central Campus CTS area. Removal of non-native species that are adversely affecting the Covered Species would benefit both the Covered Species and other more common plants and animals. No effect on pond turtle or steelhead.
4.3 If monitoring shows 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.	4.3 Beneficial effect. Could benefit the Covered Species by fostering habitat diversity.

<sup>10</sup> Except as specifically noted, the implementation of the Central Campus CTS Management Plan will not affect red-legged frogs, steelhead, or pond turtles.

<b>Activity</b>	<b>Net Effect</b>
4.4 Lagunita will continue to be operated consistent with the Lagunita operations plan (section 3.1.3 of the HCP), which includes diverting water from San Francisquito Creek during years of substantial rains to essentially provide breeding habitat of suitable depth and duration for tiger salamander to successfully breed that season. The diversion will be implemented only if the diversion facilities are safe and operational, there is sufficient water available and the diversion is not in significant conflict with other environmental considerations, there are not overriding public health and safety concerns associated with water in Lagunita, and the diversion is critical to the local persistence of tiger salamander.	4.4 Beneficial effect. Would provide management of water levels in important breeding habitat to the benefit of tiger salamander. Balanced diversions would not adversely affect red-legged frog, pond turtle, garter snakes and steelhead habitat in San Francisquito Creek.
4.5 No biocides will be applied to Lagunita for schistosome cercarial dermatitis (“swimmer’s itch”) without prior approval of the Conservation Program Manager.	4.5 Beneficial effect. Would prevent biocides from affecting tiger salamander reproduction. No effect on red-legged frog, pond turtle, garter snakes or steelhead.
4.6 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.	4.6 Beneficial effect. Mowing would occur when tiger salamander are underground, safe from possible direct harm, and when garter snakes are least likely to be present. Reducing the vegetation height would facilitate tiger salamander and garter snake migration. The restriction on discing would reduce the chance of physical harm to tiger salamander and garter snake. Beneficial to red-legged frog if it occurs at Lagunita. No effect on pond turtle or steelhead.
4.7 Ill-fitting utility box covers within 1500 feet of Lagunita will be retrofitted to exclude tiger salamanders.	4.7 Beneficial effect. Would prevent entrapment of tiger salamander in utility boxes.
4.8 Prohibit off-road vehicles in Lagunita and the Conservation Program Manager will inspect Lagunita monthly to ensure compliance with the prohibition.	4.8 Beneficial effect. Would prevent take of tiger salamander due to off-road vehicle use.
4.9 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.	4.9 Beneficial effect. Would reduce predation on tiger salamander and garter snake by domestic/feral cats. Would benefit red-legged frog if present at Lagunita. No effect on pond turtle or steelhead.
4.10 A 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.	4.10 Beneficial effect. Would increase worker awareness of tiger salamander and garter snake ecology and procedures if tiger salamander or garter snake is encountered. No effect on red-legged frog, pond turtle or steelhead.

**Table 5-4. Summary Estimated Loss of Zone 1 and 2 Habitat (HCP Table 5-2)**

	Annual estimated short-term habitat disruption	Total estimated short-term habitat disruption	Annual estimated permanent loss of habitat	Total estimated permanent loss of habitat
Steelhead <sup>11</sup>	600 feet (maximum in one year)	15,000 feet	40 feet	2,000 feet
red-legged frog	2.0 acres	100 acres	0.6 acres	30 acres
tiger salamander	2.0 acres	100 acres	1.3 acres	68 acres
Garter snake	4.0 acres <sup>12</sup>	200 acres	1.9 acres	98 acres
Western pond turtle	1.6 acres	80 acres	0.3 acres	15 acres
Permanent loss of habitat totals are not identical to the values shown in HCP Table 4-1 because some of the habitat is shared by multiple species and some permanent loss of habitat is associated with ongoing Covered Activities.				

**Table 5-5. Summary of Estimated Take of Individuals for both Direct and Indirect Effects (HCP Table 5-1)**

	Estimated annual incidental mortality	Minimum population level	Maximum incidental mortality (percent)	Maximum population level	Minimum incident mortality (percent)
Juvenile steelhead	120	1,500	8 percent	9,000	1 percent
red-legged frog	3	25	12 percent	250	1 percent
tiger salamander	20	400	5 percent	4,000	1 percent
Garter snake	0	20	0 percent	100	0 percent
Western pond turtle	0	10	0 percent	40	0 percent
Population estimates are based on studies conducted at Stanford: 1992 to present (most variation in population estimates are based on annual fluctuations)					

<sup>11</sup> The steelhead numbers represent temporary and permanent habitat loss only within the creek channels.

<sup>12</sup> In addition, there would be approximately 75 acres of grassland that would be mowed each year for fire break and CTS conservation purposes.

*Other Special-Status Species.* The riparian Monitoring and Management Plans and the CTS Reserve Monitoring and Management Plan<sup>13</sup> include measures that could affect the Cooper's hawk, long-eared owl, yellow warbler, golden eagle, San Francisco dusky-footed woodrat, bats (long-eared myotis, Yuma myotis, and Townsend's big-eared bat), and the western leatherwood plant. Bank stabilization, restoration planting, and invasive species removal could temporarily reduce the amount of bird and bat habitat, and result in the removal of western leatherwood. It is estimated that 2 to 4 acres would be affected annually, and that the area would be substantially restored within a year.

Vegetation temporarily lost by bank stabilization measures could be replaced with native vegetation when the species are not nesting, so that nesting habitat is not lost. Similarly, invasive species removal and activities associated with revegetation, primarily in the riparian area, could result in the removal of woodrat houses, which would temporarily displace woodrats, but would not prevent them from building a new house or otherwise using the habitat. Likewise, there is sufficient potential bird and bat habitat available at Stanford that any loss of habitat resulting from the HCP's Conservation Program monitoring, management and enhancement activities would have a negligible effect on these species, primarily because it would be a temporary loss of a year or less.

Western leatherwood grows in foothill woodland and riparian forest, and exists at Jasper Ridge and on Los Trancos Creek upstream of Stanford-owned lands. Western leatherwood is expected to occur in suitable habitat in Zones 1 and 2 along the San Francisquito and Los Trancos creek corridors. Bank stabilization could result in the loss of individual stands of western leatherwood if it is located in or immediately adjacent to areas that require bank stabilization. Mitigation to avoid or replace the western leatherwood could be imposed, if needed, on a project-specific basis.

The implementation of the Conservation Program would not result in a significant decline in the populations of these wildlife species or the western leatherwood plant, particularly because in the course of implementation, Stanford would preserve and improve the native habitat that supports these species. Thus it is anticipated that the HCP's conservation activities would provide a long-term net benefit to other special-status species.

*Other Biological Resources.* The variety of plant communities within the Stanford HCP area provide suitable foraging, cover, and nesting habitat for a large number of common amphibians, reptiles, birds, and mammals. Many of these species are not specific to one vegetation community, especially for omnivorous and predacious species that utilize a variety of habitats.

The Conservation Program would establish conservation easements along San Francisquito/Los Trancos and Matadero/Deer creeks and the preserved habitat would be monitored and managed in perpetuity. The Conservation Program also encourages habitat enhancement actions that would benefit the local ecology. For example, mitigation credit can be earned for expanding riparian areas around the creeks by removing existing structures and planting riparian vegetation. Although there would be temporary construction impacts when the structures are removed, including re-grading the site and potentially removing native vegetation prior to re-planting, in the long term such riparian restoration would benefit more species than just the Covered Species. Other enhancements, such as creating new off-channel red-legged frog breeding ponds, could

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<sup>13</sup> The Central Campus CTS Management Plan would have no adverse effect on other special-status species.

result in the conversion of existing habitat into a new habitat type, depending on the selected location. For example, a patch of grassland might be excavated in order to build the pond, but the addition of the pond may enhance the habitat for other species by providing a new source of water and prey. The CTS Reserve Monitoring and Management Plan includes measures to maintain and enhance the tiger salamander breeding ponds, for example, which also benefits common wildlife that also uses the ponds. Areas within 150 feet of the ponds would be maintained in oak woodland and savannah grasslands, and chaparral plants would be removed. While this could reduce the overall amount of chaparral that could develop in the foothills, it also preserves oak woodland habitat that is important to common species.

### **Ongoing Stanford Operations**

*Plant Communities.* Ongoing Stanford operations, including repairs, maintenance, and the construction of new infrastructure occur throughout Stanford in all habitat types. However, these activities would not remove or substantially affect a significant portion of native grassland, oak woodland, or riparian habitat because most of the infrastructure in undeveloped areas is located underground and its repair or maintenance only requires temporary disturbance of the ground. Moreover, under the HCP, areas that are temporarily disturbed by ongoing activities would be restored in accordance with recommendations made by the Conservation Program Manager resulting in the permanent loss of very little habitat.

*Covered Species.* Landscaping, vegetation management, utility repairs, agricultural activities, bank stabilization, golf course maintenance,<sup>14</sup> academic field studies and other ongoing activities in Zones 1 and 2 could all affect the Covered Species, either by harming, harassing, or killing the species or temporarily removing their habitat.<sup>15</sup> The impacts of the ongoing activities would be reduced by the HCP's Minimization Measures, which include preconstruction surveys, scheduling work outside of the breeding season, worker education, and habitat restoration for activities that temporarily disturb habitat areas (see Chapter 4 of the HCP). As a result of these measures, the overall effect of Stanford operations on the Covered Species is considered insignificant.

California Tiger Salamander. Ongoing activities such as mowing, pipe repair, road maintenance, and other routine maintenance, would temporarily disturb an average of 2 acres of tiger salamander habitat each year, and could inadvertently harm, harass, or kill tiger salamanders (see Table 5-4). Over the course of the 50-year permit term, up to 100 acres of tiger salamander habitat (about 10 percent) could be temporarily disturbed, but it would happen incrementally and would be restored following the disturbance. The Minimization Measures that require pre-activity surveys and prohibit non-emergency work during the breeding and migration season would substantially decrease the chance of incidental mortality of any tiger salamanders in the course of ongoing Covered Activities. Salamanders may be crushed or injured by earth-moving activities such as pipe repair and maintenance. The ongoing activities could result in the incidental mortality of up to 20 tiger salamanders per year, which is approximately 1 to 5 percent of the current tiger salamander population (See Table 5-5). The 20 individuals that might be lost annually are expected to be replaced as the local population remains stable or increases due to management actions under the HCP.

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<sup>14</sup> This includes golf course maintenance that could temporarily disturb steelhead Critical Habitat.

<sup>15</sup> Permanent losses of habitat are included as future development.

California Red-legged Frog. Agricultural activities, cattle grazing, academic field work, vegetation management, water diversion maintenance, and other ongoing Covered Activities in the riparian areas could disturb approximately 2 acres of red-legged frog habitat per year (See Table 5-4). This disturbance could cause individual red-legged frogs to alter their behavior, which could temporarily increase the level of red-legged frog mortality. Ongoing activities also could inadvertently harm, harass, or kill red-legged frogs, although with the Minimization Measures that require pre-activity surveys and prohibit non-emergency work in the creeks or riparian areas during the breeding and migration season, fewer red-legged frogs would be directly impacted by these activities. The ongoing Covered Activities could result in the incidental mortality of 3 frogs per year, which would be up to 12 percent of the current red-legged frog population (See Table 5-5).

Steelhead. Maintenance and operation of Stanford's diversion facilities, bridge repairs, creek bank stabilization, and other instream Covered Activities, particularly those that require dewatering portions of the creeks, could temporarily disturb approximately 600 feet of the creek channels and adjacent riparian areas each year (See Table 5-4). In addition, dewatering and other activities associated with these activities could harm, harass, or kill steelhead, even with the Minimization Measures. With the full implementation of the SHEP (which should occur during the 2009-2010 rainy season), these activities could therefore result in the incidental mortality of up to 30 juvenile steelhead per year, which would represent 0.33 to 2 percent of the steelhead population (See Table 5-5). Monitoring performed for the HCP may result in the incidental mortality of up to an additional 90 juvenile steelhead per year. No adult steelhead are expected to be disturbed, captured, or killed by Covered Activities or the monitoring program. For purposes of this analysis, the DEIS assumes the maximum impact (120 juvenile steelhead per year) could occur.

