

CHAPTER 5: IMPACTS ANALYSIS

5.1 Introduction

This chapter describes the approach taken to estimate take for covered species; describes direct, indirect and cumulative impacts that result from covered activities; and quantifies impacts by habitat cover-types and by individual species.

A vast majority of take that is authorized under the SSHCP occurs within the Urban Development Area (UDA). This area is defined as that portion of the SSHCP project boundary that is located within the County's Urban Service Boundary (USB) or within the City limits of Elk Grove, Galt and Galt's Sphere of Influence (SOI) or Rancho Cordova. The UDA corresponds to locations that are identified for urban development by County or City General Plans. In addition some additional take will be permitted to occur outside of the UDA within areas identified as Agricultural-Residential communities by the County of Sacramento's General Plan Land Use Diagram and to cover management and restoration actions.

Overall the SSHCP is permitting 47,612 acres within the UDA and 2,398 acres outside of the UDA for take. Impacts covered under this plan that occur within the UDA are wide ranging and result from a variety of development and public infrastructure projects. Impacts covered under this plan that occur outside of the UDA are limited to public infrastructure projects such as roads and agricultural-residential development.

5.2 Habitat Based Take Estimates

Since tracking and counting of individual occurrences is not possible or practical for most covered species, this plan will calculate take for individual species based on loss of habitat. In doing so this plan assumes that all potential habitat is occupied. By making this assumption this plan may overestimate take for some species. It should be noted however, that overestimating take for some species does not imply overestimation of impacts on a multiple species approach. The following describes the approach to calculating take for species covered under this plan.

- Two habitat cover-type maps were prepared, one that mapped base cover-types such as grassland, agricultural or urbanized features and a second that mapped vernal pool features. The base cover-types map was prepared through the interpretation of color aerial imagery (November 2002). A total of approximately 345,000 acres were mapped at a scale of 1 inch = 400 feet. The vernal pool maps are based on the interpretation of black and white aerial imagery (March 2000). Utilizing heads-up digitizing vernal pool features were mapped at a scale range of 1 inch = 83 feet to 1 inch = 205 feet. Heads up digitizing is a mapping technique where a cartographer uses a mouse to create a representative map layer on screen from a graphic or image. The minimum mapping unit utilized to create the vernal pool

layer is .0004 of an acre. The two maps were combined to create a master Habitat Cover-Types Map.

- Species specific habitats were initially identified by overlaying species occurrence information and ecological knowledge of habitats used by each species onto the habitat cover-types map. Further refinements were made by local experts who either added or removed cover-types from various locations based on their knowledge of species use within the SSHCP study area.
- The area where take will be authorized was identified by overlaying that portion of the SSHCP project boundary with the County's Urban Service Boundary (USB), with the City limits of Elk Grove, Galt and Galt's Sphere of Influence (SOI) or Rancho Cordova. This area is referred to as the Urban Development Area (UDA) and corresponds to locations that are identified for urban development by County or City General Plans. A second area where take will be authorized that is located outside of the UDA was identified by overlaying the SSHCP project boundary with Agriculture-Residential areas as depicted on the County's General Plan Land Use Diagram
- The acreage available for take within the UDA was calculated by subtracting from the total inside-UDA acres (i) the acreage of already developed land, (ii) the acreage of land that is undeveloped but already permitted by the regulatory agencies, (iii) the acreage of land that is already preserved, and (iv) the acreage of additional inside-UDA conservation required by the SSHCP. These subtractions give the total acreage available for take within the UDA. The acreage available for take outside of the UDA was calculated by identifying the acreage of Agricultural-Residential communities as identified by the County's General Plan land Use Diagram and subtracting (i) the acreage of already developed land, (ii) land that is less than five acres in size (iii) land that is identified by the County Assessors office with a land use other than vacant or agricultural and (iii) the acreage already preserved. These subtractions give the total acreage available for take outside the UDA.
- Take estimates for each covered species were calculated by subtracting those portions of the habitat cover-types deemed suitable habitat for a species with the calculations of acreages available for take as described above. Habitat cover-types deemed suitable for a species are described and illustrated in the species analysis documents in appendix A.

Place holder. 5.x Approach to Jurisdictional Wetlands and Waters

5.3 Impacts

The following section describes direct, indirect and cumulative impacts that will result from the development of natural habitats and the implementation of this Habitat Conservation Plan.

5.3.1 Direct Impacts

Direct Impacts are defined as an immediate disturbance to a habitat cover-type or a taking of a covered species that results from the implementation of a project or activity. Direct impacts are generally related to clearing, grading, grubbing, excavating, filling or other site improvements that are associated with urban development. In addition direct impacts may occur through management, restoration and enhancement actions associated with the establishment of the preserve system. Direct impacts to covered species and their habitats are generally related to activities associated with urban development; installation and maintenance of public infrastructure; restoration, creation or enhancement of habitat; habitat monitoring and management activities; and agricultural activities. Direct Impacts can be permanent or temporary in nature.

5.3.2 Indirect Impacts

Indirect impacts are defined as impacts to a habitat cover-type or covered species that occur away from the direct impact of a project or activity or occur at a later time, but can be attributed to that project or activity's implementation. Indirect impacts are mostly related to fragmentation and isolation of species habitat and the degradation of habitat at the edge of preserve boundaries known as edge effects. Urban development will have a variety of indirect impacts, especially on reserves within the UDA. It is likely that covered activities will result in indirect impacts to some species covered under this Plan. Indirect impacts that result from covered activities include the following:

- **Hydrologic Alterations**

As new development encroaches upon natural habitat, increased precipitation runoff flowing from nearby developed impermeable surfaces and runoff from irrigated landscapes and errant drainages have the potential to add water to a habitat's natural hydrologic system that may result in increased or prolonged inundation. The alteration of the natural hydrologic regime could reshape the existing landscape and alter species habitat. Construction of barriers such as berms or raised beds, which are often built to support roadways and railroad tracks, will also result in alterations to hydrology by creating impoundments where water can collect. If these impoundments are built near existing wetlands they may cause shifts from a seasonal wetland inundation regime to one of a more perennial wetland regime. Development of part of a vernal pool drainshed will alter the hydrology of the remaining vernal pools, while development beyond that drainshed may alter subsurface flows and again impact remaining vernal pools.

- **Pollution**

New development will increase the potential for point and non-point-source pollutants to enter the landscape via overland and subterranean flow of water, wind-blown trash accumulation and illegal dumping of household garbage and garden waste in natural ecosystems.

Pesticides, insecticides, herbicides, and fertilizers will enter adjacent landscapes through runoff from irrigated landscapes. Automobiles will release contaminants such as oil, gas and other fluids that can runoff of roadways and cause harm to species. Contaminants from road materials, leaks, and spills also could adversely affect wetland species by contaminating the water in wetlands.

Humans will dump unwanted items such as trash, tires, and appliances in vacant habitat areas crushing plants and restricting photosynthesis in plants by shielding the sun. Waste material also may disrupt the natural hydrologic flow.

- **Invasive Plants and Animals**

As development and infrastructure continue to encroach further into open space areas, new footholds are provided where invasive species can exist and eventually invade natural habitat settings. Invasive species can negatively affect habitat in a variety of ways, ultimately changing ecological functions and negatively affecting desirable species.

Invasive mammals that are known to have some impact on natural ecosystems in California include the Domestic Cat, Domestic Dog, Norwegian Rat, Black Rat, House Mouse, Ferrets. These animals prey on native species, thus decreasing population viability. They also have the potential to spread diseases and parasites to other mammals within the area.

Invasive plant species can dominate natural ecosystems in a very short period of time. If allowed to propagate unchecked these aggressive species may negatively affect natural vegetation assemblages by out competing them for resources. Italian Rye and Mediterranean Barley are two non-native facultative wetland species that typically dominate disturbed seasonal wetlands and invade smaller, more ephemeral vernal pool types. Yellow Star Thistle, Purple Star Thistle and Medusa Head are just some of the more common “weed” species that can dominate upland areas and that are present in the SSHPC study area.

- **Habitat Fragmentation**

Fragmentation of habitat results from a variety of causes and occurs at a range of spatial and temporal scales. Fragmentation will reduce the spatial and ecological continuity within a given land unit as habitat is reduced in size and becomes more isolated from adjacent areas of similar habitat types.

Fragmentation of natural habitats by roads, railroad tracks, walls, utility corridors fence lines or developments tends to fragment continuous populations into subpopulations, making each subpopulation more vulnerable to local extinction events due to decreased emigration, immigration and gene flow.

At the larger landscape scale, change in regional abundance and distribution of habitat may also change the migration and habitat use patterns of some species, which in turn also affects meta-population dynamics of numerous organisms and alters multiple landscape-scale ecological functions.

As remaining habitat areas diminish in size, the ratio of vulnerable edge to preserved interior area increases. Ecological consequences arise because, as this ratio increases, any given interior point (habitat or organism) is closer to potential threats existing outside of the preserve boundary. Associated with increased edge effect are increased vulnerability to stochastic disturbances, pollution, and increased vulnerability to invasions by non-native plant and feral animal species.

- **Isolation**

Many species will either not cross roads or other urbanized areas , or do so infrequently. This leads to a variety of problems, including isolation of populations. If populations become isolated they can become vulnerable to negative demographic trends, including genetic bottlenecks, genetic drift, and inbreeding depression. This barrier effect also leads to changes in the overall species composition of natural areas, such as biological preserves. These changes in turn can affect ecological functions and the long-term viability of species for which roads are not a major barrier.

- **Recreation Activities**

Recreational use of open space near developed areas is relatively common and can have detrimental effects on covered species and their habitat. Impacts are usually caused by foot, horse and bicycle traffic or by off road vehicles. These activities can compact soils, eliminate vegetation, impair hydrological functions, and disturb plants and wildlife. Recreational off-road vehicle use, especially during the wet season, can create large ruts in wetland habitat and reduce vegetative cover. Off-leash pets may also harass and kill wildlife reducing the value of open space areas as habitat.

- **Noise, vibration and light**

Activities that produce low frequency noise and vibration, such as grading for development, seismic exploration or mining or activities causing light pollution near habitat may be detrimental to many species covered under the SSHCP. Species that are extremely sensitive to external stimuli can experience negatively affects such as interrupted dormancy, abandonment of habitat or disturbance in breeding patterns. These stressors can result in mortality or reduced fitness to covered species.

