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4.4 BIOLOGICAL RESOURCES

This section evaluates the potential effects of implementation of the 2003 LRDP on biological resources on the campus as well as the project's contribution to cumulative impacts on biological resources in the region. Biological resources include all flora, fauna, and associated habitats (including wetlands) that would be affected by project implementation.

In the impact assessment that follows, the term "campus" refers to the 3,700-acre main campus and the 1,600-acre Russell Ranch.

In response to the Notice of Preparation (See Appendix A), the concern was raised regarding considering the walnut trees along Russell Boulevard in any development along that road. This concern is addressed in the analysis below.

4.4.1 Environmental Setting

4.4.1.1 Regional Setting

The campus is located in a region composed primarily of active and fallow agricultural lands that include remnant riparian (streamside) and urban areas. Agricultural lands provide habitat for a variety of resident and migratory wildlife species that are capable of exploiting the various crop types and cycles of cultivation for their survival. Within the areas of active fields, some fallow lands and unmaintained field edges support annual grasses and forbs (herbaceous broad-leaved plants) and are an important habitat element that provides food and cover for resident and migratory wildlife.

Numerous species can also be found using landscape plantings, tree-lined streets and other roadside vegetation, and vacant lots in the urban and rural areas associated with the cities, towns, and farms in the region. Riparian corridors in the region, dominated by native trees and shrubs, provide essential habitat elements (food, water, thermal and nesting cover, and movement corridors) for an abundance of wildlife species. Compared to highly modified agricultural lands, the habitat provided by the remaining riparian corridors makes them perhaps the most significant contributor to wildlife habitat throughout the region.

4.4.1.2 Campus Setting

The 5,300-acre campus typifies the regional landscape described above. The west campus and the Russell Ranch are dominated by agricultural lands adjacent to the Putah Creek riparian corridor. The central campus, the eastern portion of the south campus, and clusters of facilities on the west campus are largely developed with buildings, roads, and a landscaped environment of managed ornamental plantings. Additional lands in South Davis Research Park and elsewhere in the City of Davis are composed primarily of teaching and research facilities surrounded by fallow, disked fields and urban development.

The campus Arboretum along the Arboretum Waterway and the landscaped environment of the central campus, while managed for ornamental plant species, still provide for many native plant and wildlife species on campus. A portion of the North Fork Cutoff on the west campus is used as an intense pasture for sheep and cattle and still supports a few old and declining trees from the

time approximately 125 years ago when it was a riparian habitat along the main Putah Creek stream course.

The west campus and the western portion of the south campus are agricultural lands used primarily for agricultural and environmental teaching and research, and for food production for campus livestock. The Russell Ranch agricultural lands, with the exception of approximately 100 acres used as research for long-term sustainable agricultural by the campus, are currently leased for agricultural production. As such, Russell Ranch lands are subject to typical crop rotations and regular seasonal cultivation practices. On the west and south campus, research fields typically are managed more intensely than fields used for commercial production and are subdivided into small research plots. For example, tillage on research and teaching fields is not limited to that needed to farm but includes tillage to teach and research principles beyond basic productivity.

4.4.1.3 *Habitat Types*

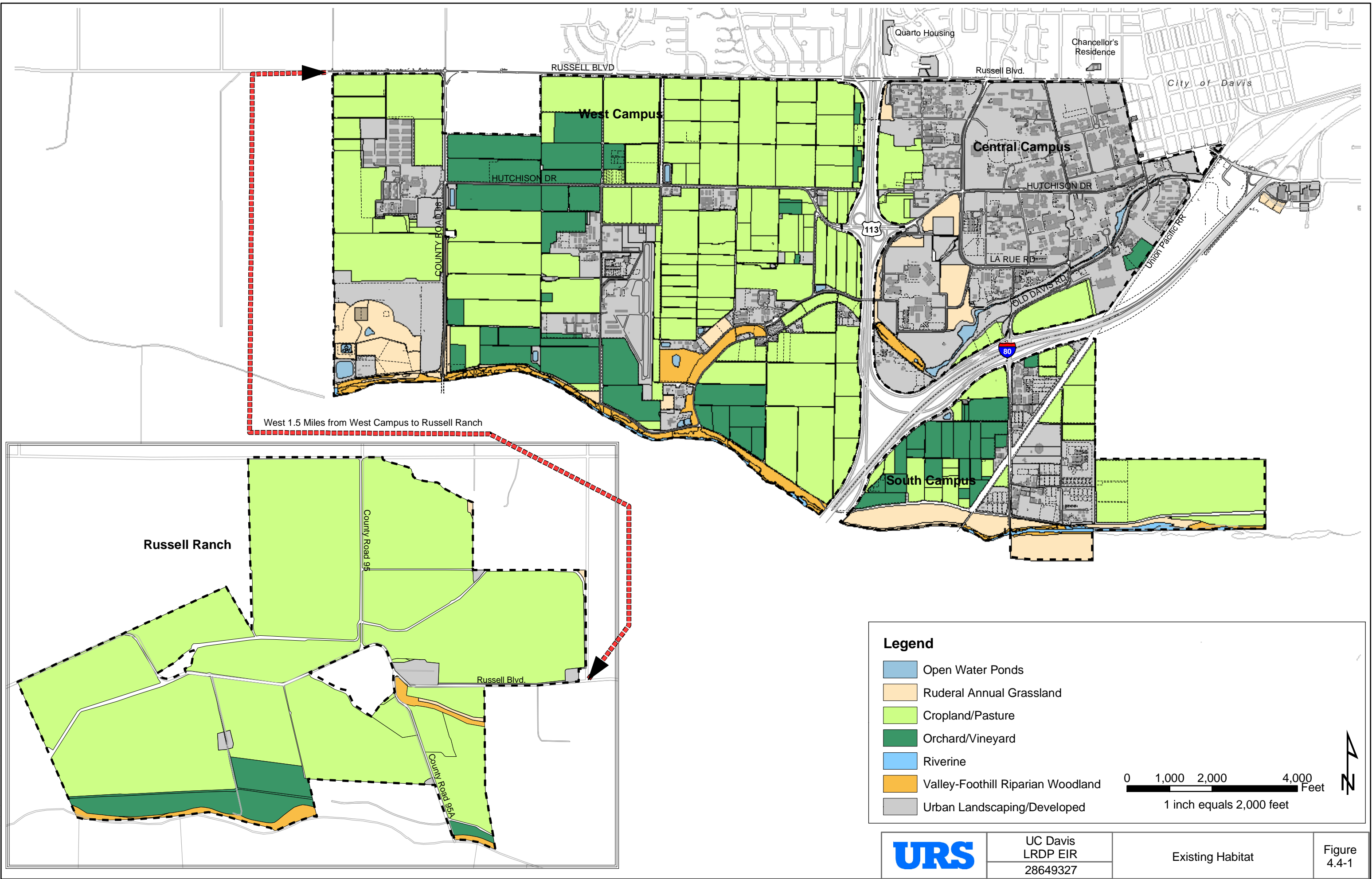
The habitat types within the project area can be described as Agricultural Lands (including Cropland/Pasture, and Orchard/Vineyard), Valley-Foothill Riparian Woodland, Ruderal/Annual Grassland, Open Water Ponds, Riverine, and Urban Landscaping/Developed as defined by the Wildlife Habitat Relationship System (WHR). The WHR is operated and maintained by the California Department of Fish and Game in cooperation with the California Interagency Wildlife Task Group. Its aim is to provide information to wildlife managers on the likely occurrence of wildlife species on different habitats. The WHR defines habitats based on the composition and structure of the dominant vegetation of any given area and provides generalized information pertaining to wildlife value and use of these habitat types.

The following descriptions of habitat types on the campus reference habitat values relative to each habitat type. For the purposes of this evaluation, habitat values are based on the condition of a parcel of land to provide essential habitat elements that are used by wildlife for all or a part of their life cycles. Key habitat elements contributing to habitat values include: the abundance and availability of food and water, corridors for migration and dispersal, and escape, nesting, and thermal cover. Parcels with more of these elements can be considered to be of a higher habitat value for wildlife. For example, an active agricultural field provides food and cover for rodents and foraging habitat for raptors with little cover for nesting, movement, or escape (low to moderate values for wildlife); whereas a riparian corridor would support virtually all of the elements described above and is considered to have a high value for wildlife.

The following are brief descriptions of the composition, structure, wildlife value, and location of these habitat types on the campus. Figure 4.4-1 illustrates the location and extent of the habitat types on the campus. Table 4.4-1 presents total campus acreage by habitat type as it existed in 2001-02 and assuming full development under the 2003 LRDP.

Agricultural Lands. Agricultural lands comprise approximately 3,500 acres of campus lands and include two habitat/cover types. These are: (1) Cropland/Pasture habitat composed of an annual herbaceous plant species cover type, and (2) Orchard/Vineyard habitat composed of a perennial woody plant species cover type. Agricultural lands are found primarily on the west and south campus, and on the Russell Ranch. The distribution of these agricultural cover types throughout the campus varies depending on current research projects.

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Legend

- Open Water Ponds
- Ruderal Annual Grassland
- Cropland/Pasture
- Orchard/Vineyard
- Riverine
- Valley-Foothill Riparian Woodland
- Urban Landscaping/Developed

0 1,000 2,000 4,000 Feet
1 inch equals 2,000 feet

**Table 4.4-1
Habitat Acreages on the UC Davis Campus**

Habitat Type	Existing 2001-02	2003 LRDP	Change
Cropland/Pasture	2,949	2,466	-483
Orchard/Vineyard	529	493	-35
Ruderal/Annual Grassland	204	175	-30
Valley-Foothill Riparian Woodland	126	126	0
Riverine Habitat	20	20	0
Open Water Ponds	22	22	0
Urban Landscaping/Developed	1,424	1,972	548
Total	5,274	5,274	0

Cropland/Pasture (Herbaceous Agricultural Cover Types). Cropland is used for cultivation of annual or short-lived crops. It is a dynamic landscape feature that is frequently altered throughout the year. Cropland at UC Davis includes land used for academic teaching and research and for food production for campus livestock.

Most Cropland habitat supports a single crop that is planted in the spring and harvested during summer or fall. This can vary with crops such as wheat which is planted in the fall and harvested in the spring, sugar beets which grow over the winter and are harvested in the spring after the soil dries, and alfalfa which is a perennial crop mowed several times during the growing season. Planting and harvesting cycles are usually associated with the disking and tilling of fields, which regularly and frequently disturbs the land.

Agricultural practices at UC Davis vary in response to field size, research activities, instructional uses, and crop type. Fields that are used for food production typically are (1) greater than 20 acres and are used for single-species crop production and (2) are routinely managed as a part of the regular seasonal practices of cultivation. These types of fields occur at the Russell Ranch and on portions of the west campus.

In contrast to the large fields described above, teaching and research fields are usually divided into small plots (typically less than 1 acre or to 5 acres) that are highly manipulated and may have a variety of crops within one area. For example, individual rows within a teaching and research plot may be composed of many different types of plants being studied or planted and harvested more often than would be necessary for crop production. These types of fields occur on much of the west campus, the western portion of the south campus, and the Long-Term Research on Sustainable Systems project area (LTRAS) at the Russell Ranch.

Cropland provides food and cover for wildlife species such as songbirds and small rodents, and foraging opportunities for raptors due to the frequent flooding, mowing, or harvesting of the fields that make the prey readily available. The State-listed threatened Swainson's hawk relies heavily on Cropland for foraging. Plant species associated with Cropland habitat include cultivated crops, isolated oak trees, and non-native herbs, shrubs, and trees associated with landscaped or disturbed edges along roads, irrigation ditches, and agricultural fields.. Most

notable of the tree-lined streets are the walnut trees planted along Road 98 and Russell Road and the olive trees along Hopkins Road and Olive Tree Lane. These habitat elements, when present, may provide perching and nesting habitat for birds, as well as food, cover, and movement corridors for birds and other wildlife.

Pasture is used for livestock grazing and may not be leveled, regularly disked, or irrigated. Vegetation is typically a low, grassland-like ground cover. Habitat on campus value varies according to pasture size and grazing intensity. Campus pastures provide variable habitat values depending on their size and intensity of grazing. Pastures that are essentially confined animal pens may provide almost no value for native wildlife, while larger pastures with grassland-like habitat provide higher habitat values for wildlife. Higher value Pasture habitat is found in the northern part of the “C” tract, the equine research lab on the south campus, and at the Russell Ranch.