Western Pond Turtle. Maintenance of the diversion facilities, bridge repairs, creek bank stabilization, and other instream activities could disturb approximately 1.6 acres of pond turtle habitat each year (See Table 5-4). Only two pond turtles have been found at Stanford, and given the scarcity of the turtles, the ongoing Covered Activities should not come into direct contact with a turtle. Moreover, because of the turtle's scarcity at Stanford, the ITPs would not permit any incidental mortality because such take would be significant. Minimization Measures that require pre-activity surveys and prohibit non-emergency work in the creeks or riparian areas during the breeding and migration season significantly reduce the chance of incidental mortality of pond turtle.

San Francisco Garter Snake. Ongoing ground maintenance activities, such as mowing and vegetation management, pipe repair, road maintenance, and other routine maintenance, would temporarily disturb an average of approximately 4 acres of potential garter snake habitat annually. In addition, about 75 acres of grassland are mowed each year for fire control and tiger salamander conservation purposes. Dry season mowing may harass any garter snake that happens to be present and the removal of grass cover may increase the likelihood of predation. Implementation of minimization measures such as time of day and height of mowing precludes the likelihood or incident of mortality of garter snakes.

*Net Effects on the Covered Species.* The HCP includes a Conservation Program to offset the take caused by the Covered Activities. The net effect is that tiger salamander habitat would be permanently protected and managed in a way that would increase the size of the tiger salamander population. It is expected that at a minimum the individuals lost each year would be replaced

and that over time the population would also increase due to habitat improvements. No more than 5 percent of the tiger salamander population would be harmed, harassed or killed per year.

The HCP's Conservation Program, including riparian easements, control of non-native animal species, and bank stabilization is expected to improve the quality of red-legged frog habitat and decrease red-legged frog mortality, with a net effect of increasing the population over the term of the HCP. The Covered Activities could result in take of up to 3 frogs per year, and a total of 30 acres of red-legged frog habitat, but would permanently protect and manage 360 acres of habitat, including at least three new off-channel breeding sites for red-legged frog.

The HCP would also provide a net benefit to steelhead. While the Covered Activities are anticipated to result in the incidental mortality of 120 juvenile steelhead annually (Table 5-5), and permanently remove a total of 2,000 feet of habitat, the Conservation Program would reduce the amount of fine sediment introduced into the channels, reduce erosion, remove barriers to migration, and improve cover for steelhead. There are many external factors that could affect steelhead, since part of its life cycle occurs outside of the HCP area, but habitat improvements under the HCP could feasibly increase the local steelhead population.

Implementation of the HCP should have the net effect of improving garter snake survivability in general by protecting stream corridors, increasing the prey base by increasing red-legged frog breeding habitat and the red-legged frog population, and placing restrictions on mowing.

Implementation of the HCP would also improve habitat for pond turtle, and would protect it from incidental mortality, but may not increase its population in the HCP area. There are so few pond turtles in the HCP area that improved habitat may not be sufficient to increase the population.

*Other Special-status Species.* Habitat for the Cooper's hawk, long-eared owl, yellow warbler, golden eagle, San Francisco dusky-footed woodrat, bats (long-eared myotis, Yuma myotis, and Townsend's big-eared bat), and western leatherwood could be affected by academic research, infrastructure installation and maintenance, and vegetation management, even with the implementation of the Minimization Measures. For example, infrastructure installation and vegetation management could result in the removal of a woodrat house, or could result in the removal of western leatherwood. The ongoing activities generally would not affect birds or bats that are protected during their nesting and roosting seasons by the MBTA and California wildlife laws. Continuation of the ongoing Covered Activities is not expected to reduce the population of a wildlife special-status species or western leatherwood to a point that makes them eligible for listing under the Federal ESA or CESA because the Minimization Measures that are intended to reduce the amount of take of the Covered Species would also prevent adverse effects on other special-status species.

*Other Biological Resources.* Landscaping, vegetation management, utility repairs and installation, road maintenance, agricultural activities, bank stabilization, golf course maintenance, academic field studies and other ongoing activities as well as maintenance of the water diversion facilities, bridge repairs, and other instream activities could affect other common wildlife species by removing vegetation or other habitat that is used for forage or nesting and potentially disrupting feeding or breeding behaviors that in turn cause a reduction in the population. For example, those activities that require dewatering portions of the creeks could temporarily disturb approximately 1.2 acres a year of the creek channels and adjacent riparian areas. This may disrupt local fish and amphibian movement and breeding success, or may reduce the amount of food available in the water habitat. Grounds-related work could destroy

ground squirrel and other rodent burrows possibly killing any animals in the burrows, displace or kill lizards and snakes, and remove plants used by various insects. On occasion, grounds-related work could remove mature trees and shrubs used for nesting by various bird species.

In general, the Minimization Measures that are intended to reduce the amount of take of Covered Species, or that are standard requirements of wildlife agencies, such as active bird nest protections, would eliminate or minimize the effects of ongoing Covered Activities on common, plants and animals. In addition, the requirement to restore disturbed habitat with native species would replace habitat lost to temporary activities.

### **Future Development**

*Plant Communities.* The Covered Activities in the HCP include up to 30 acres of development allowed under the current GUP generally located in the vicinity of Lagunita, and 50 to 150 acres of development in Management Zones 1, 2, and 3 beyond the GUP. Together, the GUP and additional future development would affect up to 180 acres of non-native grassland, oak woodland and riparian habitat. The specific location of the additional 50 to 150 acres of development is currently unknown because Stanford does not have any specific development plans beyond the GUP. However, existing land use restrictions would affect where the development occurs. For example, most of the riparian areas would be protected by easements, and local ordinances generally prohibit development in the riparian areas. Hence, the development likely would affect primarily non-native grassland or oak woodland habitat. While up to 15 acres of riparian habitat<sup>16</sup> could be affected if local ordinances change and all of the anticipated Zone 1 development occurs in riparian areas, the HCP estimates that 7 acres of Zone 1 and 2 riparian habitat outside of the creek channels would be developed. The remaining acres of development would be in grassland or oak woodland. Although the exact location of future development beyond the GUP is not known, the HCP estimates the approximate amount of grassland, oak woodland, and riparian habitat that could be developed during the life of the HCP. These estimates are based on historical building patterns, infrastructure needs, and projected future Stanford needs. Future development could permanently remove 1 to 3 percent of the habitat in Zone 1, and 2 to 4 percent of the habitat in Zone 2, and 1 to 4 percent of the habitat in Zone 3.

The 180 acres of potential development that would be subject to the ITPs and HCP represent a small fraction (0.04 percent) of the five thousand acres of grassland, oak woodland, and riparian habitat in Zones 1, 2, and 3. As such, the anticipated future development that would be subject to the HCP and associated ITPs would not remove or substantially modify a significant portion of habitat, including grassland, oak woodland, and riparian habitat; and therefore would not result in an adverse effect on the plant communities. Moreover, the permanent loss of Zone 1 and 2 habitat and land in Zone 3 would be mitigated through the HCP by permanently preserving higher quality riparian, oak woodland and grassland habitats. The set-aside ratios are 3-to-1 (3 acres preserved for each acre lost) for the permanent conversion of Management Zone 1 habitat, 2-to-1 for Zone 2, and 0.5-to-1 for Zone 3.

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<sup>16</sup> The ITPs will cover up to 30 acres of Zone 1 development, including GUP and beyond the GUP. The GUP development would affect 15 acres of non-riparian Zone 1 habitat, leaving 15 acres of Zone 1 that could be developed beyond the GUP and that could include riparian habitat.

*Covered Species.* Permanent loss of habitat in Zones 1 and 2 is the primary effect that future development would have on the Covered Species. Before any construction activities begin, the HCP and ITPs require preconstruction surveys, the relocation of any Covered Species, placement of barriers to prevent Covered Species from re-entering a construction site, and worker education. It is therefore unlikely that future development would harm, harass, or kill any of the Covered Species. However, on rare occasions, a Covered Species could be inadvertently crushed by equipment or work crews during the course of construction.<sup>17</sup>

Less than 1 percent of the habitat next to the creeks where steelhead occur would be developed. Approximately 1.6 percent (30 acres) of the total red-legged frog and garter snake habitat at Stanford would be developed. This includes the approximately 7 acres that overlap with steelhead riparian habitat, and grasslands that also provide habitat for tiger salamanders and garter snakes. Approximately 68 acres oak woodland and grassland habitat that could support tiger salamander in Zones 1 and 2 could be developed. This represents 0.2 percent and 9.9 percent respectively of tiger salamander habitat. Less than 1 percent (15 acres) of suitable pond turtle habitat would be developed. Approximately 50 acres of suitable garter snake habitat is anticipated to be developed during the life of the HCP. This is less than 5 percent of the total suitable habitat at Stanford. Suitable habitat areas could support a larger garter snake population. These estimates are based on existing habitat for the Covered Species, and do not take into account new habitat that may be created during the life of the HCP. Thus, they represent the maximum acreage of habitat lost.

The HCP encourages development in Zones 3 and 4, which would minimize the effects of development on the Covered Species. The Covered Species do not normally occur in Zone 3 and Zone 2 provides a buffer between development in Zone 3, and the high quality Zone 1 habitat. Moreover, current State and local water quality regulations strictly regulate post-development water quality impacts, and new development would not be permitted if it does not comply with these regulations. With the enforcement of these regulations, new development would not result in adverse post-development water quality impacts on the creeks, or riparian areas, that support steelhead, red-legged frogs, pond turtles, or garter snakes.

There is sufficient habitat in Zones 1 and 2 to support the existing population of the Covered Species, and sufficient additional habitat exists to accommodate a population increase. Moreover, the value of the residual habitat could be higher than it is today because at least 360 acres of riparian habitat would be within a permanent conservation easement and managed in perpetuity for the benefit of the Covered Species that occur in the riparian zone, and development would be prohibited on over 300 acres of tiger salamander habitat for at least 50 years. The successful creation of new tiger salamander breeding ponds, and other habitat management measures, should increase the amount and quality of tiger salamander habitat, which would offset the overall loss of habitat.

Implementation of the HCP is expected to benefit the Covered Species even with the permanent loss of habitat. Despite the permanent loss of up to 180 acres of habitat for the Covered Species, HCP implementation would provide a net benefit to these species through permanent conservation easements and monitoring and management of the easements.

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<sup>17</sup> This potential lethal loss of a Covered Species was included in the take estimates described for the ongoing Covered Activities shown in Table 5-4.

*Other Special-status Species.* Future development anticipated in the HCP in Zones 1, 2 and 3 could affect other special-status species, primarily through the permanent loss of habitat. An individual could be inadvertently killed or harmed, and habitat could be temporarily disturbed during the course of construction. The MBTA and California Fish and Game Code protect birds and mammals. The HCP does not specifically address the potential impacts that future development could have on other special-status species. However, the HCP includes a Conservation Program that would protect the habitat of the Covered Species, which in turn, would protect the habitat of other special-status species, and benefit these species.

In addition, future development would be subject to environmental review under CEQA. While impacts to the Covered Species would be mitigated through the HCP, additional measures that address other special-status species could be incorporated into project conditions based on a project-specific environmental review. Measures that were included in the GUP Conditions of Approval are examples of measures that could be carried forward to development anticipated in the HCP beyond that identified in the GUP. As one example, special-status plants are protected by measures requiring focused surveys for all proposed building projects located in riparian and oak woodland areas, providing a fenced buffer of at least 30 feet from identified special-status plants during construction, and site-specific mitigation plans. Thus, if necessary, there are feasible mitigation measures to further reduce the effects of development on other special-status species.

*Other Biological Resources.* The primary effect that future development would have on common wildlife species is permanent habitat loss in Zones 1, 2, and 3. Management Zone 1 contains the riparian habitat used by several bird, mammal, amphibian, and reptile species found in the region. Management Zone 2 contains the riparian woodland and grassland habitat that could provide suitable nesting and foraging habitat for a variety of common species. Management Zone 3 contains the grassland and oak savannah habitat that could provide suitable nesting and foraging sites for birds, mammals, and reptiles. Permanent loss of habitat could lead to habitat fragmentation, encroachment by exotic weeds and plants, and area-wide changes in surface water flows due to an increase in impervious surfaces. The protection and management of riparian and grassland habitats under the HCP's Conservation Program would benefit other biological resources. As mentioned above, future development is subject to CEQA review and the mitigation provisions of CEQA would assure that the removal of mature trees and other valuable native vegetation such as woodlands, would mitigate impacts of future development on biological resources.