5.3.3 Cumulative Impacts

While each development project has a variety of impacts, the total impacts of all projects, including those projects that can reasonably be foreseen in the future, can be more than the sum of individual project impacts. For example, individual projects may remove discrete acreages of habitat for an individual species. But the cumulative effect of all projects may not be just the aggregate loss of habitat for that species but a situation where the remaining habitat is inadequate to support a viable population of the species over the long term within the entire HCP planning area. In addition, projects and activities not covered by the SSHCP (see below) will inevitably result in loss of habitat and will have a cumulative effect on SSHCP covered species. Section (?) of the federal Endangered Species Act, as well as CEQA and NEPA, require consideration of cumulative impacts. Potential cumulative impacts are discussed at length in the draft EIS/EIR.

There are several projects and activities located outside of the UDA and outside of the SSHCP project area that have the potential to impact habitat cover-types and species covered under this plan.

Agricultural-Residential: Continued agricultural-residential development outside of the UDA will have a negative impact on species using those habitats. There is a growing body of scientific knowledge showing that very low density development, such as one house per 5 acres and even one house per 40 or 80 acres have very significant adverse impacts on native species and reduces or obliterates the long-term habitat value of the land where these homes are located. Currently virtually all such development in Sacramento County occurs within discrete Agricultural-Residential communities that have defined boundaries. However there is the possibility of additional, scattered rural residential development throughout the SSHCP planning area outside of the UDA that could, over time, have significant impacts on biological functions and species' viability.

Agriculture: Day to day agricultural operations will result in the take of some SSHCP covered species. Agricultural practices that result in take are expected to be relatively small. Furthermore some agricultural operations provide benefits for some SSHCP covered species

Mining: There are a least three planned mining operation located in the eastern portion of the plan area, outside of the UDA. While these operations will net be covered by the SSHCP they will create landscape scale and cumulative impacts and could adversely affect portions of the SSHCP reserve system.

Existing Roadways & Maintenance: It is anticipated that direct impacts to SSHPC covered species will result from the ongoing maintenance and potential widening of roadways in rural areas. Since many of the roadways are already in place and it is anticipated that only minor impacts will result from road widening. Existing roadways will continue to act as a barrier to movement and will result in direct mortality of some species by road strikes.

5.4 Impact and Preservation Estimates for Biotic Communities

The following section describes the rationale for take, the estimated amount of take and the estimated amount of preservation for each habitat cover-type that has been identified by the SSHCP for take coverage.

5.4.1 Agricultural Cover-Types

It is anticipated that most agricultural practices within the UDA will cease to remain viable upon full build-out. It is also reasonable to assume that most remaining agricultural operations within the UDA will be small and fragmented providing minimal value to SSHCP covered species. Therefore the SSHCP will allow the loss of nearly all agricultural cover-type acres within the UDA and require that most preservation of agricultural cover-types occur outside of the UDA.

Compensation for loss of Orchards, Vineyards and Croplands will be achieved through the preservation of cropland habitat. Compensation for Irrigated Pasture-Grassland will be achieved through the preservation of similar habitat. A total of 12,484 acres of cropland and 2,424 acres of Irrigated Pasture-Grassland will be preserved.

Croplands – The SSHCP will allow the loss of 10,573 acres of cropland within the UDA. Compensation for loss of cropland cover-types will occur through the preservation of 10,373 acres of croplands located outside of the UDA and 200 acres of croplands located within the UDA.

Irrigated Pasture-Grassland – The SSHCP will allow the loss of all Irrigated Pasture-Grassland acres within the UDA, estimated to total 2,424 acres. Compensation for loss will occur entirely outside of the UDA through the preservation of 2,424 acres of Irrigated Pasture-Grassland.

Orchards – While orchards provide modest habitat value for many of the species covered under this plan, there is still potential for the land to be utilized by species should a new crop be introduced or should the land simply lay fallow. In addition Orchards offer some value as corridors for species movement and can provide perching and vantage points for some bird species. For these reasons impacts to orchards will be compensated by preserving croplands that are deemed suitable habitat for SSHCP covered species.

The SSHCP will allow the loss of all vineyard acres within the UDA estimated to total 309 acres. Compensation for loss will occur entirely outside of the UDA through the preservation of 309 acres of croplands that are suitable cover-types for SSHCP covered species.

Vineyards – While vineyards provide modest habitat value for many of the species covered under this plan, there is still potential for the land to be utilized by species

should a new crop be introduced or should the land simply lay fallow. In addition Orchards offer some value as corridors for movement of some species and can provide perching, nesting and vantage points for some bird species. For these reasons impacts to vineyards will be compensated by preserving croplands that are deemed suitable habitat for SSHCP covered species.

The SSHCP will allow the loss of all vineyard acres within the UDA estimated to total 1,638 acres. Compensation for loss will occur entirely outside of the UDA through the preservation of 1,638 acres of croplands that are suitable cover-types for SSHCP covered species.

5.4.2 Annual Grassland Cover-types

A majority of the annual grasslands within the UDA are fragmented and located within a mosaic of both high and low density development areas. The location and fragmented nature of annual grasslands within the UDA have less value as functioning habitat than some other cover-types. Therefore the SSHCP will allow the loss of all Annual grassland cover-type acres within the UDA. Compensation for loss of Annual Grasslands will be achieved through the preservation of Annual Grassland and Vernal pool Grassland habitat.

Annual Grasslands – The SSHCP will allow the loss of all Annual Grassland acres within the UDA, estimated to total 9,202 acres. Compensation for loss will occur entirely outside of the UDA through the preservation of X,XXX acres of Annual Grasslands and X,XXX acres of Vernal Pool Grasslands that are suitable cover-types for SSHCP covered species.

Since there is a limited amount of Annual Grassland habitat located outside of the UDA the SSHCP will allow 4,601 acres of Vernal Pool Grasslands to be used as compensation for the loss of 4,601 acres of Annual Grassland habitat. Vernal Pool Grasslands were chosen as they most closely mimic the habitat functions of Annual Grassland resources. Vernal pool grasslands include important areas with a low density of vernal pools that most closely resemble annual grassland habitat.

5.4.3 Blue Oak Woodland & Savannah Cover-Types

Impacts to Blue Oak Woodland and Savannah cover-types will be relatively small. It is however, necessary to protect a significant amount of Blue Oak Woodland and Savannah habitat to maintain covered species populations that utilize them. Since this is a comprehensive habitat conservation plan, the SSHCP must be able to demonstrate that it is capable of sustaining species populations that are covered under this plan. For this reason the SSHCP will protect significantly more Blue Oak Woodland and Blue Oak Savannah than is being lost so that an adequate amount of habitat will be available for use by species that utilize these habitats. This additional conservation will occur through funding sources other than development mitigation.

Blue Oak Woodland – The SSHCP will allow the loss of all Blue Oak Woodland acres within the UDA, estimated to total 51 acres. Compensation for loss will occur entirely outside of the UDA through the preservation of 51 acres of Blue Oak Woodland habitat. An additional 5,000 acres of Blue Oak Woodland will be protected through acquisitions that are not related to compensatory mitigation requirements.

Blue Oak Savannah – The SSHCP will allow the loss of all Blue Oak Savannah acres within the UDA, estimated to total 63 acres. Compensation for loss will occur entirely outside of the UDA through the preservation of 63 acres of Blue Oak Savannah. An additional 2,000 acres of Blue Oak Savannah will be protected through acquisitions that area not related to compensatory mitigation requirements.

5.4.4 Riparian Cover-Types

Due to the already significant loss of riparian habitat within the SSHCP Study Area, take of Riparian habitat cover-types will be limited. Compensation for loss of Eucalyptus Woodland and a majority of Cottonwood Woodland will be achieved through the preservation of Mixed Riparian Woodland. A total of 500 acres of Cottonwood Woodland, 2,656 acres of Mixed Riparian Woodland, 210 acres of Mixed Riparian Scrub and 40 acres of Valley Oak Riparian Woodland will be preserved.

Cottonwood Woodland – A vast majority of the Cottonwood Woodland resources to be lost are associated with mine tailing located within or near Aeroject’s testing facilities. After examining SSHCP covered species data it is believed that these Cottonwood Woodland resources primarily provide nesting and perching habitat for raptors that also utilize Mixed Riparian Woodland and Oak Woodland cover-types. In addition these Cottonwood Woodland resources also provide associated scrub habitat that includes Elderberry plants that potentially offer suitable habitat for Valley Elderberry Longhorn Beetle. Since Cottonwood woodland is associated with high water tables and cottonwoods are a major riparian species, and since Valley Elderberry Longhorn Beetle is dependant on Elderberry plants that are commonly associated with riparian habitats, the SSHCP will provide compensation for the loss of Cottonwood Woodland by protecting Mixed Riparian Woodland. The SSHCP will allow the loss of 2,071 acres of Cottonwood Woodland within the UDA. Compensation for loss will occur entirely outside of the UDA through the preservation of 2,071 acres of Mixed Riparian Woodland.

Eucalyptus Woodland – Eucalyptus Woodlands provide limited habitat value for many of the species covered under this plan, but it does offer value as a wildlife corridor for species movement and can provide perching, nesting and vantage points for some bird species. After examining SSHCP covered species data it is believed that Eucalyptus Woodlands primarily provide nesting and perching habitat for raptors that also utilize Mixed Riparian Woodland and Oak Woodland cover-

types. Since Mixed Riparian Woodland appears to be at greater risk of extirpation than Blue Oak Woodland the SSHCP will provide compensation for the loss of Eucalyptus Woodland by protecting Mixed Riparian Woodland

The SSHCP will allow the loss of 7 acres of Eucalyptus Woodland within the UDA. Compensation for loss will occur entirely outside of the UDA through the preservation of 7 acres of Mixed Riparian Woodland.

Mixed Riparian Scrub - The SSHCP will allow the loss of 42 acres of Mixed Riparian Woodland within the UDA. Compensation will include preservation of 42 acres of Mixed Riparian Scrub within the UDA and 168 acres outside of the UDA. The SSHCP will also require the restoration of 42 acres of Mixed Riparian Scrub.

Mixed Riparian Woodland - The SSHCP will allow the loss of 20 acres of Mixed Riparian Woodland within the UDA. Compensation for loss will occur entirely inside of the UDA through the preservation of 578 acres of Mixed Riparian Woodland. The SSHCP will also require the restoration of 80 acres of Mixed Riparian Woodland.