Orchard-Vineyard (Woody Agricultural Cover Types). Orchard-Vineyard is dominated by trees or vines and have a relatively low value for wildlife because understory vegetation that would provide food and cover for wildlife is not allowed to grow. Species such as ground squirrels, American crow, and western scrub-jay that use this habitat are often considered agricultural pests. At UC Davis, Orchard-Vineyard is interspersed with Cropland primarily in the northwest corner of the west campus, along Putah Creek at the southern edge of Russell Ranch, and in the southwest area of the west campus.

Ruderal/Annual Grassland. Ruderal/Annual Grassland is found along the edges of roads and fields, vacant uncultivated areas, and along the levee banks and upland flood plain of Putah Creek. This habitat type is a result of regular past or current disturbance from agricultural practices, road and levee maintenance, and proximity to roads and buildings. It typically occurs as open treeless grassland composed primarily of annual plant species. However, since the early 1900s, no large areas of grassland remain on campus due to the extensive amounts of cultivation and development.

The composition of the Ruderal/Annual Grassland habitat consists largely of non-native introduced annual grasses and forbs. Because of the aggressive nature of these introduced plants, the virtual extirpation of many native species and continued disturbance, they have become naturalized as the dominant species and have excluded the growth of native perennial grassland species that occurred prior to settlement and cultivation of the area. Underdeveloped land adjacent to the Health Science District of the Central Campus is the largest area of Ruderal/Annual Grassland on the campus. The location and quality of Ruderal/Annual Grassland Habitat elsewhere changes as agricultural uses of fields change and as they are plowed or mowed for weed control.

Grassland edges to the fields and roads provide food, cover, and movement corridors for resident and migratory wildlife species. Small mammals, reptiles, and birds can be found in this habitat type. The burrowing owl is perhaps the most notable special-status wildlife species that has been observed nesting and foraging in Ruderal/Annual Grassland on campus.

Valley-Foothill Riparian Woodland. The Valley-Foothill Riparian Woodland is characterized by woody riparian tree and shrub species. Dominant tree species include Fremont’s cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), and willows (*Salix* sp.). Understory tree and shrub species includes box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), Mexican elderberry (*Sambucus mexicana*), and California wild rose (*Rosa californica*). Sedges, rushes,

and other herbaceous species may be found along the Putah Creek channel where there is a sufficient water supply.

Valley-Foothill Riparian habitat is located along Putah Creek and the South Fork of Putah Creek corridors that comprise the southern edge of the main campus and Russell Ranch areas. Riparian habitat also occurs along the drainage south of the Russell Estate on Russell Ranch. The South Fork of Putah Creek is an artificially excavated channel constructed in the 1870s to reduce flooding problems in the City of Davis. It currently supports a well-developed riparian corridor. Valley-Foothill Riparian habitat on campus is included within the Putah Creek Riparian Reserve, which is protected from development to maintain wildlife values and is used for teaching and research purposes.

From a wildlife habitat perspective, the Valley-Foothill Riparian habitat along Putah Creek provides some of the highest wildlife values on campus by providing food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife species. Of particular significance is the use of tall trees in riparian habitats for nesting by the state-listed, threatened Swainson's hawk.

The North Fork Cutoff and the Arboretum Waterway were the original alignment of Putah Creek through the campus prior to the flood control diversion in the 1870s. The North Fork Cutoff supports a highly degraded riparian habitat (a few widely spaced oak trees) especially towards the eastern end due to the lack of water and presence of livestock pastures within the channel and is considered to be pasture habitat. The UC Davis Arboretum is located adjacent to the Arboretum Waterway where it crosses the central campus. While many of the trees and shrubs in the Arboretum are remnants of the time when the Arboretum Waterway was part of Putah Creek, and the structure is similar to riparian woodland, it is considered to be Urban Landscaping/Developed because (1) the Arboretum Waterway is a stormwater pond, channelized and lined with rock for erosion control, (2) the vegetation is composed of a wide variety of introduced trees and shrubs with a highly maintained understory, and (3) it is a campus park where human activity is high.

Riverine Habitat. Riverine habitat is the open water habitat of Putah Creek and the South Fork of Putah Creek. The riparian habitat associated with the Riverine habitat is the terrestrial component of this interdependent system. Putah Creek and the South Fork of Putah Creek support a fish community that includes several native and many non-native species. Sporadic spawning runs of migratory fish can occur during wet years when sufficient flows establish the necessary connection to the Yolo Bypass. Construction of upstream dams, water diversions, and channelization for flood control have drastically altered the natural flows and subsequently changed habitat values of Putah Creek for native fish and wildlife species. Of the 35 fish species currently found in Putah Creek, only 13 are native to the Putah Creek system (Marchetti and Moyle 2001).

Open Water Ponds. Open water pond (Lacustrine) habitat includes various ponds located throughout the campus including the Arboretum Waterway. All of the ponds on campus including the Arboretum Waterway have been artificially constructed or modified for agriculture, research, storm water management, or wastewater treatment purposes and are subject to a variety of hydrologic regimes and management practices (draining, vegetation clearing, or use of chemicals). As such, habitat values vary considerable from pond to pond in response to the substrate (concrete or earth lined), the amount of emergent vegetation that is present, and depth

and duration of water throughout the year. The pond with the highest habitat values is Jameson Pond, which is earth-lined, contains a small island, and supports emergent vegetation. A diverse array of birds, mammals, reptiles, amphibians, and fishes are known to use Jameson Pond.

Urban Landscaping/Developed. Urban habitat is the landscaped areas (trees, shrubs, and maintained grassy areas) of the central campus and all outlying areas of development. While the Arboretum contains a significant collection of botanical specimens, it is included within this habitat designation because it is essentially a landscaped park with many non-native plantings, and is subject to regular maintenance as well as high frequency use by people (picnicking, jogging, walking, etc.).

Central campus landscaped areas, with their abundance of mature trees, provide wildlife habitat values (food and cover) within the developed areas of central campus. Many species of birds (including the Swainson's hawk) are known to nest in central campus trees. Other resident and migratory hawks, owls, songbirds, and woodpeckers are also known to use landscaped areas on the campus for nesting, food, and cover.

Wetlands. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (ACOE) has authority to regulate activity that could discharge fill or dredge material or otherwise adversely modify wetlands or other waters of the United States. Perennial and intermittent creeks are considered waters of the United States and are within the regulatory jurisdiction of the ACOE. The ACOE implements the federal policy embodied in Executive Order 11990, which, when implemented, is intended to result in no net loss of wetlands values or acres. In achieving the goals of the Clean Water Act, the ACOE seeks to avoid adverse impacts and to offset unavoidable adverse impacts on existing aquatic resources. Any fill or adverse modification of wetlands may require a permit from the ACOE prior to the start of work.

Perennial and intermittent streams also fall under the jurisdiction of the California Department of Fish and Game (CDFG). Sections 1601-1603 of the Fish and Game Code (Streambed Alteration Agreements) gives the CDFG regulatory permitting authority over work within the 100-year flood plain, consisting of but not limited to the diversion or obstruction of the natural flow or changes in the channel, bed, or bank of any river, stream or lake.

Putah Creek, South Fork of Putah Creek, the Arboretum Waterway, the ponds, drainage ditches that carry natural drainage, or isolated wetlands may qualify as waters of the U.S. and fall under the jurisdiction of the ACOE. Activities within these wetland features, including any modifications or fills, could require permitting action by the ACOE or CDFG.

4.4.1.4 Special-Status Species

For the purposes of this EIR, special-status species include taxa with a moderate or greater potential to occur on the campus including those: (1) listed as threatened or endangered under either the California or Federal Endangered Species Acts; (2) candidates for either state or federal listing; (3) species afforded protection under the Fish and Game Code of California; (4) federal and CDFG "Species of Special Concern"; (5) CDFG "Species of Special Concern highest and second priority lists; (6) and California Native Plant Society (CNPS) List 1-3 plants.

The California Natural Diversity Data Base (CNDDDB), the CNPS electronic database, and the official USFWS species list were reviewed to determine the occurrence or potential occurrence of special status plant or wildlife species, and natural communities of special concern on or

within an approximate 10-mile radius of the campus. A search range of an approximate 10-mile radius was used to identify potential special-status species issues because it encompasses a sufficient distance to accommodate for regional habitat diversity and to overcome the limitations of the CNDDDB. The CNDDDB is based on actual recorded occurrences and does not constitute an exhaustive inventory of every resource.

Table 4.4-2 includes a list of these special-status plant and wildlife species with both scientific and common names, legal status, description of habitat preference, and the recorded or potential occurrence on the campus. Many of the special-status species are not expected to occur on the campus or have a low potential for occurrence because the habitat elements they require either were never present or are no longer found on the highly managed and modified lands associated with the campus and adjacent agricultural and urban development. Although not considered special-status species for purpose of this EIR, information on species with no or low potential to occur on campus is presented in Table 4.4-2 for background information. Surveys have been done over large areas of the campus primarily in conjunction with past or current projects (Figure 4.4-2). Special-status species known to occur, or with potential habitat still present on the campus, that may be affected by development under the 2003 LRDP are discussed below.

Special-Status Plants. Only one special-status plant, the northern California black walnut, has been observed on the campus. Northern California black walnut trees planted as ornamental or along roadsides are not naturally occurring. The CNPS database for this species only lists 4 USGS quadrangles where naturally occurring plants still occur. The USGS quadrangles including and surrounding the campus are not included in this list. Therefore, it is not considered a special-status species on the campus. Putah Creek and the South Fork of Putah Creek support potential habitat for the rose mallow (*Hibiscus lasiocarpus*) and the Sanford's arrowhead (*Sagittaria sanfordii*).

The remaining plant species listed in Table 4.4-2 with the potential to occur in the area are associated with unaltered valley grassland habitat, specific soil types, or seasonal wetlands such as vernal pools. The highly modified landscape on the campus and surrounding area, which lacks seasonal wetlands, clay or alkaline soils, creates a very low probability for the occurrence of these species. However, remnant populations could occur in areas left fallow or along relatively undisturbed field edges and roadsides. Rare plant surveys were conducted in numerous areas since the early 1990s (Figure 4.4-2) included active and fallow lands and associated ruderal field edges and roadsides. No special-status plants or their habitats were observed.

Special-Status Wildlife. All of the upland habitat types identified on campus represent suitable nesting and/or foraging habitat for the nesting, migrating, or wintering special-status birds-of-prey listed in Table 4.4-2 as well as more common species such as the white-tailed kite, red-tailed hawk, red-shouldered hawk, and American kestrel. Birds-of-prey are protected against take or possession, and the destruction of nests or eggs is prohibited pursuant to Section 3503.5 of the California Fish and Game Code. Riparian woodland along Putah Creek provides habitat for roosting, foraging, and cover; and expanses of agricultural land in the region would provide foraging habitat. Swainson's hawk and burrowing owl are discussed below. Ferruginous hawk occurs rarely as a winter visitor foraging in agricultural fields on the west campus and Russell Ranch. Northern harriers also forage in campus agricultural fields.

Vaux's swift, willow flycatcher, bank swallow, rufous hummingbird, Allen's hummingbird and yellow warbler do not breed on the campus, but may occur on the campus in small numbers

during either spring or fall migration. As migrants, they may forage in or over a wide variety of habitats ranging from Urban Landscaping/Developed to agricultural lands and Valley-Foothill Riparian Woodland. Tricolored blackbird, whimbrel, and long-billed curlew occur in small numbers in the winter and forage in agricultural fields. Loggerhead shrike may nest in Valley-Foothill Riparian Woodland and forage in adjacent agricultural habitats or ruderal/annual grassland. Small numbers of double-crested cormorant forage in the Arboretum Waterway.

Burrowing Owl. The burrowing owl (*Speotyto cunicularia*) is fully protected against take pursuant to Section 3503.5 of the California Fish and Game Code and is a CDFG species of special concern. In addition, biologists and environmental organizations concerned about the status of burrowing owls in California have proposed listing it under the California Endangered Species Act (CESA). Burrowing owls are small birds with the relatively unique habits of being active during the day as well as in the evening and nesting underground. They typically use burrow systems formerly occupied by ground squirrels or other large burrow-dwelling rodents. Their diet is usually dominated by insects but may also include small mammals, reptiles, and amphibians. Burrowing owls generally forage in open fields with relatively sparse, short vegetation; their foraging ability is disrupted by dense tall vegetation.

Nesting burrowing owls have been recorded at various central campus locations since 1981. No information is available on the status of burrowing owls on the campus prior to 1981. A significant reduction in the number of breeding pairs has occurred since 22 pairs were observed in 1981. Only 12 pairs were observed in 1986, and breeding was not observed on the central campus from 1992 through 1997 (Jones and Stokes 1992-2000).

