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Biological Resources Evaluation  
for the  
Aggie Research Campus Project

Yolo County, CA

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4 February 2020

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## I. SUMMARY OF FINDINGS AND CONCLUSIONS

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This biological resources evaluation report documents baseline biological conditions for the Aggie Research Campus (ARC) Project. The 815-ac biological study area (BSA) includes the 185-ac ARC site and several off-site areas, including non-project parcels proposed to be annexed by the City, two sewer alignment alternatives, and parcels east of the ARC project where stormwater capacity improvements are contemplated. The BSA for the ARC Project is similar to the area studied for the Mace Ranch Innovation Center (MRIC) Project. This report incorporates and updates the results of an earlier biological resources evaluation and accompanying technical studies conducted for the MRIC Project in 2015.

Surveys conducted in support of the ARC Project include general biological surveys, protocol botanical surveys, a wetland and hydrologic monitoring surveys, an arborist survey, targeted burrowing owl surveys, and CDFW (2012) guideline surveys for burrowing owl (ongoing). Surveys conducted 2014 through 2020 document the following biological resources that could be affected by the ARC Project:

- Five elderberry shrubs, the host plant for the federally threatened valley elderberry longhorn beetle (VELB), are present in the Campus BSA and areas within 200 ft. The shrubs are isolated, in non-riparian contexts. No potential VELB exit holes were observed on the elderberry shrubs.
- Suitable aquatic habitat for federally threatened giant garter snake (GGS) is present in the southernmost portion of an irrigation ditch on the parcels where stormwater capacity improvements are proposed, and in the following features within 200 ft: the Railroad Channel to the south, created wetlands to the north, a detention basin located to the northwest, and the Yolo Bypass located to east of these parcels. GGS was not observed during surveys. There is no suitable aquatic habitat for GGS on the proposed ARC site or within 200 ft.
- A few trees in the BSA and trees in two eucalyptus groves located off-site to the east and north of the ARC site provide potential nesting habitat for State-threatened Swainson's hawk and other tree-nesting raptors. Mature trees located within 1,320 feet of the BSA provide suitable nesting habitat. No nesting raptors have been observed in the BSA. Agricultural and ruderal areas in the BSA provide foraging habitat for Swainson's hawk and other birds of prey.
- The Mace Drainage Channel (MDC) and the southernmost portion of an irrigation ditch on the parcels where stormwater capacity improvements are proposed provide marginal nesting habitat for State-threatened tricolored blackbird. Suitable nesting habitat also occurs in off-site aquatic habitat bordering the parcels where stormwater capacity improvements are proposed.
- The BSA provides marginal to suitable foraging and/or nesting habitat for the following wildlife species of special concern: burrowing owl, mountain plover, northern harrier, white-tailed kite (Fully Protected), song sparrow –Modesto population, birds of prey, protected migratory birds, and protected and locally important bats.
- Burrowing owl (State Species of Special Concern) occupies six sites within 500 ft of the BSA. These sites are located along existing roads in the western and northern portion of the BSA.
- An estimated 93 individuals of Parry's rough tarplant, a CNPS California Rare Plant Rank 4.2 plant species, were found in the BSA, mostly near Ikeda's Market.
- The portion of the MDC immediately east of Mace Blvd contains managed freshwater marsh vegetation. This is a sensitive natural community under the Yolo HCP/NCCP.
- Eight young trees occur in the portion of the BSA proposed for development. Seven of these trees are protected under City of Davis Municipal Code.



## II. INTRODUCTION

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### A. Purpose of Report

The purpose of this report is to document baseline biological resources in the Aggie Research Campus Project (Project) Biological Study Area (BSA). The approximately 815-ac BSA includes the 185-ac ARC site, and off-site areas, as provided in Section II.D (Project Description). For the purpose of biological analysis, the BSA is split into the 'Campus BSA' (a 265.09-ac study area that includes the 185-ac ARC site), and the off-site 'Stormwater BSA' (a 550.25-ac study area consisting of the parcels where stormwater capacity improvements are contemplated).

