4.2 BIOLOGICAL RESOURCES

4.2.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) provides an evaluation of the biological resources, including special-status species and sensitive habitats, on and in the immediate vicinity of the campus site, and describes the impacts to these resources that could result from campus development pursuant to the 2020 LRDP.

Data Sources

Information presented in this section is based on the following data sources:

- California Department of Fish and Wildlife, California Natural Diversity Database (CNDDB) records search of the Winton, Yosemite Lake, Haystack Mountain, Atwater, Merced, Planada, Sandy Mush, El Nido, and Plainsburg U.S. Geological Society (USGS) 7.5 Minute Topographic Quadrangles (California Natural Diversity Database 2018 and 2019);
- California Native Plant Society (CNPS) Rare Plant Program Online Inventory of Rare and Endangered Plants of California (California Native Plant Society 2018);
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) list of endangered, threatened, and proposed species for the project area obtained from the USFWS IPaC website (USFWS 2018b);
- Biological Assessment Clean Water Act (CWA) Section 404 permit applications for UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project (County of Merced 2002);
- Supplement to the Biological Assessment for the UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project (Jones & Stokes 2002a);
- Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1 and Campus Buildout (USFWS 2002);
- 2008 Supplement to Biological Assessment for the University of California, Merced Campus and University Community North (Airola 2008a);
- Compensatory Wetland Mitigation and Monitoring Plan (Gibson & Skordal 2008);
- Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (Airola 2008b);
- Amended Biological Opinion for the University of California, Merced Campus and Community North Project (USFWS 2009);

- Second Amended Biological Opinion for the University of California, Merced Campus and Community North Project (USFWS 2016a);
- Modification of Formal Consultation for the UC Merced Project, Merced County, California (USFWS 2016b);
- Incidental Take Permit for the University of California, Merced Campus and Community North Project (California Department of Fish and Game 2011a);
- Amendment No. 1 to the Incidental Take Permit for the University of California, Merced Campus and Community North Project in Merced County (California Department of Fish and Game 2011b);
- Amendment No. 2 to the Incidental Take Permit for the University of California, Merced Campus and Community North Project (California Department of Fish and Wildlife 2015); and
- Numerous other survey reports, as referenced in this section, associated with the preconstruction survey requirements for the ongoing campus expansion (2020 Project).

Field Surveys

Since the inception of the UC Merced Campus and University Community Project, numerous biological surveys have been conducted on the project site and in the project vicinity. General types of surveys conducted include botanical surveys, wildlife surveys, and wetland delineations. Surveys were conducted by ICF Jones & Stokes, EIP Associates, Vollmar Consulting, URS, Gibson and Skordal, Salix Consulting, LSA, Live Oak Associates, Sequoia Ecological Consulting, Padre Associates, PES Environmental, Inc., UC Merced Natural Reserve System staff, and the UC Merced Campus Biologist. **Table 4.2-1, Biological Resource Surveys in the Project Site and Vicinity**, contains a summary of each of these surveys.

4.2.2 Environmental Setting

The proposed project is located in the San Joaquin Valley in eastern Merced County, a transition zone between the Sierra Nevada foothills to the east and the flat San Joaquin Valley floor to the west. The campus is located about 2 miles northeast of the City limits of Merced, southeast of Lake Yosemite Regional Park (see **Figure 3.0-2** in **Section 3.0, Project Description**).

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
February 4-April 16, 1999	Vernal pool branchiopod surveys	1999 (10,360 acre) UC Merced / University Community Planning Area	EIP Associates (1999a)
February 8, 21, and 22, and March 8-11, and 20-26, 1999	California tiger salamander larval surveys	Vernal pool grasslands north of Yosemite Avenue, vernal pools in the upper portion of Black Rascal Creek, seasonal wetlands associated with the headwaters of Cottonwood Creek, vernal pool grasslands located north of Cardella Road.	URS Corporation (UC Merced 2001)
February 8-March 26, 1999	Vernal pool branchiopod surveys	Vernal pool grasslands located north of Cardella Road and ponded water along Arboleda Drive, Yosemite Avenue, Kibby Road, South Orchard Drive, Olive Avenue, and Bear Creek Drive	URS Corporation (1999)
February 8-March 26, April 12, and May 3, 1999 and January 18, and 25, and June 19-20, 2000	Avian surveys	Campus Parkway (including northern half of 2001 University Community Plan site)	URS Corporation (UC Merced 2001)
Various surveys between April 19 June 16, and July 6-August 27, 1999	Botanical surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (1999b)
April 19 and June 9 and 10, 1999 and April 17, May 9, and 24, and September 15, 2000	Botanical surveys	Campus Parkway (including northern half of 2001 University Community Plan)	URS Corporation (UC Merced 2001)
Between April 19-June 16, 1999 and July 6-August 27, 1999	Avian surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (UC Merced 2001)
May and June 1999 and April and May 2000	Wetland delineation	UC Merced/University Community Planning Area	EIP Associates (2000)
May 18-19, 1999 and June 19-20, 2000	Swainson's hawk surveys	Campus Parkway (including northern half of 2001 University Community Plan) and 10-mile radius	URS Corporation (UC Merced 2001)
July 12-23, July 28-August 8, and August 16-27, 1999	San Joaquin kit fox protocol surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (1999c)
January 18 and 25, 2000	California tiger salamander nocturnal surveys	Study area included areas north of Bellevue Road and west of Lake Road, south of the Flying M Ranch dirt road, east of Lake Road, grassland located north of the golf course, east of Lake Road, east of Lake Road between the golf course and the Flying M Ranch dirt road	URS Corporation (UC Merced 2001)
February 1- March 16, 2000	Vernal pool branchiopod protocol surveys	Campus Parkway study area	URS Corporation (2000)
February 14-April 29, 2000	Vernal pool branchiopod protocol surveys	Subset of 1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (2001a)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
March 30-April 7, April 18-19, and May 8-11, 2000	California tiger salamander larval surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area in the larger marshes located adjacent to Merced Irrigation District's Le Grand and Main Canals	EIP Associates (2001d)
August 9-23, 2000	San Joaquin kit fox protocol surveys	Campus Parkway (including northern half of 2001 University Community Plan)	URS Corporation (UC Merced 2001)
February 9 to mid-April, 2001	Vernal pool branchiopod surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
Various dates during February 14 through April 12, 2001	Wetland delineation	2001 (2,396 - acre) University Community Plan site	EIP Associates (2001e)
Early March to mid-June, 2001	Avian surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
March 27-May 10, 2001	California tiger salamander surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
April 2-3, May 8, and June 26, 2001	Botanical surveys	2001 (2,396 acre) University Community Plan site	EIP Associates (2001b)
April 4-mid-July, 2001	Botanical surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe]) and various other private lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
April 30-June 7, 2001	Small mammal trapping	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
Various dates in June and July 2002	Wetland assessment	Eastern Merced County	EIP Associates (2002)
Various dates in 2007 (surveys excluded vernal pool branchiopods) and 2008 (surveys included all species)	Surveys for listed vernal branchiopods, California tiger salamander, western spadefoot, western burrowing owl and other raptors, and special-status plants.	Tier 2 mitigation land (Robinson Ranch)	Vollmar Consulting (2008)
August 20 and 21, 2007 and February 4, 2008	Wetland delineation	University Community Land Company (UCLC) (229 acres) and Hunt Property (80 acres) within the 2008 University Community site	Gibson & Skordal, LLC (2008)
May 23, 2008	General site visit	2008 (2,925 acre) Long Range Development Plan (LRDP) and University Community Project Site	ICF Jones & Stokes
February 15, 2011	San Joaquin kit fox preconstruction survey	North Bowl Parking Lot Project site	PES Environmental, Inc.
November 2011 - January 2012	Burrowing owl and San Joaquin kit fox preconstruction surveys	Campus Phase 6 Project site	Live Oak Associates, Inc. (2012a)
March 2014 – May 2015	Camera trapping for San Joaquin kit fox consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands and Campus Build-Out Lands	Merced Vernal Pools and Grassland Reserve staff (UC Merced 2015x)
April 4, 2012 – May 15, 2012	Succulent owl's clover preconstruction surveys	Campus Phase 6 Project site	Live Oak Associates, Inc. (2012b)
April 2015	Presence/absence surveys for California tiger salamander larvae consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	Vollmar Natural Lands Consulting (2015)
September and October 2015	Colusa grass and San Joaquin Valley Orcutt grass surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2015b)
November 2015	San Joaquin kit fox preconstruction survey and biological monitoring for artificial kit fox den installation	Tier 1(a) Conservation Lands	LSA (2015c)
November 2015	Little Lake/North Basin and South Basin habitat assessment	Little Lake/North Basin and South Basin within the 2020 Project site	Salix Consulting (2016)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
February 2016	Preconstruction San Joaquin kit fox survey for the California tiger salamander exclusion fence installation	2020 Project site perimeter	Padre Associates (2016a)
February 2016	Preconstruction nesting bird surveys for the California tiger salamander exclusion fence installation	2020 Project site perimeter	LSA (2016b)
February and March 2016	Protocol wet season vernal pool crustacean surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2017a)
February, April, and May 2016	Presence/absence surveys for California tiger salamander larvae consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2016b)
April, May, June, and August 2016	Preconstruction surveys for succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass	2020 Project site	LSA (2016a)
April, June, September, and October 2016	Succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2016d)
May 2016	Preconstruction San Joaquin kit fox survey and camera trapping	North Bowl Parking Lot Expansion site	Padre Associates (2016b)
May 2016 – November 2016	Camera trapping for San Joaquin kit fox consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	Merced Vernal Pools and Grassland Reserve staff (UC Merced 2017b)
August 2016	Preconstruction surveys for nesting birds, burrowing owl, Swainson's hawk, California tiger salamander, western pond turtle and San Joaquin kit fox	2020 Project site	Sequoia Ecological Consulting (and Padres Associates by reference) (2016b)
October 2016	Preconstruction survey for western pond turtle	2020 Project site	Sequoia Ecological Consulting (2016a)
January and February 2017	Protocol wet season vernal pool crustacean surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2017b)
March, April, May, and August 2017	Presence/absence surveys for California tiger salamander larvae consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2017c)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
April 2017 – October 2017	Succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	UC Merced and Merced Vernal Pools and Grassland Reserve staff (UC Merced 2017c)
July 2017	Camera trapping for San Joaquin kit fox consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	UC Merced and Merced Vernal Pools and Grassland Reserve staff (UC Merced 2017a)
March and April 2018	Protocol wet season vernal pool crustacean surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	UC Merced and LSA staff (UC Merced 2018)

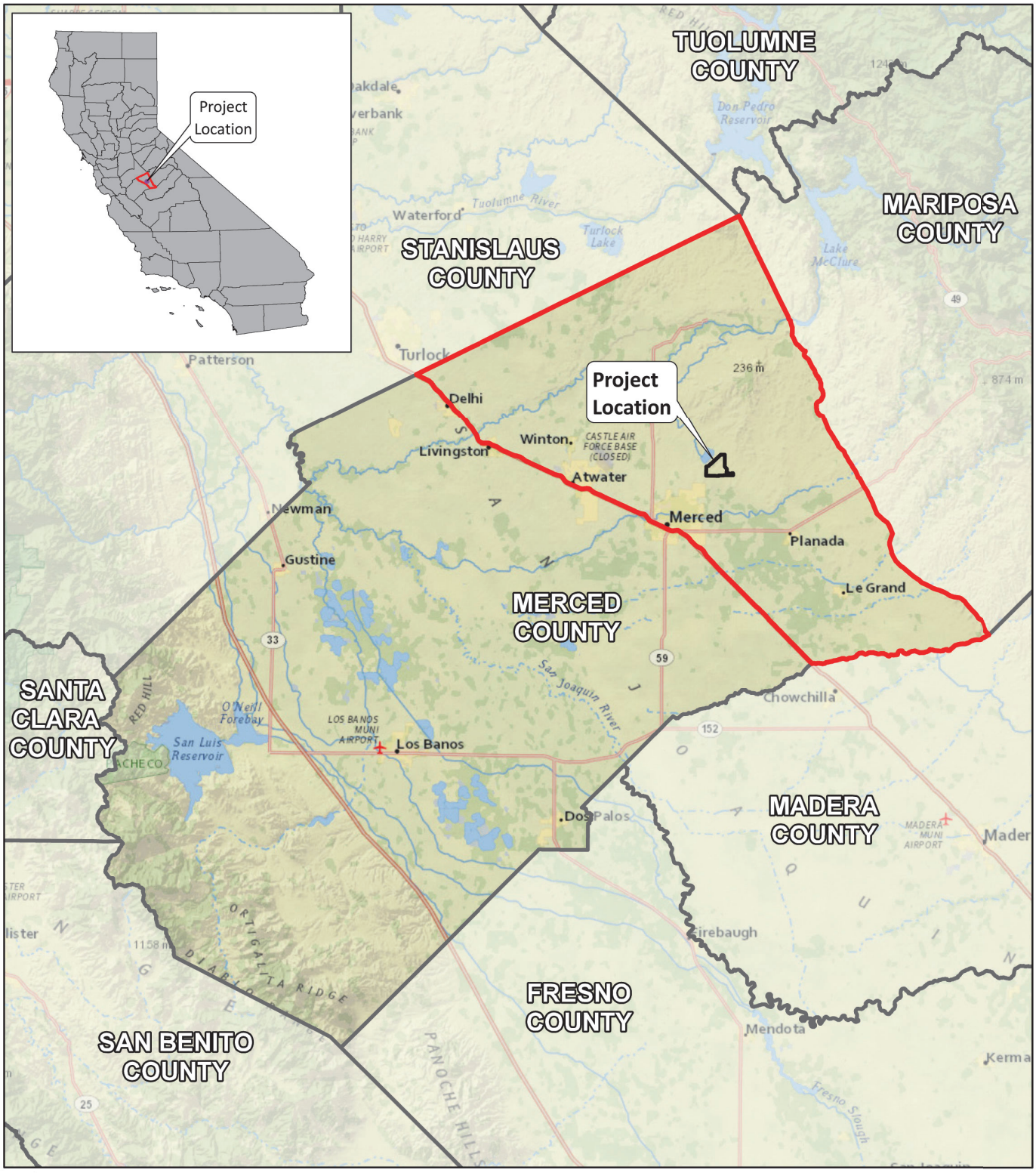
Regional Setting

For the purposes of this section, the project study area is defined as the eastern portion of Merced County (see **Figure 4.2-1, Project Study Area**). The proposed project is located in the transition zone between land utilized for grazing and land developed for intensive agriculture and urban development. This transition zone is marked by changes from older alluvial soils with well-developed hardpans or claypans to younger alluvial soils that lack well-developed hardpans or claypans. The poorly drained soils with hardpans or claypans are primarily utilized for grazing, while level, well-drained soils on the valley floor have been largely converted to agriculture or urban land uses. Evidence of claypans and hardpans throughout the eastern San Joaquin Valley is demonstrated most effectively at the soils' surface by the presence of seasonally inundated areas—vernal pools and swales. Grazing of grassland areas with poorly drained soils, and the conversion of younger, more fertile lands to agricultural, residential, and commercial land uses, have altered the landscape through the removal of trees and native vegetation, the introduction of nonnative species, and the modification of natural watercourses. Habitat types typical of the region include annual grasslands, irrigated pasture and croplands, oak woodlands, vernal pool and swale complexes, seasonal seeps and marshes, ponds, riparian forest and scrub, perennial streams, and scattered areas of ruderal vegetation.

Project Site History

The topography of the project site is relatively level with elevations ranging from approximately 200 to 300 feet above mean sea level. The northeastern portion of the project site contains small hills and valleys while the remainder of the undeveloped portion of the project site slopes gently from the northeast to southwest. Three canals that are located on the project site include Le Grand Canal, Fairfield Canal, and the Yosemite Lateral.

The topography of the project site is altered from historical conditions due to three to four separate phases of development. Historically, prior to any land development on the campus site, the site was altered in conjunction with agriculture. Although early agriculture in Merced County focused on "dry-farming" methods, during the 1860s many local ranchers and farmers began to develop small-scale irrigation projects. By the early 1880s, Charles H. Huffman, a prominent businessman and landowner instrumental in the formation of the town of Merced, controlled the irrigation system in the project area.



SOURCE: UC Merced, 2019

FIGURE **4.2-1**

Project Study Area

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The Crocker-Huffman Land & Water Company constructed the Fairfield Canal between 1903 and 1909. In 1919, Merced County voters approved the creation of the Merced Irrigation District (MID), a publicly owned entity that purchased the Crocker-Huffman system in 1922. At some point in the mid to late 1920s, following its acquisition by MID, the function, alignment, and geometry of Fairfield Canal was fundamentally realigned. Sometime between 1922 and 1927, the MID built the Le Grand Canal. The two canals traverse through the campus site from northwest to southeast. Although the canals were developed to follow the contours of the land, nonetheless, the canals resulted in the interruption of the sheet flow of runoff that drained generally from northeast to southwest across the campus site. The construction of the canals resulted in the truncation of the headwaters of a creek that were located within the central portion of the current campus site. Additional alterations of the campus site related to agriculture included grading of unimproved roadways to provide access to grazing land and the construction of ponds for cattle watering, and in the southern portion of the campus site, the land was leveled and placed under irrigated pasture.

In the 1990s, the project site was altered by the construction of a golf course. The Merced Hills Golf Course was constructed on approximately 200 acres in the north-central portion of the campus site and opened to the public in 1995. The golf course included a clubhouse and other built facilities adjacent to what is now called Ranchers Road, and the 18-hole course occupied the lands to the south, and included one man-made lake (now called Little Lake) and a second pond (Lower Pond) to the southwest of the man-made lake. The golf course was closed in 2002, when the site was approved for the development of the campus.

The first phase of the campus (Phase 1) was developed beginning in 2002 on the northern 80 acres of the 200-acre Merced Hills Golf Course, in the area occupied by the clubhouse facilities (UC Merced 2001; County of Merced 2001). In 2011, upon receipt of applicable permits and approvals from the U.S. Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW), in anticipation of further campus development, UC Merced implemented Phase 6 Site Development and Infrastructure Project (Phase 6 project) which resulted in the grading and filling of several wetlands throughout the campus site. The second major phase of campus construction (2020 Project) commenced in 2016 and is currently underway to the south of the first phase. As part of the 2020 Project, Little Lake has been modified and Lower Pond has been filled. The 2020 Project, when completed, will provide academic, housing, athletics, support, and other facilities.

Prior to the development of the UC Merced campus and the grading activities associated with the infrastructure and the 2020 Project, the central portion of the project site contained mima mound topography (hummocking) associated with the vernal pool complexes. Remnants of this topography are still present in the northeastern portion of the project site.

To compensate for losses of vernal pool plants (and invertebrates) that were considered unavoidable for the development of the UC Merced campus (including the 2020 Project) and the University Community North, the University committed to and proceeded with protecting nearly 24,000 acres of Tier 1 and Tier 2 Conservation lands that contain suitable habitat for the affected species, as described in the 2009 LRDP EIS/EIR. In 2012, UC Merced commenced the process of providing compensatory wetlands mitigation for the wetlands fill to date and, in 2016, was successful in completing two compensatory mitigation projects, reflecting an additional approximately 191 acres of conservation lands. **Table 4.2-2** below presents the properties that have been placed under conservation easements or for which conservation easements are currently in process or have been previously pursued by the University to address impacts to vernal pool plants, invertebrates, and wildlife species. **Figure 4.2-2, Project Site and Tier 1 Conservation Lands** presents the project site and Tier 1 Conservation Lands, and **Figure 4.2-3, Tier 2 Conservation Lands,** presents Tier 2 Conservation Lands.