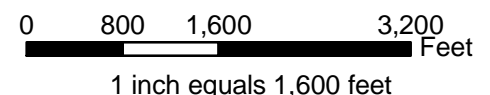
The declining population of burrowing owls on the campus persisted longest on the open fields in and around the Health Sciences District. These lands were used for agricultural research, including orchards, until the construction of the Schools of Medicine and Veterinary Medicine in and the SR113 highway in the early 1960s through the mid-1970s. Undeveloped lands to the east and north of these schools had been actively farmed for decades, typically for dryland crops such as safflower and oats. As a result of farming practices, the entire area was disced on an annual basis and the dense crops were unsuitable foraging and nesting habitat for burrowing owls most of the year. Weedy field edges may have been used by burrowing owls.

More recently, these lands have been managed primarily for weed control, a practice that prevents growth of tall, dense vegetation, keeping it open and potentially suitable for nesting and foraging by burrowing owls. Since at least the mid-1980s all campus actions related to management of these fields have considered the presence of burrowing owls. Typical weed control activities include identifying the location of burrows occupied by burrowing owls, mowing the fields once or twice a year away from the burrows, and when needed to keep the habitat open, hand mowing the vegetation immediately around active burrows. Prior to construction of the Genome and Medical Sciences Building, the field immediately north of Medical Sciences 1A Building and west of Parking Lot 54 had been posted with signs identifying the area as burrowing owl habitat and generally has been mowed to control weeds. Posting the area with signs was intended to benefit burrowing owls by minimizing disturbance by people walking through the fields.



Legend

- Elderberry Plant
- Areas of Botanical Survey



UC Davis
LRDP EIR
28649327

Special Status Plant Surveys

Figure
4.4-2

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The burrowing owl population in the Health Sciences District has been monitored routinely since the early 1990s (Jones and Stokes 1992-2000, May and Associates 2001-2002). Burrowing owl surveys were conducted in accordance with the burrowing owl protocol survey guidelines recommended by the CDFG. From 1992 through 1998, burrowing owl surveys were conducted approximately nine times each year from February through November so that an opportunity to observe owls during the entire nesting season was possible. Beginning in January 1999, surveys have been conducted approximately once every three weeks. Surveys were conducted on foot during the recommended time of day to locate burrowing owls and potential burrows.

From 1993 through 1996, no burrowing owls were observed in the survey area. In 1997, burrowing owls were observed sporadically between March and November in the field east of the Health Sciences District (south of the project site). Although nesting was not documented in 1997, pellets and white wash were identified at a burrow entrance in March of that year. In 1998 a single pair of burrowing owls nested near the intersection of Garrod Drive and Veterinary Medicine Drive. During 1999, two pairs of burrowing owls nested and fledged young in the fields east of the Health Sciences District. During 2000, two pairs of burrowing owls nested in the same field east of the Health Sciences District (Jones & Stokes Associates 1992-2000). The single pair that was present in the winter 2000-2001 was relocated to artificial burrows in the eastern portion of the field east of the Health Sciences District. Relocation was undertaken in compliance with CDFG guidelines as part of the UC Davis Veterinary Medicine Facilities Improvement Project. The relocated pair used the artificial burrow for several months, but has not been observed since.

During the last decade, nesting burrowing owls have been observed adjacent to the airport runway (1 pair) and sporadically on teaching and research fields west of SR 113 between Russell Boulevard and Hutchison Drive (1-2 pairs). Nesting burrowing owls have not been observed during casual observations at Russell Ranch, but no formal surveys have been conducted. Due to the clean farming practices their presence at the site is unlikely.

Dispersing young from other areas could become established on previously unoccupied campus sites. Ground squirrel colonies and scattered burrows along the edges of fields and roads represent potential nesting habitat for the burrowing owl. The area around the Health Sciences District is managed to protect nesting burrowing owls that may be present but to discourage the establishment of ground squirrel burrows and therefore any new burrowing owls.

Swainson's Hawk. The Swainson's hawk (*Buteo swainsoni*) is listed as a threatened species under the California Endangered Species Act and is also fully protected against take pursuant to Section 3503.5 of the Fish and Game Code of California. The Swainson's hawk is a relatively large bird-of-prey that typically nests in large trees in riparian corridors as well as isolated trees remaining in or adjacent to agricultural fields in the Central Valley. However, in the City of Davis, and on the central campus, these hawks also nest in the large trees among buildings, roads, and dwellings.

This species forages in open grassland habitats and has adjusted to foraging in certain types of agricultural lands. The value of foraging habitat can be affected by a variety of characteristics including density and availability of prey, proximity to disturbing features, and distance to nesting territories. Published information indicates these raptors typically forage within a 10-mile radius of nest sites but may range up to 18 miles from a nest site in search of suitable foraging habitat and available prey. Formal studies have shown that Swainson's hawks will spend the

majority of foraging time in close proximity to the nest site when high quality foraging habitat (measured by the abundance and availability of prey) is present.

The occurrence of the Swainson's hawk in and around the campus is well documented. UC Davis conducted yearly surveys for Swainson's hawk nests on the campus and within one-half mile of the campus from 1991 through 1998. Project-specific surveys have been conducted annually since 1998. The results of these surveys documented approximately 20 active nests per year and a total of approximately 50 total nests within one-half mile of the campus over the decade. Most of the Swainson's hawk nests are located in the Putah Creek riparian corridor. In order to protect the Swainson's hawk nest sites, no location information is included in this EIR. This information is on file at the UC Davis Office of Resource Management and Planning.

Valley Elderberry Longhorn Beetle (VELB). The VELB (*Desmoceros californicus dimorphus*) is listed as a threatened species under the Federal Endangered Species Act (FESA). This species requires its host plant, the Mexican elderberry shrub (*Sambucus* spp.), for its complete life cycle. The USFWS considers all elderberry shrubs within the historic range of VELB (the Central Valley and foothills up to 2,000 feet) as potential habitat for this species. Project-specific surveys have been conducted for the Mexican elderberry shrub on campus. Elderberry shrubs occur primarily along both forks of Putah Creek. Scattered shrubs and shrub clusters also are located throughout the campus primarily along fences and power lines where fruit-eating birds may depart seeds.

California Tiger Salamander. The California tiger salamander (*Ambystoma californiense*) is a federal candidate species and a CDFG species of special concern. This species ranges from Sonoma County south to Santa Barbara County and east to the foothills of the Sierra Nevada (Stebbins 1985). Agricultural and urban development have significantly reduced the number of California tiger salamanders found throughout the state.

Appropriate breeding habitat for this species is generally found in seasonal pools, low gradient streams, and stock ponds that retain water long enough for larvae to metamorphose. Tiger salamanders generally aestivate during the summer in excavated mammal burrows within 1 kilometer (0.6 mile) of their freshwater breeding habitats (Stebbins 1985).

While there is potential habitat for this species on campus, California tiger salamanders have never been reported on campus. An individual salamander was found in a field near Pole Line and Anderson Roads in the mid-1990's but was most likely a released animal (Shaffer 2003). The closest occurrence in the CNDDDB was recorded in 1993 and was approximately 1.5 miles northwest of Russell Ranch. Since no salamanders have been observed on campus, this species is not expected to occur in the project area.

Chinook Salmon. Chinook salmon (*Oncorhynchus tshawytscha*) historically ranged from the Ventura River in California to Point Hope, Alaska, on the eastern edge of the Pacific and in the western portion of the Pacific Ocean from Hokkaido, Japan, to the Anadyr River in Russia (Healey 1991). The general life history of the anadromous chinook salmon includes both freshwater and oceanic phases of development. Incubation, hatching, and emergence occur in freshwater, followed by migration to the ocean at which time smoltification occurs. Chinook salmon typically spend 3 to 6 years maturing in the ocean before returning as adults to spawn in their natal streams (Moyle 1976).

The National Marine Fisheries Service (NMFS) classifies and lists salmon by evolutionarily significant unit (ESU). To be considered an ESU, a population or group of populations must be (1) substantially reproductively isolated from other populations and (2) contributing substantially to the ecological or genetic diversity of the biological species (Myers et al. 1998). Factors used in determining ESUs include spatial, temporal, and genetic isolation, maturation rates, and other life history traits. Fall-run Chinook are known to occur in lower Putah Creek (Marchetti and Moyle 2001). Although it is considered to be the most robust of all the chinook ESU populations, it is federally listed as a threatened species. This group of salmon enters freshwater from July through November with spawning beginning in October.

Since the fall-run Chinook salmon ESU have been known to occur in lower Putah Creek, it has the potential to occur on campus. Other ESUs of Chinook salmon were not recorded in Putah Creek during extensive sampling over the last decade as part of preparation for recent litigation concerning flows in the creek or in follow-up studies (Marchetti and Moyle 2001). Therefore, these ESUs are not expected to occur on the campus.

Giant Garter Snake. The giant garter snake (*Thamnophis gigas*) is listed as threatened under the federal and State ESAs. This mostly aquatic snake is the largest of the garter snake genus, *Thamnophis*, and is endemic to the valley floors of the Sacramento and San Joaquin Valleys (USFWS 1999). Before the conversion of the Central Valley to agricultural lands, giant garter snakes inhabited vast tule and cattail marshes. Today the snakes are found in rice fields, canals, and irrigation ditches. Giant garter snakes hunt small fish, tadpoles and frogs during the spring, summer, and early fall. From late October to late March giant garter snakes hibernate above the high water line. Hibernaculae are often abandoned rodent burrows, but the snakes can also hibernate in other types of cracks or crevices that would provide them with adequate shelter.

The only giant garter snake record in the CNDDDB in the vicinity of the campus was in 1976 and is a non-specific record along Putah Creek. The non-specific category of this giant garter snake record places the occurrence generally within one mile of Putah Creek at Old Davis Road and does not reflect an exact location of the occurrence. Since this observation is more than 25 years old, there are no more recent records, and suitable habitat is not present, the giant garter snake is not expected to occur on campus.

Steelhead

Like chinook salmon, steelhead (*Oncorhynchus mykiss*) have also been divided into ESUs. All of the ESUs were listed as threatened under the FESA. Steelhead are not listed under CESA. Steelhead make spawning runs into several rivers and small creeks flowing into the Bay. In general, adult steelhead return to rivers and creeks in the Bay region from October to April, and spawning takes place in the rivers from December to May. Juvenile steelhead can spend up to 7 years in freshwater before moving downstream as smolts during March to May (Busby et al. 1996). Steelhead can spend up to 3 years in saltwater before returning to freshwater to spawn (Barnhardt 1986). Since juvenile steelhead remain in the creeks year-round, adequate flows, suitable water temperatures and an abundant food supply are necessary throughout the year in order to sustain steelhead populations (USACE 1999). The most critical period is in the summer and early fall when these conditions become limiting.

Although steelhead have not been documented in Putah Creek, there is potential habitat for this species. Potential spawning and rearing habitat would be located between the Putah Diversion

Dam and approximately Winters; the proper water temperatures potentially occur along this reach of the creek. If steelhead occur in Putah Creek on the Campus they would be in transit between the Pacific Ocean and spawning/rearing habitat upstream of Winters.

Northwestern pond turtle. Northwestern pond turtles (*Clemmys marmorata*), including both the northwestern (ssp. *marmorata*) and southwestern (ssp. *pallida*) subspecies, are federal and CDFG species of special concern. Northwestern pond turtles range throughout the State of California, from southern coastal California and the Central Valley, east to the Cascade and Sierra Nevada ranges. The two subspecies are believed to integrate over a broad range in the Central Valley.

Northwestern pond turtles occur in a variety of permanent and intermittent aquatic habitats, such as ponds, marshes, rivers, streams, and ephemeral pools. Pond turtles require suitable basking and haul-out sites, such as emergent rocks or floating logs, which they use to regulate their temperature throughout the day. In addition to appropriate aquatic habitat, these turtles require an upland oviposition site in the vicinity of the aquatic habitat, often within 200 meters (656 feet). Nests are typically dug in grassy, open fields with soils that are high in clay or silt fraction. Egg laying usually takes place between March and August.

This species is present on campus in the Arboretum Waterway and along Putah Creek.

4.4.1.5 *Regulatory Setting*

The federal regulatory requirements and laws that apply to the proposed project include:

- Federal Endangered Species Act
- Clean Water Act, Sections 404 and 401
- Migratory Bird Treaty Act

Applicable state laws and regulations include:

- California Endangered Species Act
- Native Plant Protection Act
- California Fish and Game Code

A brief description of each of the relevant laws and regulations is provided below.