### **5.2.2 Effects of the No Action Alternative**

**Conservation.** Under the No Action alternative the ITPs would not be issued and the HCP would not be implemented, so there would not be a Conservation Program. Activities that could cause the take of a federally listed species (i.e., red-legged frog, steelhead, garter snake or tiger salamander), would require take authorization on a project-specific basis. Under this alternative it is assumed that the activities in Zones 1 and 2 that require a permit would also require minimization measures like those identified in the HCP for Zones 1 and 2. As part of project-specific take authorization, conservation easements could be placed over portions of the riparian corridors and tiger salamander habitat to mitigate for specific projects and project-specific monitoring and mitigation plans could be required. These measures, including easements and monitoring, would happen when development occurs (not in advance of it) and would only be required to offset the biological effects of a specific project. Since federally listed species are

not expected to be impacted by activities in Zone 3, these areas would probably not require take authorization.

Under the No Action alternative, the Covered Species, other special-status species, and plant communities in Zones 1, 2 and 3 would not benefit from the comprehensive approach and management provided in the HCP's Conservation Program. The riparian, oak woodland, and grassland communities would not be managed in a coordinated way to address issues of erosion and invasive non-native plant and animal species control. Consistent restoration planting would not occur. Any required conservation easements could be placed over these habitats in a piecemeal way. While it is feasible that the No Action alternative may not have more adverse effects on the Covered Species, other special-status species, or plant communities, than the Proposed Action, the No Action alternative is inferior to the Proposed Action with regard to protection of biological resources because it is less comprehensive.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate. While most ongoing operations are located in Zones 3 and 4 and would not require a permit for take of the Covered Species, activities in Zones 1 and 2 that could result in take of a federally listed species would require project-specific take authorization. It is assumed that such take authorization would require measures to protect the federally listed species that are similar to those listed in the HCP. These measures could benefit plant communities and other special-status species, but not to the same extent as the Proposed Action because they would not be as comprehensive. For the diversion on Los Trancos Creek Diversion and pump station on San Francisquito Creek, water diversions would occur in compliance with the fish bypass flows established by the SHEP. However, monitoring and evaluation of the effects of these water diversions on steelhead would not occur.

**Future Development.** Under the No Action alternative, future development would occur. Future development that would result in take of federally listed species would require take authorization issued on a project-by-project basis. As discussed above, project-specific take authorization would require measures to protect federally listed species, similar to the HCP. These measures could benefit plant communities and other special-status species, but not to the same extent as the Proposed Action because they would be project-based and would not provide comprehensive protection.

### 5.2.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** Under this alternative, the geographic scope of the HCP would be limited to the CTS Basin that includes the Lagunita area, golf course and driving range, and CTS Reserve in the foothills south of Junipero Serra Boulevard. The conservation program would be limited to the monitoring and management activities outlined in the Central Campus CTS Management Plan and the CTS Reserve Monitoring and Management Plan, and the tiger salamander-related Minimization Measures and enhancements. Ongoing activities and new development in Zones 1 and 2 that could result in the take of steelhead and red-legged frog would need to obtain take authorization on a project-by-project basis. The conservation activities would include vegetation and ground animal management, worker education,

restriction on off-road vehicles, and monitoring. These activities would have very little, if any, effect on plant communities, the Covered Species, or special-status species because they involve very little ground disturbance.

The HCP for CTS Only alternative would not include conservation easements over the riparian habitat along San Francisquito, Los Trancos, Matadero, and Deer creeks because tiger salamander does not occur in these areas. These riparian communities would be protected on a piecemeal basis through mitigation required under project-specific take authorization or environmental review. The mitigation would likely include minimization measures like those in the Conservation Program and mitigation for loss of habitat. The mitigation would occur later in time than proposed in the HCP and would only address the impacts of specific projects.

In general the effects of this alternative on biological resources would be the same as the Proposed Action except that it is not likely to result in conservation easements as big as proposed in the HCP and would not have the same monitoring and management plans overseen by a conservation program manager. This alternative is inferior to the Proposed Action with regard to protection of the red-legged frog, steelhead, pond turtle, and garter snake because it is less comprehensive.

**Ongoing Stanford Operations.** Under the HCP for CTS Only alternative Stanford would continue to operate. While conservation activities in the CTS Basin would be the same as the Proposed Action, as noted above, the riparian habitat would not be protected as comprehensively as under the Proposed Action. Most of the ongoing Stanford operations occur in Zones 3 and 4 and are unlikely to require project-specific take authorization or be subject to minimization measures or other mitigation. This in turn would provide less protection than the Proposed Action for biological resources, including plant communities and other special-status species.

For the diversion on Los Trancos Creek Diversion and pump station on San Francisquito Creek, water diversions would occur in compliance with the fish bypass flows established by the SHEP. However, monitoring and evaluation of the effects of these water diversions on steelhead would not occur.

**Future Development.** Under the HCP for CTS Only alternative, future development would occur as described for the Proposed Action, but any development in Zones 1 or 2 outside of the CTS Basin would likely require project-specific take authorization and mitigation. Future development would also be subject to CEQA review. This alternative would result in the same protection of tiger salamander as the Proposed Action, but piecemeal protection in Zones 1 and 2 of steelhead, red-legged frog and garter snake, other special-status species (such as pond turtle), and biological resources in general. Smaller fragments of habitat would be protected and may not be contiguous, offering less benefit to biological resources than the Proposed Action. The Proposed Action provides more comprehensive and coordinated protection of the biological resources affected by future development.

#### 5.2.4 Comparison of Alternatives

The Proposed Action or alternatives would not result in a significant adverse effect on biological resources. The Proposed Action provides greater benefit to biological resources than the alternatives because it provides a comprehensive Conservation Program and Monitoring and Management Plans that would be implemented in perpetuity over at least 360 acres of the highest quality habitat. The No Action and HCP for CTS Only alternatives do not provide either a

comprehensive Conservation Program or perpetual management of biological resources over as large an area of Stanford lands.

### 5.3 SOCIOECONOMIC ENVIRONMENT

This section addresses the effects of the Proposed Action and alternatives on the socioeconomic environment, including jobs, housing, and commercial activities that generate revenue. Effects on the socioeconomic environment are analyzed qualitatively, taking into consideration the affected environment and the activities described in the HCP. The Proposed Action and the alternatives would have a significant adverse socioeconomic effect that could result in physical changes to the environment if it were to result in a substantial loss of employment opportunities, housing opportunities, or income-producing activities.

#### 5.3.1 Effects of the Proposed Action

The Proposed Action (implementation of the proposed HCP and issuance of take permits) would not adversely affect employment, housing, or income producing activities. With or without the HCP in place, Stanford would continue to employ the staff (both teaching and non-teaching) needed to operate Stanford. The proposed HCP would not affect the regional economy, displace workers, jobs, farms or other agricultural uses, or permanently change the conditions that affect individual businesses or the local economic climate (land use, transportation systems, customer base, etc.).

**Conservation Program.** The Proposed Action includes a Conservation Program that would establish conservation easements that would permanently remove lands from potential development that could provide housing or generate revenue. These easements include the riparian zones along Los Trancos, San Francisquito, Matadero, and Deer creeks (360 acres total), and could include lands in the CTS Reserve south of Junipero Serra Boulevard. The initial easement areas and CTS Reserve represent about 8 percent of Stanford's total land and development in much of this area is already limited by current general plan designations and zoning.

The Conservation Program also regulates leasehold uses in Management Zones 1 and 2 by requiring buffers, set backs from riparian areas, and the implementation of best management practices to protect water quality and habitat. Establishment of the easements would not eliminate any existing equestrian/agricultural leased uses.

Activities carried out under the HCP and the position of Conservation Program Manager would be funded by Stanford. Stanford is financially solid and has sufficient revenue to cover the cost of implementing the measures proposed in the HCP, without affecting housing or employment opportunities at Stanford or adversely affecting income-generating assets.

Implementation of the Conservation Program would not result in a loss of employment, housing or income-producing activities, and would not have an adverse socioeconomic effect.

**Ongoing Stanford Operations.** Ongoing Stanford operations would continue under the Proposed Action. The HCP would not affect the current revenue-producing activities at Stanford. Most of the revenues are generated by uses that are in Zone 4, such as the Medical Center, Shopping Center, and Stanford Business Park, and are not affected by the HCP.

**Future Development.** The Proposed Action would not change future development anticipated to be needed by Stanford and would have no adverse socioeconomic effect relative to housing.

The HCP would replace the need to obtain project-specific take authorization for each project that could result in take of the Covered Species. It would streamline the permit process under the Endangered Species Act by clearly defining the Conservation Program activities required to mitigate project-specific impacts to the Covered Species.

The proposed HCP would not rezone any parcels, introduce any new or substantially different uses, or alter or expand any support infrastructure to these areas (e.g., expand water service, improve transportation network) such that the value of surrounding lands would be affected.

### 5.3.2 Effects of the No Action Alternative

**Conservation.** Under the No Action alternative, take authorization would be required for each activity that results in take of a federally listed species (i.e., red-legged frog, steelhead, garter snake and tiger salamander), on a project-specific basis. Under this alternative, it is assumed that the activities in Zones 1 and 2 that require a permit would also require minimization measures similar to those defined in the HCP for Zones 1 and 2. Several components of the HCP's Conservation Program would not occur under this alternative unless required as mitigation for a take authorization. While conservation easements could be placed over portions of the riparian corridors to mitigate for specific projects, the 360 acres of conservation easements proposed in the HCP would not be established. The permanent conservation easements that would be placed over at least 360 acres of land along the creek corridors, and possibly more in high quality tiger salamander habitat, would prohibit permanent structures unless they benefit the Covered Species. Under the No Action alternative, these restrictions would not be present, but other restrictions imposed by general plan and zoning designations already inhibit development in areas adjacent to the creek zone and in high quality tiger salamander habitat. Due to these restrictions, the No Action alternative would not have significant socioeconomic effects associated with conservation.

**Ongoing Stanford Operations.** Under the No Action alternative, Stanford would continue to operate, and separate take authorization would be needed for any maintenance or repair project that could result in take of the Covered Species. The efficiency and predictability in being able to carry out normal Stanford operations that is offered by the Proposed Action would not exist under the No Action alternative. However, this alternative would not result in a loss of housing, employment, or revenue and would not result in significant socioeconomic effects associated with ongoing Stanford operations.

**Future Development.** Future development under the No Action alternative is the same as that described for the Proposed Action. Any new development that is not already allowed under the 2000 GUP would require project-specific building permits, CEQA review and possibly take authorization.

Under the No Action alternative, conservation easements could be placed over portions of the riparian corridors to mitigate for specific projects, but the conservation easements proposed in the HCP would not be established. The initial easement areas and CTS Reserve that would be set aside under the Proposed Action represent about 8 percent of Stanford's total land and development in much of this area is already limited by current general plan designations and zoning, thus the socioeconomic effects would be minor. The No Action alternative would not result in adverse socioeconomic effects, and does not significantly differ from the Proposed Action.

### 5.3.3 Effects of the HCP for CTS Only Alternative

Under this alternative, the HCP area would be geographically limited to the CTS Basin, which includes the area around Lagunita (90 acres) and the CTS Reserve in the foothills south of Junipero Serra Boulevard (315 acres). Stanford activities that would result in the take of listed species other than tiger salamander would require project-specific incidental take permits.

**Conservation Program.** Under the HCP for CTS Only alternative, Stanford would implement a Conservation Program in the CTS Basin that includes the Lagunita area, golf course and driving range, and the CTS Reserve in the foothills south of Junipero Serra Boulevard. Conservation may entail establishing permanent easements over tiger salamander habitat in the future that would prohibit permanent structures unless they benefit tiger salamander. Development on the lands south of Junipero Serra Boulevard is already restricted by general plan and zoning designations, so the conservation measures under this alternative would not result in significant socioeconomic effects.

Conservation activities for red-legged frog, garter snake and steelhead would be addressed separately, on a project-specific basis. While conservation easements could be placed over portions of the riparian corridors to mitigate for specific projects, the 360 acres or more of conservation easements proposed in the HCP would not be established. The extent of conservation activities would likely be less than the Proposed Action and more land could remain available for development. However, development of most of this land is currently constrained by general plan and zoning designations, so the socioeconomic effects do not significantly differ from the Proposed Action. This alternative would not have significant socioeconomic effects associated with conservation.