Table 4.2-2
Conservation Lands (Units and Sizes)

Major Land Category	Land Unit	Size (Acres)[1]	Owner
Tier 1(a)[2]	Virginia Smith Trust (VST) Preserve	5,130	UC
	Campus Natural Reserve (CNR)	1,339	UC
	Myers Easterly	92	UCLC
Tier 1(b)[3]	Cyril Smith Trust	3,070	TNC
	Tier 1 Subtotal	*9,631*	
Tier 2	Carlson	305	Private
	Chance	7,619	Private
	Cunningham	1,761	Private
	Nelson	3,861	Private
	Robinson	3,595	Private
	Tier 2 Subtotal	*17,141*	
2016 Mitigation Properties	Yosemite Lake Conservation Area	75[4]	Private
	Merced County Preserve	166	Merced County
	2016 Mitigation Properties Subtotal	*241*	
Total: All Conservation Lands		**27,013**	

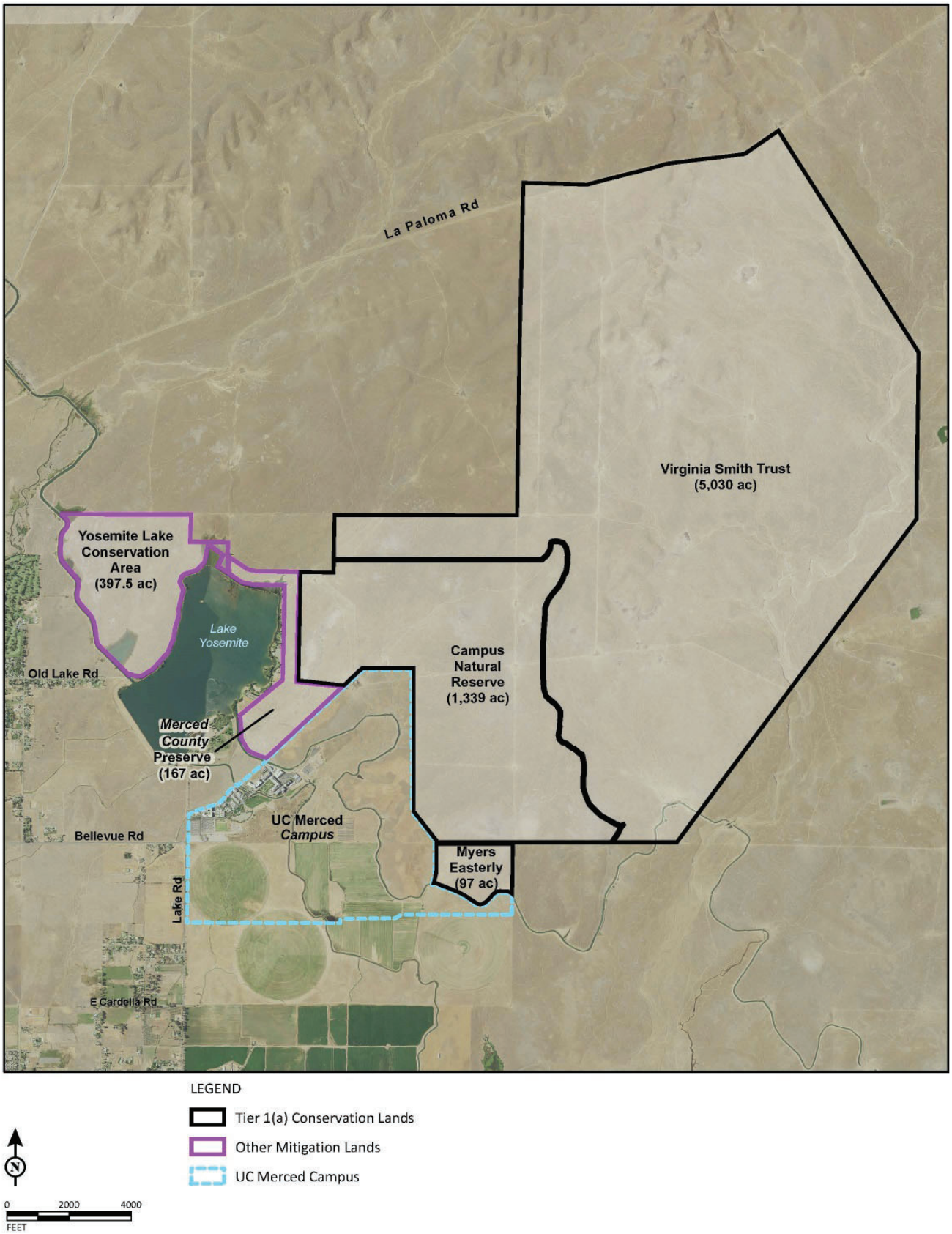
Source: University of California, Merced 2019

[1] *Tier 1(a) Conservation Lands acreages updated slightly from acreages reported in the 2009 LRDP EIS/EIR.*

[2] *Conservation easement establishment is in process for the Tier 1(a) Conservation Lands.*

[3] *As reported in the 2009 LRDP EIS/EIR, UC Merced committed to placing the Tier 1(b) Conservation Lands/Cyril Smith Trust property under a conservation easement, and this property is included in UC Merced's Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (Airola 2008b). However, the property was acquired in fee for conservation purposes and is currently owned by The Nature Conservancy (TNC) an environmental nonprofit organization which is holding the property for conservation purposes and cattle grazing. Therefore, while UC Merced has previously pursued the establishment of a conservation easement for the Tier 1(b) Lands, these lands are already being managed by TNC for conservation purposes which achieves the purposes of the UC Merced Management Plan. UC Merced is not currently involved in the management of this property.*

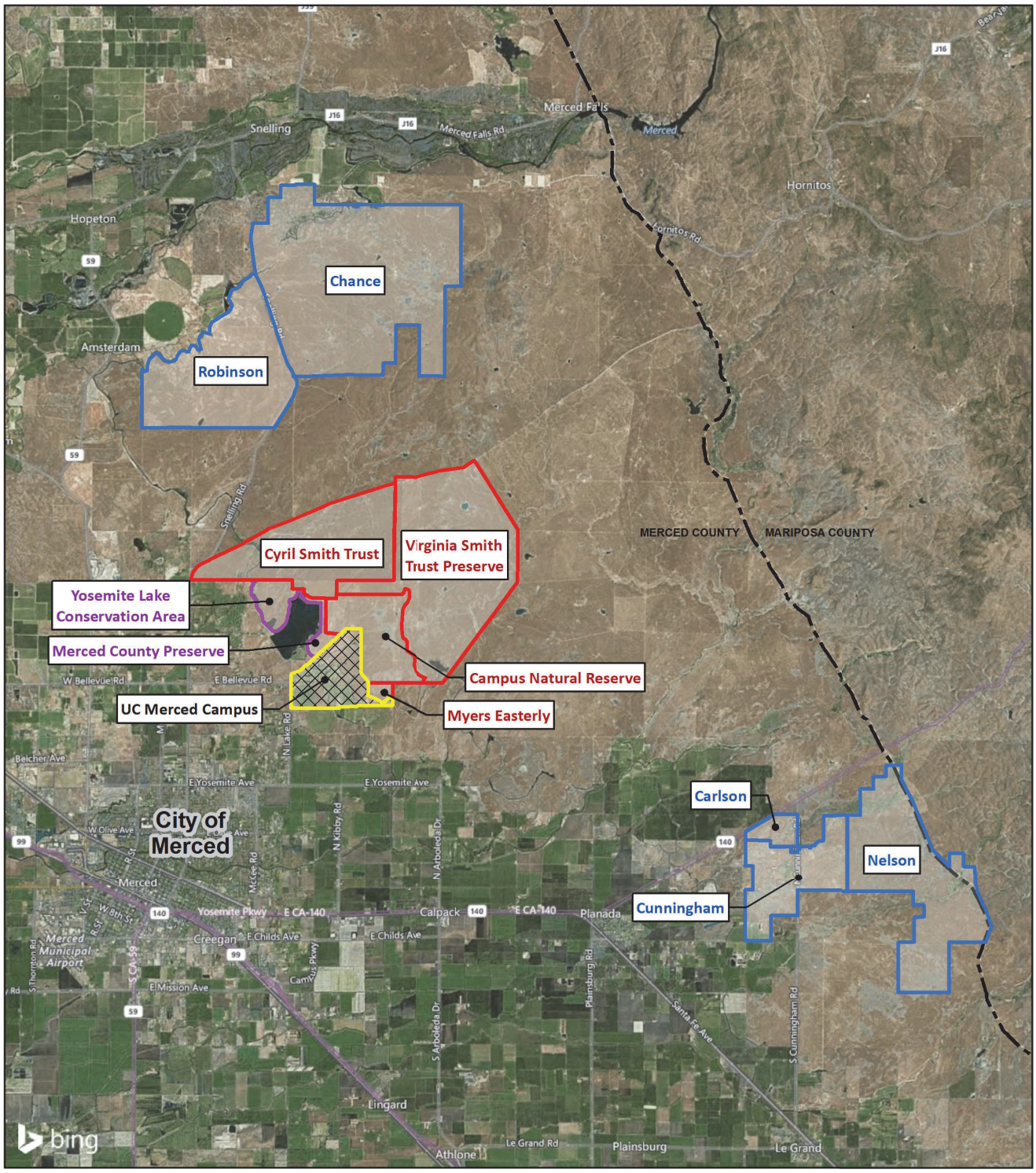
[4] *Twenty-five acres of wetland re-establishment and 50 acres of upland habitat preservation on an approximately 392-acre site placed under a conservation easement.*



SOURCE: USDA NAIP Imagery, 2014

FIGURE **4.2-2**

Project Site and Tier 1 Conservation Lands



SOURCE: World Imagery Service, 2018

FIGURE **4.2-3**

Tier 2 Conservation Lands

Land Cover Types within the Project Site

The primary land cover types identified on the project site are California annual grasslands, agricultural lands (irrigated pasture), vernal pools, vernal swales, seasonal wetlands, man-made ponds, seasonal freshwater marsh, drainages, canals, and developed areas (See **Figure 4.2-4, Land Cover Types in the Campus Site,** and **Table 4.2-3** below).

Historically, the project site also contained two other land cover types. There was a small (0.33 acre) area of clay slope wetlands. However, that land cover type was filled in 2011, and is no longer present on the project site and is not discussed below. Similarly, riparian habitat was historically located along the edges of the Little Lake. However, nearly all of the riparian vegetation was removed during the construction of the 2020 Project. Because UC Merced is required to replace the riparian habitat that was removed, riparian habitat will be reestablished along the margins of Little Lake and that land cover type is discussed below.

Table 4.2-3
Cover Types in the Project Site[1]

Cover Type	Acres[2]
Annual Grassland	570.9
Irrigated Pasture	196.3
Vernal Pools	0.4
Vernal Swales	11.2
Seasonal Wetlands	2.1
Manmade Ponds	3.9
Seasonal Freshwater Marsh	9.3
Drainages	2.5
Developed Areas	229.3
Totals	**1,026[2]**

Source: University of California, Merced 2019

[1] *Cover type acreages do not include areas within canal easements because, with the exception of bridges associated with the campus circulation system, these areas will not be developed and are not within the bounds of the project.*

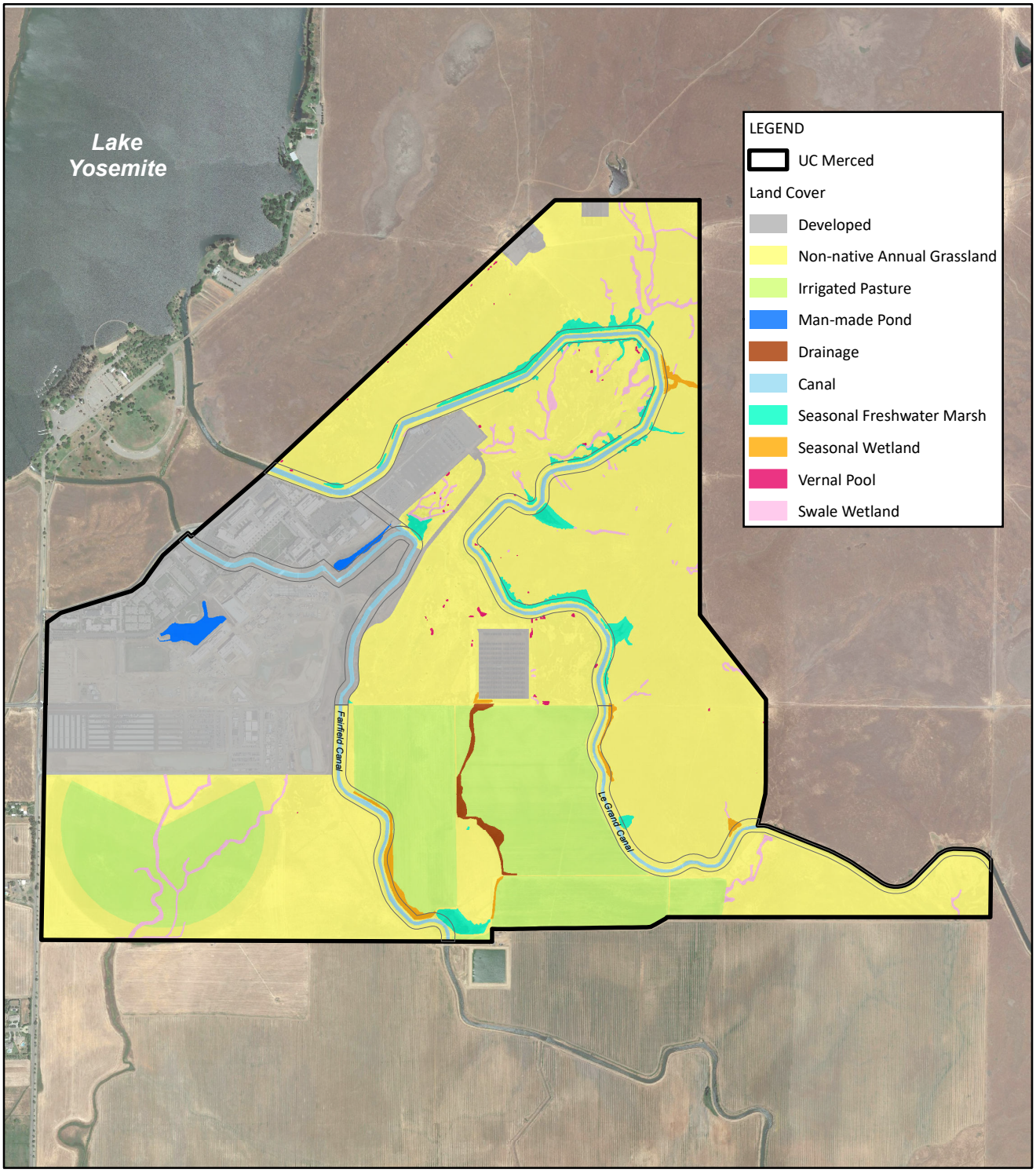
[2] *Total rounded to the nearest whole acre.*

California Annual Grassland

The dominant plant community within the project site is California annual grassland (Sawyer and Keeler-Wolf 1995). Although historically, annual grassland occurred throughout the project site, at the present time, approximately 571 acres in the northern, eastern and southern portions of the project site are under this community (see **Table 4.2-3, Cover Types in the Project Site,** and **Figure 4.2-4**).

California annual grassland, also known as non-native grassland (Holland 1986), is dominated by non-native annual grass species such as soft chess (*Bromus hordeaceus*), oats (*Avena fatua*, *A. barbata*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and rattail sixweeks grass (*Festuca myuros*), but it also contains a high diversity of native grasses and native and non-native forbs, such as filarees (*Erodium cicutarium*, *E. moschatum*, *E. botrys*), shining peppergrass (*Lepidium nitidum*), small-flowered fiddleneck (*Amsinckia menziesii*), mouseear chickweed (*Cerastium glomeratum*), dwarf brodiaea (*Brodiaea nana*), wild hyacinth (*Triteleia hyacinthina*), Ithuriel's spear (*T. laxa*), and yellow mariposa lily (*Calochortus luteus*). In addition, other species that appear later in the growing season (e.g., June and July) have a limited distribution in the project site, including narrow tarplant (*Holocarpha virgata*) and prickly lettuce (*Lactuca serriola*). In addition to non-native grass species, other invasive ruderal (i.e., weedy) species that are often found in annual grasslands occur on the project site. Such species, including yellow star thistle (*Centaurea solstitialis*) and black mustard (*Brassica nigra*), are most commonly located adjacent to the canals and along the edge of existing campus development.

Wildlife known to use annual grassland for all or part of their life cycle include numerous mammal and avian species. Small mammals including California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Otospermophilus beecheyi*), deer mouse (*Peromyscus maniculatus*), Merced kangaroo rat (*Dipodomys heermanni dixoni*), and western harvest mouse (*Reithrodontomys megalotis*) provide foraging opportunities for mammalian predators, such as coyote (*Canis latrans*), bobcat (*Felis rufus*), and avian predators such as American kestrel (*Falco sparverius*), merlin (*F. columbarius*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*B. swainsoni*), burrowing owl (*Athene cunicularia*), barn owl (*Tyto alba*), short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), prairie falcon (*F. mexicanus*), and golden eagle (*Aquila chrysaetos*). Other avian species known to forage in annual grasslands include, mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*), California horned lark (*Eremophila alpestrisis actia*), loggerhead shrike (*Lanius ludovicianus*), tricolored blackbird (*Agelaius tricolor*), and numerous other common raptors and other migratory birds. The annual grasslands also provide potential nesting habitat for burrowing owl, northern harrier, and California horned lark, and potential denning and dispersal habitat for San Joaquin kit fox (*Vulpes macrotis mutica*).



SOURCE: UC Merced, 2019

FIGURE **4.2-4**

Land Cover Types in the Campus Site

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Irrigated Pasture

Agricultural land within the project site includes flood-irrigated pastures and pivot-irrigated pastures which occupy approximately 196 acres in the southern portion of the project site (see **Table 4.2-3** and **Figure 4.2-4**). Flood-irrigated pastures are grassland areas irrigated during the spring and summer months. Flow of irrigation water in the pastures is controlled by a series of parallel levees or contour checks constructed approximately 12 to 14 inches high and approximately 6 to 10 feet apart, extending for the full length of each field. Vegetation in flood-irrigated pastures consists primarily of pasture grasses and other weedy species favored by summer irrigation. The characteristic species within the project site include sporadic to dense stands of Pacific rush (*Juncus effusus*), Italian rye grass (*Festuca perennis*), Bermuda grass (*Cynodon dactylon*), white clover (*Trifolium repens*), and annual blue grass (*Poa annua*). With the exception of the Pacific rush, all of the above species are common in pasture seed mixes and were likely seeded for pasture cultivation. The project site also contains pivot-irrigated pasture. Pivot-irrigated pastures receive less summer water than flood-irrigated pastures but function very similarly and have vegetation similar in composition to flood-irrigated pasture.

Irrigated pastures support many of the same wildlife species found in annual grassland habitats. Mammals known to occupy these habitats include California vole, black-tailed jackrabbit, California ground squirrel, deer mouse, and Botta's pocket gopher (*Thomomys bottae*). San Joaquin kit fox and coyote may also use these areas for foraging. Birds known to use these areas for foraging are similar to those known to forage in annual grasslands.

Vernal Pools

Historically, numerous vernal pool complexes occurred on the project site, embedded in the annual grasslands. Vernal pools are seasonally inundated wetland communities. Vernal pools occur in shallow depressions in areas that are underlain by an impermeable subsurface layer, such as hardpan, claypan, or bedrock. Vernal pools at the project site have been classified as northern hardpan vernal pools (Holland 1986; Sawyer and Keeler-Wolf 1995). These hardpans are so thick and dense that they do not allow water from winter rains to seep into the lower soil column. Instead, the water accumulates or "ponds," above the hardpan. Small hummocks or mounds frequently characterize the topography in these areas. Vernal pools develop in areas where depressions between the hummocks meet areas underlain with a hardpan. Vernal pools collect winter and spring rain and dry out completely in the summer and fall months. Subsequently, these vernal pools support unique vegetation and wildlife endemic only to vernal pools. As discussed above, in 2011 and 2016, in conjunction with the Phase 6 project and the 2020 Project, areas that contained vernal pools were graded and filled. As a result, at the present time, there is about 0.4 acre of vernal pools on the campus site (see **Table 4.2-3** and **Figure 4.2-4**).

The dominant plant species in the vernal pools in the project site include coyote thistle (*Eryngium* sp.), vernal pool goldfields (*Lasthenia fremontii*), bristled downingia (*Downingia bicornuta*), adobe popcornflower (*Plagiobothrys acanthocarpus*), stalked popcornflower (*P. stipitatus*), woolly marbles (*Psilocarphus brevissimus* var. *brevissimus*), white meadowfoam (*Limnanthes alba*), annual hairgrass (*Deschampsia danthonioides*), and Pacific foxtail (*Alopecurus saccatus*). The remnant vernal pools within the project site and on the adjacent Tier 1 Conservation Lands are also known to support several federal and State listed species, including succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), and San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*). Of these three, only succulent owl's clover has been observed within the project site.

Wildlife species found in vernal pools on the project site include vernal pool fairy shrimp (*Branchinecta lynchi*), midvalley fairy shrimp (*B. mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California linderiella (*Linderiella occidentalis*), and California tiger salamander (*Ambystoma californiense*). Other vernal pool species known to occur in the region include Conservancy fairy shrimp (*B. conservatio*), molestan blister beetle (*Lytta molesta*), and western spadefoot (*Spea hammondii*).

Within the project site, the plant species and some of the wildlife species (e.g., vernal pool invertebrates) described above are adapted to, and depend on, the cyclical inundation of water and complete desiccation of the soil that occurs in vernal pools. Most vernal pool-associated plant and wildlife species life cycles can only be completed by the progression of inundation and desiccation. Avian species that rely on vernal pools for resting and foraging during the winter and spring migration periods include mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), killdeer (*Charadrius vociferus*), and greater yellowlegs (*Tringa melanoleuca*).

Vernal Swales

Swales are narrow, linear seasonal wetlands found in low-lying areas, often at the base of hills where surface water collects and the underlying soil often remains saturated for extended periods during the rainy season. Swales can connect vernal pools into large complexes. Some vernal pool/swale complexes are so interrelated by hydrology that isolated features cannot be discerned. Swales are integral to the health and sustainability of vernal pools and seasonal wetlands. Swales provide important hydrology to the pool and wetland basins and also provide linkages between plant and invertebrate populations for genetic exchange. While many of the swale systems within the campus site have been graded as part of the Phase 6 project and the ongoing 2020 Project, there are approximately 11.2 acres of remnant swale features on the project site (see **Table 4.2-3** and **Figure 4.2-4**). The swales on the project site lack a well-defined channel and are sparsely vegetated or are dominated by mesic grassland species such as Italian rye grass. Swales are essential to the health of vernal pool ecosystems and provide habitat values similar to vernal pools.

Seasonal Wetlands

Numerous seasonal wetlands occur within the project site (see **Table 4.2-3** and **Figure 4.2-4**). The term seasonal wetland is used within the context of this SEIR to describe wetlands that fill naturally during the winter through direct precipitation and either natural or man-maintained overland flows and are dry during most of the year. Within the project site, this habitat occurs in areas where the natural hydrology of the landscape has been altered to create wetland features that did not naturally occur or in areas where the natural hydrology has been augmented with summer irrigation with a resultant change in the vegetation composition of the natural feature. Although their hydrology is similar to that of vernal pools, they do not support typical vernal pool vegetation diversity and abundance due to disturbance or due to their recent formation.

Seasonal wetlands appear along the Le Grand Canal and Fairfield Canal in several overflow areas where the surrounding topography prevents water from draining away from the canal. These areas, as well as some seasonal freshwater marsh areas (see discussion below) were previously delineated on site as canal wetlands. Seasonal wetlands also appear in areas where irrigation waters from pastures create summer flooding in former vernal pool systems. These areas were previously delineated on site as irrigation wetlands.