This report incorporates and updates the results of previously conducted biological studies, including a biological resources evaluation report prepared for the Mace Ranch Innovation Center Project (Sycamore Environmental 2015e), an aquatic resource delineation (Sycamore Environmental 2015b), letters transmitting the results of spring and fall protocol botanical survey (Sycamore Environmental 2015d,f), a letter evaluating potential biological resources for off-site storm water capacity work (Sycamore Environmental 2015c), a certified arborist survey (Sycamore Environmental 2015a), and a biological survey update letter (Sycamore Environmental 2019). This report documents the results of additional biological surveys conducted in 2019 and 2020 (see Section III.B for a comprehensive list of surveys conducted).

### B. Project Location

The 265.09-ac Campus BSA is located east of Mace Blvd., north of Interstate 80, east of the City of Davis, CA, in the Central Valley. The BSA is on the Davis USGS topographic quad (T8N, R2E, Sections 1 & 12 and T8N, R3E, Sections 6 & 7, Mt. Diablo Base & Meridian; Figure 1) and is in the Lower Sacramento Hydrologic Unit (Hydrologic Unit Code 18020163). The geographic coordinates of the Campus BSA are 38.564285° north, 121.684761° west (WGS84), and the UTM coordinates are 614,585 meters east, 4,269,245 meters north, Zone 10N (WGS84).

The 550.25-ac off-site Stormwater BSA is located east of the City of Davis, CA, north of Interstate 80, immediately west of the Yolo Bypass in the Central Valley. The Stormwater BSA is on the Davis USGS topographic quad.

Figure 2 is a 13 August 2018 aerial photo of the BSA and surrounding area.

### C. Project Applicant

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## D. Project Description

The proposed Aggie Research Campus (ARC) Project is an innovation center that offers a live/work environment through a comprehensive sustainable site design and broad array of complementary land uses. The Campus features office, research & development, laboratory, prototyping, advanced manufacturing, recreation, open space, and housing, all in one compact location. This mix of uses will serve to attract new economy incubators, entice UCD-spawned businesses seeking a growth location, and provide large-scale locational opportunities for well established companies, particularly those with research ties to the University. The objective is to fulfill a clear City need for economic development space and allow existing and new companies to grow and remain in Davis.

The 185-ac ARC project site is located immediately east of the City of Davis city limits, near the “Mace Curve,” in unincorporated Yolo County.

At build-out, the ARC would include up to 2,654,000 sq ft of innovation center/business uses and 850 residential units of varied sizes and affordability. More specifically, the Project would include space for office, research & development, laboratory, advance manufacturing, prototyping, limited supportive retail, a hotel and a conference center, and include 850 residential units to provide a jobs/housing balance. The Campus has identified land uses within an urban framework that are designed to:

- Deliver office and corporate spaces that are highly flexible and technologically advanced. The spaces would include collaborative spaces, flex spaces, as well as dry and wet labs.
- Develop space for research/incubator start-ups that may be small, independent entrepreneurs or subsidiaries of larger, more established companies in Davis, Sacramento, and/or the Bay Area.
- Include programs that are scientific, technical and research-focused. The programs are anticipated to be University of California, Davis (UC Davis) spin-off research labs and internships.
- Be suitable for private research programs in the fields of ag tech, med/bio tech, and clean tech.
- Integrate spaces for prototyping and manufacturing with research facilities to allow for greater ease of advanced product development.
- Permit advanced manufacturing facilities on-site to allow for the establishment of “research-to-market” companies.
- Include a variety of workforce housing units, diverse in both size and affordability, designed to meet the needs of the innovation center employees, further spur collaboration and technology start-ups, create a hive of activity with people living and working on-site, and thereby reduce project-related vehicular trips.
- Accommodate corporate travelers and educational conferences.

In furtherance of this vision, the ARC applicants are seeking the following entitlements from the City of Davis:

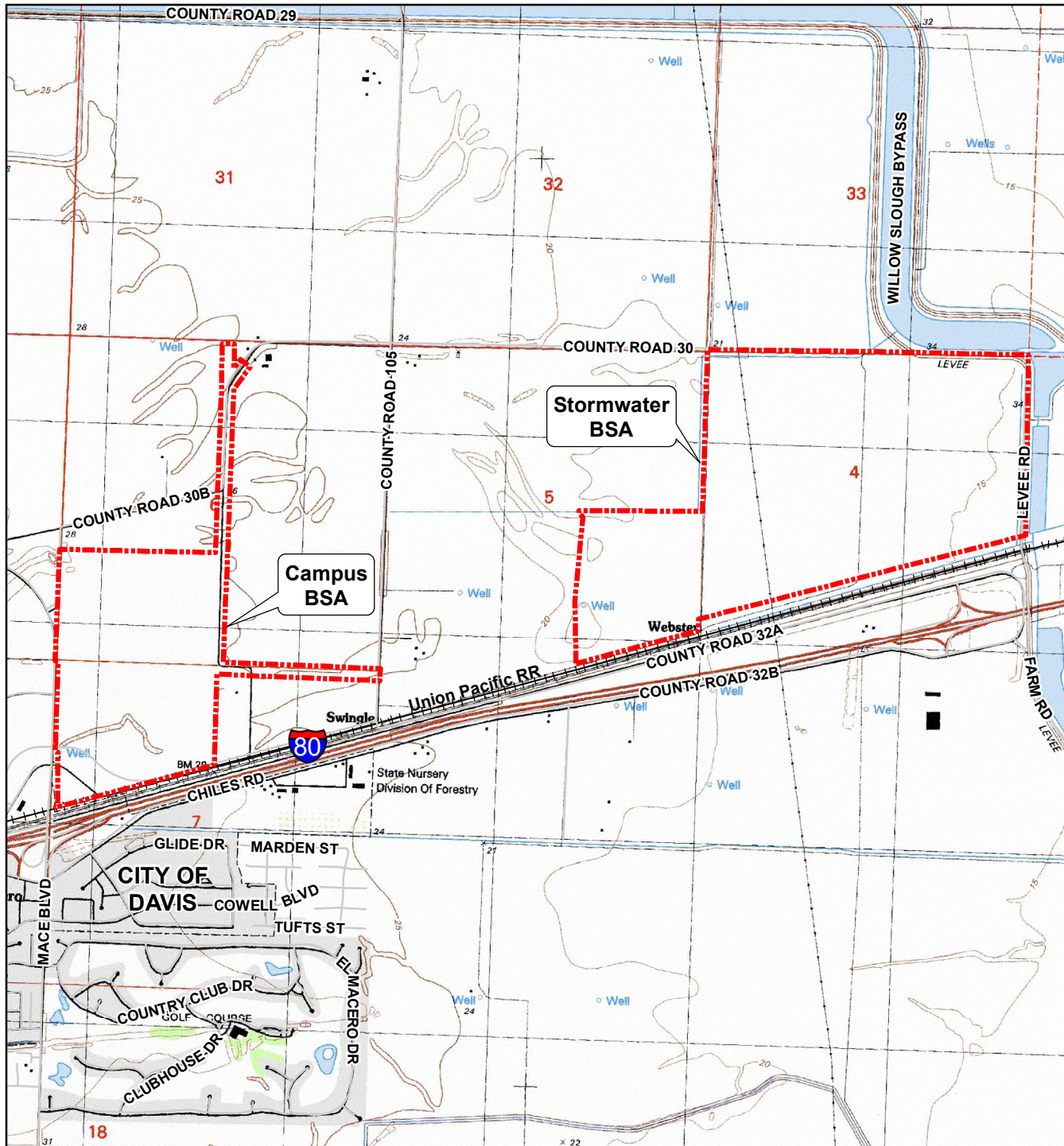
1. General Plan Amendment converting the project site from Agriculture to Innovation Center
2. Prezone to Preliminary Planned Development
3. Annexation into the City of Davis
4. Development Agreement
5. Municipal Service Review
6. Detachment from the East Davis County Fire Protection District

Off-site, two alternative sewer line connections are being evaluated: one which extends from the northeast side of the ARC site, northward approximately 0.6 mi, along Road 104, and another which extends from the east side of the ARC site, eastward approximately 0.5 mi, along a farm road, to Road 105. Off-site stormwater capacity improvements are proposed approximately one mile to the east of the ARC site, in the open agricultural fields adjacent to the Yolo Bypass.