Valley Oak Riparian Woodland - Owing to the extern rarity of Valley Oak Woodland within the Study Area the SSHCP will not permit the loss of this Cover-Type and will require that 10 acres be protected within the UDA and an additional 30 acres be protected outside of the UDA. The SSHCP will also require the restoration of 65 acres of Valley Oak Riparian Woodland.

5.4.5 Seasonal Wetland and Open Water Cover-Types

Freshwater Marsh - The SSHCP will allow the loss of 79 acres of Freshwater Marsh within the UDA. Compensation will include preservation of 79 acres of Freshwater Marsh within the UDA and 237 acres outside of the UDA. The SSHCP will also require the restoration/creation of 79 acres of Freshwater Marsh.

Open Water - The SSHCP will allow the loss of 317 acres of Open Water habitat within the UDA. Compensation will include preservation of 317 acres of Open Water habitat within the UDA and 317 acres outside of the UDA. The SSHCP will also require the restoration/creation of 317 acres of Open Water habitat.

Seasonal Impoundment - The SSHCP will allow the loss of 195 acres of Seasonal Impoundment within the UDA. Compensation will include preservation of 195 acres of Seasonal Impoundment within the UDA and 390 acres outside of the UDA. The SSHCP will also require the restoration/creation of 195 acres of Seasonal Impoundment.

Seasonal Wetlands – The SSHCP will allow the loss of 71 acres of Seasonal Wetlands within the UDA. Compensation will include preservation of 71 acres of Seasonal Wetlands within the UDA and 142 acres outside of the UDA. The SSHCP will also require the restoration/creation of 71 acres of Seasonal Wetlands.

Swale – The SSHCP will allow the loss of 239 acres of Swale habitat within the UDA. Compensation will include preservation of 239 acres of Swale habitat within the UDA and 239 acres outside of the UDA. The SSHCP will also require the restoration of 239 acres of Swale habitat.

5.4.6 Streams and Creeks

Urban development within the UDA will ultimately compromise the functions of stream channel habitat to some degree. This marginalization of habitat within the UDA will result in diminished functional value for species that utilize stream channel habitat. To compensate for these impacts the SSHCP will require that an equal amount of stream channel habitat, located outside of the UDA, be protected.

Streams and Creeks – The SSHCP will allow impacts to XX linear miles of stream habitat within the UDA. Compensation will include preservation of XX liner miles of stream habitat within the UDA and XX miles outside of the UDA.

5.4.7 Vernal Pool Cover-Types

Vernal Pools and Vernal Pool Grasslands will unquestionably be the most impacted of all habitat cover-types covered by the SSHCP. This is primarily a result of the quantity of vernal pool and vernal pool grassland cover types within the SSHPC study area and their location within existing areas that have been identified for future development. By protecting these resources in large core preserves, some ranging in size from 2,000 -15,000 acres and connected via landscape corridors, the SSHCP will maintain and in some instances increase vernal pool ecosystem function and value. Compensation for loss of Vernal Pool wetlands and Vernal Pool Grasslands will be achieved through the preservation of Vernal Pool wetland and grassland habitat.

Vernal Pool Wetlands – The SSHCP will allow the loss of 310 acres of Vernal Pool wetlands within the UDA. Compensation will include preservation of 310 acres of Vernal Pool wetlands within the UDA and 930 acres outside of the UDA. The SSHCP will also require the restoration or, in exceptional circumstances, creation of XX acres of Vernal Pool Wetlands.

Vernal Pool Grassland – The SSHCP will allow the loss of 20,037 acres of Vernal Pool Grasslands within the UDA. Compensation will include preservation of 7,000 acres of Vernal Pool Wetlands within the UDA and 24,638 acres outside of the UDA.

5.5 Impact Estimates of Covered Species

This section provides a summary of the ecological requirements; a general impacts assessment and a table that illustrates habitat take and habitat preserved for each SSHCP covered species. Habitat acreage, or in the case of stream channels linear feet, rather than individual occurrences will be used to quantify level of take and level of preservation.

5.5.1 Amphibians & Reptiles

California Tiger Salamander

Ecology

California Tiger Salamander breeding and aestivation habitat includes vernal pools, seasonal and perennial ponds, and surrounding upland grassland areas. In the absence of historical breeding ponds, stock ponds for livestock have become important aquatic habitats for the California Tiger Salamander throughout its range, especially in rural grazing lands.

The upland component of California Tiger Salamander breeding habitat typically consists of grassland or oak savannah. California Tiger Salamanders typically utilize burrows in open grassland or under isolated oaks, and less commonly in woodlands. California Tiger Salamander cannot dig their own burrows and depend on burrowing mammals for aestivation sites.

Impact Assessment

California Tiger Salamander use in the SSHCP Study Area principally occurs in the southeastern portion of the County outside of the Urban Development Area (where there is a Critical Habitat unit for the species) but there is also the potential for California Tiger Salamander to utilize habitat within the City of Rancho Cordova, the City of Galt's Sphere of Influence and portions of the Unincorporated County. For purposes estimating take only potential habitat within Zones 1 and 12 less the amount of habitat acreage targeted for preservation was counted as potential take for this species.

Take estimates for California Tiger Salamander are based on projected take of five habitat cover-types associated with the species, Annual Grasslands, Savannah, Seasonal Impoundments, Vernal Pool and Vernal Pool Grasslands located within Zones 1 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Galt, and the unincorporated County will impact approximately 13,826 acres of habitat for California Tiger Salamander.

Take and Preserve Estimates for California Tiger Salamander By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	1,712	1,712
Savannah	46	46

Seasonal Impoundments	53	159
Vernal Pool	126	504
Vernal Pool Grassland	11,836	11,836
Total	13,773	14,257

Giant Garter Snake

Ecology

The species utilizes freshwater marsh associated with streams for foraging and reproduction. GGS move up to 800 feet from freshwater marsh habitat to winter in hibernacula created from burrowing animals. GGS are not associated with fast flowing water or streams with rocky/gravel banks or bottoms.

Impact Assessment

Giant Garter Snake use in the SSHCP Study Area principally occurs along stream corridors in the western portion of the study area. It should be noted that a significant portion of what is considered by the HCP to be suitable habitat will not be directly impacted but will be “marginalized” as urban development expands.

Marginalized habitat is defined as habitat that is not necessarily taken (removed/destroyed) but due to encroaching development may no longer provide the full range of habitat functions that are needed to support the species. In the case of GGS, streams within the UDA may no longer have associated upland habitat as development encroaches close to the stream channel. Without upland habitat GGS has no place for aestivation or basking and as a result will not utilize stream segments devoid of these habitats. These streams will be considered marginalized as they no longer provide functional habitat for the species, which warrants the preservation of intact GGS habitat elsewhere to support the recovery of the species.

Streams north of Jackson Hwy and East of Sunrise Blvd within the UDA are not considered GGS habitat as noted in the GGS Recovery Plan and in consultation with USFWS staff. These streams generally do not provide the water and freshwater marsh habitats found further to the southwest. For areas south of Jackson Hwy and west of Sunrise Boulevard it was determined, using aerial photography and cover-type shape files, which streams or stream segments do not provide suitable habitat as they are currently surrounded by development and do not provide functional habitat. These stream reaches were removed from take estimates as they can not be considered potential habitat.

In addition, all portions of North Laguna Creek were removed from take estimates as it is the intention this HCP to preserve the entire reach of North Laguna Creek and to ensure that functions necessary to sustain GGS populations are left intact.

For purposes of the SSHCP, take for Giant Garter Snake is calculated based on the projected loss of Stream/Creek and Freshwater Marsh habitat located within Zones 3, 4, 5 and 12. Projected

urban growth within the Cities of Elk Grove, Galt and the unincorporated County will affect 44 acres of Freshwater Marsh and 40.15 linear miles of Stream/Creeks utilized for breeding, foraging, basking and aestivation habitat for GGS.

Take and Preserve Estimates for Giant Garter Snake By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type	Total To Be Preserved By Cover-Type
Freshwater Marsh	44 acres	88
Stream/Creeks	40.15 linear Miles	40.15 linear Miles
Total	-	-

Western Pond Turtle

Ecology

Western Pond Turtles utilize fresh to brackish marshes, rivers, ponds and streams. They may also occur in man-made habitats, such as irrigation ditches, reservoirs, and sewage and millponds. Preferred aquatic habitat is characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, partially submerged rocks and logs, open mud banks and matted floating vegetation for thermoregulatory basking.

Western Pond Turtles “hibernate” in both aquatic and terrestrial habitats. Aquatic refugia consist of rocks, logs, mud, and undercut areas along banks while terrestrial hibernacula consist of burrows in leaf litter, heavy brush, or soil. Upland nesting sites must be dry and often have high clay or silt component. Terrestrial habitats surrounding aquatic breeding sites are critical to the survival of WPT, which depends on mesic ecotones to complete their life cycle.

Impact Assessment

Western Pond Turtle observations are relatively wide-spread across the SSHCP Study Area but the lack of recorded occurrence data makes it difficult to estimate the exact distribution of this species. The scarcity of occurrence data is likely due to a lack of survey effort and should not be interpreted to imply extremely low population levels. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species. The SSHCP will assume, for purposes of estimating take, that all Freshwater Marsh and Stream/Creek habitat throughout the SSHCP Study Area that provide perennial water are utilized by Western Pond Turtle.

Take estimates for Western Pond Turtle are in part based on indirect impacts to stream/creek corridors that result in marginalized habitat. Marginalized habitat is defined as habitat that is not necessarily taken (remove/destroyed) but due to encroaching development may no longer provide the full range of habitat functions that are needed to support the species. In the case of Western Pond Turtle, streams within the UDA may no longer have associated upland habitat as development encroaches close to the stream channel. Without upland habitat Western Pond Turtle has no place for aestivation or nesting and as a result will not utilize stream segments devoid of these habitats. Pollution from urban runoff that is expelled into Stream/Creek Channels or

into wetlands areas adjacent to Stream/Creek channels also marginalizes habitat functions for this species. These streams will be considered marginalized as they no longer provide functional habitat for the species, which warrants the preservation of intact Western Pond Turtle habitat elsewhere to support the recovery of the species.