Seasonal wetlands within the project site provide similar habitat for wildlife as vernal pools and may occasionally support vernal pool fairy shrimp, midvalley fairy shrimp, California linderiella, and a variety of shorebird and waterfowl species

Manmade Ponds

There are about 4 acres of artificial ponds within the project site (see **Table 4.2-3** and **Figure 4.2-4**), including the Little Lake, a small settling pond located just north of the Fairfield Canal within the 2020 Project site, and one permanent storm water detention basin located within the developed portion of the campus (Northern Pond). The Little Lake was constructed as part of the Merced Hills Golf Course and was historically and is currently maintained by pumping groundwater from a well near the lake. The lake has been modified as part of the 2020 Project. While vegetation surrounding the Little Lake is currently limited, it generally includes Pacific rush and cattail (*Typha sp*.), as well as an interrupted band of willows along the northern boundary. Species known to occur within the Little Lake include bullfrog (*Lithobates catesbeianus*), Pacific chorus frog (*Pseudacris sierra*), great egret (*Ardea alba*), red-winged blackbird (*Agelaius phoeniceus*), mallard, and cinnamon teal. As a result of vegetation clearing and ongoing project activities, the Little Lake may provide marginal habitat for the western pond turtle (*Actinemys marmorata*); furthermore, this species has been observed on the project site at the Northern Pond storm water detention

basin. Several created stock ponds located within the adjacent Tier 1 Conservation Lands are maintained as livestock watering sources and provide known or potential breeding habitat for California tiger salamander, and support Colusa grass, and San Joaquin Valley Orcutt grass.

Seasonal Freshwater Marsh

Seasonal freshwater marshes (delineated on site as canal wetlands) are located adjacent to both the upgradient and the downgradient sides of both canals on the campus site (see **Table 4.2-3** and **Figure 4.2-4**). Seasonal water to these marshes is provided by precipitation and sheet flow, and perennial water is provided by canal leakage. The vegetation is dominated by Pacific rush, common spikerush (*Eleocharis macrostachya*), willow, cattail, and vernal pool buttercup (*Ranunculus bonariensis var. trisepalus*).

Marsh areas are valuable wildlife habitat and provide foraging, nesting, breeding, and resting grounds for many birds, small mammals, amphibians, and reptiles. Some typical species found in marshes include great blue heron (*Ardea herodias*), great egret, snowy egret (*Egretta thula*), mallard, cinnamon teal, red-winged blackbird, song sparrow (*Melospiza melodia*), marsh wren (*Cistothorus palustris*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), western pond turtle, valley garter snake (*Thamnophis sirtalis fitchi*), Pacific chorus frog-, and American bullfrog. In May 2018, tricolored blackbirds were observed nesting in a seasonal freshwater marsh on campus lands adjacent to Fairfield Canal just south of the North Bowl parking lot. Tricolored blackbird was listed as state threatened by CDFW on April 19, 2018.

Drainages

The southern portion of the project site contains one unnamed drainage that has an area of about 2.5 acres (see **Table 4.2-3** and **Figure 4.2-4**). The drainage is supplied with water from precipitation, sheet flow, and irrigation overflow.

The feature supports dense stands of Pacific rush. Drainages provide an important source of water to wildlife, including but not limited to Pacific chorus frog, gopher snake (*Pituophis catenifer catenifer*), striped skunk, raccoon, and cliff swallows (*Petrochelidon pyrrhonota*).

Riparian

As stated above, although there is little riparian area on the project site at this time, it is anticipated that some riparian habitat will be reestablished along the edges of Little Lake upon completion of the 2020 Project. It is also likely that over time, riparian habitat will establish along the sides of the canals and storm water detention basins.

Riparian communities typically contain a canopy tree layer, subcanopy tree layer, understory shrub layer, and dense ground cover. Vegetation comprising riparian communities often includes California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), willow (*Salix* spp.), and Himalayan blackberry (*Rubus armeniacus*). Blue elderberry (*Sambucus nigra* ssp. *caerulea*) can also often be found in these communities. Birds known to occur in riparian communities include Swainson's hawk, white-tailed kite, red-shouldered hawk (*B. lineatus*), Nuttall's woodpecker (*Picoides nuttallii*), western wood-pewee (*Contopus sordidulus*), tree swallow (*Tachycineta bicolor*), downy woodpecker (*Picoides pubescens*), Pacific-slope flycatcher (*Empidonax difficilis*), and house wren (*Troglodytes aedon*). Common amphibians and reptiles known to occur in riparian communities include Pacific chorus frog, American bullfrog, and valley garter snake.

Canals

Canals within the project site include Le Grand Canal and Fairfield Canal (see **Figure 4.2-4**). A third canal called the Yosemite Lateral occurs as an above ground canal adjacent to the western portion of the campus site. Although it previously traversed the campus site, it has been re-routed and does not pass through the campus. Though technically within the project site boundaries, Le Grand Canal and Fairfield Canal are located within 150-foot easements that, with the exception of bridges associated with the campus circulation system, will not be developed as part of the campus development under the 2020 LRDP. Therefore, though described here with regard to the project site setting, acreages for these canals are not included in **Table 4.2-3**. However, because fill of the seasonal wetlands located within these canal easements is included the UC Merced Section 404 permit, these wetlands are included in the acres of wetlands reported in this section. Further, the wetlands impact discussion below applies to these wetlands.

Within the project site, Le Grand Canal is bordered mainly by a portion of the existing campus, annual grassland, and irrigated pasture. Fairfield Canal is bordered by the existing campus, ongoing 2020 Project construction activities, annual grassland, and irrigated pasture. Both of the canals are also bordered by large areas of seasonal freshwater marsh (discussed above). These canals likely support various amphibians and reptiles, including Pacific tree frog, American bullfrog, western pond turtle, and valley garter snake.

Developed Areas

Developed areas within the project site occupy about 229 acres (see **Table 4.2-3** and **Figure 4.2-4**), and include the first phase of campus development; the 2020 Project, which is currently under construction; a barn and a corral located in the northeastern portion of the campus; a campus research site in the northern portion of the campus; and the campus photovoltaic array that occupies about 9.8 acres in the eastern portion of the campus.

Special-Status Species

Special-status species are plants and wildlife that are legally protected under the federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA) or other regulations, and other plants and wildlife that are considered sufficiently rare to qualify for consideration under the California Environmental Quality Act (CEQA). The categories for special-status plants and animals are described below:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the FESA;
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under CESA;
- Plant species given the California Rare Plant Ranking (CRPR) of 1A, 1B, 2, 3, and 4 as assigned by a collaborative group of over 300 botanists in government, academia, non-governmental organizations, and the private sector. This group is sanctioned by, and jointly managed by, the CDFW and the CNPS;
- Animal species designated as Species of Special Concern or Fully Protected by CDFW;
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the *State CEQA Guidelines*; or Species that are considered a taxa of special concern by local agencies.

Special-status plant and wildlife species that occur or have potential to occur in or near the project site are presented in **Table 4.2-4, Special-Status Plants Known to or with Potential to Occur on the Campus Site or its Vicinity,** and **Table 4.2-5, Wildlife Species Known to or with Potential to Occur on the Campus Site or its Vicinity.**

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Agrostis hendersonii	Henderson's bentgrass	–/–/3.2	Moist places in grasslands and vernal pools (0 to 3,380 ft). Blooms April – July.	**Potential to Occur.** Grassland and vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Snelling Road just over 2 miles northwest of the project area.
Atriplex cordulata var. *cordulata*	Heartscale	–/–/1B.2	Chenopod scrub, valley and foothill alkali grassland, alkali meadows and seeps (0 to 900 ft). Blooms April – October.	**Not Expected to Occur.** Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Atriplex depressa	Brittlescale	–/–/1B.2	Shadscale scrub, valley grassland, alkali sink, and playas (0 to 1,050 ft). Blooms April – October.	**Not Expected to Occur.** Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Atriplex minuscula	Lesser saltscale	–/–/1B.1	Chenopod scrub, alkali playas, valley and foothill grassland (0 to 738 ft). Blooms April – October.	**Not Expected to Occur.** Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Atriplex persistens	Vernal pool smallscale	–/–1B.2	Alkaline vernal pools (0 to 377 ft). Blooms June – October.	**Not Expected to Occur.** Vernal pool habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, the nearest CNDDB occurrence of this species is from near Merced Airport just over 7 miles southwest of the project area.
Atriplex subtilis	Subtle orache	–/–1B.2	Alkaline soils in valley and foothill grassland (0 to 328 ft). Blooms June – October.	**Not Expected to Occur**. Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Calycadenia hooveri	Hoover's calycadenia	–/–1B.3	Rocky, barren areas in grasslands and foothills (200 to 1,300 ft). Blooms June – September.	**Potential to Occur.** Grassland habitat with rocky barren areas is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area
Castilleja campestris var. succulenta	Succulent owl's clover	T/E/1B.2	Vernal pools (65 to 2,460 ft). Blooms April – June.	**Known to Occur.** Vernal pool habitat is present within the project area. There are multiple CNDDB occurrences of this species from the project area (EIP Associates surveys in 1999 and 2001), including a cluster of observations in the undeveloped northeastern most portion of the project area inside the large bend of Le Grand Canal. This species was not identified during focused surveys conducted by LSA in April and May 2016 in advance of grading for the campus expansion (2020 Project) (LSA 2016a).

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Centromadia parryi ssp. rudis	Parry's rough tarplant	--/–/4.2	Grassland, edges of marshes and vernal pools, disturbed sites (0 to 1,640 ft). Blooms May – October.	**Not Expected to Occur.** Grassland, vernal pool, and disturbed habitats are present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Clarkia rostrata	Beaked clarkia	–/–/1B.3	Cismontane woodland, valley and foothill grassland (200 to 3,000 ft). Blooms April – May.	**Potential to Occur.** Grassland habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area.
Convolvulus simulans	Small-flowered morning-glory	–/–/4.2	Clay substrates, occasionally serpentine, annual grassland, coastal-sage scrub, chaparral (100 to 2,870 ft). Blooms March – July.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	–/–/4.2	Oak woodland and grassland (200 to 1,970 ft). Blooms March – May.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Delphinium recurvatum	Recurved larkspur	–/–/1B.2	Chenopod scrub, valley and foothill grassland, cismontane woodland (10 to 1,970 ft). Blooms March – June.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Downingia pusilla	Dwarf downingia	–/–/2.2	Valley and foothill grassland (mesic sites), vernal pools (0 to 1,600 ft). Blooms March – May.	**Known to Occur.** Vernal pool habitat is present within the project area. There is one CNDDB occurrence (EIP Associates surveys in 1999) of this species from the northernmost portion of the project area itself, north of the existing campus.
Eryngium racemosum	Delta button-celery	–/E/1B.1	Seasonally inundated floodplains with clay soils (10 to 100 ft). Blooms June – October.	**Not Expected to Occur.** Seasonal wetland and clay slope wetland habitat is present within the project area; however, the project area is located outside of the range for this species. Furthermore, there are no CNDDB occurrences of this species within 10 miles of the project area.
Eryngium spinosepalum	Spiny-sepaled button-celery	–/–/1B.2	Vernal pools, valley and foothill grassland (50 to 4,170 ft). Blooms April – July.	**Potential to Occur.** Grassland and vernal pool habitats are present within the project area. There are multiple CNDDB occurrences of this species within 1 mile east of the project area, southeast of UC Merced's Tier 1 conservation lands.

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Gratiola heterosepala	Bogg's Lake hedge-hyssop	–/E/1B.2	Fresh marshes, lake margins, and vernal pools (0 to 7,900 ft). Blooms April – September.	**Potential to Occur.** Fresh marsh and vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 5 miles east of the project area.
Hesperevax caulescens	Hogwallow starfish	–/--/4.2	Vernal pools, flats, and steep slopes (sometimes serpentine) (0 to 1,640 ft). Blooms March – June.	**Potential to Occur.** Vernal pool habitat is present within the project area. Although there are no CNDDB occurrences of this species within 10 miles of the project area, this species was previously documented in the 2009 LRDP EIS/EIR as occurring in 0.33 acre of clay slope wetlands on the campus site.
Lagophylla dichotoma	Forked hare-leaf	–/--/1B.1	Cismontane woodland, valley and foothill grassland (sometimes clay) (620 to 1,100 ft). Blooms April – June.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, the only CNDDB occurrence of this species is from over a century ago, and its exact location is unknown (listed only as Merced).
Navarretia myersii ssp. myersii	Pincushion navarretia	–/–/1B.1	Vernal pools on clay soils within non-native grassland (150 to 330 ft). Blooms April – May.	**Potential to Occur.** Vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area.
Navarretia nigelliformis ssp. nigelliformis	Adobe navarretia	–/–/4.2	Vernal pools in clay depressions (30 to 3,280 ft). Blooms April – June.	**Not Expected to Occur.** Vernal pool habitat is present within the project area. However, there are no CNDDB occurrences of this species within 10 miles of the project area.
Navarretia nigelliformis ssp. radians	Shining navarretia	–/–/1B.2	Cismontane woodland, valley and foothill grassland, vernal pools (200 to 3,280 ft). Blooms April – July.	**Known to Occur.** Grassland and vernal pool habitat is present within the project area. There are multiple CNDDB occurrences (EIP Associates surveys in 1999) of this species from the project area, including a cluster of observations in the northernmost portion of the project area just north of the Le Grand Canal.
Neostapfia colusana	Colusa grass	T/E/1B.1	Large, deep vernal pools (0 to 410 ft). Blooms May – August.	**Potential to Occur.** Vernal pool habitat is present within the project area; however there are no large, deep pools within the project site that provide the typical habitat for this species. There are multiple occurrences within 1 mile east of the project area on UC Merced's Tier 1 conservation lands; one such occurrence overlaps the project area, but this species is not known from the project site.
Orcuttia inaequalis	San Joaquin Valley Orcutt grass	T/E/1B.1	Vernal pools (0 to 2,625 ft). Blooms April – September.	**Potential to Occur.** Vernal pool habitat is present within the project area; however, there are no large pools within the project site that provide the typical habitat for this species. The nearest CNDDB occurrence of this species is from within 1 mile east of the project area on UC Merced's Tier 1 conservation lands.

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Orcuttia pilosa	Hairy Orcutt grass	E/E/1B.1	Vernal pools (0 to 650 ft). Blooms May – September.	**Not Expected to Occur.** Vernal pool habitat is present within the project area. However, there are only two CNDDB occurrences of this species within 10 miles of the project area. The nearest occurrence is from approximately 2 miles west of the project area. This occurrence is now extirpated because the site has been developed. The other CNDDB occurrence is located over 7 miles north of the project area and is also considered potentially extirpated.
Phacelia ciliata var. opaca	Merced phacelia	–/–/1B.2	Valley and foothill grassland in adobe or clay soils or alkaline flats (200 to 280 ft). Blooms February – May.	**Potential to Occur.** Grassland habitat and clay soils are present within the project area. One CNDDB occurrence (1929) of this species overlaps the project area, and there are two more modern records within 5 miles of the project area.
Pseudobahia bahiifolia	Hartweg's golden sunburst	E/E/1B.1	Cismontane woodland, valley and foothill grassland. Predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools (200 to 650 ft). Blooms March – May.	**Potential to Occur.** Grassland and vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek within 8 miles northeast of the project area.
Puccinellia simplex	California alkali grass	–/–/1B.2	Meadows and seeps, chenopod scrub, valley and foothill grasslands, and vernal pools (0 to 3,000 ft) associated with alkaline soils. Blooms March – May.	**Not Expected to Occur.** Grassland and vernal pool habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, there are no CNDDB occurrences of this species within 10 miles of the project area.
Sagittaria sanfordii	Sanford's arrowhead	–/–/1B.2	Standing or slow-moving freshwater ponds, marshes, and ditches (0 to 1,985 ft). Blooms March – October.	**Potential to Occur.** Ponds, marshes, and ditches are present within the project area. The nearest CNDDB occurrence of this species is from within 2 miles southwest of the project area.
Sidalcea keckii	Keck's checkerbloom	E/–/1B.1	Grassy slopes on clay soils. Affinity to serpentine soils (250 to 2,130 ft). Blooms April – May.	**Potential to Occur.** Grassy slopes are present, and the project area is within the range for this species. The nearest CNDDB occurrence reflects an unconfirmed identification of this species from near the north shore of Yosemite Lake, approximately 1.5 miles north of the project area.

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Tuctoria greenei	Greene's tuctoria	E/R/1B.1	Vernal pools in open grasslands (80 to 4,350 ft). Blooms May – July.	**Potential to Occur.** Vernal pool and grassland habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area.

Source: California Natural Diversity Database (CNDDB) 2018
**Status explanations:*
Federal:
– = No status
E = Listed as "endangered" under the federal Endangered Species Act.
T = Listed as "threatened" under the federal Endangered Species Act.
State:
– = No status
E = Listed as "endangered" under the California Endangered Species Act.
R = Listed as "rare" under the California Endangered Species Act.
California Rare Plant Rank:
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2 = List 2 species: rare, threatened, or endangered in California, but more common elsewhere.
3 = List 3 species: plants about which we need more information.
4 = List 4 species: plants of limited distribution.
0.1 = Seriously endangered in California
0.2 = Fairly endangered in California
0.3 = Not very endangered in California

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Invertebrates				
Bombus crotchii	Crotch bumble bee	--/CE/--	Open grassland and scrub habitats. Primarily nests underground. Occurs primarily in California, from coastal California east to the Sierra-Cascade crest and south into Mexico.	**Potential to Occur.** There are no current (1999 – 2019) CNDDB occurrence records for this species within the San Joaquin Valley, and the only two records in Merced County (both located more than 10 miles from the project area) are associated with collections made in the 1950s. However, **s**uitable nesting and foraging habitat for this species is present in the project area and the project site is located within the range for this species. Furthermore, the vernal pool-grassland complex in the project area, in particular associated with the adjacent Tier 1 conservation lands, provides a broad expanse of floral resources that may be utilized by this species.
Branchinecta conservatio	Conservancy fairy shrimp	E/--/IUCN-EN	Vernal pools and other seasonal wetland features in valley and foothill grassland communities. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/ spring rains, which last until June.	**Potential to Occur.** Not observed in vernal pools on site during protocol-level surveys. The nearest CNDDB occurrence of this species is from within 1 mile east of the project site on UC Merced's Tier 1 conservation lands.
Branchinecta lynchi	Vernal pool fairy shrimp	T/--/--	Vernal pools and other seasonal wetland features in valley and foothill grassland communities. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**Known to Occur.** Species is known to occur in vernal pools throughout the project area.
Branchinecta mesovallensis	Midvalley fairy shrimp	--/SA/--	Vernal pools and other seasonal wetland features in valley and foothill grassland communities.	**Known to Occur.** Species is known to occur in vernal pools near the project area.
Lepidurus packardi	Vernal pool tadpole shrimp	E/--/--	Vernal pools and swales in the Sacramento Valley containing clear to highly turbid water.	**Known to Occur.** Species is known to occur in vernal pools within the project area.
Linderiella occidentalis	California linderiella	--/--/IUCN NT	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions.	**Known to Occur.** Species is known to occur in vernal pools within the project area.
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	T/--/--	Stream side habitats below 3,000 feet in California's Central Valley.	**Not Expected to Occur.** No elderberry shrubs occur in the project area.
Lytta molesta	Molestan blister beetle	--/SA/--	Vernal pools and other seasonal wetland features in California's Central Valley.	**Potential to Occur.** Not observed in vernal pools on site during surveys. The nearest CNDDB occurrence of this species is from near Snelling Road approximately 3 miles northwest of the project area.

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Fish				
Mylopharodon conocephalus	Hardhead	--/SSC/--	Clear, deep pools with sand-gravel-boulder bottoms and slow water velocity.	**Not Expected to Occur.** The aquatic habitat on the site is not appropriate for the species and there are no CNDDB occurrences within 10 miles of the project area.
Oncorhynchus mykiss irideus	Steelhead – Central Valley DPS	T/--/--	Sacramento and San Joaquin rivers and their tributaries.	**Not Expected to Occur.** There is no suitable habitat on the site is not appropriate for the species and there are no CNDDB occurrences within 10 miles of the project area.
Amphibians				
Ambystoma californiense	California tiger salamander	T/T/--	Require seasonal wetlands for breeding, and upland areas with small mammal burrows for estivation in dry season.	**Known to Occur.** Species is known to breed in the stock pond within the Phase 1.1 site and has been observed in vernal pools in the campus and Community North portions of the project area. Grasslands with burrows within 1.24 mile of breeding ponds are considered suitable upland habitat for the species.
Rana draytonii	California red-legged frog	T/SSC/--	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	**Not Expected to Occur.** There is no suitable aquatic breeding habitat on the site and there are no CNDDB occurrences within 10 miles of the project area.
Spea hammondii	Western spadefoot	--/SSC/--	Require vernal pools for breeding, primarily within grassland habitats, but can be found in valley-foothill hardwood woodlands.	**Potential to Occur.** The species has been documented in numerous locations throughout the project region but has not been documented in the project area (CNDDB 2018). Project site does not contain suitable breeding habitat for the species, but dispersing individuals could move through the project site.
Reptiles				
Gambelia silus	Blunt-nosed leopard lizard	E/E/--	Sparsely vegetated alkali and desert scrub habitats.	**Not Expected to Occur.** The project region is within blunt-nosed leopard lizard's range but contains no suitable habitat for the species. The species has not been documented in the project area (CNDDB 2018).
Phrynosoma blainvillii	Blainville's horned lizard	--/SSC/--	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging. Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 4,000 feet in northern California	**Not Expected to Occur.** The project site is within the range for California horned lizard but the surrounding development and dense grasslands are not suitable habitat for the species. The species has not been documented in the project region (CNDDB 2018) or observed by biologists on or near the project site.