Federal Endangered Species Act. Under FESA, the Secretary of the Interior and the Secretary of Commerce, jointly have the authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). FESA defines “endangered” species as those in danger of extinction throughout all or a significant portion of their range. A “threatened” species is any species that is likely to become an “endangered” species within the foreseeable future throughout all, or a significant portion of its range. Additional special-status species include “candidate” species and “species of concern.” “Candidate” species are those for which the USFWS has on file enough information to propose listing as endangered or threatened. “Species of concern” are those for which listing is possibly appropriate but for which the USFWS lacks sufficient information to support a listing proposal. A species that has been “delisted” is one whose population has met its recovery goal target and is no longer in jeopardy of extinction.

Section 7 of FESA requires formal consultation with the USFWS or NMFS for only those species listed as endangered, threatened or proposed for threatened or endangered. Taking of a federally listed species is prohibited under Section 9 of FESA. Taking is defined by FESA [Section 3(19)] to mean “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.” An incidental take of a listed species requires consultation with the USFWS or NMFS.

Federally listed species may be addressed for a proposed project in one of two ways: (1) a nonfederal government entity may resolve potential adverse impacts to species protected under Section 10 of FESA, or (2) a federal lead agency may resolve potential adverse effects to listed species in accordance with Section 7 of FESA. Both require consultation with the USFWS or NMFS, which administers the Act and ultimately issues a final opinion determining whether a project is likely to adversely affect or jeopardize the continued existence of a federally listed species, or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3],[4]).

Clean Water Act. Under Section 404 of the Clean Water Act, ACOE regulates the disposal of dredged and fill materials into “waters of the United States”. Waters of the U.S. include intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the U.S. [CFR 33 Part 328]. In areas subject to tidal influence, Section 404 jurisdiction extends to the high tide line. Certain waters of the U.S. are considered “special aquatic sites” because they are generally recognized as having particular ecological value. Such sites include sanctuaries and refuges, mudflats, wetlands, vegetated shallows, coral reefs, and riffle and pool complexes. Special aquatic sites are defined by the U.S. Environmental Protection Agency and may be afforded additional consideration in the permit process for a project. A permit from the ACOE is required under Section 404.

The ACOE also regulates navigable waters under Section 10 of the Rivers and Harbors Act. These are defined as “...those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce” [33 CFR Part 322.2].

A permit from the ACOE must be obtained for any dredge or fill activities within jurisdictional waters of the U.S. During the permit review process the ACOE determines the type of permit appropriate for the proposed project. There are two types of permits issued by the ACOE:

- General Permits issued on a state, regional and nationwide basis which cover a variety of activities including minimal individual and cumulative adverse affects. These permits fit into specific categories established by the ACOE.
- Individual Permits issued for a case-specific activity.
- In addition to the Section 404 permit, Section 401 of the Clean Water Act requires that a 404 permit applicant obtain a certificate from the appropriate state agency stating that the fill is consistent with the state’s water quality standards and criteria. In California, the authority to grant certification or waive the requirement for permits under Section 401 is delegated by the State Water Resources Control Board to the Regional Water Quality Control Boards. Pursuant to the Porter-

Cologne Act, each of California's nine regional boards must prepare and periodically update basin plans that set forth water quality standards for surface and groundwater, as well as actions to control point and non-point sources of pollution. Basin plans offer an opportunity to achieve wetlands protection through enforcement of water quality standards. No ACOE 404 permit is valid under the Clean Water Act unless it is "certified" by the state. Therefore, Regional Water Quality Control Boards may effectively veto or add conditions to any ACOE permit.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) of 1918 (16 United States Code 703-711) is an international treaty for the conservation and management of bird species that may migrate through more than one country. It is enforced in the United States by the USFWS, and makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered a "take" and is potentially punishable by fines and/or imprisonment. In 1972, the MBTA was amended to include protection for migratory birds of prey (raptors). All species and subspecies of the families listed above are protected under the provisions of the 1972 amendment.

California Endangered Species Act and Native Plant Protection Act. The California Endangered Species Act (CESA) and the Native Plant Protection Act authorizes the California Fish and Game Commission to designate endangered, threatened, and rare species and to regulate the taking of these species (§2050-2098, Fish & Game Code). CESA defines "endangered" species as those whose continued existence in California is jeopardized. State listed "threatened" species are those not presently threatened with extinction, however may become endangered if their environments change or deteriorate. Protection of special-status species is detailed in Sections 2050 and 2098 of the Fish and Game Code. The California Code of Regulations (Title 14, Section 670.5) lists animal species considered endangered and threatened by the State. Formal consultation must be initiated with the California Department of Fish and Game (CDFG) for projects that may have an adverse effect on a state-listed species. If no state listed species will be affected by a proposed project, environmental documentation is provided to the CDFG at the discretion of the lead agency.

Section 2080 of the California Fish and Game Code prohibits the taking of state listed plant and animals. The CDFG also designates "fully protected" or "protected" species as those that may not be taken or possessed without a permit from the Fish and Game Commission and/or the CDFG. Species designated as fully protected or protected may or may not be listed as endangered or threatened.

CDFG's Natural Heritage Division administers the State's endangered species program. CDFG's implementation of the CESA has created a program that is similar in structure to, but different in detail from, the USFWS program implementing the federal ESA.

The CDFG maintains a list of designated endangered, threatened, and rare plant and animal species. Listed species are either designated under the Native Plant Protection Act, or designated by the Fish and Game Commission. In addition to recognizing three levels of endangerment, the CDFG can afford interim protection to candidate species while they are reviewed by the Fish and Game Commission.

The CDFG also maintains a list of animal “Species of Special Concern,” most of which are species whose breeding populations in California may face extirpation. Although these species have no legal status, the CDFG recommends consideration of them during analysis of the impacts of proposed projects to protect declining populations and avoid the need to list them as endangered in the future.

Under provisions of Section 15380(d) of CEQA, the project lead agency and CDFG, in making a determination of significance, must treat non-listed plant and animal species as equivalent to listed species if such species satisfy the minimum biological criteria for listing. In general, the CDFG considers species on Lists 1A, 1B, or 2 of the *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994) as qualifying for consideration under this CEQA provision. Species on the Native Plant Society’s List 3 or 4 may, but generally do not, qualify for protection under this provision.

Fish and Game Code Section 1601-1603. Sections 1601-1603 of the Fish and Game Code require agencies to notify CDFG prior to any project that would divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake.

4.4.2 Impacts and Mitigation

4.4.2.1 Standards of Significance

The following standards of significance are based on Appendix G of the CEQA Guidelines. For purposes of this EIR, implementation of the 2003 LRDP may have a significant adverse impact on biological resources if it would:

- Result in a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status¹ species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or U.S. Fish and Wildlife Service (USFWS); or
- Result in the “take” (defined as kill, harm, or harass) of any listed threatened or endangered species or the habitat of such species; or
- Result in a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS; or

¹ Includes CDFG first and second category bird species of special concern. The third priority species are not included because, as stated in the CDFG list, they, "are not in any present danger of extirpation and their populations within most of their range do not appear to be declining seriously; however, simply by virtue of their small populations in California, they are vulnerable to extirpation should a threat materialize."

- Result in a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means; or
- Interfere substantially with the movement of any native resident or migratory fish, or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; or
- Conflict with any local applicable policies protecting biological resources.

4.4.2.2 CEQA Checklist Items Adequately Addressed in the Initial Study

- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other applicable HCP.

The campus does not fall within the boundaries of nor is it adjacent to an adopted regional HCP or NCCP. Therefore, there is no conflict between the 2003 LRDP and an adopted HCP or NCCP. The campus has implemented two low effects HCPs for VELB. The site identified in these HCPs is at the Russell Road and is designated as Teaching and Research Open Space in the 2003 LRDP, which is consistent with purposes of the HCPs.

4.4.2.3 Analytical Method

Potential impacts to biological resources on the campus are evaluated based on a review of the available literature regarding the status and known distribution of the special-status species within the project area, and data collected from studies conducted on the UC Davis campus for other projects. Botanical surveys have been conducted for large areas of the campus including the primate center, all research park zones, the health sciences district, the neighborhood and the RMI project areas (May & Associates, Inc. 2003). (Valley elderberry bushes found during these surveys away from Putah Creek also are illustrated in Figure 4.4-2.) In addition, surveys have been conducted for Swainson's hawk, burrowing owl, and fish in Putah Creek as described above. Selected sources used in the impact analysis include the following:

- USFWS List of Endangered and Threatened Species that May Occur in or be Affected by Projects in the Selected Quads Listed Below (Saxon, Dixon, Allendale, Grays Bend, Davis, Woodland, Madison, Winters and Merritt). Reference File Number 1-1-03-SP-0717; Date: January 2, 2003, and as updated August 20, 2003.
- The California Department of Fish and Game's Natural Diversity Database (CNDDDB) query results for the U.S. Geological Survey's 7.5-minute quadrangles of Saxon, Dixon, Allendale, Grays Bend, Davis, Woodland, Madison, Winters and Merritt
- The California Native Plant Society's Electronic Inventory

Once all data sources were reviewed, a final list of special status species with moderate or greater potential to occur in the vicinity of the project area was compiled, and each of the species was evaluated for presence or absence on the site. In addition, the presence of suitable habitat characteristics was evaluated. These species are presented in Table 4.4-2; species with no or low potential to occur are also presented for information purposes.

In order to refine the list of species potentially affected by development under the LRDP, species listed in Table 4.4-2 were rated for their potential to occur in the project area. For species rated as “no potential to occur,” appropriate habitat characteristics are not present in the project area or they are thought to have been extirpated from the region. Species rated as “low potential to occur” include species whose known distribution does not include the project area, species for which appropriate habitat characteristics or only marginal habitat characteristics are present in the project area and were not observed during focused surveys or species that have not been observed during surveys. Species rated as “moderate potential to occur” include those species for whom suitable habitat characteristics are present in the project area even though they were not detected during focused surveys. Species rated as “known to occur” were observed in the project area.

For the impact analysis presented in this document, species that were rated as “moderate potential to occur” or “known to occur” on site were considered to be adversely affected if the development envisioned under the 2003 LRDP would affect the species or their habitat. Where conservation measures could not reduce impacts completely, mitigation measures were designed to reduce impacts to the species and their habitat. The significance of the impact and the mitigation proposed are based upon the standards of significance outlined above.

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
Mammals						
<i>Corynorhinus (=Plecotus) townsendii townsendii</i>	Pacific western big-eared bat	SC	SC	NA	Humid coastal regions; roosts include caves, mines, and buildings	No potential to occur
<i>Myotis ciliolabrum</i>	Small-footed myotis bat	SC	None	NA	Open stands in forests, woodlands and brushy habitats, near water, west and east sides of Sierra Nevada; 0-2700 meters	Low potential to occur
<i>Myotis thysandoes</i>	Fringed myotis bat	SC	None	NA	Piñon-juniper forest, valley and foothill hardwood woodlands and hardwood-conifer forest	No potential to occur
<i>Myotis volans</i>	Long-legged myotis bat	SC	None	NA	Brush, woodland and forest habitats	No potential to occur
<i>Myotis yumanensis</i>	Yuma myotis bat	SC	SC	NA	Open forests and woodlands near water	No potential to occur
<i>Neotoma fuscipes riparia</i>	Riparian wood rat	E	SC	NA	Brushy habitats with scattered trees	No potential to occur
<i>Perognathus inornatus</i>	San Joaquin pocket mouse	SC	None	NA	Grasslands, blue oak savannas, needs friable soils	No potential to occur
Birds						
<i>Agelaius tricolor</i>	Tricolored blackbird	SC	SC	NA	Open valleys and foothills in streamside timber, alfalfa and rice fields, blackberry thickets, tules and cattails on and around marshes and reservoirs	No suitable nesting habitat occurs on campus; observed foraging

² For the purposes of this EIR, special-status species include taxa with a moderate or greater potential to occur on the campus including those: (1) listed as threatened or endangered under either the California or Federal Endangered Species Acts (2) candidates for either state or federal listing; (3) species afforded protection under the Fish and Game Code of California; (4) federal and CDFG “Species of Special Concern”; (5) CDFG “Species of Special Concern highest and second priority lists; (6) and California Native Plant Society (CNPS) List 1-3 plants.