The 265.09-ac 'Campus' Biological Study Area (BSA) is larger than the 185-ac ARC Project site because it includes the off-site sewer line connection alternatives and a City-owned parcel at the northwest corner of the ARC project site. The Campus BSA consists of:

- The ARC site (185 ac), identified by Assessor's Parcel Numbers (APNs) 033-630-009 and 033-650-009, north of CR 32A, currently in row crop agriculture.
- City-owned APN 033-650-26, currently in row crop agriculture.
- The Annexation Area (16 ac), south of CR 32A, consisting of APNs 033-630-011 (Ikeda's Market), 033-630-006 (a City-owned water tank and Caltrans District 3 Park-and-Ride lot), and 033-630-012 (agricultural uses, currently fallow). The Annexation Area is included in the Project to avoid creation of County "Island" property.
- A buffer around two proposed off-site sewer line connection alternatives located north and east of the MRIC site respectively. The eastern sewer line alternative crosses APN 033-290-04 (deciduous fruit/nut orchards). The northern sewer line alternative crosses APN 033-290-02, -04, -82, and -83; 033-650-027; and 042-130-03 (all in row crop agriculture or planted with deciduous fruit/nut orchards).

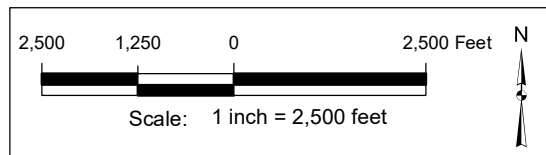
The 550.25-ac 'Stormwater' BSA consists of APN 033-300-01, 033-300-15, and 033-650-88. These parcels are currently in row crop agriculture.



Aggie Research Campus  
 Yolo County, CA  
 30 January 2020

Figure 1. Location Map

- Campus Biological Study Area (Campus BSA)
- Stormwater Capacity Biological Study Area (Stormwater BSA)



**SYCAMORE**  
 Environmental  
 Consultants, Inc.



Davis, CA (1992)  
 USGS 7.5' Quadrangle Topographic DRG  
 7.5 Minute (C) Series, Albers Nad83 Mosaics (MrSID)  
 CA Spatial Library (CASIL)  
 o\_nw0201.sid

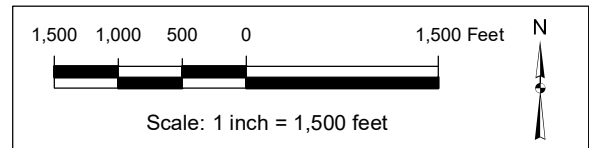


Aggie Research Campus  
Yolo County, CA  
30 January 2020

Figure 2. Aerial Photograph



-  Campus Biological Study Area (Campus BSA)
-  Stormwater Capacity Biological Study Area (Stormwater BSA)



Aerial Photograph: 13 August 2018  
2018 Yolo County Orthos Imagery  
ESRI World Imagery Arcmap Service Layer



### III. STUDY METHODS

#### A. Studies Conducted

The Project has completed baseline biological field surveys; a CDFW protocol botanical survey, a formal aquatic resource delineation, and surveys targeting burrowing owl. Breeding season surveys for burrowing owl, consistent with the requirements of the Yolo HCP/NCCP and the CDFW (2012) guidelines are in progress, with an anticipated completion date in June/July 2020. Biological resource data from state and federal agencies, maps, aerial photographs, and relevant published literature were reviewed. An evaluation of biological resources was conducted to determine if any state or federal-listed special-status plant or wildlife species or their habitat occur in the BSA.

#### B. Survey Dates, Personnel, and Coverage

Biological and botanical surveys conducted for this project are summarized in Table 1 below.