For purposes of the SSHCP, take for Western Pond Turtle is calculated based on the projected loss of Stream/Creek and Freshwater Marsh habitat located within Zones 1, 2, 3, 4, 5 and 12. Projected urban growth within the Cities of Elk Grove, Galt, Rancho Cordova and the unincorporated County will affect 131 acres of Freshwater Marsh and 54.86 linear miles of Stream/Creeks utilized for breeding, foraging, basking and aestivation habitat for Western Pond Turtle.

Take and Preserve Estimates for Western Pond Turtle By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Freshwater Marsh	131 Acres	131 Acres
Stream/Creeks	54.86 linear Miles	54.86 linear Miles
Total	-	-

Western Spadefoot Toad

Ecology

Western Spadefoot Toads have two distinct habitat requirements: seasonal pools for breeding and uplands for foraging and dry-season aestivation. Western Spadefoot Toad eggs and larvae have been observed in a variety of permanent and temporary wetlands including altered wetlands. Terrestrial habitats surrounding aquatic breeding sites are critical to the survival of Western Spadefoot Toad, which depends on mesic ecotones to complete their life cycle.

Research suggests that vernal pools and other temporary wetlands may be optimal for breeding due to the absence or reduced abundance of both native and nonnative predators, many of which require more permanent wetlands.

Impact Assessment

A majority of Western Spadefoot Toad occurrences have been recorded in the central to south-eastern portions of the SSHCP Study Area near the Cities of Rancho Cordova, Galt and in portions of the unincorporated County. Recent surveys of locations in the southern portion of the Study Area have found occurrences of Western Spadefoot Toad

and it is likely that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species. Since tracking and counting every individual population or occurrence is not practical for this species the SSHCP will assume, for purposes of estimating take, that all Annual Grassland, Savannah, Seasonal Impoundment, Vernal Pool and Vernal Pool Grassland located within Zones 1, 2, 3 and 12 is utilized by Western Spadefoot Toad.

Take estimates for Western Spadefoot Toad are based on projected take of five habitat cover-types associated with the species, Annual Grasslands, Savannah, Seasonal Impoundments, Vernal Pool and Vernal Pool Grasslands located within Zones 1, 2, 3 and 12 (See Figure 3). SSHCP covered activities within the Cities of Rancho Cordova, Galt, and the unincorporated County will impact approximately 23,287 acres of habitat for Western Spadefoot Toad.

Take and Preserve Estimates for Western Spadefoot Toad By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	3,912	3,912
Savannah	46	46
Seasonal Impoundments	145	435
Vernal Pool	257	1,028
Vernal Pool Grassland	18,927	18,927
Total	23,287	24,348

5.5.2 Birds

American Peregrine Falcon

Ecology

Peregrine Falcons occur within the SSHCP Study Area during their fall migration and over winter where they typically feed on highly mobile, flocking, and colonial nesting birds, such as shorebirds, waterfowl, doves and pigeons. They nest almost exclusively on cliff faces, but have been documented to nest on artificial structures in urban environments.

Impact Assessment

Peregrine Falcons principally occur in the north and southeastern portions of the SSHCP Study Area along Scott Road and by Chase Ranch. They are not expected to breed in the SSHCP Study Area. The documented occurrences of Peregrine Falcons nesting amongst urban environments and

limited data on the exact distribution of Peregrine Falcon and their use of the SSHCP Study Area makes it difficult to preclude any habitat within the UDA from take of Peregrine Falcon habitat.

Therefore, take estimates for American Peregrine Falcon are based on projected take of five habitat cover-types associated with the species foraging needs, Freshwater Marsh, Irrigated Pasture, Open Water, Seasonal Wetlands, and Vernal Pool Grasslands located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Rancho Cordova, Galt, and the unincorporated County will impact approximately 22,928 acres of habitat for Peregrine Falcon.

Take and Preserve Estimates for Peregrine Falcon By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Freshwater Marsh	79	316
Irrigated Pasture	2,424	2,424
Open Water	317	634
Seasonal Wetlands	71	213
Vernal Pool Grasslands	20,037	31,638
Total	22,928	35,225

Bald Eagle

Ecology

Bald Eagles are not expected to nest in the SSHCP Study Area, but do occupy the area over winter. They forage on a variety of prey including fish, waterbirds and possibly on carrion from livestock. The species prefers to roost in relatively sheltered large trees secluded from weather and other disturbances that are near large water features or open expanses of land.

Impact Assessment

Bald Eagles occur in the southeastern portion of the County, along the American, Cosumnes and Sacramento Rivers and have been cited towards Scott Road and Deer Creek. There is also potential for Bald Eagle to use Open Water, Annual Grassland, and Seasonal Wetland habitats within the City of Rancho Cordova and the unincorporated County. Lack of data on the exact distribution of Bald Eagle and their use of the SSHCP Study Area makes it difficult to preclude habitat within the UDA from take of Bald Eagle habitat. However, considering the large territories and relative solitude required by the bird, it is reasonable to assume that highly urbanized areas (i.e. conservation zones 4, 5, and 12) are not utilized by Bald Eagles.

Therefore, take estimates for Bald Eagle are based on projected take of three habitat cover-types associated with the species winter foraging needs, Annual Grassland, Open Water, and Seasonal Wetlands located within Zones 1, 2, and 3. SSHCP covered activities within the City of Rancho Cordova and the unincorporated County will impact approximately 3,884 acres of habitat for Bald Eagle.

Take and Preserve Estimates for Bald Eagle By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grasslands	3,509	3,509
Open Water	317	317
Seasonal Wetlands	58	58
Total	3,884	3,884

Cooper’s Hawk

Ecology

Cooper’s Hawk appears strongly associated with live oak woodland but are also commonly noted in other woodland habitats. Dense canopy closure is a consistent feature of most nest sites; and the tallest tree in the stand is often selected for nesting. Cooper’s Hawk also breeds in urban and suburban areas. The SSHCP Study Area supports Cooper’s Hawks during the breeding and non-breeding seasons where they primarily eat medium-sized birds and mammals.

Impact Assessment

Cooper’s Hawks occur in suitable habitat within the SSHCP Study Area; however, their overall distribution, abundance, and population structure are not well known. Habitats used by Cooper’s Hawk are well represented in the SSHCP Study Area, including within urban environments, and it is anticipated that recorded Cooper’s Hawk occurrences will increase as lands are surveyed and preserved via the SSHCP.

Take estimates for Cooper’s Hawk are based on the projected take of five cover-types associated with the species, Blue Oak Woodland, Cottonwood Woodland, Valley Oak Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland within Zones 1, 2, 3, 4, 5, and 12. The expansion of urban development, infrastructure improvements, and/or reclamation of mine tailings in the Cities of Elk Grove, Galt, Rancho Cordova and the unincorporated County will impact an estimated 2,184 acres of Cooper’s Hawk habitat within the SSHCP Study Area. Figure 3 depicts the habitat cover-types that may be potentially available for take within the SSHCP Study Area.

Take and Preserve Estimates for Cooper’s Hawk By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Valley Oak Riparian Woodland	0	40
Total	2,184	5,957

Ferruginous Hawk

Ecology

The SSHCP Study Area functions as wintering and migratory foraging habitat where Ferruginous Hawks use grasslands and arid areas, particularly where pocket gophers, ground squirrels, rabbits, or prairie dogs are abundant. Winter migration initiates in early August and continues on through November. Individuals return in mid-February to as late as June.

Impact Assessment

Ferruginous Hawk observations in the SSHCP Study Area are primarily opportunistic sightings of individuals that have been reported from open grasslands habitats in the eastern portion of the SSHCP Study Area. Winter observations have also been recorded from non-vineyard agricultural habitats in the south and southwestern portions of the SSHCP Study Area. A lack exact distribution data, and unknown use of the SSHCP Study Area by Ferruginous Hawk makes it difficult to preclude any habitat within the UDA from take of Ferruginous Hawk habitat.

Therefore, take estimates for Ferruginous Hawk are based on projected take of eight habitat cover-types associated with the species winter foraging needs, Annual Grassland, Cropland, Freshwater Marsh, Irrigated Pature, Mixed Riparian Scrub, Mixed Riparian Woodland, Savannah, Seasonal Wetlands, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Rancho Cordova, Galt, and the unincorporated County will impact approximately 42,455 acres of habitat for Ferruginous Hawk.

Take and Preserve Estimates for Ferruginous Hawk By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture Grassland	2,424	2,424
Mixed Riparian Scrub	42	210
Savannah	63	1,563
Seasonal Wetlands	71	213
Vernal Pool Grassland	20,037	31,638
Total	42,455	53,449

Golden Eagle

Ecology

Golden Eagles nest primarily in open grassland and oak savannah habitats. They avoid densely forested habitats; and they appear to shy from agricultural lands during the

breeding and winter seasons. The availability of small to medium-sized mammalian prey, particularly rabbits and ground squirrels, is an important determining factor for nest and foraging site selection. Golden Eagles tend to avoid urban, agricultural, and forested areas. The breeding season is late January or early February through August, peaking from March through July. Golden Eagle populations are usually migratory. However, in California Golden Eagle populations are non-migratory and strongly defend well-defined territories.

Impact Assessment

Golden Eagles forage in suitable habitat within the SSHCP Study Area during migration and winter. In particular, the rolling foothills in the eastern portion of the Study Area, which support grassland and oak savannah communities, are considered excellent foraging habitat for Golden Eagle during winter. A nesting pair has been reported within the Study Area at Howard’s Ranch and another just east of the Sacramento County line. Golden Eagles are not expected to venture into urbanizing lands, but will use large open grasslands for foraging. These occurrences and observations highlight the importance of the eastern portion of the Study Area for migratory and resident Golden Eagle populations.

Take estimates for Golden Eagle are based on projected take of five habitat cover-types associated with the species needs, Annual Grassland, Blue Oak Woodland, Irrigated Pasture, Savannah, and Vernal Pool Grassland located within Zones 1a, 1b, 1c, 1e, 2, 3b, and 3c. SSHCP covered activities within the City of Rancho Cordova and the unincorporated County will impact approximately 22,545 acres of habitat for Golden Eagle.

Take and Preserve Estimates for Golden Eagle by Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	478	478
Blue Oak Woodland	0	2,551
Irrigated Pasture Grassland	510	510
Savannah	46	1,563
Vernal Pool Grassland	21,511	21,511
Total	22,545	26,613

Greater Sandhill Crane

Ecology

Greater Sandhill Crane’s winter in the SSHCP Study Area and utilize Cropland, Irrigated Pasture Grasslands, Vernal Pool Grasslands, Annual Grasslands and Seasonal Wetlands for foraging and/or roosting habitat.