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
<i>Asio flammeus</i>	Short-eared owl	None	SC	NA	Meadows, grasslands, wetlands, irrigated land	Low potential to occur
<i>Athene cunicularia hypugaea</i>	Western burrowing owl	SC	P	NA	Nests and winters in ruderal/annual grassland, cropland/pasture and sparse shrubland habitats throughout California; uses abandoned or active burrows of burrowing mammals for shelter and nest sites.	Known to occur
<i>Buteo swainsoni</i>	Swainson's hawk	SC	T	NA	Forages in cultivated lands such as croplands and pasture with scattered trees	Known to occur
<i>Buteo regalis</i>	Ferruginous hawk	SC	SC	NA	Undisturbed annual grassland and agricultural areas such as cropland and pasture (winter).	Known to occur
<i>Carduelis lawrencei</i>	Lawrence's goldfinch	SC	None	NA	Valley foothill hardwood, valley foothill hardwood-conifer	No potential to occur
<i>Chaetura vauxi</i>	Vaux's swift	None	SC	NA	Redwood and Douglas fir forests with hollow trees and snags	May occur as a migrant
<i>Charadrius montanus</i>	Mountain plover	PT	SC	NA	Nests in Montana, New Mexico, Oklahoma, Colorado, and Texas; winters primarily within the Central and Imperial Valleys of California within cultivated fields and grasslands.	No potential to occur
<i>Chlidonias niger</i>	Black tern	SC	SC	NA	Freshwater marshes, sloughs	No potential to occur
<i>Circus cyaneus</i>	Northern Harrier	None	SC	NA	Marshes, ruderal/annual grasslands, meadows, also agricultural lands such as croplands and pasture for foraging	Known to occur
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed cuckoo	C	E	NA	Large stands of valley-foothill riparian woodland	No potential to occur
<i>Dendroica petechia</i>	Yellow warbler	None	SC	NA	Riparian woodland for breeding; widespread as a migrant.	May occur as a migrant

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
<i>Elanus leucurus</i>	White-tailed kite	SC	FP	NA	Nests among dense-topped trees; forages in open ruderal/annual grasslands, agricultural lands, meadows or marshes	Known to occur; nesting and foraging observed
<i>Empidonax traillii brewsteri</i>	Little willow flycatcher	None	E	NA	Riparian habitat, dense willow thickets edging wet meadows or ponds (not specific to subspecies)	May occur as a migrant
<i>Grus canadensis tabida</i>	Greater sandhill crane	None	T	NA	Shallow waters, freshwater margins, agricultural lands and grasslands	No potential to occur
<i>Falco columbarius</i>	Merlin	None	SC	NA	As a migrant, forages in a wide variety of habitats	May occur as a migrant
<i>Haliaeetus leucocephalus</i>	Bald eagle	T, PD	E	NA	Seacoast, islands, sea cliffs, large lakes, large rivers, coastal lagoons	No potential to occur
<i>Lanius ludovicianus</i>	Loggerhead shrike	SC	SC	NA	Open canopied valley and foothill hardwood, riparian habitat; urban landscaping, developed areas, agricultural lands and grasslands	Known to occur
<i>Melanerpes lewis</i>	Lewis' woodpecker	SC	None	NA	Open pine-oak woodlands, coniferous forests, and riparian woodlands. Prefers burned and logged woodlands.	No potential to occur
<i>Numenius americanus</i>	Long-billed curlew	SC	SC	NA	Intertidal mudflats of large estuaries, upland herbaceous areas, and cropland, grassland and pasture (winter)	Known to occur
<i>Numenius phaeopus</i>	Whimbrel	SC	None	NA	Marshes, agricultural fields for foraging	Known to occur
<i>Phalacrocorax auritus</i>	Double-crested cormorant	None	SC	NA	Inland waters	Known to occur

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
<i>Plegadis chihi</i>	White-faced ibis	SC	SC	NA	Nests in a few isolated areas within the Central Valley; places nests within dense stands of fresh water emergent vegetation near shallow water or muddy fields; forages in wetlands, flooded agricultural lands and grasslands; winters mainly in the San Joaquin Valley and Imperial Valley.	Low potential to occur
<i>Riparia riparia</i>	Bank swallow	SC	T	NA	Riparian vegetation, vertical banks or cliffs near streams, rivers, lakes, and oceans	May occur as a migrant
<i>Selasphorus rufus</i>	Rufous hummingbird	SC	None	NA	Valley and foothill woodland, hardwood-conifer forest, riparian woodland, and chaparral during migration	May occur as a migrant
<i>Selasphorus sasin</i>	Allen's hummingbird	SC	None	NA	Brushy slopes, chaparral, thickets and open coniferous forests	May occur as a migrant
Reptiles						
<i>Clemmys marmorata marmorata</i>	Northwestern pond turtle	SC	SC	NA	Permanent or nearly permanent water with basking sites and upland for nest sites; can tolerate seawater for short periods of time, but prefer freshwater	Known to occur
<i>Phrynosoma coronatum frontale</i>	California horned lizard	SC	SC	NA	Lowlands along sandy washes with scattered low bushes and open areas for sunning	No potential to occur
<i>Thamnophis gigas</i>	Giant garter snake	T	T	NA	Dense emergent vegetation, deep and shallow pools of water, open areas along the margins, and upland habitat. Rice fields are often utilized by this species.	Low potential to occur
Amphibians						
<i>Ambystoma californiense</i>	California tiger salamander	C	SC	NA	Annual grassland and valley-foothill hardwood habitats, vernal pools and other seasonal water sources adjacent to underground refuges.	Low potential to occur

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
<i>Rana aurora draytonii</i>	California red-legged frog	E	SC	NA	Lowlands and foothills with deep water remaining for at least 11 weeks; water source is usually associated with abundant emergent and/or shoreline vegetation	Low potential to occur
<i>Spea hammondi</i>	Western spadefoot toad	SC	SC	NA	Quiet streams and temporary pools in grassland, open chaparral, and pine-oak woodlands	No potential to occur
Fish						
<i>Acipenser medirostris</i>	Green sturgeon	SC	SC	NA	Rivers and estuaries	Low potential to occur
<i>Eucyclogobius newberryi</i>	Tidewater goby	E	SC	NA	Estuaries and lagoons of coastal creeks with low salinity. Critical habitat for this species is present only in southern California.	Low potential to occur
<i>Hypomesus transpacificus</i>	Delta smelt	T	T	NA	Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, river channels and sloughs	Low potential to occur
<i>Lampetra ayresi</i>	River lamprey	SC	SC	NA	Sacramento and San Joaquin Rivers and Delta; estuaries, rivers and creeks with fine gravel substrates	Low potential to occur
<i>Oncorhynchus kisutch</i>	Southern Oregon/Northern California coho salmon	T	SC	NA	Pacific Ocean, nearshore marine zone and riverine and estuarine areas. Critical habitat has been withdrawn.	Low potential to occur; within range, habitat present
<i>Oncorhynchus mykiss</i>	Central Valley steelhead	T	None	N/A	Pacific Ocean, spawn in coastal streams and rivers, over gravel beds	Low potential to occur
<i>Oncorhynchus tshawytscha</i>	Central Valley fall/late-fall-run <input type="checkbox"/> chinook salmon	T	None	N/A	Pacific Ocean, spawn in large, permanent coastal streams and rivers, over gravel beds	Known to occur

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
<i>Oncorhynchus tshawytscha</i>	Central Valley spring-run ☐ hinook salmon	T	T	N/A	Pacific Ocean, spawn in large, permanent coastal streams and rivers, over gravel beds	Low potential to occur
<i>Oncorhynchus tshawytscha</i>	Winter-run ☐ hinook salmon	T	E	N/A	Pacific Ocean, spawn in large, permanent coastal streams and rivers, over gravel beds	Low potential to occur
<i>Pogonichthys macrolepidotus</i>	Sacramento splittail	T	SC	NA	Fresh water from lower Sacramento and San Joaquin rivers down to Montezuma Slough (may extend to the mouth of Napa River at San Pablo Bay)	No potential to occur
<i>Spirinchus thaleichthys</i>	Longfin smelt	SC	SC	NA	Moderately saline estuaries and lower reaches of rivers	No potential to occur
Invertebrates						
<i>Anthicus antiochensis</i>	Antioch Dunes anthicid beetle	SC	None	NA	Sand deposits along waterways; riverine	Low potential to occur
<i>Anthicus sacramento</i>	Sacramento anthicid beetle	SC	None	NA	Sand deposits along waterways; riverine	Low potential to occur
<i>Branchinecta conservatio</i>	Conservancy fairy shrimp	E	None	NA	Vernal pools	No potential to occur
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	SC	None	NA	Vernal pools	No potential to occur
<i>Branchinecta mesovallensis</i>	Midvalley fairy shrimp	SC	None	NA	Vernal pools	No potential to occur
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	T	None	NA	Valley-foothill riparian; elderberry shrub is the host plant	Moderate potential to occur
<i>Lepidurus packardi</i>	Vernal pool tadpole shrimp	E	None	NA	Vernal pools	No potential to occur
<i>Linderiella occidentalis</i>	California linderiella fairy shrimp	SC	None	NA	Vernal pools	No potential to occur

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
Plants						
<i>Atriplex cordulata</i>	Heartscale	SC	None	1B	Chenopod scrub, meadows and seeps, sandy valley and foothill grassland, typically in saline or alkaline habitat; Apr-Oct	No potential to occur; no habitat present
<i>Atriplex depressa</i>	Brittlescale	SC	None	1B	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools, typically in alkaline or clay habitat; May-Oct	No potential to occur; no habitat present
<i>Atriplex joaquiniana</i>	San Joaquin spearscale	SC	None	1B	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland; typically in alkaline habitat; Apr-Oct	No potential to occur; no habitat present
<i>Astragalus tener</i> var. <i>ferrisiae</i>	Ferris' s milk vetch	SC	None	1B	Vernal meadows and seeps , subalkaline valley and foothill grassland; Apr-May	No potential to occur; no habitat present
<i>Astragalus tener</i> var. <i>tener</i>	Alkali milk vetch	SC	None	1B	Playas, adobe clay valley and foothill grassland, alkaline vernal pools; Mar-Jun	No potential to occur; no habitat present
<i>Cordylanthus palmatus</i>	Palmate-bracted bird' s beak	E	E	1B	Chenopod scrub, alkaline valley and foothill grassland; May-Oct	No potential to occur; no habitat present
<i>Delphinium recurvatum</i>	Recurved larkspur	SC	None	1B	Chenopod scrub, cismontane woodland, alkaline valley and foothill grassland; Mar-May	No potential to occur; no habitat present
<i>Fritillaria pluriflora</i>	Adobe-lily	None	None	1B	Chaparral, cismontane woodland, valley and foothill grassland; Feb-Apr	No potential to occur; no habitat present

**Table 4.4-2
Potential Special-Status Species within the Project Area²**

Scientific Name	Common Name	Status			Habitat/blooming period	Potential to Occur
		Federal ^a	State ^b	CNPS ^c		
<i>Hibiscus lasiocarpus</i>	Rose-mallow	None	None	2	Freshwater marshes and swamps, riparian areas; Jun-Sep	Moderate potential to occur along Putah Creek
<i>Juglans hindsii</i>	Black walnut	None	None	1B	Riparian habitats; Apr-May	Known to occur but all likely horticultural plantings
<i>Lepidium latipes</i> var. <i>heckardii</i>	Heckard's pepper grass	None	None	1B	Alkaline valley and foothill grassland; Mar-May	No potential to occur; no habitat present
<i>Lessingia hololeuca</i>	Woolly headed lessingia	None	None	3	Broadleaved upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland, typically found in clay and serpentinite habitat; Jun-Oct	No potential to occur; no habitat present
<i>Neostapfia colusana</i>	Colusa grass	T	E	1B	Vernal pools; May-Aug	No potential to occur; no habitat present
<i>Sagittaria sanfordii</i>	Sanford's arrowhead	None	None	1B	Shallow freshwater marshes or vernal pools; May-Aug	Known to occur
<i>Tuctoria mucronata</i>	Solano grass	E	E	1B	Valley and foothill grassland, vernal pools; Apr-Aug	No potential to occur; no habitat present

**Table 4.4-2
Potential Special-Status Species within the Project Area**

Notes:

^aFederal Status Codes:

E=Endangered. Species in danger of extinction throughout all or a significant portion of its range.
T=Threatened. Species likely to become endangered within the foreseeable future.
PD=Proposed for delisting
PE=Proposed for listing as endangered.
PT=Proposed for listing as threatened.
C=Candidate for listing.
SC=Special concern species.