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Thamnophis gigas	Giant garter snake	T/T/--	Perennial, slow-moving waterways or marshes or rice fields with adjacent upland areas to avoid winter flooding. Found in the Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County.	**Not Expected to Occur.** There is one historical record from 1908 for this species in the project region but no recent occurrences (CNDDB 2018). There is very limited potential habitat on the project site and surrounding area.
Actinemys marmorata	Western pond turtle	--/SSC/--	Marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	**Known to Occur.** The species has been documented in numerous locations throughout the project region (CNDDB 2018), including stock ponds on the nearby Campus Reserve Lands. The canals and artificial ponds/storm water detention basins on the project site provide suitable habitat for the species. While extensive preconstruction surveys by biologists from 2016 through 2108 did not previously detect the species on the site, a western pond turtle was observed in April 2019 at the Northern Pond storm water detention basin within the project site.
Birds				
Agelaius tricolor	Tricolored blackbird	--/T/--	Breeds near fresh water, preferably in emergent vegetation with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. Feeds in grassland and cropland habitats.	**Known to Occur.** Fresh marsh and grassland habitat is present within the project area, and the species has been observed within the project area (in a small marsh adjacent to Fairfield Canal just south of the North Bowl parking lot).
Aquila chrysaetos	Golden eagle	--/FP/--	Nests on high cliffs in mountain canyons or sometimes on high man-made structures in high deserts and sage-juniper flats. Some descend to lower elevations in winter to forage in open grasslands.	**Potential to Occur.** This species has been documented foraging adjacent to the project site and likely forages on the site occasionally. (UC Merced 2001). The project site contains suitable foraging habitat but not nesting habitat for the species.
Asio flammeus	Short-eared owl	--/SSC/--	Freshwater and salt marshes, lowland meadows, and irrigated alfalfa fields; needs dense tules or tall grass for nesting and daytime roosts.	**Known to Occur**. This species has been documented foraging in the project site (UC Merced 2001 and 2014). Limited suitable nesting habitat occurs in the project site.
Athene cunicularia	Burrowing owl	--/SSC/--	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	**Known to Occur.** This species has been documented to nest in the project site on the campus site (California Natural Diversity Database 2018, UC Merced 2014, Live Oak Associates 2012, LSA 2016b).

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Buteo swainsoni	Swainson's hawk	--/T/--	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	**Known to Occur.** The project site is within Swainson's hawk's breeding range and supports suitable foraging habitat for the species. This species is documented to nest in numerous locations throughout the project region (California Natural Diversity Database 2018). Project site contains suitable foraging and nesting habitat for the species.
Charadrius montanus	Mountain plover	--/SSC/--	Suitable wintering habitat for mountain plover includes open areas with short grasses, plowed fields, and scattered shrub or sagebrush. Species avoids areas with tall, dense vegetation.	**Known to Occur.** This species has been documented foraging in the project site (UC Merced 2001).
Circus cyaneus	Northern harrier	--/SSC/--	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	**Known to Occur.** This species has been documented nesting in the project site (UC Merced 2001) and foraging at the project site more recently (UC Merced 2014).
Elanus leucurus	White-tailed kite	--/FP/--	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging.	**Known to Occur.** White-tailed kites have been documented foraging in the project site (UC Merced 2014). Project site contains suitable foraging and nesting habitat for the species.
Haliaeetus leucocephalus	Bald eagle	--/E, FP/--	Nests in coniferous forests within 1 mile of a lake, reservoir, stream, or ocean. Forages over lakes, reservoirs, rivers, large creeks, and sometimes in the winter forages for carrion in open grassland habitats.	**Known to Occur.** This species has been documented foraging in the project area (UC Merced 2014). Project site contains limited suitable foraging but not nesting habitat for the species.
Lanius ludovicianus	Loggerhead shrike	--/SSC/--	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	**Known to Occur.** This species has been documented foraging in the project site and could nest in suitable habitat (UC Merced 2014).
Mammals				
Antrozous pallidus	Pallid bat	--/SSC/WBWG: High priority	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts.	**Potential to Occur.** This species has been documented just north of the project site (CNDDB 2018). Project site contains suitable foraging habitat.

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Dipodomys heermanni dixoni	Merced kangaroo rat	--/--/ G3G4T2T3 S2S3	Found in dry grassy plains with partly open gravelly ground on slopes with sparse chaparral. Breeding occurs from February through October, with peak activity in April.	**Potential to Occur.** This subspecies has been documented in numerous locations throughout the project region (CNDDB 2018) and was documented on an adjacent property to the northeast (VST property north of UC Merced Tier 1 conservation lands) during focused surveys (UC Merced 2001).
Eumops perotis californicus	Western mastiff bat	--/SSC/WBWG: High priority	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	**Not Expected to Occur.** This species is only present where there are significant rock outcroppings or cliffs to provide roosts.
Lasiurus blossevillii	Western red bat	--/SSC/WBWG: High priority	Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Potential to Occur.** This species has been documented near the project site (California Natural Diversity Database 2018). Project site contains suitable foraging habitat.
Lasiurus cinereus	Hoary bat	--/--/WBWG: Medium priority	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding.	**Potential to Occur.** This species has been documented near the project site (California Natural Diversity Database 2018). Project site contains suitable foraging habitat.
Myotis yumanensis	Yuma myotis	--/--/WBWG: Low-Medium priority	Optimal habitats are open forests and woodlands with sources of water over which to feed.	**Potential to Occur.** This species has been documented near the project site (California Natural Diversity Database 2018). Project site contains suitable foraging habitat.
Taxidea taxus	American badger	--/SSC/--	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	**Potential to Occur.** The project site contains suitable denning and foraging habitat for this species. Species has not been documented in project region (California Natural Diversity Database 2018).

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Vulpes macrotis mutica	San Joaquin kit fox	E/T/--	Occurs in grasslands, scrublands, and oak woodlands in the San Joaquin Valley and adjacent foothills. Below 1,000 feet elevation.	**Potential to Occur.** The project site is within the range for this species, is identified as being within the linkages site for San Joaquin kit fox (SJKF) (USFWS 2007) and contains suitable denning and foraging habitat. This species was seen in 1999, documented approximately 2.5 miles east of the project site (California Natural Diversity Database 2018). Extensive subsequent surveys including camera traps have not detected the species near the project site (PES Environmental 2011; LSA 2015b; Padre Associates, Inc. 2016a; Padre Associates, Inc. 2016b).

Source: California Natural Diversity Database (CNDDB) 2018
**Status Explanations:*
Federal:
E = Listed as endangered under the Federal Endangered Species Act.
T = Listed as threatened under the Federal Endangered Species Act.
C = Species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
-- = No listing
State:
E = Listed as endangered under the California Endangered Species Act.
T = Listed as threatened under the California Endangered Species Act.
CE = Listed as Candidate Endangered under the California Endangered Species Act.
FP = Fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
SA = CDFW Special Animal
-- = No listing
Other:
G3 = Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G3G4 = Rank is somewhere between G3 and G3.
T2T3: SUBSPECIES LEVEL Taxa which are subspecies or varieties receive a taxon rank (T-rank) attached to their G-rank. Where the G-rank reflects the condition of the entire species, the T-rank reflects the global situation of just the subspecies
S2 = Imperiled—Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 = Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S2S3 = Rank is somewhere between S2 and S3.
-- = No listing.
Western Bat Working Group (WBWG) Available: http://www.wbwg.org/spp_matrix.html)
High priority = species are imperiled or at high risk of imperilment
Moderate priority = this designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat
Low priority = While there may be localized concerns, the overall status of the species is believed to be secure.

Special-Status Plants

As summarized in **Table 4.2-4,** 31 special-status plant species were identified as having some potential to occur in the vicinity of the project site, based on a general review of species lists obtained from CNDDB (2018), CNPS (2018), and USFWS (2018), as well as previous studies, reports and plans for the project. Fourteen of these species are not known to occur in, or are thought to be extirpated from, the project region and/or suitable habitat for them is not present on the project site or the surrounding conservation lands; therefore, these species are not discussed further.

A total of 17 special-status plant species were identified as having potential to occur within the project site. Although potentially suitable habitat exists on the project site for the majority of these species, surveys conducted of the project site to date (including those conducted in advance of the 2009 LRDP EIS/EIR and for the 2020 Project; see **Table 4.2-4**) have not identified many of these species. However, five special-status plant species (succulent owl's clover, Colusa grass, San Joaquin Valley Orcutt grass, dwarf downingia [*Downingia pusilla*], and shining navarretia [*Navarretia nigelliformis* subsp. *radians*]) are known to occur within the project site and/or the adjacent Tier 1 Conservation Lands based on documented sightings. The following species descriptions summarize information for these five plant species.

Succulent Owl's Clover

Succulent owl's clover (aka fleshy owl's-clover) is a state endangered, federally threatened, and CRPR List 1B.2 species. Succulent owl's clover is endemic to vernal pool complexes along a 66-mile stretch of the eastern San Joaquin Valley and the adjacent foothills up to 2,500 feet. The species' range extends through northern Fresno, western Madera, southeastern San Joaquin, and Stanislaus Counties.

Succulent owl's clover is restricted to vernal pools. Beyond its restriction to vernal pools, the specific habitat requirements of succulent owl's clover are not known. It occurs in vernal pools with a wide range of area and depth, as well as on a variety of geologic formations and soils, although the specific microhabitat requirements have not been determined (EIP Associates 1999b; Dittes and Guardino 2002; California Natural Diversity Database 2018). A regional analysis based on the results of several surveys indicate that succulent owl's clover in eastern Merced County occurs primarily on Laguna, Riverbank, and North Merced Gravel geologic units. Commonly reported associates include Fremont's goldfields (*Lasthenia fremontii*), three-colored monkey-flower (*Mimulus tricolor*), vernal pool popcornflower (*Plagiobothrys stipitatus*), downingia (*Downingia* sp.), and coyote-thistle (*Eryngium* sp.) (EIP Associates 1999b; California Natural Diversity Database 2018).

Most of the known occurrences (62) of succulent owl's clover are located in the project region, and two occurrences are present within the project site (California Natural Diversity Database 2018). Ten

occurrences are within the adjacent Tier 1 Conservation Lands. Additional surveys completed in advance of the 2009 LRDP EIR/EIS and subsequent to the 1999 and 2002 EIP Associates surveys further documented additional occurrences of the species in the study area (Jones & Stokes 2003; Vollmar Consulting 2008; Airola 2008a; LSA 2016d; UC Merced 2017c).

In 2016, in advance of grading activities associated with the 2020 Project, focused preconstruction surveys were conducted after visiting nearby reference populations during the normal blooming period for this species. The preconstruction surveys yielded negative findings (LSA 2016a). However, there are still some limited remaining vernal pools within the project area that coincide with previous documented occurrences, and UC Merced is currently monitoring extant populations of this species on the adjacent Tier 1(a) Conservation Lands.

Colusa Grass

Colusa grass is a state endangered, federally threatened, and CRPR List 1B.1 species. Colusa grass is endemic to the Sacramento and San Joaquin Valleys, where it grows in large or deep vernal pools at elevations of up to 410 feet (California Native Plant Society 2018; California Natural Diversity Database 2018). The species' historical distribution included Merced, Stanislaus, Solano, and Colusa Counties (California Natural Diversity Database 2018).

The species grows primarily in large pools retaining water until late spring (Crampton 1976; U.S. Fish and Wildlife Service 2002). These pools occur on a wide variety of soils. Within them, Colusa grass typically grows in monospecific patches; consequently, associated species may grow in very different microsites within a pool. San Joaquin Valley Orcutt grass, hairy Orcutt grass, Solano grass (*Tuctoria mucronata*), and Hoover's spurge (*Euphorbia hooveri*) occur in the same pools as Colusa grass at several sites (Stone et al. 1988; EIP 1999b; California Natural Diversity Database 2018). Given the rarity of all these species, this co-occurrence indicates similar habitat requirements at the scales of individual pools or pool complexes.

Colusa grass is known to occur at 32 locations within the project region but is not known to occur on the project site (California Natural Diversity Database 2018). However, UC Merced is currently monitoring extant populations of this species on the adjacent Tier 1(a) Conservation Lands, where there are 12 currently documented occurrences.

San Joaquin Valley Orcutt Grass

San Joaquin Valley Orcutt grass is a state endangered, federally threatened, and CRPR List 1B.1 species. San Joaquin Valley Orcutt grass is the only Orcutt grass restricted to the San Joaquin Valley. This grass was once relatively common in vernal pool complexes along the eastern margin of the valley in Stanislaus,

Merced, Fresno, Madera, and Tulare Counties. The species grows at elevations of up to 2,625 feet (California Native Plant Society 2018).

The species grows primarily in large pools that retain water until late spring (Crampton 1976; Stone et al. 1988). Soils underlying these pools are typically acidic, varying in texture from clay to sandy loam (Stone et al. 1988). Interestingly, Colusa grass, hairy Orcutt grass, and Hoover's spurge occur at several of the same sites as San Joaquin Valley Orcutt grass (EIP 1999b; U.S. Fish and Wildlife Service 2002; California Natural Diversity Database 2018). Given the rarity of all of these species, this co-occurrence indicates similar habitat requirements at the scales of individual pools or pool complexes.

San Joaquin Valley Orcutt grass is known to occur at 24 locations in the project region but is not known to occur on the campus site (California Natural Diversity Database 2018). However, UC Merced is currently monitoring extant populations of this species on the adjacent Tier 1(a) Conservation Lands, where there are four currently documented occurrences.

Dwarf Downingia

Dwarf downingia is a CRPR List 2.2 species. It occurs in vernal pools in the interior North Coast Ranges, southern Sacramento Valley, and northern and central San Joaquin Valley.

The project site is within the geographic range of dwarf downingia and contains habitat that is potentially suitable for the species. The species has been documented at 13 locations within the project region (California Natural Diversity Database 2018). One occurrence has been documented at the northern undeveloped end of the project site as part of surveys conducted by EIP Associates in 1999. One additional CNDDB occurrence is also present within the adjacent Tier 1 Conservation Lands.

Shining Navarretia

Shining navarretia is a CRPR List 1B.2 species. It typically grows in clay flats in annual grasslands, although it also occurs in heavy clay soils on grassy slopes, vernal swales, and vernal pools (California Natural Diversity Database 2018).

The project site is within the geographic range of shining navarretia and contains habitat that is suitable for the species. The species has been documented at 37 occurrences within the project region (California Natural Diversity Database 2018). Portions of two occurrences of shining navarretia are located within the northernmost undeveloped portion of the project site, as documented by surveys conducted by EIP Associates in 1999. Ten occurrences are located within Tier 1 Conservation Lands within the study area.

Special-Status Wildlife

Specials-status wildlife species were identified as having the potential to occur in the project site based on a review of species lists obtained from CNDDB (2018 and 2019) and USFWS (2018); and previous studies, reports, and surveys of the project site and its vicinity.

As summarized in **Table 4.2-5**, 35 special-status wildlife species were identified as having potential to occur on or in the general vicinity of the project site. Upon further review, it was determined that eight (8) of these species are not expected to occur on the project site. Of the remaining 27 special-status wildlife species, 14 species are known to occur on the project site based on documented sightings and 13 species have the potential to occur on the project site based on the presence of suitable habitat. More detailed evaluation is provided below for the special-status species and/or species groups that are known from or may occur at the project site and could be affected by project implementation. Though Conservancy fairy shrimp has not been observed in the project site due to the lack of suitable habitat, this species is discussed further in this report due to its known occurrence within the adjacent Tier 1 Conservation Lands. With the exception of Conservancy fairy shrimp, all other special-status species that are not expected to occur are not discussed further in this section but are included in **Table 4.2-5**.

Invertebrates

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp is a federally listed threatened species. This species is the most widely distributed of the special-status vernal pool crustaceans occurring in the project region. The species is found from Shasta County in the north throughout the Central Valley and west to the central Coast Ranges, at elevations of 30 to 4,000 feet. Additional populations have been reported from the Agate Desert region of Oregon near Medford, and disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside Counties. However, most known locations are in the Sacramento and San Joaquin Valleys and along the eastern margin of the central Coast Ranges (Eng et al. 1990).

Vernal pool fairy shrimp inhabit vernal pools that form in depressions, usually in grassland habitats (Eng et al. 1990). Pools must remain inundated long enough for the species to complete its life cycle. Vernal pool fairy shrimp also occur in other wetlands that provide habitat similar to vernal pools, such as alkaline rain pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal swales, and some seasonal wetlands (Helm 1998). Occupied wetlands range in size from as small as several square feet to more than 10 acres. Vernal pool fairy shrimp and other fairy shrimp have been observed in artificial depressions and drainages where water ponds for a sufficient duration (Helm 1998). Examples of such areas include roadside ditches and ruts left behind by off-road vehicles or heavy equipment. Soil

compaction from construction activity can sometimes create an artificial hardpan, or restrictive layer, which allows water to pond and form suitable habitat for vernal pool fairy shrimp.

Based on previous surveys conducted for the proposed project, there are two CNDDB occurrences within the project site associated with approximately 50 presumed extant point observations of this species and 10 occurrences of the species on Tier 1 Conservation Lands associated with approximately 920 point observations. Vernal pool fairy shrimp has been documented in vernal pools and swales throughout the project site and adjacent Tier 1 Conservation Lands (California Natural Diversity Database 2018; UC Merced 2001; LSA 2017a; and LSA 2017b).

Vernal Pool Tadpole Shrimp

Vernal pool tadpole shrimp is a federally listed endangered species. This species is a California Central Valley endemic species, with the majority of populations in the Sacramento Valley. This species has also been reported from the Sacramento River Delta east of San Francisco Bay and from scattered localities in the San Joaquin Valley from San Joaquin to Madera Counties (Rogers 2001).

Vernal pool tadpole shrimp occur in a wide variety of seasonal habitats including vernal pools, ponded clay flats, alkaline pools, ephemeral stock tanks, and roadside ditches (Helm 1998; Rogers 2001; California Natural Diversity Database 2018). Habitats where vernal pool tadpole shrimp have been observed range in size from small (<25 square feet), clear, vegetated vernal pools to highly turbid alkali scald pools to large (>100-acre) winter lakes (Helm 1998; Rogers 2001). These pools and other ephemeral wetlands must dry out and be inundated again for the vernal pool tadpole shrimp cysts to hatch. This species has not been reported in pools that contain high concentrations of sodium salts but may occur in pools with high concentrations of calcium salts (Helm 1998; Rogers 2001).

Vernal pool tadpole shrimp has been documented to occur in vernal pools and swales within the Community North portion of the project site reflected in the 2009 LRDP EIS/EIR (California Natural Diversity Database 2018). There are no recorded occurrences of vernal pool tadpole shrimp within the current project site. Four CNDDB occurrences of this species are located entirely or partially within the Tier 1(a) Conservation Lands.

Conservancy Fairy Shrimp

Conservancy fairy shrimp is a federally listed endangered species. The range of Conservancy fairy shrimp extends from the northern Sacramento Valley to the San Joaquin Valley, and includes Butte, Glenn, Tehama, Solano, and Yuba Counties in the Sacramento Valley and Stanislaus and Merced Counties in the San Joaquin Valley (California Natural Diversity Database 2018).

Conservancy fairy shrimp occur in alkaline pools and vernal lakes and pools (Helm 1998). Observations suggest this species is generally found in pools that are relatively large and turbid (King et al. 1996; Helm 1998; Eriksen and Belk 1999). These pools may exceed several acres in size. The species is known to occur in pools on the Anita, Pescadero, Riz, Solano, Edminster, San Joaquin, and Peters soil series.

Conservancy fairy shrimp occur with several other vernal pool crustaceans, including vernal pool fairy shrimp, California linderiella, and vernal pool tadpole shrimp (King et al. 1996; Helm 1998; Eriksen and Belk 1999). The species also occurs with several vernal pool plant species, including Colusa grass and the Orcutt grasses.

This species requires large, deep vernal pools that are not present within the project site. This species was not observed in vernal pools within the project site during protocol-level surveys (see **Table 4.2-1** for summary of these surveys). This species is discussed further in this document due to its known occurrence within Tier 1 Conservation Lands, specifically the CNR lands. There is one known occurrence of Conservancy fairy shrimp within the Tier 1(a) Conservation Lands associated with an approximately 1.6-acre playa pool.

Midvalley Fairy Shrimp

While it has no state or federal listing status, midvalley fairy shrimp is included on CDFW's Special Animal List; it is also a target species on the Tier 1 Conservation Lands (Airola 2008a). Midvalley fairy shrimp is endemic to California's Central Valley, occurring from Sacramento to Fresno Counties (Belk and Fugate 2000). In the project region, the vast majority of midvalley fairy shrimp occurrences have been recorded on the Riverbank Formation; a significant number have been recorded on North Merced Gravels (UC Merced 2009).

Midvalley fairy shrimp differ from vernal pool tadpole shrimp and, to a lesser degree, vernal pool fairy shrimp in that they are generally associated with smaller and more ephemeral pools than these other species (Helm 1998). Midvalley fairy shrimp can also occur in roadside ditches adjacent to occupied habitat (Belk and Fugate 2000).

Midvalley fairy shrimp has been documented in vernal pools and swales within the project site. There is one presumed extant CNDDB occurrence associated with nine point observations of this species remaining within the project site.

USFWS proposed to list this species, but then declined to list it because it was determined to be "well represented on protected lands and in areas with little or no current threat" (USFWS 2004). The 2002 BO for the UC Merced project (which was issued prior to the decision to decline the listing of the species)

identified the need to provide protection for midvalley fairy shrimp due to its potential to be listed. Although the BO requirements no longer apply to this species (because it was not listed), the 2009 LRDP EIS/EIR determined that 24 acres of vernal pools occupied by this species would be removed by the Proposed Action and 325 acres of occupied midvalley fairy shrimp habitat was identified on Tier 1 Conservation Lands; as such, this species would therefore be protected (at a mitigation ratio of 12:1) as part of the project regardless of its listing status.

While midvalley fairy shrimp is not currently protected under the federal or state ESAs, it is considered a "species at risk" by CDFW. Consistent with the 2009 LRDP EIS/EIR, this species is not evaluated further, but it should be noted that as a result of the preservation and management of suitable habitat on the Conservation Lands, impacts to this species would not be considered significant under CEQA.

Crotch Bumble Bee

On June 12, 2019, the California Fish and Game Commission (Commission) voted to accept a petition from the Xerces Society (2018) to consider listing four subspecies of bumble bee, including the Crotch bumble bee (*Bombus crotchii*), under CESA. As a result of this decision, the Crotch bumble bee is a state candidate endangered species; as such, it is temporarily afforded the same protection as state-listed threatened or endangered species. The range of Crotch bumble bee historically extended throughout the southern two-thirds of California, from coastal California east to the Sierra-Cascade crest and south into Mexico, but recent data indicates that this species is absent from the center of its historical range due to extensive agricultural intensification and urbanization (Xerces Society 2018). There are no current (1999 – 2019) CNDDB records for this species within the San Joaquin Valley (California Natural Diversity Database 2019).