**Ongoing Stanford Operations.** Under the HCP for CTS Only alternative, Stanford would continue to operate, but any operations outside of the CTS Basin that could result in take of a federally listed species would require project-specific take authorization. This could delay some operations, but would not result in a substantial loss of employment opportunities, housing opportunities, or income-producing activities, and would not have a significant socioeconomic effect associated with ongoing Stanford operations.

**Future Development.** Under the HCP for CTS Only alternative, the future development anticipated in the HCP would still occur. If a future project could result in take of a federally listed species other than tiger salamander, a project-specific take authorization would be needed. This reduces the efficiency and predictability of completing future development outside of the CTS Basin, but does not preclude development. It would not result in a substantial loss of employment opportunities, housing opportunities, or income-producing activities and would not have a significant socioeconomic effect associated with future development.

### 5.3.4 Comparison of Alternatives

The Proposed Action or the alternatives would not result in significant adverse effects to socioeconomics. Future conservation easements under the Proposed Action or alternatives will restrict the ability to develop the land for economic benefit, however development on most of these lands is currently restricted by local land use regulations. The Proposed Action or alternatives do not significantly differ in effects on socioeconomics.

## 5.4 ENVIRONMENTAL JUSTICE

This section assesses the effects of the Proposed Action and alternatives on environmental justice. The analysis is qualitative, and is based on consideration of the affected environment and the activities proposed in the HCP. An adverse effect would be disproportionately high and adverse for a minority or low income population if it would predominantly result in an adverse effect on a minority or low income area; or result in an adverse effect on a minority or low income area that is appreciably more severe or of greater magnitude than the adverse effect experienced by non-minority and non-low-income areas.

There are no minority or low income areas on the lands where the HCP would be implemented. Issuance of the ITPs and implementation of the HCP would not affect any minority or low income areas, and thus would not have a disproportionately high adverse effect on minority or low-income populations. It would not significantly affect household, or per capita, incomes within the study area and would not have any human health effects.

Likewise, the alternative actions would not have a disproportionately high adverse effect on minority or low-income populations. The alternatives, like the Proposed Action, would not significantly affect incomes within the study area and would not have any human health effects. Therefore, the Proposed Action, the No Action alternative and the HCP for CTS Only alternative would not have a disproportionately high or adverse effect on these populations.

### 5.4.1 Comparison of Alternatives

The Proposed Action and alternatives would not have adverse effects related to environmental justice. The Proposed Action and alternatives do not differ in their effects on environmental justice.

## 5.5 CUMULATIVE EFFECTS

Cumulative impacts are defined as the “impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions.” (40 CFR 1508.7). In this section, the incremental impact of the Proposed Action and the alternatives are assessed in light of other past, present and reasonably foreseeable future Federal, State, local government, and private actions. The study area for cumulative effects generally includes San Mateo and Santa Clara counties. However, the geographic scope does vary for some of the resources addressed in this analysis. As such, the relevant geographic scope is identified for each resource in the resource specific discussions below. For example, the geographic scope was expanded for air quality to include the San Francisco Air Basin, and is narrower for traffic impacts since such impacts tend to be localized. As such, the relevant geographic scope is identified for each resource in the resource specific discussions below.

### 5.5.1 Past, Present, and Reasonably Foreseeable Future Actions

The San Francisco Peninsula has been highly altered by human generated actions, including substantial residential, commercial, institutional, industrial, and recreational development, along with a vast transportation network and other infrastructure to support these land uses. These alterations to the natural landscape have all contributed to the current environmental conditions, which are described in DEIS Chapter 4, Affected Environment.

Population growth in the study area will continue over the 50-year timeframe of the ITPs. As such, urban development is likely to continue. In addition to future development, there are a number of environmental programs underway that also may be implemented. These present and reasonably foreseeable future actions that could affect the resources in the study areas are described below.

### **Urban Development**

The City of Palo Alto, Town of Portola Valley, City of Menlo Park, and Town of Woodside (collectively, “cities”) and San Mateo and Santa Clara counties will continue to urbanize. Based on the cities’ and counties’ general plans, new shopping centers, commercial and institutional buildings, and housing will be built during the next 50 years. This development would be accompanied by public and private infrastructure improvements, such as new roads, utilities, and recreational facilities, and maintenance of new and existing facilities, such as street and sidewalk repairs.

Urban development includes regional transportation, and a number of regional transportation improvements will occur during the next 50 years. *See, e.g.*, Comprehensive County Expressway Planning Study Draft 2008 Update, October 2008.

<http://www.sccgov.org/rda/expressways2/draft2008update.pdf>. Although the scope of regional transportation improvement projects is not known, and is subject to a number of considerations, including funding availability, changes in population and employment centers, and future environmental reviews, currently anticipated transportation projects include the U.S.

101/University Avenue Interchange Reconstruction, U.S. 101 northbound and southbound auxiliary lanes from Marsh Road to Santa Clara County line, Hwy 280/Page Mill Intersection modification, and Oregon Expressway operational and pedestrian improvements, which are underway.

### **Regional Flood Control**

*San Francisquito Flood Protection and Ecosystem Restoration Project.* In 2006, the U. S. Army Corps of Engineers (Corps) and San Francisquito Creek JPA initiated a feasibility study for the San Francisquito Flood Protection and Ecosystem Restoration Project 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 Corps anticipates that the feasibility study will take several more years to complete and any project selected for implementation would require Congressional approval and further NEPA review. The Notice of Intent (NOI) for the feasibility study identified several potential alternatives, including the construction of new detention basins and other structural and non-structural improvements within the San Francisquito Creek watershed. Although flooding occurs primarily downstream of El Camino Real, actions upstream may be implemented to reduce flows downstream. At this time, the feasibility study has not identified a preferred alternative or determined whether any of the alternatives identified in the NOI are feasible.

### **Environmental/Conservation Projects**

A number of regional and local environmental improvement projects are currently underway or anticipated during the next 50 years. These include the following projects.

*Local Environmental Improvement Projects.* Local cities and the Town of Woodside anticipate implementing a number of small scale environmental improvement projects including stabilization of degraded banks along San Francisquito creek and tree reforestation.

The San Francisquito Creek Watershed Council – Steelhead Task Force evaluated the entire San Francisquito Creek watershed, including numerous tributaries for steelhead passage, and identified modification of the Bonde Weir in order to improve steelhead passage as a high priority. The weir presents a passage barrier for both in-migrating adult and out-migrating smolt steelhead trout. The barrier is the farthest one downstream in the watershed and is located just downstream of the Caltrain tracks adjacent to Bonde Park, El Palo Alto Park, and the Alma Street Bicycle Bridge. The design and permitting for this project are complete, and the City of Menlo Park is currently seeking funding for construction. The project is anticipated to be completed by the end of 2010.

*Proposed Three Creeks Habitat Conservation Plan.* The Santa Clara Valley Water District is preparing an HCP to support an application for a 50-year Incidental Take Permit for 10 federally listed threatened or endangered species and 20 unlisted species from NMFS and FWS. The permit would include red-legged frog, CCC Steelhead and fall-run Chinook salmon.

The permit would cover the District on-going operations and maintenance activities, as well as future major construction activities for dam safety upgrades and other non-routine maintenance projects at District facilities within Stevens Creek, Guadalupe River, and Coyote Creek watersheds (Three Creeks). The working draft conservation program includes measures to improve streamflow and stream temperatures below District reservoirs on steelhead and salmon streams, fish habitat restoration and enhancement projects, removal of existing barriers to fish passage, and biological monitoring.

The SCVWD is developing the Three Creeks HCP to protect and enhance habitats for a suite of aquatic species and to provide for the conservation of species impacted by its on-going water-supply operations in northern Santa Clara Valley. The Three Creeks HCP addresses water-supply operations and facilities in the Coyote Creek, Guadalupe River, and Stevens Creek watersheds and incorporates a stream habitat-restoration program called the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE). The SCVWD anticipates submitting the HCP to NMFS for permitting in mid-2010.

*Proposed Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (SCV Habitat Plan).* The SCV Habitat Plan is a regional partnership between the County of Santa Clara, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, Santa Clara County Open Space Authority, and the cities of San Jose, Gilroy and Morgan Hill and the California Department of Fish and Game, USFWS, and NMFS. The SCV Habitat Plan is in preparation, with a draft scheduled to be released in early 2010; it is currently in its second administrative draft, which is available online ([www.scv-habitatplan.org](http://www.scv-habitatplan.org)). The SCV Habitat Plan covers approximately 520,000 acres in southern Santa Clara County, and will be submitted as part of an incidental take permit application for 30 covered species, including the tiger salamander, red-legged frog, steelhead, pond turtle, western burrowing owl, Bay checkerspot butterfly, and other plant and animal species. It does not include the San Francisco garter snake. The covered activities include urban development, major capital improvements, and in-stream operations, maintenance, and flood protection projects.

The proposed SCV Habitat Plan includes a conservation strategy that provides for the protection and enhancement of natural resources at landscape, natural community, and species specific levels. The conservation strategy consists of the following major components:

- the acquisition of land and the creation of a Reserve System, including regional connections between protected areas;
- the long-term management, enhancement, and in some cases restoration of the Reserve System;
- the development of a comprehensive aquatic conservation strategy to address the needs of covered fish, amphibians, and aquatic reptiles;
- the implementation of a comprehensive, long-term adaptive management and monitoring program; and
- the implementation of avoidance and minimization measures on covered activities (called conditions on covered activities). (Jones and Stokes, June 2009)

Land acquisition would preserve an estimated 48,000 acres of upland, creek, and riparian habitat and create a network of reserves for the benefit of covered species, natural communities, biological diversity, and ecosystem function. This includes over 250 miles of riverine habitat and an estimated 664 acres of floodplain riparian habitat would be protected within the Reserve System, including at least 11.75 miles of high-quality spawning habitat for steelhead. Water releases from SCVWD reservoirs would be modified to increase stream flows when it would benefit the covered fish species. The aquatic conservation strategy would also improve fish passage through the removal of complete and partial barriers along the main courses and tributaries to Uvas Creek, the Guadalupe River, and Coyote Creek.

All terrestrial and aquatic land-cover types in the Reserve System would be enhanced to benefit covered and other native species. The SCV Habitat Plan contains detailed guidelines and recommendations for monitoring landscapes as well as the management, enhancement, or restoration of grassland, chaparral and northern coastal scrub, oak and conifer woodland, riverine and riparian forest, and wetlands and ponds. If all predicted impacts occur, the SCV Habitat Plan would restore up to 573 acres of riparian woodland and scrub, wetlands, and ponds, and up to 17.1 miles of streams.

The proposed SCV Habitat Plan overlaps a portion of the Three Creeks HCP. The covered activities and conservation actions in the Three Creeks HCP for Coyote Creek and the Guadalupe River watersheds are also included in the SCV Habitat Plan, so the plans are consistent with one another for the overlapping covered activities and conservation actions.

The proposed SCV Habitat Plan would provide for the protection of steelhead, pond turtle, tiger salamander and red-legged frog habitat in Uvas Creek, Llagas Creek, Coyote Creek, and a portion of the Guadalupe River watersheds, but does not cover the San Francisquito Creek or the Stevens Creek watersheds. It includes a portion of the San Francisco Bay Diversity Stratum in the CCC steelhead DPS, and a portion of the Interior Coast Range Stratum in the South-Central California Coast steelhead DPS. The Three Creeks HCP would provide for the protection of steelhead, pond turtle, tiger salamander, garter snake and red-legged frog in a portion of the San Francisquito and Matadero creek watersheds, and is entirely within the CCC steelhead DPS.

*RWQCB Basin Plan Amendment regarding the Guadalupe River Watershed Mercury Contamination.* The RWQCB has adopted a Basin Plan amendment that specifies the total maximum daily load (TMDL) for mercury in the Guadalupe River watershed. The amendment

addresses seven mercury-impaired waters: Guadalupe Reservoir, Calero Reservoir, Guadalupe Creek, Alamitos Creek, the Guadalupe River upstream of tidal influence, Almaden Reservoir and Lake Almaden. As of 2004, Guadalupe Reservoir had the highest recorded fish mercury concentrations in California-about 20 times higher than the U.S. EPA methylmercury criterion. Beneficial uses of waters in the watershed that are impaired by mercury are water contact recreation (due to human consumption of fish), wildlife habitat, and preservation of rare and endangered species.