^cCalifornia Native Plant Society Status Codes:

1A=Plants presumed extinct in California.
1B=Plants that are rare, threatened, or endangered in California and elsewhere.
2=Plants that are rare, threatened, or endangered in California, but more common elsewhere.
3=Plants about which more information is needed.
NA=Not Applicable

^bCalifornia Status Codes:

E=Endangered. Species whose continued existence in California is in jeopardy.
P=Proposed for listing
T=Threatened. Species likely to become endangered within the foreseeable future.
R=Rare. Plant species, although not presently threatened with extinction, that may become endangered in the foreseeable future.
SC=California Department of Fish and Game species of special concern.

^eDefinitions for potential occurrence in the study area:

Known to occur. Populations have been reported within the last 30 years.
Potential to occur; suitable habitat present. Plants: known to have occurred historically in the study area, but may be extirpated.
Fish: status of population in study area not presently known.
Other wildlife: potential to occur based on presence of potential supporting foraging and/or breeding habitat. Specific occurrence data for the study area may not have been found.
Not likely to occur; no suitable habitat. Supporting habitat not present in the study area.

4.4.2.4 *Project Impacts and Mitigation*

Under the 2003 LRDP, the majority of the impacts to biological resources, such as nesting birds and loss of foraging habitat for special-status species, would occur in the south campus, west campus, and Russell Ranch. The most significant change would be the conversion of approximately 550 acres of cropland/pasture, orchard/vineyard, and ruderal/annual grassland to urban uses. These changes will occur: (1) on the central campus primarily in the vicinity of the Health Sciences District and along the entrance road north of I-80; (2) on the west campus at the sites for the new neighborhood, expansion of the CNPRC, and in the research park area adjacent to the University Airport; (3) on the south campus at the research park and the new support zone; and (4) on the Russell Ranch on lands that would become a new research dairy.

LRDP Impact 4.4-1: Development allowed under the 2003 LRDP could result in the loss of special-status plant species or species that may be added to the special-status plant list in the future.

Significance: Potentially significant

LRDP Mitigation 4.4-1(a): During the project planning phase, the campus shall conduct a rare plant survey if the site is previously undeveloped and is in a valley-foothill riparian, open water pond, riverine, wetland or ruderal/annual grassland or habitat. Surveys shall be conducted by qualified biologists in accordance with the most current CDFG/USFWS guidelines or protocols and shall be conducted during the blooming period of the plant species with potential to occur in the area, as listed in Table 4.4-2. If these surveys reveal no occurrences of any species, then no further mitigation would be required.

LRDP Mitigation 4.4-1(b): Should surveys determine that special-status plant species are present, measures will be taken to avoid the plants and the associated habitat necessary for long-term maintenance of the population. If avoidance is not feasible the campus will provide off-site compensation at a 1:1 ratio. Off-site compensation will include preservation of existing populations at other sites and/or enhancement of the affected species. The campus will preserve either an equal number of the affected plants or an equal area of the affected species habitat. The campus shall also develop and fund the implementation of a plan to manage and monitor the preserve to ensure the long-term survival of the preserved population.

Residual Significance: Less than significant

As discussed in Section 4.4-1, there are only three special status plant species that could occur on campus and only one, northern California black walnut, has been observed on campus. The black walnut trees on campus all have been planted and are considered ornamentals. In addition, the campus is not considered within the historic range of this species, so the tree is not considered a special status species. Habitat for rose-mallow and Sanford's arrowhead are present only along

Putah Creek and the South Fork of Putah Creek. Furthermore, recent rare plant surveys of parcels in the central and west campus areas have resulted in no observations of any rare plants or their potential habitat. Surveys have been done on all large new areas where development may occur. The majority of these areas are intensively farmed with a low likelihood of supporting any rare plants. Most of the grassland species observed during these surveys have been non-native species typical of disturbed and altered landscapes.

While the probability of occurrence of any special status plant species is extremely low, CDFG protocol calls for floristic surveys of all proposed project sites. This protocol is intended to ensure that all species observed are evaluated for their rarity, and that species not originally identified as potentially occurring on a site will be discovered should they occur. Should development under the 2003 LRDP proceed without appropriate surveys of project sites for special status plant species, a significant impact to these species could potentially occur. Implementation of LRDP Mitigation 4.4-1(a) and (b) would reduce this impact to a less-than-significant level.

* * *

LRDP Impact 4.4-2: Development allowed under the 2003 LRDP would result in the conversion of approximately 550 acres of Agricultural Land and Ruderal/Annual Grassland habitat to campus-related development which would result in the loss of general wildlife habitat for resident and migratory species, including foraging habitat for the Swainson's hawk.

Significance: Significant

LRDP Mitigation 4.4-2: The campus shall mitigate the loss of foraging habitat due to development through the establishment of 650 acres of mitigation lands located within or near the Putah Creek Riparian Reserve. Approximately 370 acres of this area shall be converted from existing agricultural uses to restored Valley-Foothill Riparian Woodland and Valley Grassland at Russell Ranch. An additional 280 acres of agricultural land will be protected with a habitat and farmland conservation mechanism either at the Russell Ranch or the Kidwell and McConeghy parcels. These grassland and agricultural lands would be available as foraging habitat for Swainson's hawk and other special-status species such as prairie falcon, golden eagle, wintering or migrating birds and birds of prey that may occasionally forage on campus lands. Restored Valley-Foothill Riparian Habitat would be available as nesting habitat for Swainson's hawk and other birds of prey.

An additional 15-acre mitigation area shall be established along the North Fork Cutoff. This area shall be restored as an oak-grassland and would be a nesting and foraging site for Swainson's hawk and other birds of prey.

Residual Significance: Less than significant

Many species use Agricultural Land and Ruderal/Annual Grassland for food and cover. These include wide-ranging winter and migrating bird species such as the white-tailed kite, ferruginous hawk, prairie falcon, golden eagle, northern harrier, whimbrel, and long-billed curlew that may occasionally forage on campus lands. In addition, resident raptors and the loggerhead shrike forage in the Agricultural Land and Ruderal/Annual Grassland on the campus. The 550 acres of Agricultural Land and Ruderal/Annual Grassland proposed for conversion represent approximately 17.4 percent of the total available Agricultural Land and Ruderal/Annual Grassland on the campus. This loss is small relative to the abundance of remaining Agricultural Land and Ruderal/Annual Grassland habitat on the campus and the tens of thousands of acres of these habitat types adjoining the campus in Solano and Yolo counties. Therefore, the conversion of this habitat would not result in a substantial adverse change in abundance of these species. In addition, the mitigation measures addressed for the Swainson's hawk would also benefit other resident and migratory species; these species have been addressed under LRDP Impact 4.4-1. The impact of the loss of habitat for resident and migratory species other than Swainson's hawk is less than significant due to the wide distribution of these habitat types in the area. Therefore, no mitigation is warranted specifically for these species.

As stated in the environmental setting section, up to 50 Swainson's hawk nests have been observed within ½ mile of the campus in a 10-year period, with approximately 20 active nests per year. Given the abundance of foraging habitat that will remain on the campus and in the region, it is unlikely that the loss of 550 acres of foraging habitat would directly affect any of the breeding pairs located on or near the campus. However, the CDFG has determined that the loss of suitable foraging habitat within a 10-mile radius of recorded nest sites constitutes take of the species pursuant to the CESA. Currently, CDFG guidelines require that one acre of foraging habitat be preserved for every acre lost. The mitigation areas proposed would total 665 acres, including 550 acres for development under the 2003 LRDP and 115 acres for previous development under the 1994 LRDP. Therefore the loss of foraging habitat for the Swainson's hawk associated with implementation of the 2003 LRDP is considered to be a significant impact because it is in conflict with state resource protection laws and guidelines. Implementation of LRDP Mitigation 4.4-2 would reduce this impact to a less-than-significant level.

* * *

LRDP Impact 4.4-3: Development allowed under the 2003 LRDP would result in the conversion of approximately 65 acres of Agricultural Land and Ruderal/Annual Grassland habitat suitable for nesting burrowing owls to campus-related development.

Significance: Potentially significant

LRDP Mitigation 4.4-3(a): The Russell Ranch Mitigation Area shall include at least 195 acres of grassland habitat suitable for use by burrowing owls. Ground squirrels in the mitigation area shall not be subject to control measures and will be allowed to fluctuate in response to local conditions. Artificial burrows may be installed if ground squirrel populations are not providing a sufficient number of burrows to support burrowing owls.

LRDP Mitigation 4.4-3(b): The campus shall survey proposed development areas with potential habitat for the presence or absence of burrowing owls.

LRDP Mitigation 4.4-3(c): The campus shall conduct a pre-construction survey of proposed project sites during the breeding season (from approximately February 1 through August 31), consistent with CDFG guidelines, in the same calendar year that construction is planned to begin. The survey shall be conducted by a qualified biologist to determine if any burrowing owls are nesting on or directly adjacent to any proposed project site. If phased construction procedures are planned for the proposed project, the results of the above survey shall be valid only for the season when it is conducted.

If the pre-construction breeding season survey does not identify any nesting raptor species on the project site, then no further mitigation would be required. However, should any burrowing owls be found nesting on the project site, then LRDP Mitigation 4.4-3(d) shall be implemented.

LRDP Mitigation 4.4-3(d): During the breeding season, the campus, consistent with CDFG guidelines, shall not disturb an occupied burrow while there is an active nest and/or juvenile owls are present. Avoidance shall include the establishment of a non-disturbance buffer zone around the nest site consistent with CDFG guidelines. The buffer zone shall be delineated by highly visible temporary construction fencing. The occupied nest site shall be monitored by a qualified biologist to determine when the juvenile owl is fledged and independent. Disturbance of an occupied burrow shall only occur outside the breeding season and when there is no nest or juvenile owl based on monitoring by a qualified biologist.

Based on approval by CDFG, pre-construction and pre-breeding season exclusion measures may be implemented to preclude burrowing owl occupation of the project site prior to project-related disturbance. These include the following measures:

- Obviously inactive burrows in the project area will be closed. Active or potentially active ground squirrel burrows will be monitored to confirm use by ground squirrels and not by burrowing owls before ground squirrels are removed and the burrow is closed. One-way doors will be used on active burrows if use by ground squirrels cannot be confirmed.
- The owls will be displaced from the occupied burrows according to the CDFG burrowing owl guidelines. The owls will be displaced from their burrows by installing one-way exit doors in occupied or potential burrows within the area of disturbance. After 48 hours with the doors in place, the burrows will then be closed to prevent reoccupation by owls.

- Where feasible, artificial burrows will be provided in adjacent suitable habitat consistent with CDFG guidelines.

Residual Significance: Less than significant

Surveys conducted on the campus in the past 10 years indicated that lands within future development areas have supported 2-5 pairs of burrowing owls; 2-3 pairs in the Health Sciences District and 2 pairs on the west campus at the proposed location for the new neighborhood. The campus has managed the lands in and around in the Health Science District to discourage establishment of new pairs. Without this management strategy, the number possibly could have been higher. Therefore, for purposes of this analysis it is assumed that the potential habitat of up to 10 pairs of burrowing owls could be affected by development proposed under the LRDP. The California Burrowing Owl Consortium, associated with the Santa Cruz Predatory Bird Research Group, has developed mitigation guidelines for burrowing owls. These guidelines state that each pair of burrowing owls requires 6.5 acres of foraging habitat. Thus, the potential loss of burrowing owl habitat is estimated to be approximately 65 acres. The guidelines recommend that three times the amount of affected habitat be included for off-site mitigation. Therefore, the mitigation area would be 195 acres. Potential impacts to nesting burrowing owls could result if the owls become established on a proposed project site. Pursuant to Section 3503.5 of the Fish and Game Code of California:

It is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or egg of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

Direct take of an active raptor nest site would be in violation of Section 3503.5 and is, therefore, considered to be a potentially significant impact.

Implementation of LRDP Mitigations 4.4-3(a), (b), (c), and possibly (d) would reduce this impact to a less-than-significant level.

* * *

LRDP Impact 4.4-4: Development allowed under the 2003 LRDP could result in the failure of nesting efforts by nesting raptors, including Swainson's hawks or other birds of prey.