Table 1. Survey Dates and Personnel

Date(s)	Personnel	Area(s) Surveyed	Surveys Conducted
7 October 2014	Mike Bower, M.S.	Campus BSA	Reconnaissance survey
10 December 2014	Mike Bower, M.S. Noosheen Pouya, B.S.	Campus BSA	General biological survey Botanical survey Wetland delineation fieldwork
18 December 2014	Mike Bower, M.S.	Mace Drainage Channel (outfall to Bypass)	Hydrologic observations
23 December 2014	Chuck Hughes, M.S.	Campus BSA	Arborist survey
26 January 2015 -through- 30 November 2015 (sixteen site visits)	Mike Bower, M.S. Noosheen Pouya, B.S. Juan Mejia, B.S. Carly Rich, B.S. Andy Loveall, B.S.	Mace Drainage Channel (on-site & accessible parts downstream)	Hydrologic observations
19 May 2015	Mike Bower, M.S. Juan Mejia, B.S.	Campus BSA	Protocol botanical survey
11 June 2015	Mike Bower, M.S.	Stormwater BSA	General biological Botanical survey
11 September 2015	Mike Bower, M.S. Juan Mejia, B.S.	Campus BSA	Protocol botanical survey
7 January 2016	Juan Mejia, B.S.	Campus BSA	Targeted burrowing owl survey
7 August 2019	Mike Bower, M.S. Juan Mejia, B.S.	Campus BSA	General biological survey update Protocol botanical survey update Targeted burrowing owl survey Yolo HCP Land Cover Type mapping
8 October 2019	Mike Bower, M.S.	Stormwater BSA	Reconnaissance survey Yolo HCP Land Cover Type mapping
24 January 2020	Mike Bower, M.S. Elliot Maldonado, B.S. Juan Mejia, B.S.	Entire BSA	Burrowing owl survey in accordance with CDFW (2012) guidelines (Ongoing)

## C. Literature Search

Information on the biology, distribution, taxonomy, legal status, and other aspects of the special-status species was obtained from documents on file in the library of Sycamore Environmental. Standard references used for the biology and taxonomy of plants included Abrams (1923-1960); Baldwin et al. (2012); Hickman, ed. (1993); Mason (1957); and Munz (1959). References pertaining to biological communities include California Department of Fish and Wildlife (CDFW 2019c); Holland (1986); and Sawyer et al. (2009). Standard references used for the biology and taxonomy of wildlife included Behler and King (1979); Ehrlich et al. (1988); Jameson and Peeters (2004); Jennings and Hayes (1994); Mayer and Laudenslayer, eds. (1988); McGinnis (1984); Peterson (1990); Sibley (2003); Stebbins (2003); Udvardy (1977); Verner and Boss (1980); Whitaker (1980); and Zeiner et al. (1988; 1990a,b). On-line references used include, the Jepson eFlora (2020), California Native Plant Society (2020), and Consortium of California Herbaria (CCH 2020).

Lists of CDFW special-status species reviewed included *Special Animals List* (CDFW 2019a), *State and Federally Listed Endangered and Threatened Animals of California* (CDFW 2019b), *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2020a), and *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFW 2020b).

A search of the California Natural Diversity Database (CNDDDB, dated 3 January 2020; CDFW 2020c) was conducted for the Davis and 8 adjacent USGS quads to determine known records of special-status species in or near the BSA. A CNDDDB summary report for the nine quads is in Appendix B. Table 2 lists the USGS quads evaluated.

Table 2. USGS Quads Evaluated for the Aggie Research Campus Project

Woodland	Grays Bend	Taylor Monument
Merritt	<b>Davis</b>	Sacramento West
Dixon	Saxon	Clarksburg

Sycamore Environmental obtained a list from the U.S. Fish and Wildlife Service Sacramento Field Office that identifies federal-listed species that potentially occur in or could be affected by projects on the Davis USGS quad or by projects in Yolo County (USFWS 2020; Appendix C).

## D. Field Survey Methods

### General Biological Surveys

The general biological surveys consisted of biologists walking through the BSA while looking for special-status wildlife species, their sign, and their habitat. Areas adjacent to the BSA were also inspected for important habitat features such as elderberry shrubs, vernal pools, burrows, and other wetlands/waters. Plants and wildlife species were identified and recorded (Attachment E). Areas within 200 ft of the BSA were searched for elderberry (*Sambucus* sp.) shrubs. Areas within 500 ft of the BSA were searched for burrowing owl (*Athene cunicularia*) and potentially suitable burrows. Areas within 1,320 ft of the BSA were searched for potential Swainson's hawk (*Buteo swainsoni*) nest trees, and other sensitive habitats as required under the Yolo HCP. The location of protected biological resources and important habitat features were recorded on field maps and/or with a sub-meter accurate GPS units. Wildlife species observed are listed in Appendix A.