In California, Crotch bumble bees inhabit open grassland and scrub habitats. Suitable bee habitat is based on the availability of flowers on which to forage throughout the duration of the colony (spring through fall), colony nest sites, and overwintering sites for the queens (Xerces Society 2018). Bumble bees are generalist foragers (i.e., they do not depend on any one flower type). Documented food plants for Crotch bumble bees include *Asclepias* sp., *Chaenactis* sp., *Lupinus* sp., *Medicago* sp., *Phacelia* sp., and *Salvia* sp. (Williams et al. 2014). Crotch bumble bees, like most bumble bee species, nest underground (e.g., in abandoned rodent holes) (Xerces Society 2009). Very little is known about the hibernacula utilized by Crotch bumble bee queens in the winter (Xerces Society 2018). However, bumble bees generally overwinter in soft disturbed soil, leaf litter, or abandoned small mammal burrows (Williams et al. 2014; Xerces Society 2018). The flight period for Crotch bumble bee queens is from late February to late October, peaking in early April and again in July. The flight period for workers and males extends between late March and September (Xerces Society 2018).

There are no documented observations of Crotch bumble bee within the project site or the adjacent Tier 1(a) conservation lands, although no focused surveys have been conducted. CNDDB reports two occurrences of this species in Merced County, located over 10 miles to the northeast and over 25 miles to the southwest of the project area, but both are associated with collections made in the 1950s (California Natural Diversity Database 2019). However, annual grassland areas, in particular those areas with fossorial (burrowing) mammal activity, provide potential nest sites for this species within the project area. Furthermore, the remnant vernal pool-grassland complex within the Passive Open Space (POS) and the Research Open Space (ROS) areas of the campus, as well as the broad expanse of this habitat within the adjacent Tier 1 conservation lands, could potentially provide floral resources/foraging habitat for Crotch bumble bee.

Amphibians

California Tiger Salamander

California tiger salamander (CTS) is federally and state-listed as threatened. CTS is endemic to the San Joaquin–Sacramento River Valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994). The species occurs from Sonoma County and the Colusa-Yolo County line south to Santa Barbara County in the Coast Ranges, and from southern Sacramento County south to Tulare County in the Central Valley (Jennings and Hayes 1994).

CTS is a lowland species restricted to grasslands and low foothill regions where suitable breeding habitat (vernal pools, ephemeral pools, or human-made ponds with a minimum inundation period of 3 to 4 months) occurs. Permanent aquatic sites are unlikely to be used for breeding unless they lack predatory fish or periodically dry out (Jennings and Hayes 1994). Though CTS develop in these aquatic sites, they spend most of their lives in underground retreats, typically burrows of small mammals, in upland areas usually within 1 mile of breeding sites (Shaffer et al. 2004; Trenham et al. 2001).

Although no CTS breeding locations are present on the project site, the species is known to breed in ponds and vernal pools off-site to the south and within the Tier 1 Conservation Lands to the east. Due to the proximity of the known breeding locations, the entire campus site (1,026 acres) is considered to be occupied by CTS. Approximately 180 acres of USFWS-designated critical habitat for this species is located on the project site. To compensate for the loss of CTS occupied habitat on the campus site (as well as the previously proposed Community North site), the University committed to and proceeded with protecting the Tier 1(a) and Tier 2 Conservation lands, as described in the 2009 LRDP EIS/EIR. In 2016, conservation easements were established on the Yosemite Lake Conservation Area (YLCA) property and at the Merced County Preserve. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by

The Nature Conservancy (TNC), the University has preserved approximately 17,800 acres of occupied habitat (9:1 mitigation ratio) and approximately 9,850 acres of critical habitat (43:1 mitigation ratio).

To date one occurrence of CTS has been recorded on the campus site. On September 12, 2018, one adult CTS was found within the 2020 Project site in a burrow that was being excavated in advance of construction. The animal was safely relocated in the adjacent Tier 1(a) Conservation Lands in compliance with a CTS relocation plan previously approved by CDFW and USFWS.

Studies in eastern Merced County found potential hybrid alleles of the introduced barred tiger salamander (*Ambystoma tigrinum mavortium*) and CTS in vernal pools (Fitzpatrick and Schaffer 2007). This finding may affect the management of occupied CTS habitats in the project region. This research suggests that permanent ponds have a higher representation of barred tiger salamander genes, while intermittent ponds support more genetically pure CTS. Therefore, pond management may be available as a technique to reduce hybridization. UC Merced has sampled known and potential breeding habitat on the adjacent Tier 1(a) Conservation Lands from 2016 through 2018 to document where CTS breeding occurs. In 2017, genetic samples from CTS were collected and sent them to the Shaffer Lab at UC Los Angeles for further analysis of potential hybridization.

Reptiles

Western Pond Turtle

The western pond turtle is a state species of special concern. Western pond turtle is a thoroughly aquatic turtle of water bodies such as ponds, marshes, rivers, streams, and irrigation ditches with rock or mud substrates that support aquatic vegetation (e.g., watercress, cattails, water lilies). Western pond turtles are often seen basking on logs, emergent vegetation, and mud banks (Stebbins 2003). They move to upland areas up to 0.25 mile from watercourses to deposit eggs and overwinter (Jennings and Hayes 1994). Their diet consists of aquatic plants, insects, worms, fish, amphibian eggs and larvae, crayfish, aquatic invertebrates, and carrion (Stebbins 2003).

The project site is within western pond turtle's range, and ponds and canals in the project site provide suitable habitat for this species. On October 17, 2016, a qualified biologist conducted a survey for western pond turtles in Little Lake and none were detected (Sequoia Ecological Consulting 2016a). Additional preconstruction surveys conducted by qualified biologists as required by the Final Construction Mitigation Plan for Biological Resources for the University of California, Merced Project (ICF Jones & Stokes 2009) through 2018 did not detect the species on the project site. However, in April 2019, a western pond turtle was observed at Northern Pond, a permanent storm water detention basin on the project site, during monitoring activities associated with the 2020 Project (UC Merced 2019b).

Birds

The project site contains suitable nesting and foraging habitat for numerous special-status raptors and other migratory birds. Special-status bird species known to forage in the project site and vicinity include white-tailed kite, northern harrier, bald eagle (*Haliaeetus leucocephalus*), golden eagle, Swainson's hawk, mountain plover, short-eared owl, burrowing owl, loggerhead shrike, and tricolored blackbird. Of these species, only Swainson's hawk, northern harrier, tricolored blackbird, and burrowing owl have been documented to nest on or near the project site based on CNDDB occurrences and input from UC Merced staff and biologists monitoring ongoing 2020 Project activities. The project site also contains some suitable nesting habitat for white-tailed kite, short-eared owl, and loggerhead shrike, and numerous non-special-status bird species, so there is potential for these species to nest on the site.

Swainson's Hawk

Swainson's hawk is a state-listed threatened species. Most Swainson's hawks migrate annually from wintering areas as far as South America to breeding locations in northwestern Canada, the western United States, and Mexico. In California, the breeding distribution includes the Central Valley, the Klamath Basin, the northeastern plateau, Lassen County, and the Mojave Desert (Zeiner et al. 1990a), and the California population winters in Mexico.

Swainson's hawk nests in the Central Valley in large trees in riparian corridors, oak savannah, and juniper-sage flats in open tree stands (Zeiner et al. 1990a). This species is also typically found nesting adjacent to agricultural fields. Swainson's hawks breed from late March to late August, with peak activity from late May through July. In the Central Valley, Swainson's hawks often forage in large, open agricultural habitats, including alfalfa and hay fields (California Department of Fish and Game 1994). Their diet consists of small mammals, invertebrates, amphibians, reptiles, birds and, less frequently, fish (Zeiner et al. 1990a).

The project site is within Swainson's hawk's breeding range and provides suitable foraging habitat and limited nesting habitat for the species. Several nest sites are reported to occur within 5 to 10 miles of the project site (California Natural Diversity Database 2018) and UC Merced staff have reported Swainson's hawk's nesting within the project site (UC Merced 2019a). Swainson's hawk has been observed foraging just south of the campus site and likely forages in grasslands and agricultural lands throughout the project site (UC Merced 2001).

Northern Harrier

Northern harrier is a state species of special concern. The breeding range includes most of the Central Valley, the Sacramento– San Joaquin Delta, the Suisun Marsh, and portions of San Francisco Bay (Zeiner et al. 1990a).

Tall grasses and forbs in wetlands and field borders provide cover for northern harriers. Northern harrier nests on the ground in thick grass, shrubbery, or other vegetation, often near marshes. Their nests typically consist of a pile of sticks and grass. The breeding season for this species is between April and September, with peak activity in June and July. Northern harriers feed on voles and other small mammals, birds, small reptiles, crustaceans, and insects (Zeiner et al. 1990a).

The project site is within northern harriers' breeding and wintering range and provides suitable nesting and foraging habitat for the species. This species has been documented nesting within the campus site (UC Merced 2001; County of Merced 2001).

Tricolored Blackbird

Tricolored blackbird is a state listed threatened species. Tricolored blackbird breeding colonies have been observed in all Central Valley counties (California Natural Diversity Database 2018). The vast majority of the population occurs in central California, with additional populations in coastal and inland southern California locations, as well as scattered sites in Oregon, western Nevada, and western coastal Baja California (Beedy and Hamilton 1997).

There are three basic criteria for selecting nest colony sites: open accessible water; a protected nesting substrate, characterized either by flooded areas or by thorny or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony. Nesting substrates used by tricolored blackbirds include freshwater marsh dominated by tules and cattails, willows, blackberries, thistles, and nettles (Beedy and Hamilton 1997).

The project site is within tricolored blackbird's winter and summer range and contains suitable nesting habitat along marshes on the project site and foraging habitat in grasslands and agricultural lands throughout the project site. The CNDDB lists eight extant occurrences for this species within the project region (California Natural Diversity Database 2018). A large flock of approximately 3,000 tricolored blackbirds was documented foraging in the Phase 1 campus site by a Jones & Stokes avian ecologist during environmental compliance monitoring on March 25, 2003. A focused tricolored blackbird nesting survey conducted on April 3, 2003 did not detect nesting. However, in May 2018, multiple tricolored blackbirds

were observed in a marsh adjacent to Fairfield Canal about 300 feet south of the North Bowl parking lot during bird surveys being conducted by a qualified biologist.

Burrowing Owl

Burrowing owl is a state species of special concern. Burrowing owls are found throughout much of California in annual and perennial grassland, desert, and arid scrubland (California Department of Fish and Game 1995).

Burrowing owls primarily rely on burrows excavated by ground squirrels. Where the number and availability of natural burrows is limited (for example, where burrows have been destroyed or ground squirrels eradicated), burrowing owls may occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures. The breeding season is March through August, peaking in April and May (Zeiner et al. 1990a).

The project site is within burrowing owl's breeding and wintering range and supports suitable breeding and foraging habitat for the species. This species has been documented throughout the project region and is known to nest on the campus site based on CNDDB occurrences and input from UC Merced staff and biologists monitoring ongoing 2020 Project activities (Live Oak Associates 2012; LSA 2016b; Sequoia Ecological Consulting 2016b).

Other Special-Status Species

Other special-status bird species that have potential to nest on or near the project site include white-tailed kite, short-eared owl, loggerhead shrike, and mountain plover.

Non-Special-Status Nesting Raptors and Other Migratory Birds

Non-special-status nesting raptors and other migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (50 CFR 10 and 21) and California Fish and Game Code Sections 3503 and 3503.5. Numerous non-special-status raptors and other migratory birds, including but not limited to, red-tailed hawk, red-shouldered hawk, American kestrel, and red-winged blackbird, could breed on the project site on the basis of the presence of suitable nesting habitat. A variety of other migratory birds may nest in grasslands, shrubs, trees, buildings, and on the ground on or near the project site, including killdeer and mourning doves (*Zenaida macroura*).

Mammals

San Joaquin Kit Fox

The current known range of San Joaquin kit fox extends from central Contra Costa County south through Kern County and to the northeastern edge of Santa Barbara County. Three distinct core areas support the largest known extant populations: the Carrizo Plain Natural Area in San Luis Obispo County, natural lands in western Kern County, and the Ciervo-Panoche Natural Area of western Fresno and eastern San Benito Counties. Other areas that either support San Joaquin kit fox populations or have the potential to support them include the Salinas-Pajaro River watersheds (San Benito and Monterey Counties); Camp Roberts and Fort Hunter Liggett in Monterey County; western Madera County; western, central, and eastern Merced County; eastern Stanislaus County; northern Kings County; western Tulare County; and around the Bakersfield metropolitan area in Kern County (U.S. Fish and Wildlife Service 1998).

In the central portion of the range, San Joaquin kit fox is associated with the following natural vegetation communities: valley sink scrub, interior coast range saltbush scrub, upper Sonoran subshrub scrub, annual grassland, and the remaining native grasslands. Kit foxes in the central region also use grazed non-irrigated grasslands, tilled or fallow fields, irrigated row crops, orchards, and vineyards because of the predominance of these cover types in the region (U.S. Fish and Wildlife Service 1998).

Kit foxes prefer loose-textured and deeper soils but have been found on a wide range of soil types. Kit foxes may construct their own dens, but where soils make digging difficult, foxes frequently use and modify burrows built by other animals, particularly those of California ground squirrels. Structures such as culverts, abandoned pipelines, and well casings may also be used as den sites. The breeding season begins during September and October when adult females begin to clean and enlarge natal or pupping dens. Mating and conception occur between late December and March. Gestation is 48–52 days, and litters of two to six pups are born sometime between late February and late March (U.S. Fish and Wildlife Service 1998).

A review of the distribution of San Joaquin kit fox in the project vicinity revealed a total of four CNDDB records within a 10-mile radius of the project site. Three of these occurrences are for foraging individuals, and only one of these records involved juveniles; this observation of two juveniles and a single adult, reported from Atwater in the early 1980s, is the only evidence of reproduction within 10 miles of the project site. The closest recorded occurrence for this species is a 1999 observation of a foraging adult located 1.45 miles north of the intersection of Yosemite Avenue and Arboleda Drive along Black Rascal Creek (California Native Diversity Database 2018).

As reflected in **Table 4.2-1**, San Joaquin kit fox preconstruction surveys were conducted in anticipation of the North Bowl parking lot construction in 2011, with negative findings. UC Merced has also conducted annual camera trapping within the Tier 1(a) Conservation Lands between 2014 and 2017 in an attempt to detect the presence of San Joaquin kit fox. In 2016, Padre Associates, Inc. conducted focused surveys for San Joaquin kit fox in the planned development areas of the campus. Despite this extensive effort over a continual 4-year period, no San Joaquin kit foxes have been observed on or in the vicinity of the project site.

Critical Habitat

Critical habitat is a term defined and used in the FESA as a specific geographic area(s) that contain features essential for the conservation of a federally-listed threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. An area is designated as "critical habitat" after USFWS publishes a proposed federal regulation in the Federal Register and then receive and consider public comments on the proposal. The final boundaries of the critical habitat area are also published in the Federal Register. Critical habitats considered with respect to the proposed project include vernal pool species critical habitat and California tiger salamander critical habitat, as described below.

Vernal Pool Invertebrates and Plants

Critical habitat for vernal pool invertebrate and plant species was originally designated in a final rule published on August 6, 2003 (68 FR 46683). Critical habitat was designated for the following species that occur on the project site and within the project region: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Hoover's spurge, succulent owl's clover, Colusa grass, San Joaquin Orcutt grass, hairy Orcutt Grass, and Greene's tuctoria (*Tuctoria greenei*) (FR 68 46684–46867). A revised final rule for critical habitat, with a re-evaluation of non-economic exclusions, was published in 70 FR 11140 on March 8, 2005. Economic exclusions from the 2003 final rule were evaluated and published on August 11, 2005 (70 FR 46923). Administrative revisions with species-by-unit designations were published on February 10, 2006 (71 FR 7117). On May 31, 2007, USFWS clarified its designation of critical habitat (FR 72 30279–30297), which resulted in the addition of 147,638 acres of critical habitat in Merced County. With respect to the project site, the designated area of critical habitat is primarily located east of Lake Yosemite and north of Paloma Road and does not include land within the campus site. Up to approximately 16,250 acres of critical habitat for vernal pool species lies within the Tier 1 Conservation Lands.

California Tiger Salamander

In August 2005, the USFWS designated 199,109 acres of critical habitat for California tiger salamander in 19 counties (FR 70 49379–49458). Critical Habitat Unit 9 is located in eastern Merced County and includes approximately 180 acres within the project site. Nearly 13,000 acres of Critical Habitat Units 9 and 10 are located within the Tier 1 and 2 Conservation Lands.

4.2.3 Regulatory Considerations

Federal Laws and Regulations

Clean Water Act: Section 404

The USACE and the United States Environmental Protection Agency (U.S. EPA) regulate the discharge of dredged or fill material into waters of the U.S., including wetlands, under Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). Waters of the U.S. are defined in Title 33 CFR Part 328.3(a) and include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. The lateral limits of jurisdiction in those waters may be divided into three categories – territorial seas, tidal waters, and non-tidal waters – and is determined depending on which type of waters is present (Title 33 CFR Parts 328.4(a),(b),(c)). Activities in waters of the U.S. regulated under Section 404 include fill for development, water resource projects (such as dams and levees), infrastructure developments (such as highways and airports), and mining projects. Section 404 of the CWA requires a federal license or permit before dredged or fill material may be discharged into waters of the U.S., unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).

As the development of the campus required the fill of waters of the United States considered jurisdictional under Section 404 of the CWA, on November 9, 2001, the University submitted an application to the USACE for a permit under Section 404 of the CWA to fill approximately 79.35 acres of jurisdictional waters in connection with the full development of the campus. However, because the location of the campus changed between 2001 and 2008, on February 20, 2008, the University and University Community Land Company (UCLC) submitted a Revised Section 404 Permit Application for the proposed UC Merced campus and the northern portion of University Community. In 2009, following the preparation and approval of an EIS, completion of a 404 (b)(1) analysis, as well as other requirements, including Section 106 and Section 7 consultations, the USACE issued a Department of Army permit to the University and UCLC, authorizing the filling of all 77.79 acres of jurisdictional waters on the UC Merced campus and University Community North sites, including 40.08 acres of vernal pools and swales, 0.33 acre of clay slope wetlands, 12.23 acres of irrigated wetlands, and 25.15 acres of canal wetlands.

Clean Water Act: Section 401

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U. S. to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters. At the point where the discharge originates or would originate, the discharge would have to comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. In California, the responsibility for the protection of water quality under the CWA rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs). The University and UCLC obtained water quality certification from the RWQCB in compliance with CWA Section 401 on April 20, 2009.

Federal Endangered Species Act

The federal Endangered Species Act (FESA) of 1973, as amended, provides the regulatory framework for the protection of plant and animal species (and their associated critical habitats), which are formally listed, proposed for listing, or candidates for listing as endangered or threatened under the FESA. The FESA has four major components: provisions for listing species, requirements for consultation with the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, prohibitions against "taking" of listed species, and provisions for permits that allow incidental "take." Key provisions of Section 7 of the FESA are summarized below.

Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies. "Take" is defined by the F ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 7 applies to actions that are conducted, permitted, or funded by a federal agency. Under Section 7, the federal agency conducting, funding, or permitting an action (the federal lead agency) must consult with the USFWS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed action "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect. In response, the USFWS issues a biological opinion, with a determination that the proposed action either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding); or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The biological opinion may stipulate discretionary "reasonable and prudent" alternatives. If the proposed action would not jeopardize a listed species, the USFWS issues an incidental take statement to authorize the proposed action.

Pursuant to Section 7 of the FESA, UC Merced submitted a biological assessment (2002 BA) to the USACE in February 2002 to address the effects of the development of the campus and the infrastructure components on succulent owl's clover, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Hoover's spurge, Green's Tuctoria, Hartweg's golden sunburst (*Pseudobahia bahiifolia*), vernal pool fairy shrimp, vernal pool tadpole shrimp, Conservancy fairy shrimp, valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) bald eagle, , and San Joaquin kit fox. On February 22, 2002, the USACE requested formal consultation with USFWS under Section 7 of the FESA. In July 2002, the *Supplement to the Biological Assessment for the UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project* (2002 Supplemental BA), which addressed an expanded project area, was submitted to USFWS. USFWS completed consultation on August 19, 2002, with the issuance of the *Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1.1 and Campus Buildout and Infrastructure Project* (1-1-02-I-2926), hereinafter referred to as the 2002 BO. In its 2002 BO, USFWS concluded that, contingent upon implementation of and compliance with conservation measures and parameters set forth in the 2002 BO, the UC Merced project would not result in jeopardy to federally-listed threatened and endangered species covered by the 2002 BO (U.S. Fish and Wildlife Service 2002). In fall 2008, after the University and UCLC submitted a revised DA application to the USACE for the UC Merced campus and University Community North, the *2008 Supplement to the BA for the University of California, Merced Campus and University Community North* was submitted to the USACE and USFWS. Based on the prior BA and the 2008 Supplement, the USFWS issued a revised Biological Opinion for the revised campus and Community North sites on April 28, 2009. This revised BO removed the bald eagle and mountain plover from the species list and added CTS. The BO was further amended on February 11, 2016 to account for an expansion of the action area to include two off-site mitigation properties (Lazy K Ranch and the Yosemite Lake Conservation Area), as well as a request from the USACE to modify existing CTS avoidance measures described in the 2002 BO and 2009 BO Amendment. Formal consultation was reinitiated on February 23, 2016 to reflect minor changes to the CTS avoidance measures that were revised in the February 11, 2016 amendment.

Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), Title 50 Code of Federal Regulations (CFR) Part 10, prohibits taking, killing, possessing, transporting, and importing of migratory birds, parts of migratory birds, and their eggs and nests, except when specifically authorized by the Department of the Interior (DOI). As used in the act, the term "take" is defined as meaning "to pursue, hunt, capture, collect,

kill or attempt to pursue, hunt, shoot, capture, collect or kill, unless the context otherwise requires." With a few exceptions, most birds are considered migratory under the MBTA. Disturbances that causes nest abandonment and/or loss of reproductive effort or loss of habitat upon which these birds depend could be in violation of the MBTA.