Impact Assessment

Greater Sandhill Crane use in the SSHCP Study Area principally occurs in the Cosumnes Floodplain but there is also the potential for Sandhill Crane to utilize habitat within the City of Elk Grove and the City of Galt’s Sphere of Influence. It should be noted that not all of the acreage for these cover-types within these Cities are calculated as loss. It is reasonable to assume that small and fragmented areas of habitat located within urban areas will not be utilized by Sandhill Crane and therefore are not considered as potential habitat for this species. Habitat cover-types deemed suitable for Greater Sandhill Crane that occur north of Elk Grove Boulevard and east of the City of Galt are not considered Sandhill Crane Habitat as there is no evidence that Sandhill Cranes roost or forage in these locations.

Take estimates for Greater Sandhill Crane are based on projected take of five habitat cover-types associated with the species, Cropland, Irrigated Pasture Grassland, Annual Grasslands, Vernal Pool Grasslands and Seasonal Wetlands located within Zones 4, 5 and 12 (See Figure 3). SSHCP covered activities within the Cities of Elk Grove and Galt, will impact approximately 9,168 acres of habitat for Greater Sandhill Crane.

Take and Preserve Estimates for Greater Sandhill Crane By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	2,026	2,026
Cropland	6,177	6,177
Irrigated Pasture Grassland	677	677
Seasonal Wetlands	29	29
Vernal Pool Grassland	259	259
Total	9,168	9,168

Loggerhead Shrike

Ecology

Ideal Loggerhead Shrike habitat is characterized by short, sparse vegetation, scattered or isolated low trees or large shrubs for nest sites with hunting perches that provide an open view. Loggerhead Shrikes typically avoid completely treeless and shrubless areas and are strongly territorial and aggressive during the breeding season, which begins in late January or early February, and extends to July. In many areas, Loggerhead Shrike abundance is correlated with the amount of pastureland and available hunting perches from which they target small to medium-sized animal matter, including arthropods, birds, amphibians,

reptiles, and small mammals; they also eat roadkills and carrion. Shrikes forage primarily on large ground-dwelling insects that require little to no water.

Impact Assessment

Comprehensive surveys or monitoring efforts for Loggerhead Shrike in the SSHCP Study Area have not been conducted, and the existing data of known occurrences are based mostly on incidental observations or limited surveys making the population size and nesting locations of this species in the SSHCP Study Area not well known. However, because habitat-cover types used by Loggerhead Shrikes, such as Annual Grassland, Cropland, Irrigated Pasture, Mixed Riparian Scrub, and Vernal Pool Grassland are well-represented in the SSHCP Study Area and the noted occurrences of Loggerhead Shrike appear to be well distributed throughout the Study Area, it is assumed that future monitoring and preserve efforts will reveal a greater Loggerhead Shrike population in the Study Area.

Take estimates for Loggerhead Shrike are based on projected take of six habitat cover-types associated with the species, Annual Grasslands, Cropland, Irrigated Pasture, Mixed Riparian Scrub, Savannah, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 42,455 acres of habitat for Loggerhead Shrike.

Take and Preserve Estimates for Loggerhead Shrike By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Cropland	10,537	12,484
Irrigated Pasture Grassland	2,424	2,424
Mixed Riparian Scrub	42	210
Savannah	63	1,563
Vernal Pool Grassland	20,037	31,638
Total	42,455	52,920

Long-eared Owl

Ecology

There are no known records of Long-eared Owls nesting in Sacramento County and it appears as though they only utilize the SSHC Study Area during fall and winter migrations. During which time, Owls will often roost communally in shrubby vegetation from as early as June to as late as March. Long-eared Owl eat small mammals including voles, deer mouse, harvest mouse, shrews, snakes, lizards, bats and small birds.

Impact Assessment

There are no known records of nesting occurrences in Sacramento County; and the overall distribution, abundance, and population structure of Long-eared Owls are not well known. However, land-cover types used by Long-eared Owls, such as Blue Oak Woodland, Cottonwood Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, and Valley Oak Riparian Woodland occur throughout much of the Central Valley and are well-represented in the SSHCP Study Area. Long-eared Owl has been documented at the Nature Conservancy’s Howard Ranch, the Cosumnes River’s Lower Preserve, and along the American River Parkway downstream from Goethe Park (Trochet pers. comm.). SSHCP compliance monitoring is expected to expand upon and refine Long-eared Owl occurrence and habitat distribution information through implementation of the SSHCP.

Take estimates for Long-eared Owl are based on projected take of five habitat cover-types associated with the species, Blue Oak Woodland, Cottonwood Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, and Valley Oak Riparian Woodland located within Zones 1, 2, 3, 4, 5 and 12 (see Figure 2). SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 2,184 acres of habitat for Long-eared Owl.

Take and Preserve Estimates for Long-eared Owl By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Valley Oak Riparian Woodland	0	40
Total	2,184	5,957

Merlin

Ecology

Merlins occur in open and semi-open habitats of foothills and valleys, including grasslands, pastures, open forests and woodlands, savannahs, wetlands and are also found in towns and cities during winter, where they perch on posts, buildings, and tall trees. They feed primarily on small and medium-sized birds as well as insects.

Impact Assessment

Merlins occur in Sacramento County, including the SSHCP Study Area, during fall migration and winter. They have been observed at the Cosumnes River Preserve, Howard Ranch and SRCSD Bufferlands. Aside from these observations, comprehensive surveys have not been conducted for Merlin and their full use of the SSHCP Study Area is unknown. However, it is anticipated that SSHCP compliance monitoring will expand upon and refine Merlin occurrences and distribution.

Take estimates for Merlin are based on projected take of ten habitat cover-types associated with the species, Blue Oak Woodland, Cottonwood Woodland, Cropland, Freshwater Marsh, Irrigated Pasture, Open Water, Savannah, Seasonal Wetlands, Vernal Pools, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 35,960 acres of habitat for Merlin.

Take and Preserve Estimates for Merlin By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture	2,424	2,424
Open Water	317	634
Savannah	63	1,563
Seasonal Wetlands	71	213
Vernal Pool	310	1,240
Vernal Pool Grasslands	20,037	31,638
Total	35,960	53,563

Northern Harrier

Ecology

The quality of open nesting habitats appears to be the primary factor in determining Northern Harrier presence. They generally require open habitats with dense, tall vegetation, a high prey base, and few predators, but also forage in areas of lower vegetation such as alfalfa fields. Northern Harriers feed on small mammals during the breeding season of March through September; the success of which can be largely affected by the population cycles of the small mammal prey base. Many Northern Harrier populations breeding in California are resident; however, this species is nomadic and moves within and between seasons in response to prey availability.

Impact Assessment

Northern Harriers occur in suitable habitat within the SSHCP Study Area and are probably regular breeders. Land-cover types used by Northern Harriers are well-represented in Sacramento County and the SSHCP Study Area. While there have not been comprehensive surveys for Northern Harrier conducted for the SSHCP Study Area, nesting has been documented at the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, the Nature Conservancy’s Howard Ranch, and the Cosumnes River Preserve, and is probable in areas along Scott and Latrobe Roads. Extensive portions of the SSHCP planning area are suitable foraging habitat. However, the population size and nesting locations of this species in the SSHCP Study Area are not fully known and it is expected that SSHCP compliance monitoring surveys will expand upon and refine Northern Harrier occurrence and distribution information.

Take estimates for Northern Harrier are based on projected take of nine habitat cover-types associated with the species, Annual Grassland, Cropland, Freshwater Marsh, Irrigated Pasture, Savannah, Seasonal Wetlands, Swales, Valley Oak Riparian, and Vernal Pool Grasslands located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 35,650 acres of habitat for Northern Harrier.

Take and Preserve Estimates for Northern Harrier By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	4,601	4,601
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture	2,424	2,424
Savannah	63	1,563
Seasonal Wetlands	71	213
Swale	239	478
Vernal Pool Grasslands	20,037	31,638
Total	38,051	53,717

Sharp-shinned Hawk

Ecology

During the non-breeding season, migrating Sharp-shinned Hawks will occupy any habitat that contains trees or shrubs. They prefer foraging perches with substantial cover, which are often located near or adjacent to open areas where prey are more abundant and easier to

spot and pursue. Individuals will hunt from a perch, use cover and a surprise attack, usually through foliage, to obtain prey or fly low in front of a vegetative background to increase the surprise factor. They consume mostly small birds or small mammals. Through much of the North American range Sharp-shinned Hawks are partial, sometimes long-distance migrants (>1,500km). During fall, migrating individuals are first seen at migration count sites between early August and mid-September.

Impact Assessment

There is no breeding record for Sharp-shinned Hawks in the SSHCP Study Area. Christmas Bird Counts from 1994 to 2004 show that Sharp-shinned Hawks are found within and around the Study Area during the winter, with an average of 29 birds per year. Individuals have been noted at the Cosumnes River Preserve. In general, the overall distributions of Sharp-shinned Hawk Populations are not well known. However, it is anticipated that SSHCP compliance monitoring surveys will expand upon and refine Sharp-shinned Hawk occurrence and habitat distribution information.

Take estimates for Sharp-shinned Hawk are based on projected take of seven habitat cover-types associated with the species, Blue Oak Woodland, Cottonwood Woodland, Eucalyptus Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Orchards, and Valley Oak Riparian Woodland located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 2,500 acres of habitat for Sharp-shinned Hawk.

Take and Preserve Estimates for Sharp-shinned Hawk By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Eucalyptus Woodland	7	0
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Orchards	309	0
Valley Oak Riparian Woodland	0	40
Total	2,500	5,957

Short-eared Owl

Ecology

Short-eared Owls are found in open country. They occur in grassland, freshwater marsh, coastal saltmarsh, and agricultural habitats; and they are closely associated with their small mammal prey, particularly voles. The SSHCP Study Area is located at the southern breeding limit for Short-eared Owls, which principally serves as habitat during migration and winter.