This plan recommends specific freshwater water quality objectives. Implementation started in January 2009 and targets are to be attained before 2029. The goals of the first phase of implementation include implementing effective source control measures for mining waste at mine sites; completing studies to reduce discharge of mining waste accumulated in Alamitos Creek; and completing studies of methylmercury and bioaccumulation controls in reservoirs and lakes, by December 31, 2018. The goals for the second 10-year phase of implementation are to attain the watershed fish tissue targets and the San Francisco Bay mercury TMDL allocations to urban stormwater runoff and legacy mercury sources in the Guadalupe River watershed, by December 31, 2028. Mercury reduction in the watershed would benefit both aquatic and terrestrial wildlife, including steelhead, red-legged frog, and pond turtle. Tiger salamander and the San Francisco garter snake are not known to occur in the Guadalupe River watershed.

*Grady Ranch Development and Restoration Project.* Miller Creek in Marin County is an important resource in the CCC steelhead DPS because it has no large impassable dams, and is considered “a small but important part of regional production” by Leidy et al. (2003). The only planned project in the Miller Creek watershed is the Grady Ranch Development, which includes an office space with 640,800 SF of total floor area space, a new bridge over Miller Creek, road widening, and road realignment. Project mitigation includes preserving 3,283 acres of the Miller Creek watershed as open space, and substantially restoring and enhancing Miller Creek and its primary tributaries with fish-friendly rock and log structures to improve upstream fish passage (Liz Lewis, Marin County Public Works Department, personal communication). Depending on the placement of the bridge over Miller Creek and the quality of the in-stream restoration work, this project has the potential to improve upstream migration for steelhead. This is particularly important given that the culvert at Grady Ranch Fire Road is currently an upstream barrier to adult steelhead migration (Liz Lewis, personal communication). Long-term impacts from the project will likely be the increased pollutant loads and modified peak flood flows associated with increases in impervious surfaces. The EIR for this project was certified in 1996 but development has yet to begin.

*San Anselmo Creek Saunders Avenue Crossing Fish Ladder Retrofit.* San Anselmo Creek is a major tributary to Corte Madera Creek, which drains into San Francisco Bay in Marin County, and supports steelhead. The existing crossing consists of a concrete bridge on concrete abutments and concrete pilings. A large concrete apron spans the abutments and was likely constructed to protect the bridge as the downstream channel incised. It maintains a drop of over 4 feet. There are also two weirs that encase sewer lines.

In the 1980's an Alaskan Steeppass fish ladder was installed and a low-flow channel was built to provide for steelhead passage. However, the Steeppass is poorly suited for providing adult passage at typical migration flows. At migration flows the hydraulic capacity of the Steeppass is overwhelmed, and there is inadequate attraction flow for fish to find the outlet. At lower flows there is inadequate depth in the low-flow channel for adult steelhead to swim through.

Additionally, an Alaskan Steeppass does not provide passage for juvenile salmonids and is highly susceptible to plugging by debris.

A recent fish passage assessment of road-stream crossings in Marin County identified the Saunders Avenue site as a high priority for treatment due to more than eight miles of potential habitat affected, and presence of an ineffective fish ladder (Ross Taylor and Associates, 2003). The Friends of Corte Madera Creek Watershed received grant funding to develop design alternatives for improving fish passage at the site. The selected alternative is intended to improve passage conditions for both adult and juvenile salmonids, and to meet the design criteria of both NMFS and the California Department of Fish and Game. A pool and weir fish ladder is proposed.

### **5.5.2 Summary of Cumulative Effects**

The cumulative effects for each environmental resource are described below. Both adverse and beneficial cumulative effects are considered in the context of other local, State, and Federal actions. In most cases there is no cumulative effect, either existing or caused by the Proposed Action or alternatives. However, continued urban development would likely increase traffic and cause a further decline in air quality. The air basin continues to exceed emission standards for fine particulate matter, and several intersections are currently below acceptable levels of service. These resources are therefore already impacted and current and reasonably foreseeable future development would impact them further because any future development would contribute additional particulate matter into the air basin, and potentially increase levels of traffic, which would exacerbate these conditions. The Proposed Action and alternatives would all have a relatively minimal incremental contribution to these already impacted traffic and air quality conditions. These are indirect effects of the Proposed Action and alternatives that would occur as a result of anticipated future development.

### **5.5.3 Geology and Seismicity**

The study area used for the analysis of cumulative effects on geology and seismicity is Santa Clara and San Mateo counties. Most future urban development in the study area would be subject to similar geologic or seismic hazards and these hazards are generally mitigated through a combination of engineering design and site-specific geotechnical measures that address each project's needs as required by applicable local and State codes. The geologic hazards within the study area are considered typical and are normally addressed through appropriate engineering. Therefore, no regional cumulative effect exists. As described in the Environmental Consequences section of this DEIS, the Proposed Action and alternatives would not have any independent adverse effect on geologic resources or pose a seismic hazard, and since current and reasonably foreseeable future actions are not likely to have an adverse effect, neither the Proposed Action nor the alternatives would have an additive effect on geology or seismicity.

### **5.5.4 Cultural and Historic Resources**

Historically, development in Santa Clara and San Mateo counties (the study area), has resulted in a cumulative loss of cultural (including archaeological and paleontological) and historic information because these resources have not been consistently identified, documented, assessed and protected. Currently, cultural and historic resources in the study area are protected by State and Federal laws to avoid significant adverse impacts to these resources, so that the cumulative

effect is mitigated. In addition, as described in the Affected Environment, Stanford has adopted policies to protect archaeological resources on Stanford lands, and maintains a professional staff position (University Archaeologist), collections, and archives on its archaeological resources. Procedures are in place to assure that all ground-disturbing activities are done in a manner that avoids impacts to known cultural resources. When previously unknown cultural resources are discovered, they are documented and assessed for the need to preserve them, sometimes in consultation with the California State Historic Preservation Officer. Because cultural and historical resources are protected in the region and at Stanford through State and Federal laws, and also at Stanford with site-specific Stanford policies, no cumulative impact is anticipated and the Proposed Action and alternatives would therefore not contribute to a study area cumulative effect.

### 5.5.5 Hydrology and Water Quality

The study area used for the analysis of cumulative effects on hydrology and water quality is the San Francisquito Creek and Matadero/Deer Creek watersheds, as past development in these watersheds has contributed to current hydrologic and water quality conditions (See Figure 1-2, Primary Watershed Basins).

As explained in Chapter 4, water quality was historically impaired in the watersheds primarily as a result of stormwater runoff laden with sediment and commonly used landscape pesticides. As a result, the NPDES permit requirements of the SCVURPPP and SMCWPPP control pollution in storm water runoff. Each plan includes a hydromodification<sup>18</sup> plan to reduce pollution of watercourses from human activity. These plans are expected to prevent study area cumulative effects on water quality. Likewise, conservation activities or development under the Proposed Action or alternatives are subject to requirements that minimize water pollution. No cumulative impact to water quality is anticipated and the Proposed Action and alternatives would therefore not contribute to a study area cumulative effect.

The gradual increase in impervious surfaces due to development in the watersheds has resulted in flooding problems in portions of the San Francisquito Creek watershed, although current and future urban development projects, including Stanford projects, are required to control storm water runoff (see DEIS Chapters 3 and 4). The Corps and JPA initiated the San Francisquito Flood Protection and Ecosystem Restoration Project feasibility study in an effort to reduce existing flood risk in the San Francisquito Creek watershed. The study is still underway and has not identified any preferred flood reduction options. The JPA, however, has been working to identify some flood reduction options along San Francisquito Creek that may be implemented before the San Francisquito Flood Protection and Ecosystem Restoration Project feasibility study is completed. Early implementation options include the possibility of increasing the capacity of the creek near San Francisco Bay and increasing detention along upstream portions of San Francisquito Creek, including possible detention facilities on Stanford lands. In June 2009 the JPA decided to proceed with more in-depth study of the flood reduction options near San Francisco Bay.

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<sup>18</sup> Hydromodification is the alteration of the natural flow of water through a landscape, often caused by increased runoff from impervious surfaces. A hydromodification management plan delineates areas where increases in runoff are most likely to impact channel health and water quality and provides management options for maintaining pre-project runoff patterns. See [http://www.scvurppp-w2k.com/pdfs/0506/hmp\\_factsheet.pdf](http://www.scvurppp-w2k.com/pdfs/0506/hmp_factsheet.pdf)

The conservation easements could complicate, but not prevent, the acquisition of Stanford's land by the Corps or JPA if proven necessary as part of a flood reduction project. Such acquisition is already difficult because, Stanford's Founding Grant prohibits Stanford from selling its lands donated by the Stanford family. Thus, if the Corps and JPA pursue a preferred flood reduction project on Stanford owned lands, the land would have to be condemned through the power of eminent domain. Property subject to a conservation easement is generally more difficult to acquire by eminent domain, but could be condemned if sufficient need for the property is shown. Once condemned, Stanford would no longer control the land and it would no longer be subject to the HCP and associated incidental take permits. However, any public flood reduction project would still be subject to the ESA and could require authorization by the USFWS and NMFS.

As described in the Environmental Consequences section of this DEIS, the Proposed Action or alternatives would not have any independent adverse effect on flooding, and would not preclude regional flood reduction improvements. No cumulative flooding impact is anticipated in the watersheds, and therefore, neither the Proposed Action nor the alternatives would have an additive effect on flooding.

### **5.5.6 Air Quality**

The study area for the air quality analysis is the San Francisco Bay Area Air Basin. The San Francisco Bay Area Air Basin is managed by the Bay Area Air Quality Management District. It is made up of nine counties including, Alameda, Contra Costa, Marin, San Mateo, San Francisco, Santa Clara, Napa, southern Sonoma and western Solano counties.

As explained in Chapter 4, although overall emissions have improved over time, the air basin remains out of compliance for certain fine particulate matter and ozone emissions. This is primarily due to construction and an increase in vehicle miles traveled. Although there are plans in place to reduce these emissions (e.g., the 2001 Regional Transportation Plan for the San Francisco Bay Area and the Transportation Air Quality Conformity Analysis [MTC 2002]), the region is currently out of compliance.

Continued urban development in the study area would affect air quality. Specific projects in the study area would be subject to environmental review under CEQA or NEPA and would generally be required to implement feasible mitigation measures to mitigate the impacts to air quality. However, the impacts, and type of mitigation available to mitigate such impacts is currently not known. The Proposed Action and alternatives would result in localized air emissions caused by Conservation Program activities that require heavy equipment use for habitat restoration, as well as from future development anticipated in the 50-year term of the ITPs and the traffic associated with that development. These sources are similar to everyday activities that already occur in the air basin, and would not be a significant new source of air pollution, either stationary or mobile.

Because the San Francisco Bay Area Air Basin is currently in non-attainment for California's ambient air quality standards for fine particulate matter, there is an existing regional cumulative effect. The Air Basin will likely remain in non-attainment as particulate matter (PM10 and PM2.5) emissions are expected to increase slightly in the future. All reasonably foreseeable future urban development would likely contribute fine particulate matter. The Proposed Action or alternatives would not be a significant source of particulate matter emissions; therefore, their incremental contribution is minimal.

The San Francisco Bay Area Air Basin is also currently in non-attainment for the National 8-hour ozone standard and California 1-hour ozone standard, so there is an existing regional cumulative effect. The BAAQMD's 2005 Ozone Strategy contains policies and regulations that outline how the San Francisco Air Basin will achieve compliance with the State 1-hour ozone standard. The Bay Area Air Basin has already shown a dramatic improvement in ozone conditions over the years (quantified in number of days over the threshold), and ozone precursor emissions are expected to continue to decline over the next 15 years due to the implementation of 1) stationary source control measures through BAAQMD's regulations, 2) mobile source control measures through incentive programs and 3) other activities and transportation control measures in regionally coordinated transportation programs. Because of the expected continued decline in ozone due to these measures, this cumulative impact is likely to be reduced or eliminated during the next 50 years, even with reasonably foreseeable future urban development. As such, the Proposed Action or alternatives are not likely to contribute to a cumulative effect relative to ozone.

The San Francisco Bay Area Air Basin is currently in attainment for California and national ambient air quality standards for CO, NO<sub>x</sub>, SO<sub>x</sub>, and lead. Future emissions of ROG and NO<sub>x</sub> (ozone precursors), TOG, SO<sub>x</sub>, and CO from activities in the Air Basin have been forecast to continue decreasing or level off in the future, and this takes into account future population growth. Thus, no other future cumulative air quality impacts are anticipated.

The effects related to global climate change are discussed in section 5.4.13, below.