A December 2017 opinion from the Office of the Solicitor for the U.S. Department of the Interior (M-opinion) concluded the MBTA restrictions apply only to affirmative and purposeful actions, such as hunting and poaching that reduce migratory birds and their nests and eggs, by killing or capturing, to human control and not incidental taking (U.S. Department of the Interior 2017). April 2018 guidance from the Principal Deputy Director of the USFWS provides further guidance on revisions to past policies and guidance regarding the MBTA (USFWS 2018a). This guidance concludes the MBTA's prohibitions on take of migratory birds apply only when the purpose of the action is to take migratory birds, their eggs, or their nests.

Federal Bald and Golden Eagle Protection Act

The Bald Eagle Protection Act (16 U.S.C. 668) was passed in 1940 to protect bald eagles and was later amended to include golden eagles. Under the Act, it is unlawful to import, export, take, sell, purchase, or barter any bald eagle or golden eagle, their parts, products, nests, or eggs. Take includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing eagles.

State Laws and Regulations

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code Section 2050 et seq.) establishes state policy to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. For projects that would affect a species that is both federally and state-listed, compliance with FESA satisfies CESA if CDFW determines that the federal incidental take authorization is consistent with CESA under California Fish and Game Code Section 2080.1. CDFW administers CESA and authorizes take through Section 2081 agreements (except for species designated as fully protected).

As the development of the campus had the potential to result in the take of state-listed species, the University submitted an application to the CDFW for an incidental take permit (ITP) under Section 2080.1 of the California Fish and Game Code Section. The ITP was issued on March 30, 2011, and covers the

following species: CTS, Swainson's hawk, succulent owl's clover, Colusa grass, San Joaquin Orcutt grass, and San Joaquin kit fox. The ITP was subsequently amended on September 30, 2011 to primarily reflect modifications to one of the conditions associated with CTS. The second ITP amendment was issued on October 30, 2015 to primarily expand take coverage to two off-site mitigation properties (Lazy K Ranch and the Yosemite Lake Conservation Area).

California Fish and Game Code

Lake and Streambed Alteration Agreements (Section 1600 et seq.)

Under Section 1602 of the CDFG code, agencies are required to notify CDFW before implementing any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental review process. When an existing fish or wildlife resource may be substantially adversely affected, CDFW is required to propose reasonable changes to the project to protect the resources. These modifications are formalized in a Lake or Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project.

UC Merced obtained a Lake Alteration Maintenance Agreement on July 21, 2008 for routine maintenance activities at Little Lake and Lower Pond. On May 9, 2017, a Lake Alteration Agreement was issued by CDFW to the 2020 Project developer for modifications occurring in and adjacent to Little Lake and Lower Pond as part of the 2020 Project.

Unlawful Destruction of Nests or Eggs and Birds-of-Prey or their Eggs (Sections 3503 and 3513)

According to Section 3503 of the California Fish and Game Code it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except birds that do not naturally occur in California as a resident, regular migrant or occasional migrant species, such as house sparrows (*Passer domesticus*) and European starlings (*Sturnus vulgaris*). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MTBA, prohibiting the take or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by CDFW.

California Fully Protected Species

The California Fish and Game Code provides protection from take for a variety of species, referred to as "fully protected species." Section 5050 lists fully protected amphibians and reptiles; Section 3515 lists fully protected fish; Section 3511 lists fully protected birds; and Section 4700 lists fully protected mammals.

The California Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of fully protected species is prohibited. Three fully protected bird species - bald eagle, golden eagle, and white-tailed kite, have potential to forage on the project site. White-tailed kite also has potential to nest along drainages on the project site.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act authorizes the State Water Resources Control Board (SWRCB) to regulate state water quality and protect beneficial uses. As noted above, the SWRCB certifies that activities subject to CWA Section 404 permits.

California Native Plant Protection Act

The California Native Plant Protection Act (CNPPA) preserves, protects and enhances endangered native plants in California. The act gave the California Fish and Game Commission the power to designate native plants as endangered, threatened, or rare, and to require permits for collecting, transporting, or selling such plants. Three special-status plant species afforded protection under the CNPPA are known to occur within the project site and adjacent Tier 1 Conservation Lands.

California Native Plant Society Rare Plant Ranking System

The CNPS has been involved in assembling, evaluating, and distributing information on special-status plant species in the state, as listed in the *Inventory of Rare and Endangered Plants of California* (CNPS 2001 and electronic inventory update). CNPS has recently updated their rating system for the rarity of special-status plants, and now include both a California Rare Plant Rank and a Threat Rank. Species are ranked according to their rarity status.[1] CEQA requires government agencies to consider environmental impacts of discretionary projects and to avoid or mitigate them where possible. Under Section 15380, CEQA provides protection for both State-listed species and for any other species which can be shown to meet the criteria for State listing. CDFW recognizes that special-status plants with a California Rare Plant Rank (CRPR) of 1A (Presumed extinct in California), 1B (Rare, threatened, or endangered in California and elsewhere), and 2 (Rare and endangered in California, but are more common elsewhere) in the CNPS Inventory consist of

[1] The CNPS Inventory contains the following listings:
1A = Plants Presumed Extirpated in California and Ether Rare or Extinct Elsewhere
1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
2A = Plants Presumed Extirpated in California, But More Common Elsewhere
2B = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
3 = Plants About Which More Information is Needed – A Review List
4 = Plants of Limited Distribution – A Watch List

plants that, in a majority of cases, would qualify for listing and these species should be addressed under CEQA review. In addition, CDFW recommends, and local governments may require, protection of species which are regionally significant, such as locally rare species, disjunct populations, essential nesting and roosting habitat for more common wildlife species, or plants with a CRPR of 3 (Plant species for which additional data is needed – a review list) and 4 (Plant species of limited distribution - a watch list).

Sensitive Vegetation Natural Communities

Sensitive vegetation natural communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, state, and local conservation plans, policies or regulations. The CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its CNDDB. Sensitive vegetation natural communities are also identified by the CDFW on its List of California Natural Communities Recognized by the CNDDB. Impacts to sensitive natural communities and habitats identified in local or regional plans, policies, regulations or by federal or state agencies must be considered and evaluated under CEQA (CCR: Title 14, Div. 6, Chap. 3, Appendix G).

Although sensitive natural communities have no legal protective status under FESA and CESA, they are provided some level of protection under CEQA. *State CEQA Guidelines* identify potential impacts on a sensitive natural community as one of six significance criteria. As an example, a discretionary project that has a substantial adverse effect on any riparian habitat, native grassland, valley oak woodland, or other sensitive natural community would normally be considered to have a significant effect on the environment. Further loss of a sensitive natural community could be interpreted as substantially diminishing habitat, depending on its relative abundance, quality and degree of past disturbance, and the anticipated impacts to the specific community type. Where determined to be a significant impact under CEQA, the potential impact would require mitigation through avoidance, minimization of disturbance or loss, or some type of compensatory mitigation when unavoidable.

Local Plans and Policies

The University is constitutionally exempt from local land use laws and regulations under Article IX, Section 9 of the California Constitution. This exemption applies to all city and county general plans, as well as community plans and zoning regulations. However, the University has and will continue to work cooperatively with adjacent local communities to pursue cooperative planning, land use compatibility and consistency with local plans and policies, whenever feasible. There are no local City or County plans and policies related to biological resources that are applicable to the proposed project.

The land use plan applicable to the campus is the proposed 2020 LRDP. Although the 2020 LRDP does not set forth policies focused on the protection of biological resources, the plan designates 283 acres of land within the campus site as Passive Open Space (POS) which would not be developed with facilities. The plan also identifies about 135 acres of Research Open Space (ROS) which would also not be used for development but may be used by UC Merced to conduct field research. Finally, the plan designates 306 acres of land as Campus Building Reserve and Support Land (CBRSL), which would not be developed under the 2020 LRDP but may be developed with campus facilities at some point in time after 2030. While the 2020 LRDP allows for the siting of small facilities (less than 10,000 square feet each) on ROS or CBRSL lands, such projects would be small scale and would be sited carefully to avoid or minimize disturbance of sensitive biological resources. Therefore, about 725 acres of the 1,026-acre campus would not be developed and biological resources within those lands would remain largely undisturbed.

4.2.4 Impacts and Mitigation Measures

Significance Criteria

The impacts of the proposed project on biological resources would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the *State CEQA Guidelines*:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on state or federally protected wetlands (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.

Issues Not Discussed Further

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

The proposed project would not result in an impact related to conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan because no habitat conservation plans or natural community conservation plans have been adopted that encompass the project area.

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

The proposed project would not result in an impact related to a conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as there are no local ordinances that are applicable to the campus.

Methodology

All of the campus facilities under the 2020 LRDP would be located within 274 acres of land designated Campus Mixed Use (CMU) on the land use diagram. About 171 acres of the CMU lands are either already developed with campus facilities or will be under campus facilities once the 2020 Project is constructed. Therefore, about 103 acres of CMU lands could be developed under the proposed 2020 LRDP. This impact analysis assumes full buildout of those 103 acres, resulting in loss of all habitats located within those lands.

With respect to the rest of the campus site, as explained above, about 800 acres of the 1,026-acre campus would not be developed under the proposed 2020 LRDP and biological resources within those lands would remain undisturbed. Therefore, the proposed 2020 LRDP would generally result in a reduced impact on biological resources when compared to the project evaluated in the 2009 LRDP EIS/EIR. However, the 2020 LRDP would allow the siting of small facilities, such as a field station, solar array, or a research project, on lands designated CBRSL or ROS. As noted earlier, those projects would be small scale and sited carefully to avoid or minimize impacts to sensitive biological resources. Nonetheless, the potential for these small projects to result in biological impacts is analyzed below.

The following activities would have the potential to affect biological resources. These types of direct and indirect impacts were used to assess project-related impacts on biological resources.

Direct Impacts

- Vegetation clearing (including trees), grading, excavating/trenching, and paving activities during construction;
- Destroying breeding, feeding and sheltering habitat and movement/migration corridors for special-status species;
- Permanently removing wetlands;

- Temporary stockpiling and side-casting of soil, construction materials, or other construction wastes;
- Soil compaction, dust, and water runoff from the construction site;
- Short-term construction-related noise (from equipment); and
- Degradation of water quality in drainages and wetlands, resulting from construction runoff containing petroleum products.

Indirect Impacts

- Altering light and noise levels;
- Altering hydrology;
- Causing damage through toxicity associated with herbicides, pesticides, and rodenticides;
- Introducing pet and human disturbance (including trash dumping);
- Increasing habitat for native competitors or predators; and
- Introducing invasive nonnative species.

4.2.5 LRDP Impacts and Mitigation Measures

LRDP Impact BIO-1: Implementation of the 2020 LRDP would not have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. *(Less than Significant)*

In 2002, following the completion of environmental review and approval of a new UC campus on a 910-acre site near Lake Yosemite in Merced County, construction of the first campus facilities was commenced on an approximately 100-acre portion of the 910-acre campus site, in an area that was occupied by a former golf course and did not contain any wetlands. Concurrently with commencement of campus development, in 2002, the University and Virginia Smith Trust (VST) formed a limited liability corporation (LLC) called University Community Land Company (UCLC) for the development of an approximately 1,111-acre parcel to the south of the campus (University Community North). Following the establishment of the very first facilities on the campus, the University continued to work with the U.S. EPA, USACE, and other state and federal agencies to adjust the location of the proposed campus. Once agreement on the exact location of the campus was achieved, the University prepared a revised LRDP (2009 LRDP) for the campus. In March 2009, the Regents certified the EIR and approved the 2009 LRDP. That EIR evaluated and disclosed the direct and indirect impacts of campus development and University Community North on wetlands and other waters of the U.S. present on the campus and University Community North sites.

Also in 2009, the USACE approved the EIS and in April 2009 issued a Department of the Army (DA) Permit No. SPK-1999-00203 to the University and UCLC, authorizing the filling of 77.79 acres of waters of the U.S., in conjunction with the development of the campus and the adjacent University Community North. The 77.79 acres of fill that is authorized by the permit includes 15.03 acres of vernal pools, 25.05 acres of swale wetlands, 0.33 acres of clay slope wetlands, 12.23 acres of irrigated wetlands, and 25.15 acres of canal wetlands. The permit also identifies the requirements with respect to compensatory mitigation for the approved fill, and notes that UC Merced and UCLC must comply with the mitigation requirements outlined in the Compensatory Wetlands Mitigation and Monitoring Plan (CWMMP). It should be noted that the wetland classification reflected in the DA permit does not align perfectly with the classification used in **Table 4.2-3**. However, because both the classification and the acreage included in the DA permit have been verified and approved by the federal and state agencies, those acreages and wetland types are used in the discussion of impacts below.

Wetland Impacts of Campus and University Community North Development

In 2011, UC Merced initiated the construction of the Phase 6 Project. This project included site preparation for future campus development to properly maintain the existing campus and to readily expand outside the Phase 1 campus development. The Phase 6 Project provided critically needed campus site development and infrastructure directly associated with expansion of the initial campus footprint for new instruction and research facilities. In total, the grading activities involved the discharge of fill materials into approximately 26.52 acres of wetlands, including 21.93 acres of vernal pools and swales and 4.58 acres of other seasonal wetlands.

In fall 2016, UC Merced commenced site preparation and grading for the 2020 Project which encompasses the next phase of campus development over an area of approximately 150 acres to the south of the existing campus. The 2020 Project site is within the area covered by the UC Merced DA permit. Grading and construction associated with the 2020 Project resulted in the fill of additional wetlands that were present within the footprint of that project.

Table 4.2-6 presents a summary of the authorized fill and the fill to date by wetland type.

Table 4.2-6
Permitted Wetland Fill and Fill to Date (acres)

Type	Authorized Fill Per DA Permit	Acres Filled under Phase 6 Project	Acres Filled under 2020 Project	Balance
Vernal pools	15.03	14.60	0.06	0.37
Swale wetlands	25.05	7.33	1.73	15.99
Clay slope wetlands	0.33	0.11	0	0.22
Irrigated wetlands	12.23	2.51	0	9.72
Canal wetlands	25.15	1.97	4.92	18.26
Total	**77.79**	**26.52**	**6.71**	**44.56**

Source: University of California, Merced 2019

Compensatory Wetland Mitigation to Date

The CWMMP requires UC Merced and UCLC to provide compensatory wetlands for the wetlands filled in conjunction with the development of the campus and University Community North. Based on the CWMMP and for ease of reference, the five wetland types in **Table 4.2-6** above are consolidated into two broad categories: the category "vernal pools" is used to refer to all vernal pools, swale wetlands, and clay slope wetlands, and the category "non-vernal pool seasonal wetlands" is used to collectively refer to irrigated wetlands and canal wetlands in the discussion and table that follows.

In 2012, UC Merced commenced the process of providing compensatory wetlands mitigation for the wetlands fill to date and was successful in completing two compensatory mitigation projects in 2016. UC Merced also purchased vernal pool credits to compensate for a portion of the vernal pool wetlands impact. The three completed mitigation projects are briefly described below.

- **Wetlands Creation.** The 5G's Corporation Yosemite Lake Conservation Area (YLCA) is located in Merced County to the northwest of the campus. The 392-acre mitigation site will accommodate the re-establishment of about 31 acres of vernal pool, swale, and clay flat wetlands, including 25 acres of restored vernal pool wetlands and 50 acres of protected uplands for UC Merced. The construction of 25 acres of vernal pool wetlands at YLCA has been completed and on October 4, 2016, the USACE conducted a site visit to inspect the pools that have been constructed. Pursuant to the Interim and Long Term Management Plan submitted to the USACE by 5G's Corporation, the constructed wetlands will be monitored for success, and if needed remedial activities will be implemented to ensure that the wetlands are successfully established.

- **In Lieu Fees.** Due to problems encountered by UC Merced in commencing the construction of a compensatory vernal pool creation/restoration project in Madera County that would have provided 10.5 acres of compensatory vernal pool wetlands, UC Merced requested and the USACE approved that UC Merced could purchase vernal pool credits for up to 10.5 acres under the Sacramento District California In-Lieu Fee Program (ILF Program). UC Merced completed the purchase on May 27, 2016.

- **Merced County Preserve.** Merced County owns an approximately 167-acre property located between the campus and Lake Yosemite Regional Park. This property contains a large complex of highly valuable vernal pools and other seasonal wetlands embedded within an annual grassland landscape. The University worked with Merced County to place a conservation easement on this land to permanently preserve 30.74 acres of wetlands present on the site. Due to the high quality of wetlands on this property and the relatively poor quality of some of the seasonal wetlands that would be filled on the campus and Community North sites, the USACE, U.S. EPA, and the RWQCB concluded that the conservation of 30.74 acres of wetlands present on this property provides adequate compensation for the filling of up to 37.38 acres of non-vernal pool seasonal wetlands authorized under the Section 404 permit. The conservation easement for this property was put in place on August 4, 2016.

Table 4.2-7 presents an accounting of the compensatory wetland mitigation completed to date.

Table 4.2-7
Compensatory Wetland Mitigation to Date

Wetland Category	Permitted Acreage	Fill Through Completion of the 2020 Project	Remaining Acreage	YLCA Mitigation (acres)	In Lieu Fee (acres)	County Conservation Lands (acres)	Total Mitigation Credits to Date
Vernal Pools	40.41	23.83	16.58	25.10	10.50	--	35.60
Non Vernal Pool Seasonal Wetlands	37.38	9.40	27.98	--	--	30.74	37.38
Total	**77.79**	**33.23**	**44.56**	**25.10**	**10.50**	**30.74**	**72.98**

Source: University of California, Merced 2019

As the table shows, although UC Merced has filled less than half of the permitted wetlands acreage on the campus and University Community North sites, it has provided compensatory mitigation for all of the seasonal wetland acreage that is allowed to be filled under the DA permit. With respect to vernal pool wetlands, UC Merced has provided compensatory mitigation for 35.60 acres of fill, although only 25.83 acres have been filled to date.

Remaining Compensatory Wetland Mitigation

As **Table 4.2-7** above shows, while UC Merced has provided 35.60 acres of compensatory vernal pool mitigation, in the event that UC Merced fills all of the remaining vernal pool wetlands such that the total fill equals the permitted fill of 40.41 acres, it will need to provide an additional 4.81 acres of compensatory vernal pool mitigation. UC Merced has discussed this with the USACE, and the USACE has agreed that this small acreage can be mitigated via the purchase of vernal pool credits under the ILF Program. Note that under the 2008 Mitigation Rule, the USACE recommends that impacts to waters be compensated via an in-lieu fee program (or a mitigation bank), rather than through permittee-responsible mitigation projects.

In summary, the impacts of campus development on wetlands were fully evaluated in the 2009 LRDP EIS/EIR, and in compliance with the DA permit, have been fully mitigated for filling all except about 4.81 acres of vernal pools and swales. As there is very limited acreage of unfilled vernal pools and swales within the CMU area that would be developed under the proposed 2020 LRDP, campus development under the 2020 LRDP is not expected to affect any wetlands for which adequate compensatory mitigation has not been provided. Nonetheless, if a project is proposed which requires filling of the remaining permitted vernal pool and swale acreage, UC Merced will mitigate the loss via purchase of vernal pool credits under the ILF Program. The impact on wetlands would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid fill of wetlands. Furthermore, due to the small size of these projects, they would be unlikely to substantially affect wetlands. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-2: Implementation of the 2020 LRDP would not result in adverse impacts on special-status plant species. ***(Less than Significant)***

The 2009 LRDP EIS/EIR analyzed potential impacts of the development of the campus and University Community North on special-status plant species and concluded that the proposed development would result in the removal of eight vernal pools containing succulent owl's clover, one vernal pool containing an unreported number of dwarf downingia plants, and the removal of 14 stands of shining navarretia. The loss of these plants and their habitat would constitute both a reduction in numbers of individuals and a loss of occupied habitat for these species and would be a significant impact.

As noted above in **Section 4.2.2.2**, to compensate for losses of vernal pool plants (and invertebrates) that were considered unavoidable, the University committed and proceeded to protect nearly 24,000 acres of Tier 1 and Tier 2 Conservation Lands that support suitable habitat for the affected species. As reported in the 2009 LRDP EIS/EIR, approximately 527.77 acres of vernal pools and vernal pool/swale complexes, potential habitat for succulent owl's clover and dwarf downingia, were committed to preservation on the Tier 1 Conservation Lands. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by TNC, the University has preserved approximately 460 acres of vernal pools and swale complexes on the Tier 1(a) Conservation Lands, and approximately 792.87 acres of vernal pools and vernal pool/swale complexes have been preserved on Tier 2 properties. Similarly, approximately 75 acres of clay flats, habitat for shining navarretia, were preserved on Tier 1(a) Conservation Lands, and approximately 305.46 acres of clay flats were preserved on Tier 2 properties. Although the preservation of vernal pools

would not compensate for the loss of plants and individuals caused by campus development, the preservation and management of a substantial proportion of the occurrences of these special-status plant species in the project region, would benefit the species by reducing the risk of extinction and by providing for opportunities to enhance the preserved occurrences. Therefore, the 2009 LRDP EIS/EIR concluded that the development of the campus and University Community North sites would not result in a substantial adverse effect on special-status plant species.

In 2011, UC Merced initiated the construction of the Phase 6 Project, which involved grading activities that filled about 21.93 acres of vernal pools and swales and 4.59 acres of other seasonal wetlands. All of the previously documented occurrences of succulent owl's clover, shining navarretia, and dwarf downingia were located outside of the Phase 6 Project footprint.

In 2016, UC Merced initiated grading activities associated with the 2020 Project. In advance of project construction and consistent with the conditions of the University's ITP, focused surveys were conducted during the normal blooming periods for succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass (LSA 2016a). Local reference populations were visited to verify that the surveys were conducted during the appropriate timeframe. No occurrences of these three species were detected on the 2020 Project site during any of the surveys, although two CNDDB occurrences of succulent owl's clover partially overlapped the survey area. While Colusa grass and San Joaquin Valley Orcutt grass were not anticipated to occur within the 2020 Project site, had succulent owl's clover been identified, the plant(s) would have been salvaged consistent with the 2016 salvage plan for succulent owl's clover that was approved by the USFWS and CDFW.