### **Protocol Botanical Survey**

The protocol botanical survey followed the guidelines set forth by USFWS (2000) and CDFW (2018). The survey was timed to occur in May and September, during the evident and identifiable period (the published blooming period) for all special-status plant taxa with potential to occur. The BSA was surveyed by botanists familiar with the flora of the region, including the special-status species with potential to occur. The botanists walked meandering transects through the BSA while searching for special-status plants. Emphasis was placed on areas outside of active agriculture, such as the edges of fields, the detention basin, and the bed and banks of the Mace Drainage Channel (MDC). Natural communities were classified and mapped. Plant species were either identified on-site or collected and identified later using dichotomous keys in the Jepson Manual, 2<sup>nd</sup> ed. (Baldwin et al., eds. 2012). Nomenclature and taxonomy follow Baldwin et al. (2012). Plants species observed in the BSA are listed in Appendix A.

### **Aquatic Resource Survey**

A formal aquatic resource (wetland) delineation was conducted in accordance with standard U.S. Army Corps of Engineers Wetland Delineation Manual methods (Corps 1987). The aquatic resource delineation report was prepared separately (Sycamore Environmental 2015b). The results of the delineation are incorporated in this biological resources evaluation report.

### **Hydrologic Observations**

Five long-term study sites were established along the Mace Drainage Channel (MDC) from Mace Blvd downstream, to a location just east of Road 105, spanning approximately 1.1 mi. The five sites were visited a total of 16 times, approximately once every 1 to 4 weeks, between 26 January and 30 November 2015 (full list of survey dates and study sites provided in the Discussion of Giant Garter Snake presented in Section V.C.2). During each site visit, the MDC was photographed and water present was noted at each study site. Dominant plant species were identified and recorded at each study site. The primary purpose of the hydrologic observations was to evaluate suitability of habitat in the MDC for giant garter snake.

### **2019-2020 Surveys**

Sycamore Environmental biologists Mike Bower, M.S., and Juan Mejia, B.S., conducted a general biological survey and botanical survey on 7 August 2019, covering the Campus BSA. Mr. Bower conducted a reconnaissance survey of the off-site Stormwater BSA on 8 October 2019.

Within the last three years, Sycamore Environmental biologists have conducted numerous burrowing owl surveys and monitoring events covering the areas within 500 ft of the BSA. Surveys targeting burrowing owl, conducted in accordance with the CDFW (2012) *Staff Report on Burrowing Owl Mitigation*, were commenced on 24 January 2020. The burrowing owl survey covered areas within 500 ft of the Campus BSA, and areas within 500 ft of the preferred location of stormwater capacity work (100 ac on APN 033-300-15) in the Stormwater BSA (see map in Appendix G). The survey was conducted by qualified biologists familiar with burrowing owl, and approved to conduct burrowing owl surveys under the Yolo HCP. The occupancy status of potential burrowing owl burrows was determined based on the presence of owls, or sign of burrowing owl consisting of whitewash, feathers, pellets, etc. The *Staff Report on Burrowing Owl Mitigation* (CDFW 2012) considers burrow sites to be occupied if a burrowing owl has been observed occupying a burrow, or burrowing owl sign has been observed at a burrow, within the last three years. The results of all burrowing owl surveys conducted within the last three years are incorporated in the preliminary survey results letter included in Appendix G.



## **E. Mapping**

Biological resources observed by Sycamore Environmental were mapped using sub-meter accurate GPS units (Trimble GeoXT, Geo7X, and TDC100 equipped with R-1 receiver). The 13 August 2018 aerial photo in Figures 2 and 4 was downloaded from ESRI World Imagery. GPS data were exported to AutoCAD® and aligned with the aerial photo to create Figure 4. Biological communities were mapped based on GPS data, field observations, and interpretation of the aerial photographs available on Google Earth. Yolo HCP/NCCP Land Cover Types were mapped using land cover type definitions from the current Yolo HCP/NCCP Permitting Guide (November 2019).

## **F. Problems Encountered and Limitations That May Influence Results**

The general biological survey was not a focused or agency protocol wildlife survey. The general biological survey may not necessarily have detected cryptic, fossorial, migratory, nocturnal, or seasonally apparent species. The general biological survey is intended to gather information on habitat suitability and the potential for any given species to occur. A set of burrowing owl protocol surveys conducted in accordance with the CDFW (2012) guidelines is currently underway. While the final results of these surveys will not be available until the summer of 2020, initial survey results are included in this report, along with the results of numerous previously conducted biological surveys, and surveys specifically targeting burrowing owl. No other problems or limitations were encountered.