### **5.5.7 Noise**

Noise in the study area (Santa Clara and San Mateo counties) is regulated through the noise element of a city or county general plan and local noise ordinances. Appropriate land use planning locates compatible land uses next to each other and requires mitigation to protect receiving sites from new noise sources or protects new development from existing noise sources. Therefore, there is no existing regional cumulative effect on noise. The Proposed Action and alternatives include conservation activities, ongoing activities, and future development that are normal activities that are anticipated in the region. Implementation of the Proposed Action or alternatives, in conjunction with other reasonably foreseeable actions would not result in a significant amount of new sources of noise. Therefore, no cumulative effects are anticipated, and neither the Proposed Action nor alternatives would have an adverse cumulative effect on noise levels, either alone or in combination with other noise sources in the study area.

### **5.5.8 Traffic**

The cumulative analysis for traffic includes an overview of trends in the San Francisco Bay Area region, as well as conditions at Stanford and in the adjoining communities of Portola Valley, Menlo Park, Palo Alto and Woodside. While regional trends provide a historic context and sense of the future, the cumulative effect of development on traffic level of service is typically more severe at the local level. The study area is therefore limited to Stanford, Woodside, Portola Valley, Menlo Park, and Palo Alto.

Traffic in the San Francisco Bay Area has progressively increased over time as population and vehicle ownership has increased. Vehicles per capita in the Bay Area increased from 0.29 in 1930 to 0.64 in 2000, and population increased by over 5 million people. This trend is anticipated to continue. Past and future population growth combined with an increased number of cars and miles traveled contributes to worsening levels of service at intersections and roads in

the region. While measures to improve roadways and reduce traffic are continually implemented, there is an existing adverse study area cumulative effect from past and current development on traffic levels, both regionally and locally within Stanford, Woodside, Portola Valley, Menlo Park, and Palo Alto.

Continued urban development in the study area may lead to more traffic. Future local growth and land use change that could affect traffic is predicted in the general plans for Palo Alto and Menlo Park. Both plans foresee future growth through infill and redevelopment. While these communities are built out in terms of vacant lots, there is potential for population growth through increased density.

The City of Palo Alto Comprehensive Plan (1998-2010) directs future growth in the City “in appropriate locations within the urban area, particularly along transit corridors and near employment centers.” It identifies future growth through infill and redevelopment as there is less than 1 percent of vacant developable land in the City.

Menlo Park is mostly built-out, and future development is expected to consist of infill and redevelopment. The development projects recently approved or pending include residential units as well as retail and commercial uses on El Camino Real.

Future growth in Woodside, Portola Valley and unincorporated Santa Clara/San Mateo counties is limited by available parcels and density restrictions, and would include primarily residential development. No large subdivisions are contemplated in the general plans.

The cumulative impact analysis in the GUP EIR included a series of projects that could take place by Year 2010 in the vicinity of Stanford. The analysis concluded that the impacts would be less than significant on public transit, bicycle/pedestrian traffic, parking, and freeways. However, the analysis concluded that by 2010 intersection impacts would be significant along five intersections in the City of Palo Alto, eight in the City of Menlo Park, two in Stanford, and two in Santa Clara County. A series of mitigation measures were included in the GUP EIR; however, despite the program of intersection improvements and trip reduction measures proposed, the EIR stated that “it is not possible to conclude definitively that intersection levels of service would be reduced to less than significant levels. Therefore, although it is likely that intersection impacts would be adequately mitigated for GUP related traffic, this impact is considered to be significant and unavoidable.” The traffic impact analysis provided in Chapter 5.1.6 of this DEIS also concluded that the future development anticipated in the HCP could adversely affect traffic levels of service.

Generally, conservation related actions, either those related to the Proposed Action, alternatives or other reasonably foreseeable environmental/conservation projects would not permanently alter existing traffic patterns or result in a permanent increase in vehicle trips. Conservation activities include creek restoration to remove impediments, bank stabilization, non-native species removal, vegetation management/tree planting, and similar activities. These activities could result in minor temporary traffic delays when personnel and equipment are maneuvered to and from project sites. Thus, conservation related actions associated with the Proposed Action or alternatives would contribute minor and temporary traffic to the existing adverse condition.

Reasonably foreseeable urban development, along with the Proposed Action or alternatives could result in increased localized traffic. Future development that would be subject to the ITPs would result in additional traffic during the next 50 years. Cumulative growth in the surrounding

communities, including population density and the per capita vehicle ownership, would also result in increased traffic levels.

The reasonably anticipated future development could adversely affect traffic levels of service at local intersections, both individually and cumulatively with other projects. The specific intersections are not known because the specific location of the development is not yet known. A definitive determination of effects on traffic is not possible considering the uncertainty of changes that could occur over the next 50 years. Improvements to the road system or transit in and around Stanford unrelated to Stanford development could change the projected future traffic environment compared to what is being evaluated here. Even so, it is assumed that the cumulative traffic effect in the study area would be adverse, and that the Proposed Action or alternatives would have an additive effect.

### **5.5.9 Hazardous Materials**

The study area for hazardous materials (and hazardous waste) is San Mateo and Santa Clara counties. Hazardous materials are regulated by State and Federal law to protect health and safety. As a result, there is no existing regional cumulative effect related to hazards and toxic materials or waste in the study area. The Proposed Action and alternatives, and other reasonably foreseeable actions would not require the use of hazardous materials other than those normally used in construction (e.g., machinery fuels, antifreeze, etc.), and these would be managed in order to prevent adverse effects. No hazardous waste sites would be affected by these actions, and no cumulative adverse effect is anticipated. The Proposed Action and alternatives would not result in an adverse cumulative effect related to hazardous materials/waste in the absence of a regional cumulative effect.

### **5.5.10 Public Services**

The study area for public services (schools, police, fire, wastewater, and solid waste) includes San Mateo and Santa Clara counties. It is anticipated that minimum adequate levels of service would be maintained for future urban development within the study area as mitigation for projects, if necessary, would be required at the time of project approval. Such mitigation could include fees for the expansion of public services including fire and police protection, and schools. Available capacity at regional landfill facilities is anticipated to extend beyond the 50-year time frame of the Proposed Action, given current waste reduction programs mandated by State law. Therefore, there is no study area cumulative effect for schools, police, fire, wastewater, and solid waste services, and the Proposed Action or alternatives would not have an additive effect.

The study area for water supply in the analysis of cumulative effects is the service area for the San Francisco Public Utilities Commission (SFPUC). The SFPUC is the third largest municipal utility in California and the SFPUC Regional Water System currently supplies 2.4 million residential, commercial, and industrial customers. Approximately one-third of delivered water is supplied to retail customers in San Francisco, while the remaining two-thirds are wholesale deliveries to 238 suburban agencies in Alameda, Santa Clara, and San Mateo counties, including Stanford.

SFPUC water demand fell sharply following the drought-induced conservation efforts between 1987 and 1992 and despite increasing population, current water demand remains below pre-drought use. Greater efficiency realized through changes in the plumbing code, conservation

efforts, alternative water sources such as recycled water and desalination, all contribute to the amount of water available for future use. The 1983 California Urban Water Management Act requires all major water suppliers to prepare an Urban Water Management Plan every 5 years to ensure the long term management and efficient use of water supplies. The SFPUC's 2005 Urban Water Management Plan includes reliability planning; past, current, and projected water use; supply and demand comparisons; water demand management; shortage contingency plans; and water recycling. The SFPUC expects to meet projected water demand (in normal water years) through 2030 (SFPUC 2005). Because these types of plans are developed to manage existing and future supply and demand of water, there would be no existing study area cumulative effect. The analysis in Section 5.1.3 found that any future development would be subject to available water allocations. The Proposed Action or alternatives, along with other reasonably foreseeable actions would not result in an adverse cumulative effect on water supply.

### **5.5.11 Land Use**

The study area for land use is San Mateo and Santa Clara counties. Land use is regulated by city and county general plans and zoning ordinances so that there is a balance between residential, commercial and industrial uses and these uses are appropriately located. There is no existing regional cumulative land use effect in the study area because the land use has been locally controlled and approved.

Implementation of the Proposed Action or alternatives along with other reasonably foreseeable urban development would not result in significant changes in land use, and no cumulative impacts to land use are therefore anticipated. As such, the Proposed Action or the alternatives would not result in cumulatively adverse changes in land use in the absence of a regional cumulative effect.

### **5.5.12 Biological Environment**

The study area for the cumulative effects analysis for the tiger salamander, pond turtle, garter snake, and other biological resources, including special-status species, (Cooper's hawk, long-eared owl, yellow warbler, California thrasher, golden eagle, San Francisco dusky-footed woodrat, long-eared myotis, Yuma myotis, and Townsend's big-eared bat, and western leatherwood),<sup>19</sup> includes San Mateo and Santa Clara counties.

The assessment of cumulative effects on steelhead presented in this DEIS has broadened the study area to encompass the Coastal San Francisco Bay Diversity Stratum. Diversity strata are generally defined by Bjorkstedt et al. (2005) as groups of populations that inhabit regions of relative environmental similarity and therefore presumed to experience similar selective regimes. Diversity strata represent an important level of structure (although not necessarily biological structure) between the population and Distinct Population Segment, and offer a useful

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<sup>19</sup> The other special-status species that are included in this analysis are the Cooper's hawk, long-eared owl, yellow warbler, golden eagle, San Francisco dusky-footed woodrat, long-eared myotis, Yuma myotis, and Townsend's big-eared bat, and western leatherwood. These species variously occur in riparian, scrub, and grassland habitat. They are known to occur at Stanford and elsewhere in San Mateo and Santa Clara counties. The San Francisco dusky-footed woodrat and the western leatherwood occur in more restricted ranges than the other species. The woodrat occurs from the southern end of the Golden Gate Bridge to Santa Cruz. Western leatherwood occurs only in the San Francisco Bay area in six counties. The remaining special-status species also occur in other areas of California.

framework for accounting for diversity and spatial structure in the evaluation of population viability under current conditions and future scenarios (Bjorkstedt 2005). The Coastal San Francisco Bay Diversity Stratum of the Central California Coast Steelhead DPS includes populations that spawn in eastern Marin County (Novato Creek, Miller Creek, Corte Madera Creek, and Arroyo Corte Madera del Presidio), in portions of Santa Clara County (Guadalupe River, Stevens Creek and a portion of San Francisquito Creek), and in portions of San Mateo County (San Francisquito Creek and San Mateo Creek) (Figure 5-1). Activities on these creeks could affect the Coastal San Francisco Bay Diversity Stratum populations.

Similarly, the study area for red-legged frog includes Recovery Unit #4 identified in the USFWS Recovery Plan for the California Red-legged Frog (USFWS, 2002). The recovery unit covers most of San Mateo, Santa Clara, Alameda, and Contra Costa counties. It is defined by watersheds and contains an area with similar conservation needs and population statuses. Stanford is in this recovery unit (Figure 5-2).

Population growth in San Mateo and Santa Clara counties has contributed to the decline in numbers or extent of several plant and wildlife species, primarily due to disturbance or loss of vegetation types that provide the plant and animal habitat. (See Chapter 4, Affected Environment for more information on the status of these species). Moreover, small losses of habitat for non-listed plants may be overlooked at the single-project level, but contribute to the cumulative decline of these species throughout their range. While non-listed these species generally occur in a broader range and have higher population numbers than special status species, over time their habitat in San Mateo and Santa Clara counties have been adversely affected by development.

Reasonably foreseeable actions that would affect the biological environment include future incidental take authorizations, future urban development, and future regional flood reduction activities that could result in further habitat modifications and loss of habitat for special-status and other species, and conservation activities that could improve habitat conditions and populations.

**Future Incidental Take Authorizations.** As discussed above, two other HCPs are currently being prepared within the study area; the proposed SCV Habitat Plan and the proposed Three Creeks HCP. If the USFWS and NMFS issue ITPs to these HCP applicants, those permits would authorize the take of wildlife species, including steelhead, red-legged frog, pond turtle, and tiger salamander. For example, the SCV Habitat Plan estimates the permanent loss of 4 to 5% of habitat for red-legged frog, pond turtle and tiger salamander in the plan area, and the permanent loss of less than 1% of riverine habitat that supports steelhead in the plan area. If issued, these ITPs could result in the cumulative loss of these species or their habitats within the study area. However, these permits would be accompanied by HCPs that would likely include avoidance, minimization, and conservation actions that could reduce the effects of the authorized taking and potentially improve the habitat and populations of these species.