Significance: Potentially significant

LRDP Mitigation 4.4-4(a): The campus shall conduct a pre-construction survey of trees on and adjacent to a project site during the raptor breeding season (approximately March 1 to August 31). Additionally, the campus shall conduct surveys within a ½-mile radius of the site to determine the presence or absence of any nesting Swainson's hawks. The surveys shall be conducted by a qualified biologist during the same calendar year that the proposed activity is planned to begin to determine if any nesting birds-of-prey would be affected. If phased construction procedures are planned for the proposed activity, the results of the above survey shall be valid only for the season when it is conducted.

If any Swainson's hawks are nesting within a one-half-mile radius of the project site or if other raptors are nesting in, on or adjacent to the project site, a qualified biologist shall determine the potential for disturbance to nesting raptors, including Swainson's hawks. If the biologist determines that there is a significant potential for disturbance, the campus shall implement feasible changes in the construction schedule or make other appropriate adjustments to the project in response to the specific circumstances. If feasible project changes are not readily identifiable, the campus will consult with CDFG to determine what actions should be taken to protect the nesting efforts. If, after five years, a previously recorded nest site remains unoccupied by a Swainson's hawk, it will no longer be considered as a Swainson's hawk nest site subject to this mitigation.

LRDP Mitigation 4.4-4(b):

The campus shall continue to conduct annual surveys to determine the location of nesting Swainson's hawks and other birds of prey on the campus outside the Putah Creek corridor. If nesting Swainson's hawks are found during the survey at a previously unknown location within one-half mile of a project site and/or at a location closer to the project or more visually exposed to the project site than a nearby previously documented site, a qualified biologist shall, prior to project construction, determine the potential for disturbance to nesting Swainson's hawks. If the biologist determines that there is a significant potential for disturbance, the campus shall implement feasible changes in the construction schedule or make other appropriate adjustments to the project in response to the specific circumstances (e.g. relocating noisy equipment or creating temporary sound barriers).

The implementation of LRDP Mitigations 4.4-4(a) and (b) shall be conducted under the supervision of a biologist whose qualifications include:

- A bachelor's degree in biology or a related field;
- Two years of field experience related to nesting raptors; and
- Prior construction monitoring experience.

Further:

- All decisions of the qualified biologist shall be made in consultation with the California Department of Fish and Game;

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- Monitoring shall be conducted for a sufficient time (minimum of 3 consecutive days following the initiation of construction) to verify that the nesting pair does not exhibit significant adverse reaction to construction activities (i.e., changes in behavioral patterns, reactions to construction noise, etc.); and
- Nest site monitoring will continue for a minimum of once a week through the nesting cycle at that nest.

Residual Significance: Less than significant

Many species of raptors besides burrowing owls have been observed on the campus during breeding season and, therefore, likely use the on-site habitats for nesting. Tree removal or tree pruning could result in the loss of active nest sites for the Swainson's hawk or more common species such as the white-tailed kite, red-tailed hawk, red-shouldered hawk or American kestrel. The location of nest trees varies from year-to-year depending on the site selected by the nesting birds. Therefore, these locations need to be determined annually.

The CDFG has established a ½ mile radius around known Swainson's hawk nests as a zone where potential disturbances could disrupt nesting efforts. In many instances, Swainson's hawks are tolerant of human activity as evidenced by nesting on the UC Davis campus and in the City of Davis, in urban locations adjacent to homes, business, railroad tracks, and ongoing agricultural operations and construction activities. However, the operation of machinery and earth moving activities in close proximity to an active Swainson's hawk nest could cause nest abandonment or other types of reproductive failure. Therefore, disturbance to a nest site resulting in nest failure or abandonment of the nesting effort is considered to be a significant impact. Pursuant to Section 3503.5 of the Fish and Game Code:

It is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or egg of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

Direct take of an active raptor nest site would be in violation of Section 3503.5, or CESA if the Swainson's hawk were involved, and is, therefore, considered to be a potentially significant impact. Implementation of LRDP Mitigations 4.4-4(a) and (b) would reduce this impact to a less-than-significant level.

* * *

LRDP Impact 4.4-5: Development allowed under the 2003 LRDP would result in the loss of active nest sites for Swainson's hawk.

Significance: Potentially significant

LRDP Mitigation 4.4-5: Mitigation 4.4-4(a) and (b) will be implemented, including pre-construction survey of trees on and adjacent to a project site during the raptor breeding season (approximately March 1 to August 31). If a Swainson's hawk nest tree is present, the tree will be removed outside the nesting season (March-May).

Residual Significance: Less than significant

Many species of raptors besides burrowing owls have been observed on the campus during breeding season and, therefore, likely use the on-site habitats for nesting. Tree removal or tree pruning could result in the loss of active nest sites for the Swainson's hawk or more common species such as the white-tailed kite, red-tailed hawk, red-shouldered hawk or American kestrel. The location of nest trees varies from year-to-year depending on the site selected by the nesting birds. Therefore, these locations need to be determined annually.

The CDFG has established a ½ mile radius around known Swainson's hawk nests as a zone where potential disturbances could disrupt nesting efforts. In many instances, Swainson's hawks are tolerant of human activity as evidenced by nesting on the UC Davis campus and in the City of Davis in urban locations adjacent to homes, business, railroad tracks, and ongoing agricultural operations and construction activities. However, the operation of machinery and earth moving activities in close proximity to an active Swainson's hawk nest could cause nest abandonment or other types of reproductive failure. Therefore, disturbance to a nest site resulting in nest failure or abandonment of the nesting effort is considered to be a significant impact. Pursuant to Section 3503.5 of the Fish and Game Code:

It is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or egg of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

Direct take of an active raptor nest site would be in violation of Section 3503.5, or CESA if the Swainson's hawk were involved, and is, therefore, considered to be a potentially significant impact. Implementation of LRDP Mitigations 4.4-4(a) and (b) and LRDP Mitigation 4.4-5 would reduce this impact to a less-than-significant level.

* * *

LRDP Impact 4.4-6: Development allowed under the 2003 LRDP would result in the loss of potential habitat for the VELB.

Significance: Potentially significant

LRDP Mitigation 4.4-6(a): During the project design stage and as a condition of project approval, the campus shall:

- Conduct a project-specific survey for all potential VELB habitat, including a stem count and an assessment of historic or current VELB use; and
- Avoid and protect all potential VELB habitat within a natural open space area where feasible

LRDP Mitigation 4.4-6(b): For those areas where avoidance is infeasible, the Russell Ranch Mitigation Area shall include approximately 20 acres within and adjacent to the riparian corridor of Putah Creek and within and adjacent to the existing drainage in the northeast corner of the site that will be used as a receptor site for transplanted elderberry shrubs and the associated elderberry seedlings and other native plant seedlings required to be planted in accordance with the USFWS VELB Mitigation Guidelines (USFWS 1996). The site is estimated to support between 100 and 500 transplanted

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elderberry shrubs, depending on the size and number of stems on the shrubs at the time they are transplanted.

Residual Significance: Less than significant

Surveys have been conducted for the presence of elderberry shrubs, the host plant species for the VELB, over a large portion of the campus including the major areas proposed for new development (Figure 4.4-2). Elderberry shrubs are known to occur in the Valley-Foothill Riparian habitat along Putah Creek and at other locations on the campus. While elderberry shrubs may become established elsewhere as seeds are dispersed by birds and other means, this is not associated with their typical riparian habitat. Therefore, potential habitat for the VELB may be established in the future on project sites that currently do not support any elderberry shrubs. No exit holes or VELB have been observed during any of the surveys on the urban and agricultural developed portion of campus and areas proposed for development under the 2003 LRDP.

Survey Area	Shrubs
Neighborhood Master Plan Site and utility connections	2
RMI	0
I-80 Research Park	12
West Campus Research Park	5
South Campus Support Zone	20
Equestrian Center Relocation Site	0
Multi-Use Stadium	0
Chilled Water Facility Expansion	0
Health Science Southern Expansion	9
California National Primate Research Center	0

Even though VELB has not been observed in any of the elderberry shrubs on the developed portion of campus, the USFWS considers all elderberry shrubs within the historic range of VELB as potential habitat for this federally-listed threatened species. Presently, destruction of elderberry stems greater than one inch in diameter is considered “take” under FESA and requires mitigation pursuant to USFWS guidelines. VELB exit holes on the stems of elderberry shrubs have been found on over 20 shrubs within or immediately adjacent to the Putah Creek Riparian Reserve on the main campus and the Russell Ranch (Sid England, personal communication with Teresa Talley and Lynn Kimsey, August 2003). Lands within the reserve are designated for Teaching and Research Open Space in the 2003 LRDP.

Implementation of LRDP Mitigations 4.4-6(a) and (b) would reduce this impact to a less-than-significant level.

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LRDP Impact 4.4-7: Development allowed under the 2003 LRDP could result in the loss of potential habitat for the northwestern pond turtle from drainage improvement projects, bank stabilization measures and landscape maintenance activities within Riverine habitat along Putah Creek and the Arboretum Waterway.

Significance: Potentially significant

LRDP Mitigation 4.4-7: The campus shall implement avoidance and minimization measures for the northwestern pond turtle, including but not limited to:

- Pre-construction surveys prior to any disturbance of the project site
- Installation of silt fencing to prevent any pond turtles from entering the construction area
- If work is performed in the water, seining of the area surrounding the site to relocate any northwestern pond turtles present

Residual Significance: Less than significant

Pond turtles are known to occur along the Arboretum Water and along Putah Creek. Since only small portions of the riparian corridor would be subject to disturbance, the potential take of the pond turtle is expected to be low. Implementation of LRDP Mitigation 4.4-7 would reduce this impact to a less-than-significant level.

* * *

LRDP Impact 4.4-8: Development allowed under the 2003 LRDP could result in the loss or adverse modification of natural wetlands or other waters of the U.S. that fall under the jurisdiction of the ACOE and/or CDFG.

Significance: Potentially significant

LRDP Mitigation 4.4-8(a): During the project design phase, the campus shall conduct a wetlands delineation of the project site if wetlands are potentially present. The wetland delineation shall be verified by the ACOE.

Should no wetland habitats or natural drainages be delineated on the site then no further mitigation shall be required. However, if any jurisdictional wetland habitats or natural drainages are delineated on a project site, then LRDP Mitigation 4.4-8(b) shall be required.

LRDP Mitigation 4.4-8(b): For projects that involve the fill of jurisdictional wetlands, the campus shall implement the following mitigation program that will ensure no net loss of wetland functions and values. To the

extent feasible, the campus will avoid filling wetlands by redesigning the project to promote environmentally sensitive siting and design. If avoidance is not feasible, the campus shall minimize the fill acreage. If neither of these options is feasible, the wetlands will be mitigated for at a 3:1 ratio. This ratio will include both creation and preservation, with creation equaling at least a 1:1 ratio. To ensure no net loss of wetlands, the mitigation should include wetland enhancement as well. This would include monitoring, cleanup, and maintenance of preserved wetland habitats within and adjacent to the campus, as necessary.

LRDP Mitigation 4.4-8(c): The campus shall obtain the necessary ACOE, CDFG, and RWQCB permits prior to filling or other adverse modifications of any verified jurisdictional water of the U.S., or alteration, filling or modification of the channel, bed or bank of Putah Creek, South Fork of Putah Creek, Arboretum Waterway or any other natural drainage regulated under Section 1600 of the CDFG code.

Residual Significance: Less than significant

The most significant wetland features (waters of the U.S) on the campus are the Putah Creek and South Fork Putah Creek drainages, and the Arboretum Waterway. No modifications of Putah Creek or South Fork of Putah Creek are planned under the 2003 LRDP. However, the Arboretum Waterway may be subject to disturbance from drainage improvement or maintenance projects, bank stabilization measures and landscape maintenance activities. Putah Creek also could be affected by drainage improvement or maintenance projects. Small fills can be covered under ACOE Nationwide permits. However, impacts to wetlands will need to be determined on a project-by-project basis. Therefore, impacts to wetlands resulting from the 2003 LRDP are considered to be potentially significant.

Implementation of LRDP Mitigations 4.4-8(a) through (c) would reduce this impact to a less-than-significant level.

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LRDP Impact 4.4-9: Development of the 2003 LRDP would not interfere substantially with the movement of any native resident or migratory fish, or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Significance: Less than significant

LRDP Mitigation: Mitigation is not required.

The Putah Creek corridor is the principal corridor for the movement of native resident or migratory fish and wildlife through the UC Davis campus. It is the regional connection between the hills in western Yolo County and the Sacramento River. The 2003 LRDP identifies campus

lands along Putah Creek for Teaching and Research Open Space uses, a designation that is compatible with maintenance of this corridor. Therefore, this impact is less than significant.