## IV. ENVIRONMENTAL SETTING

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The Campus BSA is located at an urban/rural interface, on the east side of the City of Davis, CA, within the unincorporated area of Yolo County, in an agricultural area in California's Central Valley. Upland row crops and fruit/nut tree orchards are common in the area. The Campus BSA is bordered to the west by Mace Blvd, existing commercial uses, and residences. The Union Pacific Railroad, Interstate-80 and various automotive dealerships are located to the south. Agricultural lands protected by a permanent conservation easement border the Campus BSA to the north and east. Elevation in the Campus BSA ranges from approximately 20 to 30 ft above sea level. The Campus BSA is generally flat. The Mace Drainage Channel (MDC) delivers City of Davis storm water through the Campus BSA, east to railroad channel and ultimately the Yolo Bypass. The Stormwater BSA occurs in agricultural fields approximately two miles east of the Campus BSA. The Stormwater BSA abuts created wetlands and the Willow Slough Bypass to the north, the Yolo Bypass to the east, the railroad channel (into which the MDC drains), Union Pacific Railroad and Interstate-80 to the south, and agricultural lands to the west and northwest. Excluding the Yolo Bypass levee at the eastern edge of the Stormwater BSA, the elevation of agricultural fields in the Stormwater BSA ranges from approximately 10 to 15 ft above sea level.

### A. Soils

Mapped soil units in the BSA are Capay Silty Clay Loam, 0 to 1 Percent Slopes; Clear Lake Clay, 0 to 1 Percent Slopes; Marvin Silty Clay Loam, 0 to 1 Percent Slopes; Sacramento Clay, Drained; Sycamore Silt Loam, Drained, 0 to 1 Percent Slopes; Sycamore Complex, Drained, 0 to 1 Percent Slopes; Tyndall Very Fine Sandy Loam, Drained, 0 to 1 Percent Slopes; Willows Clay, 0 to 1 Percent Slopes; and Willows Clay, Alkali, Drained, 0 to 1 Percent Slopes (Figure 3; NRCS 2020). Figure 3 is a soils map. The following descriptions are summarized from NRCS (1972, 2020).

#### **Capay Silty Clay Loam, 0 to 1 Percent Slopes:**

These soils occur on alluvial fans, alluvial flats, interfan basins, and basin rims. They formed in moderately fine and fine textured alluvium from mostly sandstone and shale. A typical profile is very hard, very firm, sticky, very plastic very dark grayish brown clay from 0 to 21 inches; very hard, very firm, sticky, very plastic dark brown clay from 21 to 32 inches; and hard, firm, sticky, very plastic yellowish brown clay from 32 to 62 inches. This soil is slightly acid from 0 to 5 inches, neutral from 5 to 21 inches, and moderately alkaline from 21 to 62 inches. Permeability is slow to very slow. Runoff is negligible to high. Capay series soils are classified as Fine, Smectitic, Thermic Typic Haploxererts.

#### **Clear Lake Clay, 0 to 1 Percent Slopes:**

These soils occur in flood basins, flood plains and in swales of drainageways. They formed in fine textured alluvium derived from mixed rock sources. A typical profile is massive when wet, very hard, firm, very sticky and very plastic from 0 to 13 inches; massive when wet, extremely hard, very firm, very sticky and very plastic from 10 to 45 inches; and massive, very hard, very firm, very sticky and very plastic from 45 to 60 inches. The typical profile is neutral from 0 to 13 inches and moderately alkaline from 13 to 60 inches. Permeability is slow to very slow. Runoff is negligible to high. Clear Lake series soils are classified as Fine, Smectitic, Thermic Xeric Endoaquerts.

#### **Marvin Silty Clay Loam, 0 to 1 Percent Slopes:**

These soils occur on nearly level flood plains at elevations of 10 to 100 ft under annual grasses and forbs. They formed in fine textured alluvium from mixed sources. A typical profile is hard, friable, slightly

sticky, plastic, very dark grayish brown silty clay loam from 0 to 13 inches; very hard, firm, sticky, plastic dark to very dark grayish brown heavy silty clay loam or silty clay from 13 to 42 inches; and hard, friable, sticky, plastic, dark brown silty clay loam from 42 to 60 inches. This soil is neutral to slightly acidic from 0 to 13 inches, and mildly alkaline from 13 to 60 inches. Permeability is slow. Runoff is slow. Marvin series soils are classified as Fine, Smectitic, Thermic Aquic Haploxeralfs.