**Future Development.** Most reasonably foreseeable future urban development in the study area will be on the flat lands closer to the bay. Most cities within the study area are built-out under their general plans, and future development consists of infill and redevelopment that would not substantially alter natural habitat. However, according to the Bay Area Greenbelt Report (Greenbelt Alliance, 2006), approximately 75,000 acres of greenbelt in Santa Clara County and 10,000 acres of greenbelt in San Mateo County are likely to be developed in the next 40 years. The report indicates that about 26,000 greenbelt acres are similarly at risk of development in

Alameda County, 82,000 greenbelt acres are at risk in Contra Costa County, and 3,800 acres of greenbelt are at risk of development in Marin County. The greenbelt includes lands that have not been developed, are usually on the outskirts of the urban areas, and provide habitat for plants and wildlife, including possibly the Covered Species. In addition to the loss of habitat to urban uses, urban development could result in an increased human presence in riparian areas, particularly if recreational routes are located along creeks, which could in turn affect water quality through increased trash and run-off. While future urban development would continue to result in the loss and modification of habitat for special status and other species, the specific affects on species and their habitats is not currently known and would be subject to future environmental review under CEQA. Future development covered by the Proposed Action or alternatives would contribute to the loss of habitat within the study area. Given the limited amount of development covered by the Proposed Action and alternatives, their contribution to the potential loss of habitat from urban development is relatively small.

**Future Flood Protection Projects.** Future flood protection projects could affect steelhead, red-legged frog, garter snake, pond turtle and other wildlife and plant species. Flood control projects generally do not improve steelhead habitat and can reduce the quality of steelhead habitat by reducing complexity. They can also reduce habitat value for red-legged frog by providing habitat for bullfrogs and non-native fish which prey on eggs, tadpoles and juvenile frogs. However, the permit process for these projects requires that they be reviewed by the Corps and wildlife agencies such as NMFS, USFWS and the California Department of Fish and Game. Most modern-day flood control methods use techniques that allow for some in-stream vegetation and employ materials that can provide complex habitat, but the ultimate goal to efficiently convey floodwaters frequently results in the degradation of instream habitat for native species. Flood control projects can also result in the loss of habitat for red-legged frogs, pond turtles and other riparian species by modifying the banks and side pools used by these species. Some modern flood control projects have improved flood conveyance by creating or expanding streamside flood benches which can also create opportunities to enhance habitat for native species including steelhead. For example, the Upper Guadalupe River Flood Project has removed buildings from several streamside properties to widen the channel and enhance adjacent riparian habitat. Channel widening for flood control allows for creek meanders and bends, large woody debris, and other natural channel functions to occur. The specific effects on steelhead, other species and their habitat from regional flood control projects are currently not known and would be subject to future environmental review under CEQA or NEPA.<sup>20</sup>

**Future Conservation Activities.** Reasonably foreseeable environmental/conservation projects would likely benefit special status and other species within the study area. Local tree reforestation would likely provide some additional habitat for bird species, and environmentally sensitive bank stabilization of degraded stream banks would reduce erosion. Bank stabilization projects, during construction and the subsequent vegetation growth period, often act as local sediment sources and can impact downstream steelhead habitat. However, long-term benefits

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<sup>20</sup> For example, Arroyo Corte Madera Creek in Marin County is listed as critical habitat for CCC steelhead DPS but is “limited by water” (Leidy et al. 2005). If the Lower Arroyo Corte Madera del Presidio flood control project is implemented it could impact steelhead, although the CEQA or NEPA process may identify off-site mitigation measures that reduce or off-set such impacts. As such, this project may have adverse cumulative effects, however the extent of the effects on steelhead is currently not known.

from bank stabilization projects often include reduced erosion and sedimentation and improved bank structure, cover, and shade.

Conservation actions within the study area may provide a cumulative benefit to biological resources. For example, the preservation of 3,283 acres of the Miller Creek watershed as open space, and substantially restoring and enhancing Miller Creek and its primary tributaries with fish-friendly rock and log structures to improve upstream fish passage should improve steelhead habitat on Miller Creek in Marin County, which provides a small, but regionally important contribution to steelhead production (Leidy et al. (2003). These actions also cumulatively benefit other stream-dependent biological resources. Likewise, Arroyo Corte Madera Creek in Marin County is considered ecologically important to Marin County and to the San Francisco Estuary in general for its ability to contribute regionally to steelhead numbers (Leidy et al. 2003). The fish ladder retrofit at the San Anselmo Creek Saunder's Avenue Crossing has the potential to significantly improve steelhead productivity in the Corte Madera Creek system as San Anselmo Creek is considered to have the most productive steelhead habitat within the system (Jones 1969 as cited in Leidy et al. 2003). In addition, the San Anselmo Creek Saunder's Crossing Fish Ladder Retrofit has the potential to greatly improve upstream fish passage on San Anselmo Creek, a major tributary of Corte Madera Creek. The existing fish ladder impedes adult fish passage during typical migration flows and likely significantly reduces the number of fish that are able to reach the high-quality spawning grounds of the upper watershed (Sandra Goldman, Friends of Corte Madera Creek Watershed, personal communication).

Reasonably foreseeable future actions are not anticipated to have an adverse cumulative effect on biological resources, and some future actions could benefit biological resources. For example, the Proposed Action and HCP for CTS Only alternative would have an additive effect on region-wide conservation planning currently ongoing in Santa Clara County. The proposed SCV Habitat Plan and the proposed Three Creeks HCP combined with the Proposed Action or HCP for CTS Only alternative would greatly increase the geographic area of Santa Clara County that is covered by a conservation plan such as an HCP or HCP/NCCP, which could provide better regional protections for biological resources, including steelhead, red-legged frog, pond turtle and tiger salamander. However ITPs issued in conjunction with these HCPs, would also result in a greater amount of authorized take, so until permit decisions are made, and these HCPs are completed, the cumulative conservation effect is not known.

### **5.5.13 Socioeconomics**

The study area for socioeconomics is San Mateo and Santa Clara counties. The existing cumulative effect of employment, housing and income-producing activities have created a study area that is generally economically stable. Implementation of the Proposed Action or alternatives, in conjunction with other reasonably foreseeable actions, would not have a cumulative effect on socioeconomics, although new urban development may provide some additional employment opportunities. Therefore, no cumulative socioeconomic effects are anticipated.

### **5.5.14 Global Climate Change**

Climate change is defined as any significant change in climate metrics, including temperature, precipitation, and wind patterns, over a period of time. The effects of climate change most people refer to today stems from "global warming," a relatively recent phenomenon of rising

average temperatures across the globe. The temperature increase is thought to be due in large part to the human-induced increase in greenhouse gas emissions released into the atmosphere as a result of combustion. Common greenhouse gases (GHG) such as carbon dioxide, methane, and nitrous oxide trap radiant heat from the earth causing the average temperature to rise.

Climate change research in reports from the United Nations Intergovernmental Panel on Climate Change (IPCC) ([www.ipcc.ch](http://www.ipcc.ch)), U.S. Climate Change Science Program's Science Synthesis and Assessment Products, and the U.S. Global Change Research Program, conclude that earth's climate is already changing. This change is expected to accelerate. Human GHG emissions, primarily carbon dioxide emissions (CO<sub>2</sub>), are the main source of accelerated climate change. This rise in temperature changes the climate worldwide and is expected to continue to cause or increase the severity of droughts, flooding, wildfires, and food and water shortages (USDA Forest Service guidance).

Currently, there are no laws on the national level that specifically require the evaluation of climate change in NEPA documents nor have any thresholds been set. However, NEPA generally directs Federal agencies to consider the environmental effects of their actions, and as such the effects of global climate change are addressed here.

In an effort to provide Federal agencies with guidance regarding the consideration of global climatic change in documents prepared pursuant to NEPA, the Council on Environmental Quality issued draft guidance. (October 8, 1997); see also, *Climate Change Considerations in Project Level NEPA analysis* (U.S. Forest Service (USFS), January 13, 2009)). The draft guidance identifies two aspects of global climate change which should be considered in NEPA documents:

- 1) The potential for Federal actions to influence global climatic change (e.g., increased emissions or sinks of greenhouse gases); and
- 2) the potential for global climatic change to affect Federal actions (e.g., feasibility of coastal projects in light of projected sea level rise).

### **Effects of Climate Change in the Bay Area**

General predictions can be made about the regional effects of global climate change, and some qualitative assumptions about the effects of the alternatives, and on the alternatives, can be made based on available scientific information. See, *Climate Change Considerations in Project Level NEPA analysis* (USFS, January 13, 2009).

*Sea Level Rise.* In March 2006, the California Environmental Protection Agency published the *Climate Action Team Report to the Governor and the Legislature*, which evaluated three scenarios for reducing the amounts of greenhouse gases released into the atmosphere over the next century. Depending on whether and how much these emissions can be reduced, the report projects that by 2100 average temperatures in California will rise between 3 and 10.5 degrees Fahrenheit.

One of the most publicized consequences of global climate change is a predicted acceleration of sea level rise. This acceleration would increase the historic rate of sea level rise, which has been measured in San Francisco Bay for over 140 years. Between 1900 and 2000, the level of the Bay increased by 7 inches. Depending on which end of the range of projected temperature increases occurred, the California Climate Action Team found that water levels in San Francisco Bay could rise an additional 5 inches to 3 feet, or nearly 1 meter by the end of this century. More

recent analyses indicate that sea level rise from warming oceans may exceed 4 feet over the next 100 years, or even higher depending upon the rate at which glaciers and other ice sheets on land melt (BCDC 2008).

Rainfall pattern change. Warmer weather temperatures would change where and how rain falls in areas. If more precipitation is falling as rain in the Sierra Nevada, where a slowly melting snowpack is the norm, the water will run off faster and less water can be stored.

Increased incidence and severity of droughts and flooding. Increased temperatures would likely mean that droughts would be longer and the average annual rainfall could decrease over time. When rain does fall it can create flash flood conditions causing flooding and increased erosion and scouring of waterways.

Increased energy use. Warmer temperatures could result in increased energy use due to longer hours of air conditioning.

Increased fire hazard. Reduced total rainfall or changes in rainfall patterns could result in increased fuel loads and drier fuels, which in turn could increase the risk and severity of wildfires.

### **The Potential for the Alternatives to Influence Global Climatic Change**

The DEIS assesses the effects of the Proposed Action and the No Action and HCP for CTS Only alternatives. Both the Proposed Action and the HCP for CTS Only alternative include conservation programs that would require the occasional use of construction vehicles. The contribution of GHG emissions from these actions is expected to be minimal.

The ongoing operation and maintenance of Stanford and future development are activities that would occur under the Proposed Action and both of the alternatives. These activities may result in an incremental contribution of construction-related vehicle equipment emissions and increases in traffic related to future development. An assessment of GHG emissions associated with the Covered Activities cannot be undertaken because project-level details are unknown at this time, and any attempt to quantify GHG emissions from future development would be speculative. Future development subject to the ITPs would undergo project specific CEQA or NEPA evaluation at the local level, and would include a more detailed evaluation of GHG emissions that may more precisely quantify the extent of GHG emissions, and if appropriate, impose specific mitigation.

### **The Potential for Global Climatic Change to Affect the Proposed Action and the Alternatives**

Global climate change is expected to adversely affect habitat conditions for the Covered Species for all of the alternatives. For example, North American climate models predict warmer temperatures, particularly in the summer, and less precipitation in the form of snow for the southwestern United States (IPCC 2007). VanRheenen et al. (2004) found reduced late spring snow pack resulted in decreased winter, spring, and summer streamflows in the Sacramento-San Joaquin River Basin. Warmer temperatures and reduced streamflows could adversely affect steelhead throughout its range. For example, lower streamflows affect steelhead at all life stages. Reduced winter flows, which attract adults into their natal stream for reproduction, may result in lowered spawning recruitment rates. Lower spring and summer flows would reduce the number of smolts able to leave a watershed, particularly in arid systems that dry back in most water years.

The San Francisquito watershed would likely experience the increased temperatures, particularly in summer, and generally reduced streamflows predicted for California over the next century (IPCC 2007). Reduced winter streamflows would likely have the greatest impact on San Francisquito Creek as the limiting factor for steelhead productivity is overwintering habitat (Jones and Stokes 2006). Reduced winter flow means less recruitment of the boulders and large woody debris that create complex overwintering habitat. In addition, lower flows means less scouring action and lower rates of fine sediment removal from creek pools. Lower recruitment of materials and less scouring action results in less overwintering habitat.