The presumed extant occurrences of succulent owl's clover, shining navarretia, and dwarf downingia are primarily located within portions of the campus site that will remain undeveloped or designated as open space. However, as noted above, portions of two CNDDB occurrences of succulent owl's clover overlap the 2020 Project area and development lands to the south. Subsequent development activities within the CMU lands would be subject to the preconstruction surveys for succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass, consistent with the University's ITP. As required by ITP Condition 7.26, if any of these species are identified within the development area, a designated biologist shall salvage and transplant them in accordance with an agency-approved salvage plan.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid fill of wetlands, including areas that may contain the special-status plants which are associated with vernal pools and have a potential to occur on the campus site (the known occurrences of shining navarretia and dwarf downingia are associated with wetlands located north of the proposed CMU development area and within the POS lands). Furthermore, due to the small size of these

projects (less than 2 acres of ground disturbance), they would be unlikely to substantially affect the plant species.

In summary, based on the preservation of existing occurrences and suitable habitat for succulent owl's clover, shining navarretia, and dwarf downingia, as well as compliance with the University's ITP and resource-sensitive design of future small-scale projects, the proposed project's impacts on special-status plant species would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-3: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status invertebrate species due to the loss of vernal pool ecosystems or designated critical habitat for the species. ***(Less than Significant)***

The designated critical habitat boundary for vernal pool invertebrate species is located adjacent to the campus site but does not overlap with the campus site boundary. Therefore, no critical habitat would be directly affected by campus development under the 2020 LRDP.

The 2009 LRDP EIS/EIR analyzed the potential effects of the development of the campus and Community North sites on special-status invertebrates, and noted that the proposed development of the two sites would result direct impacts to 54 acres of occupied vernal pool fairy shrimp habitat and indirect impacts to 7 acres of the species' habitat, and the development of the campus and Community North would also result in a direct impact on about 2 acres of occupied vernal pool tadpole shrimp habitat and an indirect impact on approximately 2 acres of the species' habitat. The 2009 LRDP EIS/EIR noted that campus and University North development would therefore affect 2.6 percent of the 2,294 acres of known occupied vernal pool fairy shrimp habitat and 1.2 percent of the 318 acres of known occupied tadpole shrimp habitat within the project region. The 2009 LRDP EIS/EIR further noted that more than 26,000 acres of Conservation Lands would be preserved by the University. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by TNC, the University has acquired nearly 24,000 acres of Conservation Lands that would protect 1,006 acres of occupied habitat for vernal pool fairy shrimp, representing approximately 50 percent of the known habitat in the study region. Of the 1,006 acres of protected occupied habitat, 490 acres are located within Tier 1(a) Conservation Lands (21 percent of the total known habitat) and 516 acres are located within Tier 2 Conservation Lands (22 percent of the total known habitat). Mitigation ratios achieved for direct and indirect impacts are 8:1 for Tier 1(a) Conservation lands and 16:1 with the addition of the Tier 2 Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. For vernal pool tadpole shrimp, acquired Conservation Lands

(per the 2009 LRDP EIS/EIR, the Tier 1(b) Conservation Lands provide no occupied habitat for vernal pool tadpole shrimp) would protect 14 acres of occupied habitat for the tadpole shrimp, representing 4 percent of the known habitat in the region, nearly all of which is within Tier 1(a) Conservation Lands. Tier 2 Conservation Lands would protect less than 1 acre of occupied habitat for the tadpole shrimp. The achieved mitigation ratio of 3.5:1 is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. Therefore, the impact of the campus and University Community North development on special-status invertebrates would be less than significant.

In addition to the preservation of suitable habitat within Conservation Lands, potentially suitable habitat has been created as part of the CWMMP. As noted above under **LRDP Impact BIO-1**, UC Merced has completed three mitigation projects to compensate for the filling of waters of the U.S. It has developed the YLCA mitigation site where 25 acres of vernal pools have been created successfully and 50 acres of upland have been preserved through a conservation easement as compensatory mitigation for campus impacts. The University has also placed a conservation easement on a large land area owned by Merced County that contains more than 30 acres of wetlands, including more than 25 acres of vernal pools and swales. Furthermore, the University has paid into an in lieu fee program for 10.5 acres of vernal pool credits. All of these mitigation actions by the University have also resulted in the creation and preservation of additional compensatory habitat for vernal pool invertebrates.

As noted above, in 2011, UC Merced initiated the construction of the Phase 6 Project, which involved grading activities that filled about 21.93 acres of vernal pools and swales and 4.59 acres of other seasonal wetlands. The 2020 Project, initiated in 2016, has resulted in the fill of 1.73 acres of vernal pools and swales and 4.92 acres of other seasonal wetlands. As a result, at this time only about 11.6 acres of vernal pool and swale habitat remains on the campus site. While some of this habitat is located within the area that may be developed under the 2020 LRDP, should any of this remaining habitat be developed, its removal would not represent a significant impact because UC Merced has preserved a substantial amount of suitable habitat on the Conservation Lands and in compliance with the DA permit, UC Merced will also compensate in kind for the fill of the remaining vernal pools and swales for which it has not provided already provided compensatory mitigation. Therefore, the impact on vernal pool invertebrates from the development of campus facilities on the CMU lands would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid fill of wetlands, including areas that may be habitat for listed invertebrates. Furthermore, due to the small size of these projects (less than 2 acres of ground disturbance), they would be unlikely to substantially affect the species. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-4: Implementation of the 2020 LRDP would result in a potentially significant adverse impact on nesting and overwintering habitat for Crotch bumble bee. ***(Potentially Significant; Less than Significant)***

As noted earlier in this section, Crotch bubble bee has been recently listed as a candidate endangered species by the California Fish and Game Commission. While there have been no documented observations of Crotch bumble bee within the project site or the adjacent Tier 1(a) conservation lands, no focused surveys have been conducted to date, the campus is within the range for this species, and the annual grassland areas with small mammal burrows provide potentially suitable underground nesting habitat. Furthermore, the vernal pool-grassland complex within the POS and the ROS areas of the campus and the adjacent Tier 1 conservation lands, as well as the campus landscaping, could potentially provide floral resources/ foraging habitat for Crotch bumble bee.

Campus development under the 2020 LRDP would occur primarily within an approximately 103-acre area that is designated CMU on the land use diagram (**Figure 3.0-5**). Some smaller projects may also be located within lands with other land use designations (i.e., CBRSL and ROS). Should Crotch bumble bee colonies or overwintering queens be present in underground nests on future construction sites, construction activities could adversely affect this species and its habitat. This is considered a potentially significant impact.

To address this impact, **LRDP Mitigation Measure BIO-4** is set forth below.

Mitigation Measures:

LRDP MM BIO-4: A qualified wildlife biologist shall conduct visual surveys of the development area during the flight season for the Crotch bumble bee (late February through late October). Between two and four evenly spaced surveys shall be conducted for the highest detection probability, including surveys in early spring (late March/early April) and early summer (late June/July). Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in the mornings and evenings. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such

as butterfly binoculars. If no Crotch bumble bees or potential Crotch bumble bees are detected, no further mitigation is required.

If Crotch bumble bees or potential Crotch bumble bees are observed within the development area, a plan to protect Crotch bumble bee nests and individuals shall be developed and implemented in consultation with CDFW. The plan shall include, but not be limited to, the following measures:

- Specifications for construction timing and sequencing requirements (e.g., avoidance of raking, mowing, tilling, or other ground disturbance until late March to protect overwintering queens);
- Preconstruction surveys conducted within 30 days and consistent with any current available CDFW standards prior to the start of ground disturbing activities to identify active nests;
- Establishment of appropriate no-disturbance buffers for nest sites and construction monitoring by a qualified biologist to ensure compliance;
- Restrictions associated with construction practices, equipment, or materials that may harm bumble bees (e.g., avoidance of pesticides/herbicides, BMPs to minimize the spread of invasive plant species);
- Provisions to avoid Crotch bumble bees or potential Crotch bumble bees if observed away from a nest during project activity (e.g., ceasing of project activities until the animal has left the work area on its own volition); and
- Prescription of an appropriate restoration seed mix targeted for the Crotch bumble bee, including native plant species known to be visited by native bumble bee species and containing a mix of flowering plant species with continual floral availability through the entire active season of the Crotch bumble bee (March to October).

Significance after Mitigation: Less than significant

LRDP Impact BIO-5: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status amphibians (California tiger salamanders and western spadefoot) dependent on vernal pool ecosystems, annual grasslands, and stock ponds due to the loss of these habitats and would not result in mortality of individual amphibians during construction of campus facilities due to compliance with permits. ***(Less than Significant)***

California tiger salamander

California tiger salamander (CTS) and its habitat occur on the project site. As analyzed in the 2009 LRDP EIS/EIR, the development of the campus and Community North sites would eliminate approximately 178 acres of critical habitat for the CTS on the project site and indirectly impact an additional 51 acres of critical habitat. However, as noted in the 2009 LRDP EIS/EIR, approximately 5,900 acres of critical habitat would be protected on Tier 1(a) Conservation Lands achieving a mitigation ratio of 26:1 for direct and indirect impacts. Tier 2 Conservation Lands would protect an additional 3,954 acres of critical habitat, for a total of approximately 9,850 acres protected on the Conservation Lands, representing an overall mitigation ratio of 43:1 for direct and indirect impacts on critical habitat.

The 2009 LRDP EIS/EIR also noted that the development of the campus and Community North sites would eliminate one known breeding site for the CTS (representing an unknown number of individuals and no longer located within the current campus site [i.e., within the Community North site near Lake Road]) and occupied upland habitat (i.e., within 1.75 miles of this and other breeding ponds) equating to the loss of 1,648 acres of occupied habitat and indirect impacts to an additional 236 acres of adjacent occupied habitat. The 2009 LRDP EIS/EIR noted that the development of the campus and Community North would affect less than 3 percent of the 70,988 acres (includes aquatic and associated upland habitat) of known occupied habitat within the project region. The 2009 LRDP EIS/EIR further noted that the Tier 1(a) Conservation Lands would protect and manage for conservation approximately 6,250 acres of occupied habitat (3:1 ratio). Tier 2 Conservation Lands would protect an additional 11,349 acres of upland habitat, resulting in the protection of approximately 17,600 acres, representing an overall mitigation ratio of 9:1. Though CTS was discussed in the 2002 BO, this species was not listed at that time and therefore no minimum compensation ratio was required by USFWS. Typical USFWS-approved mitigation ratio for replacement of occupied CTS habitat (upland and aquatic breeding habitat) is 3:1.

In addition to the preservation of Tier 1(a) and Tier 2 Conservation Lands, as noted above under **LRDP Impact BIO-1**, UC Merced has completed three mitigation projects to compensate for the filling of waters of the U.S. These mitigation projects also provide suitable upland and potentially breeding habitat for CTS

that has been preserved. Specifically, the YLCA mitigation site provides 50 acres of upland habitat for CTS and the Merced County Preserve provide 167 acres of upland habitat for the species.

Although the entire 1,026-acre campus site is considered occupied habitat for CTS, so far about 171 acres have been developed and another 103 acres of CMU lands would be developed with campus facilities under the proposed 2020 LRDP. Although UC Merced has mitigated for the loss of 1,648 acres of CTS upland habitat, to date it has developed only 171 acres and only another 103 acres would likely be developed under the proposed LRDP. Due to the mitigation that has already put in place, the impact related to loss of CTS upland habitat would be less than significant.

The development of the CMU lands could, however, result in injury or mortality to individual CTS. Take could result from ground and vegetation disturbance, construction, operation of heavy equipment, vehicle traffic, and other project activities. The University's ITP and BO contain a number of measures to avoid and minimize take of CTS. These measures include having a USFWS and CDFW-approved Designated Biologist conduct preconstruction surveys and monitor construction activities. UC Merced also provides an education program for all workers on the site that describes CTS and measures that must be implemented to protect it. A CTS relocation plan has been developed and approved to salvage individual CTS found within the project site. The ITP also requires the installation of a CTS exclusion fence around construction sites. UC Merced has installed CTS exclusion fencing between the known or potential breeding ponds to the north and east and much of the 2020 Project site and anticipated CMU development area. The University has been implementing all of the requirements of the ITP and BO. On September 12, 2018, one adult CTS was found within the 2020 Project site in a burrow that was being excavated in advance of construction. The CTS was uninjured and relocated to suitable habitat in accordance with the approved 2015 relocation plan (LSA 2015a).

Western Spadefoot

Habitats suitable for CTS and fairy shrimp are often also suitable for western spadefoot. However, hand excavation of burrows on the 2020 Project site and extensive dip net surveys of aquatic features on the adjacent Tier 1(a) Conservation Lands have not resulted in the detection of western spadefoot. Therefore, it is not expected that western spadefoot will be affected either directly or indirectly by the proposed project. Furthermore, the avoidance and protection measures for CTS will also help protect the species, should an individual enter a work site. Additionally, Conservation Lands containing suitable habitat for CTS and fairy shrimp will also serve to preserve habitat for western spadefoot and therefore could benefit the species within the project region. The impact on western spadefoot would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid areas with burrows that may harbor CTS and areas that contain habitat for western spadefoot. Furthermore, due to the small size and nature of these projects, they would be unlikely to substantially affect both species. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-6: Implementation of the 2020 LRDP would not result in a substantial adverse impact on western pond turtle from the loss or disturbance of ponds and seasonal freshwater marsh communities. ***(Less than Significant)***

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to affect western pond turtle, a state species of special concern. The 2009 LRDP EIS/EIR noted that the proposed development would remove ponds, marshes, wetlands, and drainages that provide suitable aquatic habitat for western pond turtle. Suitable wetland habitats for this species do not include vernal pool ecosystems, vernal swales, or seasonal wetlands. Western pond turtle is known to occur in the region and within the project site, and therefore, the removal of these habitats has potential to impact western pond turtle. The 2009 LRDP EIS/EIR noted that about 40 acres of suitable habitat would be lost with the development of both the campus and University Community North sites. However, the loss would be more than adequately compensated by at least approximately 175 acres of suitable habitat that would be protected on Tier 1(a) and Tier 2 Conservation Lands.

Although compared to the 815-acre campus analyzed in the 2009 LRDP EIS/EIR, the campus site is larger and includes 1,026 acres, the proposed 2020 LRDP envisions the development of only an additional 103 acres of CMU lands. Furthermore, although UC Merced has filled some of the suitable wetland habitats for this species, it is proposing to preserve many of the marsh areas along the canals by placing the lands under POS designation. Therefore, the proposed 2020 LRDP will result in a reduced impact on habitat for this species than previously disclosed.

With respect to the potential for campus construction activities to result in injury or mortality of the species, the University's Construction Mitigation Plan (CMP) (ICF Jones & Stokes 2009) requires that a biologist conduct preconstruction surveys for western pond turtle prior to initial ground-disturbing activities in all suitable aquatic habitats within 100 feet of the work area. If pond turtles are not observed, no additional mitigation is required. If pond turtles are observed, they will be allowed to move out of the way on their own. If active nests are found, they will be fenced with an appropriate buffer and avoided until the young

have hatched and are able to move out of the work area on their own. Implementation of this CMP measure reduces potential impacts to western pond turtle to a less than significant level.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid areas that provide western pond turtle habitat. Furthermore, due to the small size and nature of these projects, they would be unlikely to substantially affect the species. The projects would also comply with the University's CMP. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-7: Implementation of the 2020 LRDP would not result in a substantial adverse impact on Swainson's hawk from the loss of suitable foraging or nesting habitat. *(Less than Significant)*

Loss of Foraging Habitat

The 2009 EIS/EIR analyzed the potential for the development of the campus and Community North sites to affect Swainson's hawk foraging habitat. Swainson's hawks are known to nest within the campus site, and the 2009 LRDP EIS/EIR noted that the development of the campus and Community North sites would result in the removal of approximately 1,514 acres of annual grassland and irrigated pasture communities which provide suitable foraging habitat for the species. Loss of a substantial amount of foraging habitat within 1 mile of a known Swainson's hawk nest was determined to be a potentially significant impact. However, the 2009 LRDP EIS/EIR noted that Conservation Lands acquired by UC Merced contain 8,455 acres of comparable habitats within Tier 1 Conservation Lands and 15,830 acres within Tier 2 Conservation Lands, for a total of 24,285 acres. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by The Nature Conservancy (TNC), the University has preserved Conservation Lands to offset the loss of this habitat in the campus and Community North sites at a ratio of 3.5:1 considering Tier 1(a) Conservation Lands only and 14:1 considering both Tier 1(a) and 2 Conservation Lands, and additional compensation is provided by the preservation of grassland habitats in the YLCA and the Merced County Preserve. These ratios exceed CDFW's recommended replacement ratios for loss of foraging habitat. CDFW requires that loss of foraging habitat for the species be replaced at a ratio of 1:1 for projects where nesting Swainson's hawks are known to occur within a 1-mile radius (California Department of Fish and Game 1994). Therefore, due to the mitigation included in the project, the 2009 LRDP EIS/EIR concluded that there would be a less than significant impact related to foraging habitat.

Development of new facilities on the campus under the 2020 LRDP would take place within the area identified as CMU on the campus land use diagram. As more than half of the CMU land is already developed, approximately 103 acres of CMU land remain to be developed under the proposed 2020 LRDP and represent potential Swainson's hawk foraging habitat that would be removed under the 2020 LRDP. This acreage is a part of the 1,514 acres previously identified in the 2009 LRDP EIS/EIR as foraging habitat that would be lost, and its loss has been adequately mitigated by the conservation of Tier 1 and 2 lands described above. Furthermore, the 2020 LRDP sets aside more land than before as passive open space which would continue to provide foraging habitat for all avian species, and both CBRSL and ROS lands would not be developed and would continue to provide foraging habitat. The impact on foraging habitat of special-status avian species would be less than significant.

Loss of Nesting Habitat

Although no known Swainson's hawk nest sites were present on the campus or Community North sites when the 2009 LRDP EIS/EIR was prepared, a Swainson's hawk nest was established on a Fremont cottonwood (*Populus fremontii*) tree that was located within the campus site adjacent to Fairfield Canal after the certification of the EIR. As the removal of this tree was anticipated at the time that the permits for the campus were issued, the ITP issued to UC Merced by CDFW allowed for the removal of a Swainson's hawk nest tree and stipulated certain conditions related to its removal. In January 2016, in anticipation of the upcoming 2020 Project, UC Merced determined that it would remove the former nest tree and proceeded to do so in compliance with the conditions set forth in the ITP. The tree was removed on February 6, 2016, prior to the start of the Swainson's hawk nesting season. The University's ITP includes Condition No. 7.18, which requires the planting of four replacement trees for every nest tree removed. To comply with this measure, UC Merced planted four trees near stock ponds on the Tier 1(a) Conservation Lands in 2017, including two cottonwoods and two valley oaks (*Quercus lobata*). UC Merced is currently monitoring and reporting on the success of the replacement plantings.

In April 2018, a new Swainson's hawk nest was established in a tree located within the CMU area east of Fairfield Canal, and west of the campus solar array. To ensure that the nesting birds were not adversely affected by construction activities associated with the 2020 Project, in compliance with the ITP, a 700-foot buffer was established around the nest tree, and biologists monitored it daily from April through July. At least one chick successfully fledged from the nest.

As the ITP sets forth a series of conditions that UC Merced must comply with to avoid any indirect impacts on nesting Swainson's hawk and also sets forth conditions that UC Merced must comply with in the event that it decides that it will remove a tree formerly used by Swainson's hawk for nesting, as a result of

compliance with the ITP, implementation of the 2020 LRDP would result in a less than significant impact on nesting Swainson's hawks.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects would likely not be near a Swainson's hawk nest site. However, if the project site is near a nest site, construction activities will comply with the ITP, and the impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-8: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status avian species from the loss of foraging habitat. *(Less than Significant)*

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to adversely affect foraging habitat for special-status avian species. The EIS/EIR noted that the campus and Community North sites are used for foraging by numerous special-status birds, including white-tailed kite, northern harrier, bald eagle, merlin, prairie falcon, short-eared owl, burrowing owl, loggerhead shrike, California horned lark, tricolored blackbird, and mountain plover. Though not reported to forage on site, golden eagle and ferruginous hawk are known to occur in the project vicinity and have potential to use the site for foraging. The 2009 LRDP EIS/EIR noted that the development of the campus and Community North sites would result in the removal of about 1,514 acres of annual grassland and irrigated pasture communities that provide suitable foraging habitat for special-status avian species. As discussed under **LRDP Impact BIO-7** above, Conservation Lands acquired or conserved by UC Merced contain more than 5,385 acres of comparable foraging habitats in Tier 1(a) Conservation Lands and 15,830 acres in Tier 2 Conservation Lands. These lands offset the loss of this habitat on the campus and Community North sites at a ratio of 3.5:1 considering Tier 1 Conservation Lands only and 14:1 overall. In addition, UC Merced has placed a conservation easement on 167 acres that make up the Merced County Preserve and 50 acres within the YLCA. CDFW requires that the loss of foraging habitat (and burrowing habitat) be offset by acquiring and permanently protecting a minimum of 6.5 acres of foraging habitat per occupied burrow identified on the project site as recommended by the 1995 Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 1995). The updated 2012 Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 2012), which replaced the 1995 Staff report, does not establish a number of acres to be protected. Regardless, Conservation Lands containing annual grasslands and irrigated pasturelands, preserved as part of the project, well exceed this foraging habitat mitigation requirement. Therefore, the 2009 LRDP EIS/EIR concluded that although the removal of 1,514 acres of

foraging habitat for special-status birds, including burrowing owl and tricolored blackbird, would be a potentially significant impact, it would be reduced to a less than significant level through the protection of comparable habitats within Conservation Lands.