Impact Assessment

Short-eared Owls are rarely known to nest in the SSHCP Study Area but they have been found nesting at the Cosumnes River Preserve. It is assumed that nesting could occur in suitable habitat in the SSHCP Study Area given that regular nesting has been documented nearby in Yolo County. In winter, Short-eared Owls are generally rare, but are regularly observed at the Bufferlands and Cosumnes River Preserve. It is anticipated that future monitoring and preserve efforts will reveal a greater Short-eared Owl population in the Study Area.

Take estimates for Short-eared Owl are based on projected take of seven habitat cover-types associated with the species, Annual Grassland, Cropland, Freshwater Marsh, Irrigated Pasture, Savannah, Seasonal Wetlands, and Vernal Pool Grasslands located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 42,413 acres of habitat for Short-eared Owl.

Take and Preserve Estimates for Short-eared Owl By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture Grassland	2,424	2,424
Savannah	63	1,563
Seasonal Wetlands	71	213
Vernal Pool Grassland	20,037	31,638
Total	42,413	53,239

Swainson’s Hawk

Ecology

Swainson’s Hawks utilize mature trees of large stature that provide security and vantage. They can tolerate human activity around nests but in such cases trees must be exceptionally tall with the nests in impregnable situations. Hay, row and field crops are essential foraging habitats. Alfalfa, due to ample prey availability during harvest and irrigation, is highly favorable. Perennial structure crops (orchards, vineyards) exclude foraging. Cotton, rice, safflower, are also unsuitable

Impact Assessment

Swainson’s Hawk is one of only a few SSHCP covered species for which relatively good occurrence data exists. As such the SSHCP has a relatively accurate depiction of the where the birds nest and forage within the SSHCP Study Area. Swainson’s Hawks nest primarily along riparian corridors but are also frequently discovered nesting in isolated stands of

trees adjacent to agricultural operations or large grassland areas throughout the SSHCP Study Area. Likewise the hawks utilize a vast area of a myriad of habitat cover-types for foraging within the SSHCP Study Area.

Take estimates for Swainson’s Hawk are based on projected take of 13 habitat cover-types associated with the species, Annual Grassland, Blue Oak Woodland, Cottonwood Woodland, Cropland, Eucalyptus Woodland, Irrigated Pasture Grassland, Mixed Riparian Scrub, Mixed Riparian Woodland, Savannah, Seasonal Wetlands, Swale, Vernal Pool and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 44,974 acres of habitat for Swainson’s Hawk.

Take and Preserve Estimates for Swainson’s Hawk By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Cropland	10,537	12,284
Eucalyptus Woodland	7	0
Irrigated Pasture Grassland	2,424	2,424
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Savannah	63	1,563
Seasonal Wetlands	71	213
Swale	239	478
Vernal Pool	210	930
Vernal Pool Grassland	20,037	24,638
Total	44,974	53,048

Tricolored Blackbird

Ecology

In California, Tricolored Blackbirds use a matrix of rangeland and agricultural lands for foraging habitat. Tricolored Blackbirds have three basic requirements for selecting their breeding colony sites: a protected nesting substrate, including either flooded, thorny, spiny, or “visually” but not actually spiny vegetation; a suitable foraging space providing adequate insect prey within a few miles of the nesting colony; and open accessible water. In the SSHCP Study Area, Tricolored Blackbirds primarily use Himalayan Blackberry thickets for a nesting substrate.

Impact Assessment

Tricolored Blackbird is one of only a few SSHCP covered species for which relatively good occurrence data exists. As such the SSHCP has a relatively accurate depiction of where the birds nest and forage within the SSHCP Study Area. It should be noted however, that Tricolored Blackbirds are nomadic by nature. Breeding colonies are often in different locations each year, so this Plan must assume that the species is utilizing a vast portion of the SSHCP Study Area. Tricolored Blackbird prefers to nest in areas with heavy vegetated cover, usually near or within a water source, such as Freshwater Marsh or Blackberry thickets. These birds utilize various cover-types for foraging throughout the SSHCP Study Area.

Take estimates for Tricolored Blackbird are based on projected take of 10 habitat cover-types associated with the species, Annual Grassland, Blue Oak Woodland, Cropland, Freshwater Marsh, Irrigated Pasture Grassland, Savannah, Seasonal Wetlands, Swale, Vernal Pool and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 43,013 acres of habitat for Tricolored Blackbird.

Take and Preserve Estimates for Tricolored Blackbird By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Blue Oak Woodland	51	2,551
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture Grassland	2,424	2,424
Savannah	63	1,563
Seasonal Wetlands	71	210
Swale	239	478
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	43,013	57,500

Western Burrowing Owl

Ecology

Burrowing Owls use a matrix of grassland and agricultural lands. Throughout their life cycle, Burrowing Owls require habitat with three basic attributes: open, well-drained terrain (outside of areas that are at risk of flooding); short, sparse vegetation; and underground burrows or burrow facsimiles. Also, the availability of perches or other vantage points (e.g., topographic variation, etc.) may enhance habitat suitability.

Western Burrowing Owls are closely associated with California Ground Squirrel colonies; they most commonly live in natural tunnels created by California Ground Squirrels.

Burrowing Owl colonies typically occur in areas of soil disturbance or topographic breaks; they often occur in ruderal/ disturbed lands and habitat edges.

Impact Assessment

Known Western Burrowing Owl use in the SSHCP Study Area primarily occurs within urban areas where disturbances have occurred but are also adjacent to open areas where prey is available. This is evidenced by long standing recorded occurrences of Western Burrowing Owl in locations that exhibit the aforementioned characteristics such as Mather Field, Sacramento Executive Airport, Sacramento Army Depot and the Campbell Soup Plant.

Take estimates for Western Burrowing Owl are based on projected take of four habitat cover-types associated with the species, Annual Grasslands, Croplands, Irrigated Annual Grasslands and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 42,200 acres of habitat for Western Burrowing Owl.

Take and Preserve Estimates for Western Burrowing Owl By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Cropland	10,537	12,484
Irrigated Pasture Grassland	2,424	2,424
Vernal Pool Grassland	20,037	31,638
Total	42,200	51,147

White-faced Ibis

Ecology

During migration, White-faced Ibis are found using agriculture fields (e.g., alfalfa, pasture, rice) with low growing vegetation that have saturated soils from rains or flooded irrigation. Suitable breeding habitat is characterized by marshes with emergent vegetation and shallow flooding. They regularly reuse breeding and wintering areas but wander depending on water conditions and food availability. White-faced Ibis roost during the night in protected wetland areas that are extensively flooded and provide protection, presumably from mammalian predators.

Impact Assessment

White-faced Ibis are regularly observed in the SSHCP Study Area at the Cosumnes River Preserve and at the Bufferlands during migration. They are generally observed in small flocks during the months of April, May, August, and September. No breeding records

have been reported in the SSHCP Study Area however, and the nearest nesting colony to the SSHCP Study Area is just north of the Yolo Basin Wildlife Area (YBWA). Populations of White-faced Ibis are increasing in the Central Valley and new breeding locations in suitable habitat within the SSHCP Study Area are likely.

Land-cover types used by White-faced Ibis, such as Cropland, Freshwater Marsh, Irrigated Pasture, Mixed Riparian Scrub and Seasonal Wetlands, occur throughout much of the Central Valley and are well represented in the SSHCP Study Area. However, because comprehensive surveys or monitoring efforts for White-faced Ibis in the SSHCP Study Area have not been conducted, and because the existing data of known occurrences are based mostly on incidental observations or limited surveys, the population size of this species in the SSHCP Study Area is not known. It is anticipated that future monitoring and preserve efforts will reveal a greater White-faced Ibis population in the Study Area.

Take estimates for White-faced Ibis are based on projected take of five habitat cover-types associated with the species, Cropland, Freshwater Marsh, Irrigated Pasture, and Seasonal Wetlands located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 13,153 acres of habitat for White-faced Ibis.

Take and Preserve Estimates for White-faced Ibis By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture	2,424	2,424
Mixed Riparian Scrub	42	210
Seasonal Wetlands	71	213
Total	13,153	15,647

White-tailed Kite

Ecology

White-tailed Kites breed and winter in the SSHCP Study Area. Nests can be found in isolated trees, but are more often associated with small or medium size riparian woodlands with associated grasslands, irrigated pastures, or cultivated crops such as alfalfa and sugar beets. A few White-tailed Kites are known to nest in urban and suburban areas. The breeding season for White-tailed Kite is generally March to August, with fledging occurring as late as October and generally occurs in areas that receive minimal disturbance during nesting. The occurrence and abundance of White-tailed Kites during the breeding and non-breeding seasons are strongly affected by the dynamics of local rodent prey populations which constitute the majority of their diet (> 95%).

Impact Assessment

White-tailed Kites occur in suitable habitat within the SSHCP Study Area. They are known to nest or forage throughout the Study Area in locations including Mather Lake, Mather Regional Park, Laguna Creek, Morrison Creek and adjacent lands, the Cosumnes River corridor, TNC’s Howard Ranch, and are suspected to nest at Stone Lakes National Wildlife Refuge.

It is important to note that the above areas constitute a subset of the potential habitat available to White-tailed Kites for nesting and foraging given that land-cover types used by White-tailed Kites, such as Annual Grassland, Blue Oak Woodland, Cottonwood Woodland, Cropland, Freshwater Marsh, Irrigated Pasture, Mixed Riparian Scrub, Mixed Riparian Woodland, Savannah, Seasonal Wetlands, Valley Oak Riparian Woodland, and Vernal Pool Grassland occur throughout most of the SSHCP Study Area. Additionally, the overall population size and distribution of White-tailed Kite is not well known due to lack of comprehensive surveys for White-tailed Kite. It is anticipated that future monitoring and preserve efforts will reveal a greater White-tailed Kite population in the Study Area.

Take estimates for White-tailed Kite are based on projected take of eleven habitat cover-types associated with the species, Annual Grassland, Blue Oak Woodland, Cottonwood Woodland, Cropland, Freshwater Marsh, Irrigated Pasture, Mixed Riparian Scrub, Mixed Riparian Woodland, Savannah, Seasonal Wetlands, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12 (see Figure 3). SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 44,597 acres of habitat for White-tailed Kite.