Shorter rainfall seasons and more frequent or prolonged droughts may also affect other Covered Species. Tiger salamander, for example, depends on seasonal ponds that retain enough water in the Spring to facilitate metamorphosis into land-dwelling juveniles. Metamorphosis generally occurs in May or June. A prolonged drought, which is a potential consequence of global climatic change, could therefore seriously impair the continued existence or recovery of the tiger salamander (and other listed species) by impairing this important life-stage.

The effect of global climate change on the Proposed Action and alternatives is currently unknown. However, as described above, global climatic change may worsen habitat conditions for the Covered Species. But, the implementation of the HCP could respond to, and thereby reduce, some of the anticipated effects of global climatic change on the Covered Species and their habitats.

Stanford supports the last known tiger salamander population on the San Francisco peninsula, and as described above, worsening or prolonged drought conditions could adversely affect the tiger salamander. The HCP, however, addresses certain drought conditions, and commits to remedial measures that would lessen the effect of drought conditions. For example, under the HCP, Stanford may supply artificial water sources to sustain tiger salamander ponds that would otherwise no longer support tiger salamander reproduction. The HCP also includes management actions, such as stream bank revegetation, that would lessen the effects of erosion caused by increased storm severity. Steelhead management includes the addition of woody debris to San Francisquito Creek, which would improve overwintering conditions. In this way, the effects of global climate change on the Proposed Action would be reduced. The HCP for CTS Only alternative could likewise reduce the effects of climate change on tiger salamander but would not have any effect on the other Covered Species. The No Action alternative would not reduce the effect of global climate change on the Covered Species because it does not include a comprehensive conservation program.

### **5.5.15 Comparison of Alternatives**

The Proposed Action or alternatives would not contribute to cumulative effects in the study area associated with geology and seismicity, cultural and historical resources, water quality, flooding, air quality, noise, hazardous materials/waste, public services, land use, and socioeconomics.

Future development associated with the Proposed Action or alternatives would contribute to cumulatively adverse traffic effects.

Future development covered by the Proposed Action or alternatives would contribute to the loss of a relatively small amount of habitat within the study area. The Proposed Action and HCP for CTS Only alternative could have an additive beneficial effect in combination with proposed conservation plans in preparation in Santa Clara County, however ITPs issued in conjunction

with these HCPs would also result in a greater amount of authorized take, so until permit decisions are made, and these HCPs are completed, the cumulative conservation effect is not known.

The Proposed Action and the HCP for CTS Only alternative include conservation programs, but the contribution of GHG emissions from these actions is not cumulatively significant. Because project-level details are unknown at this time, any attempt to quantify GHG emissions from future development under the Proposed Action or alternatives would be speculative. The Proposed Action's Conservation Program includes actions that could reduce the effects of global climate change on the Covered Species. Similarly, the HCP for CTS Only alternative includes actions that could reduce the effects of climate change on tiger salamander.

In comparison, the Proposed Action and alternatives are the same except with regard to cumulative effects on biological resources related to development and to greenhouse gas emissions. The Proposed Action is superior to the alternatives because it provides a cumulatively beneficial effect on biological resources and provides for adaptive management throughout Covered Species habitat on Stanford lands to respond to the effects of global climate change on the Covered Species.

## **5.6 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

In accordance with NEPA, Section 102 (42 USC 4332), an DEIS must include a discussion of the relationship between the short-term uses of the environment and the maintenance and enhancement of long-term productivity. The Proposed Action is fundamentally designed to enhance long-term productivity, and ensures that the long-term preservation and enhancement provided through the Conservation Program (including conservation easements, management plans, habitat enhancement and take minimization measures) would be in place in advance of future habitat conversion.

Long-term productivity is considered in terms of both the natural environment and the human environment. In the case of this HCP, the natural environment would be protected and restored in order to foster increases in the populations of the Covered Species, and this in turn would help overall ecological productivity in the creek zones and the CTS Reserve. The HCP also would provide assurances that operation and maintenance of Stanford could continue and provide a measure of predictability for future development needed by Stanford in order to operate.

## **5.7 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSAL SHOULD IT BE IMPLEMENTED**

In accordance with NEPA, Section 102 (42 USC 4332), an DEIS must explain which environmental effects of the proposed project are irreversible or would result in an irretrievable commitment of resources, such as consumption of fossil fuels.

The Proposed Action would result in a minor irretrievable commitment of fossil fuel to implement the Monitoring and Management Plans and for future habitat enhancement. The Proposed Action would not result in a substantial change in ongoing operations and maintenance or its use of irretrievable resources.

The conversion of land from vacant to urban use would be considered an irreversible commitment due to the remote possibility that the land could revert to open space in the future. Conversion of land to urban use is a Covered Activity, but no specific development is authorized by the Proposed Action.

<b>Table 5-6. Comparison of Alternatives</b>			
	<b>Proposed Action/Preferred Alternative</b>	<b>No Action Alternative</b>	<b>HCP for CTS Only Alternative</b>
Geologic Hazards and Soils	No significant adverse effects, either individually or cumulatively. Bank stabilization would reduce erosion and benefit water quality and easements would protect prime farmland. Greatest benefit for Geologic Hazards and Soils compared to No Action and HCP for CTS Only alternatives.	No significant adverse effects, either individually or cumulatively. Because there would be no comprehensive Conservation Program, including Minimization Measures that reduce erosion in Zones 1 and 2 and easement related conservation activities, the amount of erosion control is likely less than under the Proposed Action. The location of future easements is unknown, so the effect on farmland is unknown.	No significant adverse effects, either individually or cumulatively. Because there would be no comprehensive Conservation Program for the riparian areas, including Minimization Measures or easement related conservation activities that reduce erosion in Zone 1 and 2 riparian areas, the amount of future erosion control is unknown, but is likely to be less than under the Proposed Action. The location of future riparian easements is unknown, so the effect on farmland is unknown.
Cultural Resources	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.	No significant adverse effects either individually or cumulatively.
Hydrology and Water Quality	No significant adverse effects and beneficial effects. Overall, the Conservation Program under the Proposed Action would improve surface water quality by limiting activities in the riparian easements and requiring minimization measures that protect water quality to benefit the Covered Species.	No significant adverse effects. Provides less water quality protection than the Proposed Action.	No significant adverse effects. Provides less protection of water quality than the Proposed Action.
Air Quality	No significant adverse effects individually. Significant adverse cumulative effects due to particulate emissions.	No significant adverse effects individually. Significant adverse cumulative effects due to particulate emissions.	No significant adverse effects individually. Significant adverse cumulative effects due to particulate emissions.
Noise	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.

<b>Table 5-6. Comparison of Alternatives</b>			
	<b>Proposed Action/Preferred Alternative</b>	<b>No Action Alternative</b>	<b>HCP for CTS Only Alternative</b>
Traffic	Unavoidable significant adverse effects, both individually and cumulatively. Projected traffic impacts associated with the GUP development were significant and unavoidable. Future development covered by the ITPs could result in additional traffic to levels of service that are already unacceptable. However, a definitive determination of effects on traffic is not possible because of uncertainty about future land uses and traffic patterns or traffic improvements.	Unavoidable significant adverse effects, both individually and cumulatively. The effects for this alternative would be the same as for the Proposed Action.	Unavoidable significant adverse effects, both individually and cumulatively. The effects for this alternative would be the same as for the Proposed Action.
Hazardous Materials/Waste	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.
Public Services	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.
Land Use	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively. Likely less area subject to the land use restriction of a conservation easement than under the Proposed Action.	No significant adverse effects, either individually or cumulatively. Likely less area subject to the restriction of a conservation easement than under the Proposed Action.
Biological Resources	Beneficial effect due to a comprehensive Conservation Program that would preserve and restore habitat.	No significant adverse effects. This alternative would provide fewer benefits to the Covered Species and other species than the Proposed Action. Conservation activities would be piecemeal and implemented later in time to avoid or mitigate for specific impacts.	No significant adverse effects. This alternative would have the same benefit to tiger salamander as the Proposed Action, but less benefit to the red-legged frog, garter snake, steelhead, and pond turtle due to the lack of a comprehensive Conservation Program.

<b>Table 5-6. Comparison of Alternatives</b>			
	<b>Proposed Action/Preferred Alternative</b>	<b>No Action Alternative</b>	<b>HCP for CTS Only Alternative</b>
Socioeconomics	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.	No significant adverse effects, either individually or cumulatively.

Figure 5-1 Steelhead Central Coast DPS

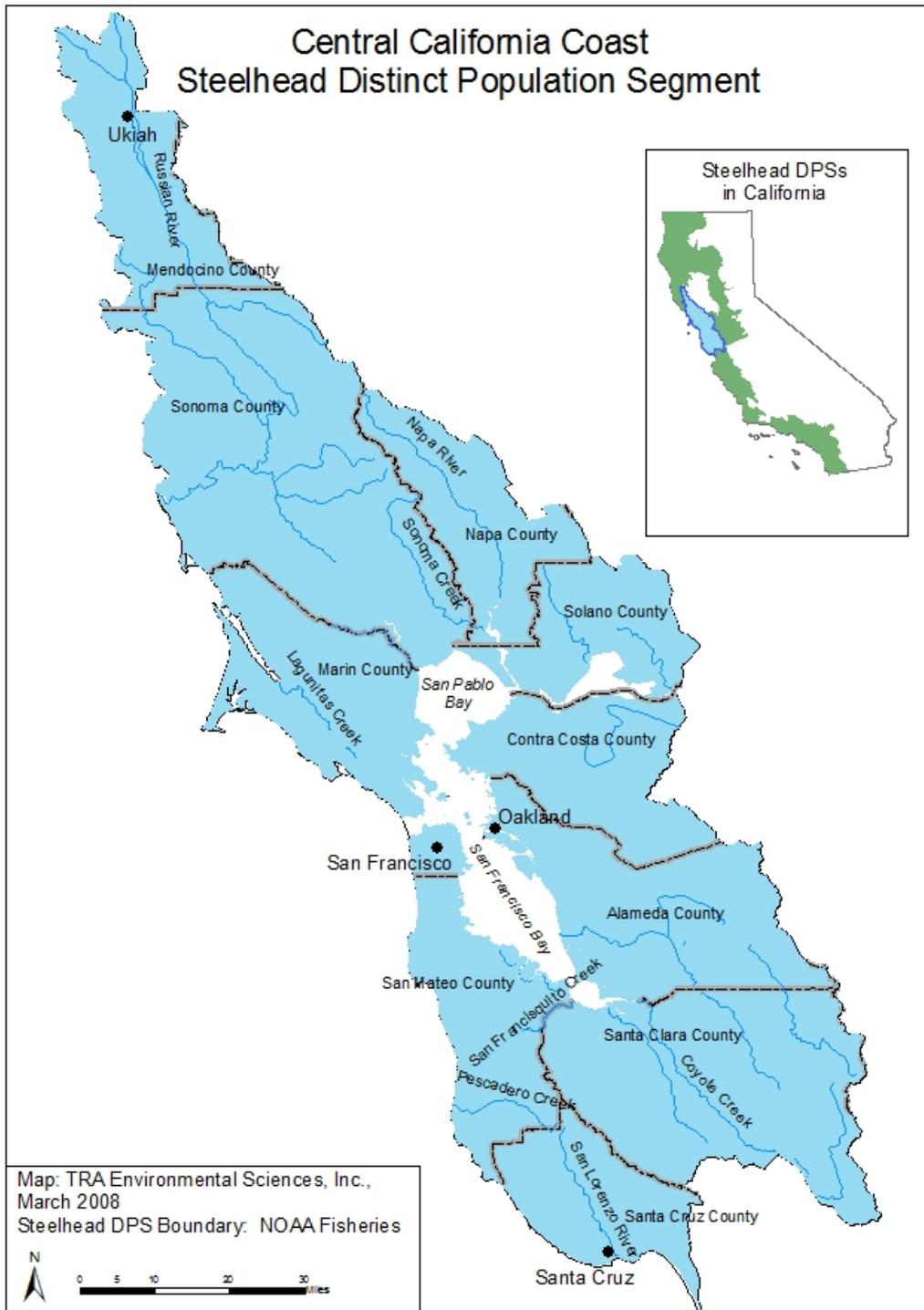


Figure 5-2 CRLF Recovery Units