As described above, campus development under the 2020 LRDP would occur primarily within an approximately 103-acre area that is designated CMU on the land use diagram, and only some limited small projects may be located within lands with CBRSL and ROS designations. All the acreage that would be developed is a part of the 1,514 acres previously identified in the 2009 LRDP EIS/EIR as foraging habitat that would be lost, and its loss has been adequately mitigated by the conservation of Tier 1(a) and Tier 2 Conservation Lands, Merced County Preserve, and YLCA properties, as described above. The impact on foraging habitat of special-status avian species would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-9: Implementation of the 2020 LRDP would result in potentially significant adverse impacts on special-status bird species and non-special-status migratory birds and raptors. ***(Potentially Significant; Less than Significant)***

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to adversely affect nesting special-status bird species and non-special status migratory birds and raptors. The EIS/EIR noted that the development of the campus and Community North sites would result in the direct loss of suitable ground and tree/shrub nesting habitat through the removal of annual grassland, irrigated pasture, vernal pools, and seasonal freshwater marsh communities, and the removal of individual trees and shrubs that occur mainly along the canals and the boundary of the project site. Additionally, site development has the potential to disturb active special-status and non-special-status migratory bird nests if ground-disturbing activities and/or construction occurs during the breeding season (generally February 15 through August 15). Special-status birds known to nest on or near the campus and Community North sites include western burrowing owl, Swainson's hawk (discussed above under **LRDP Impact BIO-7**), and tricolored blackbird. Other special-status birds for which there is suitable nesting habitat on and adjacent to the campus and Community North sites include California horned lark, white-tailed kite, short-eared owl, and loggerhead shrike. The campus and Community North sites and adjacent lands also contain suitable nesting habitat for numerous non-special-status migratory birds, including red-tailed hawk, red-winged blackbird, killdeer, mourning dove, northern mockingbird, and cliff swallow, whose nests are protected under the MBTA and CDFG Code Sections 3503 and 3503.5. As the destruction or disturbance of active nests resulting in nest failure or loss of individuals would be a potentially

significant impact, the 2009 LRDP EIS/EIR set forth Mitigation Measures BIO-9a and -9b which would reduce impact to a less than significant level. Following the certification of the 2009 LRDP EIS/EIR, UC Merced proceeded with the construction of new facilities, and since 2016, with the construction of the 2020 Project, and has been implementing Mitigation Measures BIO-9a and 9b to avoid and minimize impacts.

As described above, campus development under the 2020 LRDP would occur primarily within an approximately 103-acre area that is designated CMU on the land use diagram. Some smaller projects may also be located within lands with other land use designations. Should nesting birds be present on or near future construction sites, construction activities could adversely affect nesting birds. This is considered a potentially significant impact.

To address this impact, **LRDP Mitigation Measure BIO-9a** is set forth below. This mitigation measure is substantially revised from the prior Mitigation Measures BIO-9a and 9b in that it includes revisions made to align the mitigation measure with the conditions set forth in the ITP and it has also been updated based on CDFW's 2012 Staff Report related to burrowing owl mitigation. It replaces the prior mitigation measures.

Bird injury and mortality resulting from collisions with buildings and other man-made structures is a common occurrence in urban and suburban settings. Approximately 100 million to 1 billion birds die in North America as a result of collisions each year (Loss et al. 2014). Daytime collisions occur most often when birds fail to recognize window glass because it reflects clouds, sky, or vegetation. At night, during spring and fall bird migrations when inclement weather occurs, birds can be attracted to lighted structures resulting in collisions, entrapment, excess energy expenditure, and exhaustion (Manville 2009). The frequency of bird collisions in any particular area depends on many factors, including local and migratory avian populations, densities and species composition, migration characteristics, resting and feeding patterns, habitat preferences, time of year, prevailing winds, and weather conditions. UC Merced's location along the Pacific Flyway migratory route and its setting within a diverse environment that provides habitat for many resident bird species increases the potential for bird collisions on campus.

Resident and migratory birds could die or be injured by striking reflective and plate glass windows or other features such as breezeways associated with the new buildings that are constructed on the campus under the 2020 LRDP. The 2020 LRDP includes an implementation strategy under GOAL CD-1 (*Design Buildings to Respond to Site Conditions and the Natural Environment*) to help ensure that future development prevents and reduces bird collisions with campus structures: "Design buildings to respond to natural environment conditions on the site by incorporating wall and fenestration design features that will prevent and reduce wildlife (i.e. bird) fatalities." While the design provision would ensure that buildings are designed to minimize bird injury and mortality, the impact would still be potentially significant. **LRDP Mitigation**

Measure BIO-9b shall be implemented to ensure that specific building projects proposed under the 2020 LRDP include appropriate bird safety designs. With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to substantially affect nesting birds or birds in flight. However, these small-scale projects would be required to implement **LRDP Mitigation Measures BIO-9a and BIO-9b** below. With mitigation, the impact would be less than significant.

Mitigation Measures:

LRDP MM BIO-9a: Avoid and minimize impacts on native birds protected under the MBTA, including listed species, fully protected species, special-status species of concern, and raptors and passerines.

(a) Limit ground disturbance activities to the non-breeding season and remove potential unoccupied breeding habitat during the non-breeding season if possible. If breeding season work is required, conduct take avoidance (tree, shrub, and ground) nest surveys to identify and avoid active nests.

- If feasible, UC Merced shall conduct all project-related activities including (but not limited to) tree and shrub removal, other vegetation clearing, grading, or other ground disturbing activities during the non-breeding season (typically between September 16 and February 14).

- If activities are scheduled to occur during the breeding season (typically between February 15 through September 15), applicable CDFW and/or USFWS permit conditions in the permits issued to the University related to bird surveys must be followed. In addition, a UC Merced-approved qualified avian biologist, with knowledge of the species to be surveyed, shall conduct focused nesting surveys within 15 days prior to the start of project or ground-disturbing activities and within the appropriate habitat. The qualified avian biologist shall determine the exact survey duration and location (typically 500 feet around the work area) based on the work conditions and shall take into account existing applicable CDFW or USFWS permit conditions.

- If an unoccupied nest (without birds or eggs) of a non-listed or fully protected species (as determined by the qualified avian biologist) is found, the nest shall be removed under the direction of the qualified avian biologist.

- If an active nest is located, the qualified avian biologist shall establish an appropriate no-disturbance buffer around the nest making sure that any buffer width required by the University's permit obligations is followed. A 500-foot buffer is recommended for listed or fully protected nesting birds (or another buffer determined in consultation with CDFW and/or

USFWS), a 250-foot buffer around raptors, and a 75-foot buffer around passerines. If work activities cause or contribute to a bird being flushed from a nest, the buffer width shall be adjusted to avoid and minimize impacts to nesting birds.

- A qualified avian biologist shall monitor the nest site regularly during work activities to ensure that the nest site is not disturbed, the buffer is maintained and the success or failure of the nest is documented.

- If UC Merced elects to remove a nest tree, nest trees may only be removed after the qualified avian biologist has determined that the nests are unoccupied.

- If an active nest is causing a safety hazard, CDFW shall be contacted to determine if the nest can be removed.

(b) Minimize impacts to burrowing owl and compensate for habitat loss.

CDFW (2012) recommends that take-avoidance (preconstruction) surveys be conducted to locate active burrowing owl burrows in the construction work area and within an approximately 500-foot buffer zone around the construction area. a qualified avian biologist shall conduct take avoidance surveys for active burrows according to the CDFW's Staff Report on Burrowing Owl Mitigation (2012 Staff Report). Surveys shall be conducted no less than 14 days prior to initiating ground disturbance activities and surveillance surveys should be conducted as frequently as recommended in the 2012 Staff Report. If ground-disturbing activities are delayed or suspended for than 30 days after the take avoidance survey, the area shall be resurveyed. If no burrowing owls are detected, no further mitigation is required.

If active burrowing owls are detected, the following additional measures are required:

- Project implementation shall seasonally and spatially avoid negative impacts and disturbances that could result in the take of burrowing owls, nest or eggs.

- If burrowing owls and their habitat can be protected in place or adjacent to a construction site, buffer zones, visual screens or other measures shall be used to minimize disturbance impacts while project activities are occurring. To use these minimization measures, a qualified avian biologist shall determine the exact measures following the guidance described in the 2012 Staff Report.

- If owls must be moved away from the project site during the nonbreeding season, passive relocation techniques (e.g., installing one- way doors at burrow entrances) shall be used instead of trapping, as described in CDFW guidelines. At least 1 week will be necessary to complete passive relocation and allow owls to acclimate to alternate burrows.

- When destruction of occupied burrows is unavoidable during the nonbreeding season (September 1 to January 31), unsuitable burrows shall be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on protected lands approved by the CDFW. Newly created burrows shall follow guidelines established by the CDFW.

LRDP MM BIO-9b: New buildings and structures proposed under the 2020 LRDP shall incorporate bird-safe design practices (for example, American Bird Conservancy's *Bird-Friendly Building Design* [2015] or San Francisco Planning Department's *Standards for Bird-Safe Buildings* [2011]). The UC Merced Physical and Environmental Planning Department shall review the final designs of the buildings and structures to determine that appropriate bird safety designs have been effectively incorporated to reduce potential impacts to birds. The following design strategies shall be considered in the design of buildings and structures:

- Create building facades with "visual noise" via cladding or other design features that make it easier for birds to identify buildings and not mistake windows for open sky or trees.

- Incorporate windows that are not clear or reflective into the building or structure designs.

- Use windows that incorporate glass types such as UV-A or fritted glass and windows that incorporate UV-absorbing and UV-reflecting stripe.

- Use grid patterns on windows in locations with the highest potential for bird-window collisions (e.g., windows at the anticipated height of adjacent vegetation at maturity).Reduce the proportion of glass to other building materials in new construction.

- Avoid placement of bird-friendly attractants (i.e. vegetated roofs, water features, tall trees) near glass whenever possible.

- Install motion-sensitive lighting in any area visible from the exterior that automatically turn lights off during after-work hours.

Significance after Mitigation: Less than significant

LRDP Impact BIO-10: Implementation of the 2020 LRDP would not result in substantial adverse impacts to San Joaquin kit fox due to the loss of suitable residence and dispersal habitat. *(Less than Significant)*

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to adversely affect San Joaquin kit fox due to loss of suitable residence and dispersal habitat. The 2009 LRDP EIS/EIR noted that the campus and Community North sites are located within the current range of San Joaquin kit fox (USFWS 1998, CNDDB 2018). Four San Joaquin kit fox sightings have been documented within a 10-mile radius of the project site (CNDDB 2018). The closest of these sightings was in 1999 of an adult foraging within approximately 1 mile of the project site along the Black Rascal Creek drainage. The remaining three records were of foraging or dispersing individuals with only one record involving juvenile kit fox. The nearest documented breeding population was observed in 1999 approximately 15 miles southwest of the project site near Chamberlain Road. It appears likely, based on these recorded occurrences, that individuals dispersing from populations within the region could use portions of the campus and Community North sites for dispersal to reach suitable habitats to the north and east.

A San Joaquin kit fox habitat suitability model was created as part of the preparation of the *Conservation Strategy* for the Proposed Action. This model facilitated the assessment of the quality and distribution of potential San Joaquin kit fox residence (i.e., breeding) and dispersal habitat in the project site and region. Habitat suitability was evaluated at a landscape scale to assign suitability values to lands for residence and dispersal, and ultimately to assess the potential impacts of the Proposed Action on suitable habitat. This model rated lands within the project site and the project region as primary habitat, secondary habitat, or unsuitable. The model identified primary habitat as habitat suitable for denning or residence, which is assumed to support dispersal as well; secondary habitat as habitat suitable for dispersal only (excludes primary habitat areas); and unsuitable habitat as unsuitable for both denning and dispersal. Based on this model, about 49 percent (180,431 acres) of the project region is suitable for San Joaquin kit fox residence and about 41 percent (150,644 acres) of the project region is suitable for San Joaquin kit fox dispersal only (ICF Jones & Stokes 2008).

The 2009 LRDP EIS/EIR determined that development of campus and Community North sites would result in the direct loss of 804 acres of residence habitat and potential indirect impacts (noise, increased traffic, and other human-related disturbance) to an additional 489 acres, and the loss of 610 acres of dispersal-only

habitat and potential indirect impacts to an additional 66 acres of adjacent dispersal-only habitat. Therefore, the campus and Community North site development would affect 0.7 percent of the total amount of residence habitat and 0.5 percent of the total area suitable for dispersal in the approximately 371,000-acre eastern Merced County region (UC Merced 2009).

The 2009 LRDP EIS/EIR noted that through preservation and management of Tier 1 and Tier 2 Conservation Lands, more than 25,918 acres of habitat suitable for kit fox would be conserved, of which 94 percent (24,394 acres) is suitable for residence. As a condition of approval for the proposed development of the campus, the 2002 BO required a minimum 3:1 compensation ratio for the loss of suitable kit fox habitat. Project compensation ratios from Tier 1(a) Conservation Lands for the campus and Community North site development are 4:1 for residence habitat and 3:1 for all kit fox habitat. With incorporation of Tier 2 Conservation Lands, compensation ratios are 16:1 for residence habitat and 11:1 for all kit fox habitat. All these ratios are even higher if the preservation of the Merced County Preserve and YLCA are taken into account. These Conservation Land acquisitions contribute to the recovery plan objectives of conserving 90 percent of existing natural lands along the northeastern valley edge from San Joaquin to Madera Counties (U.S. Fish and Wildlife Service 1998) and establishing a corridor that maintains the potential for dispersal from valley floor habitats to and along the project region (i.e., the Sandy Mush Road Corridor) (U.S. Fish and Wildlife Service 1998). Additionally, the 2002 BO issued by USFWS required UC Merced to manage grazing to provide suitable grass height within the Conservation Lands for kit fox and to enhance kit fox habitat and provide protection for kit fox from free-roaming dogs by artificial den construction. According the 2009 BO, UC Merced agreed to prepare and implement a comprehensive strategy for conservation of the San Joaquin kit fox. The strategy included preserving a large area suitable for residence and a movement corridor east and north of the campus, as well as other actions, if feasible, such as enhanced passage over existing Merced Irrigation District (MID) canals. In compliance with the BO, in 2015 eight artificial dens were installed on the Tier 1(a) Conservation Lands. The artificial dens have been monitored with cameras and no kit foxes have been detected. As reflected in **Table 4.2-1**, UC Merced has conducted annual camera trapping within the Tier 1(a) Conservation Lands between 2014 and 2017 to detect the presence of San Joaquin kit fox. However, despite this effort over a 4-year period, no San Joaquin kit foxes have been observed to date on or near the project site.

There is low potential for kit foxes to occur on the campus site because kit foxes have not been observed on or near the campus since the establishment of the campus. Furthermore, as described above, campus development under the 2020 LRDP would occur within an approximately 103-acre area that is designated CMU on the land use diagram, and other lands within the campus site would not be developed, although some small projects may be located within lands with CBRSL and ROS designations. However, there is some potential for kit foxes to disperse through the campus site, and a potential for physical harm to a kit

fox, should one be present within a construction site. Both the 2002 BO and the 2009 BO issued to UC Merced by the USFWS and the ITP issued by CDFW contain extensive requirements, including pre-construction surveys and compliance measures, that UC Merced must implement during construction of projects to avoid harm to kit fox. Compliance with the BO and ITP requirements would adequately avoid and minimize harm to kit fox. The impact related to injury or mortality of kit fox due to construction activities would be less than significant.

Mitigation Measures: No mitigation is required.

4.2.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-BIO-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in the loss or adverse modification of vernal pool wetlands, clay slope wetlands, and other seasonal wetlands. ***(Less than Significant)***

The study area for a potential cumulative impact on wetlands is eastern Merced County. Eastern Merced County is generally defined as the area bound by Highway 99 to the west, Stanislaus County to the north, Mariposa County to the east, and Madera County to the south. This area comprises about 365,450 acres, the majority of which consists of lands in grazing and agricultural uses, with urban and residential uses concentrated in the western portion of the study area along Highway 99. Eastern Merced County was defined as the study area for cumulative impacts because this portion of the County contains resources similar to those that would be affected by the proposed project.

As described in the 2009 LRDP EIS/EIR, annual grasslands are the predominant natural habitat occurring over vast tracts of land in the eastern portion of the study area. These grasslands in eastern Merced County are used as rangeland. A variety of vernal pool wetlands are interspersed in a complex web throughout the grassland habitat, especially in areas with mima mound topography and on low gradient terraces. This grassland-vernal pool landscape is the largest remaining block of pristine unfragmented vernal pool habitat in California (USFWS 2005). Freshwater marsh and riparian habitats are more limited in their distribution in the study area and are associated with creeks and streams and leaking irrigation canals.

Substantial amount of wetland acreage in eastern Merced County has already been filled in conjunction with past development associated with agricultural and water conveyance projects, as well as urbanization.

Population growth in the Central Valley, and in eastern Merced County in particular, would result in additional losses of vernal pool habitat within the study area.

As discussed in the 2009 LRDP EIS/EIR, development of the campus and University Community North sites would result in the loss of 85.05 acres of wetlands, including 17.51 acres of vernal pools, 25.19 acres of swale wetlands, 0.33 acre of clay slope wetlands, 12.24 acres of irrigation wetlands, 28.75 acres of canal wetlands, and 1.03 acres of intermittent channels. In addition, the Campus Parkway project was projected to result in the loss of approximately 0.24 acre of seasonal marsh and temporary impacts to approximately 0.41 acre of riparian and forest scrub. Other development in eastern Merced County under the City of Merced and Merced County general plans would also result in additional temporary and permanent impacts on the types of wetlands listed above.

All new development would be subject to the regulatory and permitting requirements imposed by the USACE, the USFWS, CDFW, and the RWQCB. Projects subject to these requirements must demonstrate that mitigation for loss of wetland habitats would result in no net loss of wetland function and values and that mitigation would be sufficient to ensure that adverse impacts would not occur to special-status species that might be affected by filling of wetland habitat. Because all development projects would comply with the no net loss policy and to the extent there are small losses of wetlands that fall under nationwide permits and are not compensated by replacement wetlands, such small losses would not represent a substantial cumulative loss of wetlands. Therefore, on a cumulative basis, the impact on wetlands would normally be expected to be less than significant. However, as noted in the 2009 LRDP EIS/EIR, a substantial amount of wetland acreage in eastern Merced County has already been filled in conjunction with past development. Based on the historical losses of wetlands and the potential that some future losses may not fully mitigated by creation/restoration of wetlands, the 2009 LRDP EIS/EIR concluded that the cumulative impact on wetlands within the study area would be significant. However, the 2009 LRDP EIS/EIR also concluded that the high compensatory mitigation ratios demonstrate that the project's contribution to the significant cumulative impact would not be cumulatively considerable.

As described above under **LRDP Impact BIO-1**, the impacts of campus development on wetlands were fully evaluated in the 2009 LRDP EIS/EIR, and in compliance with the DA permit, have been fully mitigated for filling all except about 4.81 acres of vernal pools and swales. In the event that UC Merced fills all of the remaining vernal pool wetlands such that the total fill equals the permitted fill of 40.41 acres, it will provide an additional 4.81 acres of compensatory vernal pool mitigation.

There is very limited acreage of unfilled vernal pools and swales within the CMU area that would be developed under the proposed 2020 LRDP, and campus development under the 2020 LRDP is not expected to affect any wetlands for which adequate compensatory mitigation has not been provided. As described

above, if a project is proposed that requires filling of the remaining permitted vernal pool and swale acreage, UC Merced will mitigate the loss via purchase of vernal pool credits under the ILF Program. Any small-scale projects that may be located within lands designated CBRSL or ROS will be sited to avoid fill of wetlands. Furthermore, due to the small size of these projects (i.e., less than 1 acre of ground disturbance), they would be unlikely to substantially affect wetlands.

For these reasons, cumulative impacts on wetlands within the study area would be less than significant, and the 2020 LRDP would not result in a cumulatively considerable contribution to a significant impact related to vernal pool wetlands, clay slope wetlands, and other seasonal wetlands.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-BIO-2: **Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in the loss or adverse modification of important special-status plant and wildlife habitat, including adverse effects to special-status plant and wildlife species that occupy or could potentially occupy these habitats.** ***(Less than Significant)***

As described in the 2009 LRDP EIS/EIR, the development of the campus and University Community North sites would result in the reduction in numbers of individuals and a loss of occupied habitat of three special-status plant species (succulent owl's clover, dwarf downingia, and shining navarretia) associated with vernal pools. The development of the campus and University Community North sites would also result in a direct and indirect impact on occupied vernal pool fairy shrimp habitat and vernal pool tadpole shrimp habitat. The project would also remove or otherwise affect the following sensitive biological resources: California tiger salamander habitat; Swainson's hawk foraging habitat; occupied burrowing owl nesting habitat; suitable nesting habitat for other special-status and non-special-status migratory birds; and kit fox residence and dispersal habitat. Because these species occur in various parts of eastern Merced County, the 2009 LRDP EIS/EIR noted that it was reasonable to expect that other future development in this part of the County under the City of Merced and Merced County general plans would similarly affect these resources in the study area. Although all projects would be required to reduce their individual impacts to a less than significant level as part of their environmental review process and permitting, however, some reduction in habitat would still occur. In addition, as discussed above, substantial amount of habitat in eastern Merced County has already been removed in conjunction with past development and other activities such as agricultural conversions. Therefore, the combined effect of past, current and future projects on special-

status species habitat was considered a significant cumulative impact in the 2009 LRDP EIS/EIR. The 2009 LRDP EIS/EIR noted that the University had committed to placing more than 26,000 acres within the study area under conservation. These conservation lands contain comparable habitats to the habitats that would be lost as a result of project implementation. Furthermore, the high mitigation ratios that result from the University's conservation, restoration, and compensatory mitigation actions would more than compensate for the direct and indirect impacts of campus and Community North site development. Therefore, the 2009 LRDP EIS/EIR concluded that the project's incremental contribution to the cumulative loss of habitat for all of the species listed above would not be cumulatively considerable.

As discussed above, implementation of the 2020 LRDP would affect a much smaller area than previously analyzed in the 2009 LRDP EIS/EIR for species impacts. Furthermore, the University has proceeded with the conservation of substantial acreages of habitat (nearly 24,000 acres) for special-status species within Tier 1(a) Conservation Lands, Tier 2 Conservation Lands, Merced County Preserve, and YLCA. UC Merced also implements and will continue to implement the avoidance measures and requirements set forth in the BO and the ITP to avoid and minimize impacts on listed species. UC Merced has been and will continue to implement LRDP Mitigation Measure BIO-9a to minimize impacts on nesting birds and will implement LRDP Mitigation Measure BIO-9b to minimize bird mortality and injury. Therefore, campus development under the 2020 LRDP would result in an incremental contribution to the cumulative loss of habitat that would not be considerable, and the project's cumulative impact on special-status plant and wildlife species would be less than significant.

Mitigation Measures: No mitigation is required.

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