Take and Preserve Estimates for White-tailed Kite By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Cropland	10,537	12,484
Freshwater Marsh	79	316
Irrigated Pasture	2,424	2,424
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Savannah	63	1,563
Seasonal Wetlands	71	213
Vernal Pool Grassland	20,037	31,638
Total	44,597	59,196

Yellow-breasted Chat

Ecology

Yellow-breasted Chats migrate from North America to Central America during winter. Fall migration begins in August and Chats return to breeding areas in late April. Breeding habitat is characterized as dense riparian thickets of willows, vine tangles, and brush associated with streams, swampy ground, and the borders of small ponds. Chats are frequently associated with Himalayan blackberry (*Rubus discolor*) patches. Yellow-breasted Chats forage by gleaning insects from vegetation or from the ground feeding on insects, fruits, and berries, while nestlings are fed larval and adult insects.

Impact Assessment

Yellow-breasted Chats occur regularly in suitable habitat during migration within the SSHCP Study Area; but they are not known to regularly breed there. The highest quality habitat for Chats is located at the Cosumnes River Preserve and sightings have been noted at the SRCSD Bufferlands. However, the overall distribution, abundance, and population structure of Yellow-breasted Chats are not well studied or known. It is anticipated that future monitoring and preserve efforts will reveal a greater Yellow-breasted Chat population in the Study Area.

Take estimates for Yellow-breasted Chat are based on projected take of three habitat cover-types associated with the species, Cottonwood Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland, located within Zones 1, 2, 3, 4, 5 and 12 (see Figure 2 above). SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 2,133 acres of habitat for Yellow-breasted Chat.

Take and Preserve Estimates for Yellow-breasted Chat By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Cottonwood Woodland	2,071	500
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Valley Oak Riparian Woodland	0	40
Total	2,133	3,406

5.5.3 Invertebrates

Mid-Valley Fairy Shrimp

Ecology

This species is entirely dependant upon the aquatic environment provided by vernal pool wetland ecosystems. The Mid-Valley Fairy Shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependant upon intact sub-watersheds, and the surrounding uplands that support those watersheds.

Impact Assessment

A majority of Mid-Valley Fairy Shrimp occurrences have been recorded in the western portion of the SSHCP Study Area near the Cities of Sacramento and Elk Grove, but this could be an anomaly as this species has not been targeted for surveys in the past. Recent surveys of locations in the southern portion of the Study Area have found occurrences of Mid-Valley Fairy Shrimp and it is likely that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species. Since tracking and counting every individual population or occurrence is not practical for this species the SSHCP will assume, for purposes of estimating take, that all vernal pool wetland habitat is occupied by Mid-Valley Fairy Shrimp.

Take estimates for Mid-Valley Fairy Shrimp are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Vernal Pool Tadpole Shrimp.

Take and Preserve Estimates for Mid-Valley Fairy Shrimp By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,889

Ricksecker’s Water Scavenger Beetle

Ecology

This species is entirely dependant upon the aquatic environment provided by vernal pool wetland ecosystems. The Ricksecker’s Water Scavenger Beetle depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependant upon intact sub-watersheds, and the surrounding uplands that support those watersheds.

Impact Assessment

All Ricksecker’s Water Scavenger Beetle occurrences recorded within the SSHCP Study Area are located on Mather Filed and Rancho Seco Park. The lack of recorded occurrences makes it difficult to estimate the distribution of this species. The paucity of occurrence data is likely due to a lack of survey effort and should not be interpreted to imply extremely low population levels. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species. Since tracking and counting every individual population or occurrence is not practical for this

species the SSHCP will assume, for purposes of estimating take, that all vernal pool wetland habitat is occupied by Ricksecker’s Water Scavenger Beetle.

Take estimates for Ricksecker’s Water Scavenger Beetle are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Vernal Pool Tadpole Shrimp.

Take and Preserve Estimates for Ricksecker’s Water Scavenger Beetle By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,889

Valley Elderberry Longhorn Beetle

Ecology

The species completes its entire life cycle on and within elderberry bushes. Adult beetles forage on the leaves of elderberry bushes and lay their eggs within crevices in the bark. Upon hatching, the larval beetles bore into the center of the elderberry stems where they consume the elderberry pith. After one to two years, the larvae transform to adult beetles and bore exit holes.

Elderberry bushes can be found in a variety of habitats including cottonwood woodland, valley oak riparian woodland, mixed riparian scrub, and mixed riparian woodland.

Impact Assessment

In the SSHCP Study Area, VELB occurrences correlate to the presence of elderberry bushes within riparian and woodland habitats. Specific estimates of the number of elderberry bushes impacted are not calculated due to the variability of elderberry densities in each cover-type and individual project sites and lack of available elderberry mapping within these habitat cover-types.

Take estimates for VELB are based on the projected take of four cover-types associated with the species in Zones 1, 2, 3, 4, 5, and 12. The four habitat cover-types include Cottonwood Woodland, Valley Oak Riparian Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland. Based on these assumptions, the expansion of urban development, infrastructure improvements, reclamation of mine tailings or collection of mine tailing by mining operators in the Cities of Elk Grove, Galt, Rancho Cordova and the unincorporated County will impact an estimated 2,133 acres of VELB habitat within

the study area. Figure 3 depicts the habitat cover-types that may be potentially available for take within the SSHCP Study Area.

Take and Preserve Estimates for Valley Elderberry Longhorn Beetle By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Cottonwood Woodland	2,071	500
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Valley Oak Riparian Woodland	0	40
Total	2,133	3,406

Vernal Pool Fairy Shrimp

Ecology

This species is entirely dependant upon the aquatic environment provided by vernal pool wetland ecosystems. The Vernal Pool Fairy Shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependant upon intact sub-watersheds, and the surrounding uplands that support those watersheds.

Impact Assessment

Vernal Pool Fairy Shrimp occur in nearly every location where vernal pool complexes are found. This is evidenced by examining comprehensive invertebrate surveys that have been conducted on the Sunrise-Douglas Specific Plan Area, existing mitigation and conservation banks, Mather Field, and properties owned by the Sacramento Valley Conservancy. These surveys found that a significant number of pools exhibited presence for the species. In addition since tracking and counting of individual populations or occurrences is not practical for this species the SSHCP will assume that all vernal pool wetland habitat is occupied by Vernal Pool Fairy Shrimp.

Take estimates for Vernal Pool Fairy Shrimp are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and the unincorporated County will impact approximately 20,347 acres of habitat for VPFS.

Take and Preserve Estimates for Vernal Pool Fairy Shrimp By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,889

Vernal Pool Tadpole Shrimp

Ecology

This species is entirely dependant upon the aquatic environment provided by vernal pool wetland ecosystems. The Vernal Pool Tadpole Shrimp depends upon the presence of water in the winter and early spring and the absence of water during the summer. These specific vernal pool wetlands are dependant upon intact sub-watersheds, and the surrounding uplands that support those watersheds.

Impact Assessment

Vernal Pool Tadpole Shrimp occur in nearly every location where vernal pool complexes are found. This is evidenced by examining comprehensive invertebrate surveys that have been conducted on the Sunrise-Douglas Specific Plan Area, existing mitigation and conservation banks, Mather Field, and properties owned by the Sacramento Valley Conservancy. These surveys found that a significant number of pools exhibited presence for the species. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species. Since tracking and counting every individual population or occurrence is not practical for this species the SSHCP will assume, for purposes of estimating take, that all vernal pool wetland habitat is occupied by Vernal Pool Tadpole Shrimp.

Take estimates for Vernal Pool Tadpole Shrimp are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Vernal Pool Tadpole Shrimp.

Take and Preserve Estimates for Vernal Pool Tadpole Shrimp By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,889

5.5.4 Mammals

American Badger

Ecology

American Badger occurs in a variety of open habitats, including grasslands, shrublands, savannahs, and meadows. They are mostly carnivorous and prey primarily on fossorial (i.e., digging) mammals, especially ground squirrels and pocket gophers. Badgers mate in

summer and early fall and young are born in March to early April in burrows and juveniles disperse 3-4 months later.

Impact Assessment

The SSHCP Study Area is positioned within American Badger’s California range; and Badgers have been documented in the northeastern portion of the study area as well as at the Cosumnes River Preserve. However, their overall distribution, abundance, and population structure are not well known. Land-cover types used by Badgers, such as Annual Grassland, Savannah, and Vernal Pool Grassland occur throughout the SSHCP Study Area and it is anticipated that future monitoring and preserve efforts will reveal a greater American Badger population in the Study Area.

Take estimates for American Badger are based on projected take of three habitat cover-types associated with the species, Annual Grasslands, Savannah, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 29,302 acres of habitat for American Badger.

Take and Preserve Estimates for American Badger By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Savannah	63	1,563
Vernal Pool Grassland	20,037	31,638
Total	29,302	37,802

Pallid Bat

Ecology

The Pallid Bat is found in arid vegetation communities. The Pallid Bat day roosts in oak tree hollows, the expansion joints and internal compartments of concrete bridges, in spaces in between beams in wooden bridges, and in abandoned or little-used structures. Water features are also vital habitat component to habitat structure because bats often drink immediately after emergence.

The Pallid Bat is adapted for picking off (gleaning) insects from the surfaces of vegetation and the ground. Studies have shown that they generally feed within 3-4 miles of their roost, and regularly occupy the same feeding area.

In April pregnant females gather in maternity colonies and normally give birth to twin young in May or June. Pallid Bat pups are weaned between 6 to 8 weeks of age. It is generally known that Pallid Bats are very sensitive to disturbance at maternity colonies. In

winter the Pallid Bat hibernates but periodically arouses to forage and drink. If bats are disturbed while torpid they must arouse physiologically (burning fat reserves) to respond.

Impact Assessment

Specific information on the distribution of Pallid Bat within the Study Area is not available except for one acoustic record from Deer Creek Hills Preserve (Ramones pers. comm. 2003). Six other specimens have been collected and reported as occurring within the City of Sacramento, Sacramento County, Wilton and Fair Oaks. These specimens included females and immature bats which indicates that reproductive populations are present in the County. For the purposes of the conservation, potential habitat is presumed likely to have occurrences and it is anticipated that SSHCP compliance monitoring surveys will expand upon and refine Pallid Bat occurrence and habitat distribution information.

Take estimates for Pallid Bat are based on projected take of twelve habitat cover-types associated with the species, Annual Grassland, Blue Oak Woodland, Cottonwood Woodland, Cropland, Eucalyptus Woodland, Freshwater Marsh, Irrigated Pasture, Mixed Riparian Scrub, Mixed Riparian Woodland, Savannah, Seasonal Wetlands, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12 (see Figure 2). SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 44,533 acres of habitat for Pallid Bat.