* * *

LRDP Impact 4.4-10: Development of the 2003 LRDP could potentially result in an adverse effect, either directly or through habitat modification, on special status fish species.

Significance: Potentially significant

LRDP Mitigation 4.4-10(a): Any work conducted within the creek will be constructed outside of the migration season (September 1 and October 15) to the extent feasible.

LRDP Mitigation 4.4-10(b): If construction activities are to be conducted in the water during the migration season:

- Silt curtains will be used at the construction location.
- Water quality will be evaluated during and after all in-water construction activities. The performance criteria shall be no degradation of downstream water quality compared to upstream water quality. Water quality shall be evaluated by a qualified environmental monitor using appropriate qualitative or quantitative measurements. Remedial measures shall be implemented if downstream water quality is degraded. Remedial measures shall include the following:
 - Modification or suspension of in-water construction activities as appropriate;
 - Installation of additional sediment control devices; and
 - Additional monitoring to evaluate the water quality degradation and identify corrective measures.
- The University shall coordinate with the California Department of Fish and Game, the Regional Water Quality Control Board, and the U.S. Army Corps of Engineers as appropriate to determine whether additional remedial measures are required.

LRDP Mitigation 4.4-10(c): Silt fencing will be installed as appropriate along the edges of the creek to prevent excess fill from entering the water. All silt fences will be maintained and checked for efficacy as necessary, but not less frequently than one time per week.

Residual Significance: Less than significant

As discussed in Section 4.4.1.4, fall/late-fall-run Chinook salmon have been known to occur in lower Putah Creek. Although steelhead has not been documented in the creek, there is potential habitat for this species in Putah Creek. No modification of the creek is planned under the 2003 LRDP that could affect the passage of these species. However, implementation of the 2003

LRDP would involve two actions that could potentially affect special status fish species that may be present in the creek.

To discharge storm water from the proposed Neighborhood, a new storm drain outfall would be constructed on the bank of the creek or an existing storm drain outfall on Hopkins Road would be enlarged. In addition, maintenance or modification of existing campus outfalls could be necessary in the future. Construction or modification of an outfall could potentially result in the discharge of a small amount of silt in the creek that could adversely affect special status fish species should they be present in the area at the time of construction. To avoid impacts to special status fish species, LRDP Mitigation 4.4-10 (a-c) would be implemented which include scheduling construction work outside the migration period, use of silt curtains if construction is to occur in water during the migration period, and use of silt fences to minimize discharges of sediment into the creek from upland areas.

Fish species could also be affected if high concentrations of pollutants were present in waters from the campus discharged into Putah Creek. All outfalls on Putah Creek, including the WWTP outfall that discharges treated effluent and other outfalls associated with industrial and research sites, are operated under waste discharge requirements issued by the RWQCB. These permits place limits on the types and concentrations of pollutants that can be discharged to the creek. As the permit limits are designed to protect the beneficial uses of the creek, no adverse impacts to fish species would occur from these discharges that would continue under the 2003 LRDP. As discussed in Section 4.7, Hydrology and Water Quality, the development under the 2003 LRDP would be substantially the same as the existing development on the campus, therefore the quality of discharges from these outfalls should not change under the 2003 LRDP. Although storm drain outfalls are not regulated under permits, the campus has begun activities to comply with the NPDES Phase II regulations that govern storm water discharges. Implementation of the campus Storm Water Management Program will help avoid water quality impacts in Putah Creek from discharge of storm water.

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- LRDP Impact 4.4-11:** Development under the 2003 LRDP could result in the removal of trees recognized to meet the campus' standards for important trees, including:
- a. *Heritage Trees:* Healthy valley oak trees with trunk diameters of 33 inches or greater at a height of 54 inches from the ground.
 - b. *Specimen Trees:* Healthy trees or stands of trees that are of high value to the campus due to their size, species, extraordinary educational and research value, and/or other exceptional local importance.

Significance: Potentially significant

LRDP Mitigation 4.4-11: Before a project is approved under the 2003 LRDP, the campus will perform a tree survey of the project site. Grounds, the Office of Resource Management and Planning, and the Office of Architects and Engineers will provide input about tree classifications and will modify project design to avoid important

trees if feasible. If a project cannot avoid an important tree, the following will apply:

- a. If a project would necessitate removal of a **Heritage Tree**, no mitigation would be available to fully mitigate the impact, and the impact would be significant and unavoidable. However, implementation of Mitigation 4.4-2 would restore Valley Foothill Riparian Woodland habitat at Russell Ranch, and plantings in this area would include valley oaks.
- b. If a project would necessitate removal of a **Specimen Tree**, the project would relocate the tree if feasible, or would replace the tree with the same species or species of comparable value (relocation or replacement should occur within the project area if feasible). This would reduce the impact to a less-than-significant level.

Residual Significance:

- a. Significant and unavoidable
- b. Less than significant

Few, if any, Heritage Trees are likely to occur within areas planned for development under the 2003 LRDP, but Specimen Trees are likely to occur at various locations on campus. In accordance LRDP Mitigation 4.4-11, campus departments (including Grounds, the Resource Management and Planning, and Architects and Engineers) would coordinate with each other to perform a tree survey, identify tree classifications, and modify project designs to avoid important trees if feasible. Relocation of Heritage Trees is considered infeasible because the chance of success is low. In addition, because of the age, rarity, and high local value associated with Heritage Trees, replacement of these trees is also not considered reasonable. Therefore, the impact of removing these trees is considered significant and unavoidable. However, implementation of LRDP Mitigation 4.4-2 would help to reduce this effect. If relocated or replaced as required in LRDP Mitigation 4.4-11, removal of Specimen Trees would be considered a less-than-significant impact.

* * *

4.4.2.5 Cumulative Impacts and Mitigation Measures

LRDP Impact 4.4-12: Development allowed under the 2003 LRDP would contribute 550 acres to the cumulative loss in the region of over 1,500 acres of Agricultural Land and Ruderal/Annual Grassland habitat for resident and migratory wildlife species including Swainson's hawks and burrowing owls.

Significance: Significant

LRDP Mitigation 4.4-12: Implementation of LRDP Mitigations 4.4-1(a), (b), and (c); 4.4-2(a) and (b); 4.4-3(a) and (b); and 4.4-7(a) in combination with the Yolo County NCCP and Solano County HCP, including compliance with the regulatory and permitting requirements imposed by the USFWS and the CDFG.

Residual Significance: Significant and unavoidable

Growth in the City of Davis and other cities of Yolo and Solano counties would convert approximately over 1,000 acres of Agricultural Land and Annual Grassland habitat to urban uses, as a result of which there would be a cumulative loss of habitat for resident and migratory species. The continued loss of these habitat types around the campus and the City of Davis also would contribute to the regional loss of foraging habitat for the Swainson's hawks that may contribute to this species' decline in California. The burrowing owl also would be subject to a substantial loss of habitat as development occurs in the region.

Yolo County is preparing a Natural Communities Conservation Plan that proposes to compensate for habitat loss on a 1:1 basis. Solano County is preparing a HCP to address important biological resources. UC Davis will compensate for habitat loss on campus by developing and implementing habitat mitigation on the UC Davis campus. The campus will therefore not contribute to this cumulative impact. However, the regional conversion of habitat around the campus, the City of Davis and throughout Yolo and Solano Counties to urban development is considered a substantial reduction in the acres of habitat for native wildlife. Implementation of the Yolo County NCCP and Solano County HCP may reduce these effects to a less-than-significant level. However, UC Davis cannot guarantee implementation; therefore, the impact remains significant and unavoidable.

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LRDP Impact 4.4-13: Development allowed under the 2003 LRDP could contribute to the cumulative loss in the region of wetland and riparian habitat for resident and migratory wildlife species and special status plants.

Significance: Significant

LRDP Mitigation 4.4-13: Implementation of LRDP Mitigation Measures 4.4-1(a)-(b) and 4.4-8(a)-(c) in combination with the Yolo County NCCP and Solano County HCP, including compliance with the regulatory and permitting requirements imposed by the USFWS and the CDFG.

Residual Significance: Significant and unavoidable

Growth in the City of Davis and other cities of Yolo and Solano counties could convert wetland and riparian habitat to urban uses, as a result there could be a cumulative loss of habitat for resident and migratory wildlife species and special status plants.

The most significant wetland features (waters of the U.S) on the campus are the Putah Creek and South Fork Putah Creek drainages, and the Arboretum Waterway. No modifications of Putah Creek or South Fork of Putah Creek are planned under the 2003 LRDP with the exception of drainage improvements or maintenance. The Arboretum Waterway may be subject to disturbance from drainage improvement projects, bank stabilization measures and landscape maintenance activities. Small fills can be covered under ACOE Nationwide permits. However, impacts to wetlands will need to be determined on a project-by-project basis.

UC Davis will compensate for habitat loss on campus by implementing the mitigation measures 4.4-1(a)-(b) to mitigate for impacts to special-status plants 4.4-8(a)-(c) ensure no net loss of

wetland functions and values. No campus mitigation is required for impacts to migratory corridors. Implementation of the Yolo County NCCP and Solano County HCP may reduce these effects to a less-than-significant level. However, UC Davis cannot guarantee implementation; therefore, the impact remains significant and unavoidable.

* * *

LRDP Impact 4.4-14: Development allowed under the 2003 LRDP could contribute to the cumulative loss of valley elderberry beetle habitat.

Significance: Significant

LRDP Mitigation 4.4-14: Implementation of LRDP Mitigations 4.4-6(a) and (b), in combination with the Yolo County NCCP and Solano County HCP, including compliance with the regulatory and permitting requirements imposed by the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

Residual Significance: Significant and unavoidable

At present, approximately 35 elderberry shrubs would be affected by proposed new development on the campus. Other shrubs within the existing developed areas may also be affected. LRDP Mitigation 4.4-6(a)-(b) could reduce this campus impact to a less-than-significant level. The loss of VELB habitat under the 2003 LRDP would most likely be the loss of up to 100 plants. Other impacts of this nature may occur in the region from other development projects outside the UC Davis jurisdiction. Development in Yolo and Solano counties also could contribute to impacts to VELB. Implementation of the Yolo County NCCP and Solano County HCP may reduce these effects to a less-than-significant level. However, UC Davis cannot guarantee implementation; therefore, the impact remains significant and unavoidable.

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LRDP Impact 4.4-15: Development of the 2003 LRDP would not contribute to a cumulative adverse impact on special status fish species.

Significance: Less than significant

LRDP Mitigation: Mitigation is not required.

As discussed under LRDP Impact 4.4-10, the two fish species of concern to the campus are fall/winter run Chinook salmon and steelhead. Implementation of the 2003 LRDP would not make any adverse modifications to the Putah Creek corridor that could obstruct fish passage or cause other effects from construction activities within the waters of Putah Creek during the migration season.

In 2000, UC Davis, the Putah Creek Council, and the City of Davis reached an accord with Solano County parties ending a lawsuit over the adequacy of releases from the Solano Project into lower Putah Creek. One result of the agreement is that overall flows were increased. A second result was that specific flows designed to assist passage of anadromous fish into and out of Putah Creek are now required. Lastly, the Lower Putah Creek Coordinating Committee was formed. This committee includes five members from Solano County and five members from Yolo county including a UC Davis representative. The committee has an annual budget for fish and wildfire monitoring and habitat improvement project, and has hired a full-time Putah Creek

Streamkeeper to monitor the creek, acquire grant funds, and oversee monitoring and habitat improvement projects. As a result, habitat conditions in Putah Creek for both resident and migratory native fish are improving.

With respect to point source discharges on the reach of Putah Creek through and adjacent to the campus, the campus is the only discharger and there are no other permitted outfalls on Putah Creek. Although the volume of discharge into the creek may increase under the 2003 LRDP, the quality of discharge would remain the same as under current conditions and therefore there would not be any project-related adverse water quality impacts that could potentially cumulate with other discharges to result in cumulative adverse impacts that could be significant. Tertiary treated discharge from the campus' new WWTP is of far better quality than discharge from the old WWTP that was decommissioned in 2000. The results of toxicity testing using bioassays in 100 percent raw effluent from the old WWTP showed that the old plant generally met EPA standards. A yearly toxicity study of the Cache Creek and Putah Creek watersheds (1998-1999), which included sampling stations upstream and downstream of the old campus WWTP discharge to Putah Creek, as well as samples of 100 percent effluent from the old WWTP, concluded that the minor levels of toxicity in the Putah Creek Watershed were associated with watershed-wide events not related to discharge from the UC Davis WWTP (CRWQCB 2000).

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