Take and Preserve Estimates for Pallid Bat By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Cropland	10,537	12,484
Eucalyptus Woodland	7	0
Freshwater Marsh	79	316
Irrigated Pasture	2,424	2,424
Open Water	317	634
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Savannah	63	1,563
Seasonal Wetlands	71	213
Valley Oak Riparian Woodland	0	40
Vernal Pool Grassland	20,037	31,638
Total	44,533	59,196

Ringtail

Ecology

Ringtails occur in California’s Central Valley strongly associated with riparian forests. They are primarily carnivorous and mainly eat rodents (woodrats and mice) and rabbits. Ringtails are territorial and mark their home ranges, which have been estimated at 100-1000+acres, with urine and feces. The breeding season for Ringtail is generally February to June and they nest in logs, hollow trees, abandoned burrows, or woodrat nests.

Impact Assessment

Occurrence information for Ringtail, not only in Sacramento County but in the State as a whole, is very limited. However, Ringtails are known to occur almost exclusively in Mixed Riparian Woodlands, a habitat cover-type that is well represented in the SSHCP Study Area.

Take estimates for Ringtail are based on projected take of one habitat cover-type associated with the species, Mixed Riparian Woodland located within Zones 1, 2, 3, 4, 5 and 12 (see Figure 1). SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 20 acres of habitat for Ringtail.

Take and Preserve Estimates for Ringtail By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Mixed Riparian Woodland	20	2,656
Valley Oak Riparian Woodland	0	40
Total	20	2,696

Western Red Bat

Ecology

The Western Red Bat occurs primarily in the low and middle elevations in broadleaf tree communities. They roost in the foliage of large shrubs and trees in habitats bordering forests, riparian, agricultural, and urban areas where they forage in and amongst vegetation for insects. Water features are a vital habitat component because bats often drink immediately after emergence and water is an important source and concentration site for insects. Pups are born from late spring to early summer and are weaned between 6 to 8 weeks of age. This species makes north-south migrations in spring and fall that may be hundreds of miles.

Impact Assessment

While precise occurrence information for Western Red Bat is lacking, over 30 Western Red Bats have been documented from localities in and around the SSHCP Study Area. Furthermore, many of the cover types found in the SSHCP Study Area are likely to provide

habitat for the Western Red Bat and it is anticipated that future monitoring and preserve efforts will reveal a greater Western Red Bat population in the Study Area.

Take estimates for Western Red Bat are based on projected take of four habitat cover-types associated with the species, Blue Oak Woodland, Cottonwood Woodland, Mixed Riparian Scrub, and Mixed Riparian Woodland located within Zones 1, 2, 3, 4, 5 and 12. SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 2,184 acres of habitat for Western Red Bat.

Take and Preserve Estimates for Western Red Bat By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Valley Oak Riparian Woodland	0	40
Total	2,184	5,957

Yuma Myotis Bat

Ecology

The Yuma Myotis Bat is found in a wide variety of habitats with open water nearby. This species is closely associated with water (both roosting and foraging habitat) more so than any other North American bat. The Yuma Myotis is nocturnal and emerges after sunset to forage for insects. This species is known for foraging directly over water surfaces where the water is calm and slow-moving up to 6 km from the day roost and returning to the same foraging area every night. In April and May pregnant females gather in maternity colonies and normally give birth to a single pup in May or June. The pup is weaned between 4 to 5 weeks of age.

Impact Assessment

Over 30 Yuma Myotis were reported from localities as broad as the city of Sacramento, Wilton, Galt, Hood, Elk Grove, and Herald. However, these specimens included females and immature bats indicating reproductive populations are present in high quality habitat. The Yuma Myotis is also known to occur at the Cosumnes River Preserve and it is thought that many of the cover types found in the SSHCP Study Area may provide habitat for the Yuma Myotis Bat if roosting and foraging needs are met.

Take estimates for Yuma Myotis Bat are based on projected take of nine habitat cover-types associated with the species, Annual Grassland, Blue Oak Woodland, Cottonwood Woodland, Mixed Riparian Scrub, Mixed Riparian Woodland, Savannah, Seasonal

Wetlands, and Vernal Pool Grassland located within Zones 1, 2, 3, 4, 5 and 12 (see Figure 2). SSHCP covered activities within the Cities of Rancho Cordova, Elk Grove, Galt, and the unincorporated County will impact approximately 31,636 acres of habitat for Pallid Bat.

Take and Preserve Estimates for Yuma Myotis Bat By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Annual Grassland	9,202	4,601
Blue Oak Woodland	51	2,551
Cottonwood Woodland	2,071	500
Freshwater Marsh	79	316
Open Water	317	634
Mixed Riparian Scrub	42	210
Mixed Riparian Woodland	20	2,656
Savannah	63	1,563
Seasonal Wetlands	71	213
Valley Oak Riparian Woodland	0	40
Vernal Pool Grassland	20,037	31,638
Total	31,953	44,922

5.5.5 Plants

Ahart’s Dwarf Rush

Ecology

Impact Assessment

Most of this text says Dwarf Downingia. I do not know whether you just need to change the name or whether the data etc is that for DW

Dwarf Downingia occurs in the southern portion of the SSHCP Study Area within the City of Elk Grove and the unincorporated County. Within the SSHCP study area there are only five known occurrences of which all but two are located within a proposed preserve. Owing to the extreme rarity of this species, the SSHCP will not cover take for Dwarf Downingia unless additional populations are located. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species.

Take estimates for Dwarf Downingia are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12 (See Figure 3). In addition take of occurrences will be

authorized under the SSHCP once a total of 10 occurrences have been protected within preserves controlled by the SSHCP implementing entity. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Dwarf Downingia.

Take and Preserve Estimates for Ahart’s Dwarf Rush By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,878

Boggs Lake Hedge-Hyssop

Ecology

Impact Assessment

Boggs Lake Hedge-Hyssop is broadly distributed throughout the SSHCP Study Area. Within the SSHCP Study Area there are 10 known occurrences of which three are located within an existing preserve. Owing to the extreme rarity of this species, the SSHCP will not cover take for Boggs Lake Hedge-Hyssop unless additional populations are located and protected. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species.

Take estimates for Boggs Lake Hedge-Hyssop are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12 (See Figure 3). In addition take of occurrences will be authorized under the SSHCP once a total of 10 occurrences have been protected within preserves controlled by the SSHCP implementing entity. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Boggs Lake Hedge-Hyssop.

Take and Preserve Estimates for Boggs Lake Hedge Hyssop By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,878

Dwarf Downingia

Ecology

Impact Assessment

[See Ahart's Dwarf Rush comment.](#)

Dwarf Downingia occurs in the southern portion of the SSHCP Study Area within the City of Elk Grove and the unincorporated County. Within the SSHCP study area there are only five known occurrences of which all but two are located within an existing preserve. Owing to the extreme rarity of this species, the SSHCP will not cover take for Dwarf Downingia unless additional populations are located and protected. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species.

Take estimates for Dwarf Downingia are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located within Zones 1, 2, 3, 4, 5 and 12 (See Figure 3). In addition take of occurrences will be authorized under the SSHCP once a total of 10 occurrences have been protected within preserves controlled by the SSHCP implementing entity. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Dwarf Downingia.

Take and Preserve Estimates for Dwarf Downingia By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,878

Pincushion Navarretia

Ecology

Impact Assessment

Pincushion Navarretia occurs in the south eastern portion of the SSHCP Study Area within the unincorporated County. Within the SSHCP study area there are only four known occurrences of which all are located within an existing preserve. Owing to the extreme rarity of this species, the SSHCP will not cover take for Pincushion Navarretia unless additional populations are located and protected. It is anticipated that additional occurrences will be found as preliminary preserve acquisition surveys begin to target this species.

Take estimates for Pincushion Navarretia are based on projected take of two habitat cover-types associated with the species, Vernal Pools and Vernal Pool Grasslands that are located

within Zones 1, 2, 3, 4, 5 and 12 (See Figure 3). In addition take of occurrences will be authorized under the SSHCP once a total of 10 occurrences have been protected within preserves controlled by the SSHCP implementing entity. SSHCP covered activities within the Cities of Elk Grove, Galt, Rancho Cordova and within the unincorporated County will impact approximately 20,347 acres of habitat for Pincushion Navarretia.

Take and Preserve Estimates for Pincushion Navarretia By Habitat Cover-Type:

Cover-Type	Total Take By Cover-Type (Acres)	Total To Be Preserved By Cover-Type (Acres)
Vernal Pool	310	1,240
Vernal Pool Grassland	20,037	31,638
Total	20,347	32,878

Sacramento Orcutt Grass

Ecology

Sacramento Orcutt Grass requires deep vernal pools with long ponding durations. Ponding must be of sufficient duration and under the appropriate seasonal temperature regime to release the seeds from dormancy through decomposition of maternal floral structures in the presence of a symbiotic aquatic fungus. This species often grows in comparatively barren areas within deeper portions of vernal pools.

Impact Assessment

Sacramento Orcutt Grass is indigenous to eastern Sacramento County. The occurrences within the SSHCP study area represent the extent of the species southern, eastern and western range. Within the SSHCP study area there are only seven known occurrences of which all but two are located within existing preserves. Owing to the extreme rarity of this species, the SSHCP will not cover take of Sacramento Orcutt Grass and will require the protection of all remaining unprotected occurrences whether known or unknown.

Slender Orcutt Grass

Ecology

Slender Orcutt Grass requires deep vernal pools with long ponding durations. Of the genus *Orcuttia*, Slender Orcutt Grass does appear to occupy the widest range of vernal pool sizes and types. Ponding must be of sufficient duration and under the appropriate seasonal temperature regime to release seeds from dormancy through decomposition of maternal floral structures in the presence of a symbiotic aquatic fungus. His species often grows in comparatively barren areas within deeper portions of vernal pools

Impact Assessment

Slender Orcutt Grass occurs in the eastern portion of the SSHCP Study Area within the City of Rancho Cordova and the unincorporated County. These occurrences represent the southern most extent of the species range. Within the SSHCP study area there are only three known occurrences of which all but one is located within a proposed preserve. Owing to the extreme rarity of this species, the SSHCP will not cover take for Slender Orcutt Grass and will require the protection of all remaining unprotected occurrences whether known or unknown.