### **Sacramento Clay, Drained**

These soils occur on basin floors in flood basins. They formed in alluvium from mixed rocks. A typical profile is hard, firm sticky and very plastic from 0 to 7 inches; massive, hard, very firm, sticky, and very plastic from 7 to 16 inches; hard, firm, sticky, and very plastic from 16 to 31 inches; hard, very firm, sticky and very plastic from 31 to 53; massive, hard, firm, sticky, and very plastic from 53 to 69 inches; and massive, hard, firm, slightly sticky and very plastic from 69 to 77 inches. The soil is moderately acid from 0 to 7 inches, neutral from 7 to 16 inches, slightly alkaline from 16 to 31 inches, moderately alkaline from 31 to 53 inches, slightly alkaline from 53 to 69 inches and moderately alkaline from 69 to 77 inches. Permeability is slow. Runoff is very slow to slow. Sacramento series soils are classified as Very-Fine, Smectitic, Thermic Cumulic Vertic Endoaquolls.

### **Sycamore Silt Loam and Sycamore Complex, Drained, 0 to 1 Percent Slopes:**

These soils occur on nearly level flood plains at elevations of 10 to 100 ft. They formed in mixed sedimentary alluvium. A typical profile is hard, friable, sticky, plastic very dark grayish brown silty clay loam from 0 to 14 inches; slightly hard, friable, slightly sticky, slightly plastic dark grayish brown silt loam from 14 to 42 inches; and slightly hard, friable, slightly sticky, slightly plastic pale brown loam from 42 to 60 inches. This soil is slightly acid from 0 to 14 inches, and mildly to moderately alkaline from 14-60 inches. Permeability is moderate to moderately slow. Runoff is slow to very slow. Sycamore series soils are classified as Fine-Silty, Mixed, Superactive, Nonacid, Thermic Molic Endoaquepts.

### **Tyndall Very Fine Sandy Loam, Drained, 0 to 1 Percent Slopes:**




These soils occur on nearly level alluvial fans at elevations of 0 to 70 ft. They formed in sedimentary alluvium low in clay. A typical profile is soft, very friable, slightly sticky, slightly plastic dark to very dark grayish brown heavy very fine sandy loam to very fine sandy loam from 0 to 24 inches; soft, very friable, slightly sticky, slightly plastic light brownish gray to olive fine to very fine sandy loam from 24 to 46 inches; soft, friable, slightly sticky, slightly plastic dark grayish brown to pale olive sandy loam to very fine sandy loam from 46 to 52 inches. This soil is slightly to moderately alkaline from 0 to 41 inches, and strongly alkaline from 41-52 inches. Permeability is moderately rapid. Runoff is slow. The use of levees and other artificial means have improved natural drainage. Tyndall series soils are classified as Coarse-Loamy, Mixed, Superactive, Calcareous, Thermic Fluvaquentic Endoaquepts.

### **Willows Clay, and Willows Clay, Alkali, Drained, 0 to 1 Percent Slopes:**

These soils occur on nearly level basins in intermountain valleys and large valleys at elevations of 20 ft to as much as 1,700ft. They formed in fine-textured mixed alluvium. A typical profile is extremely to very hard, very firm, sticky, very plastic very dark gray clay from 0 to 38 inches; and hard to very hard, very firm, sticky and very plastic olive gray clay from 38 to 72 inches. This soil is neutral from 0 to 4 inches, slightly alkaline from 4 to 13 inches, and strongly alkaline from 13 to 72 inches. Permeability is very slow. Runoff is slow. Willows series soils are classified as Fine, Smectitic, Thermic Sodic Endoaquerts.

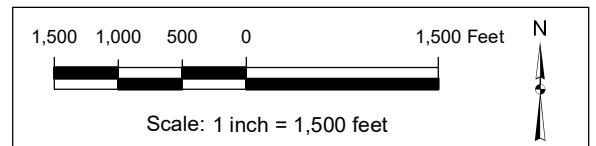


Figure 3. Soils Map

-  Campus Biological Study Area (Campus BSA)
-  Stormwater Capacity Biological Study Area (Stormwater BSA)
-  Soil Boundary

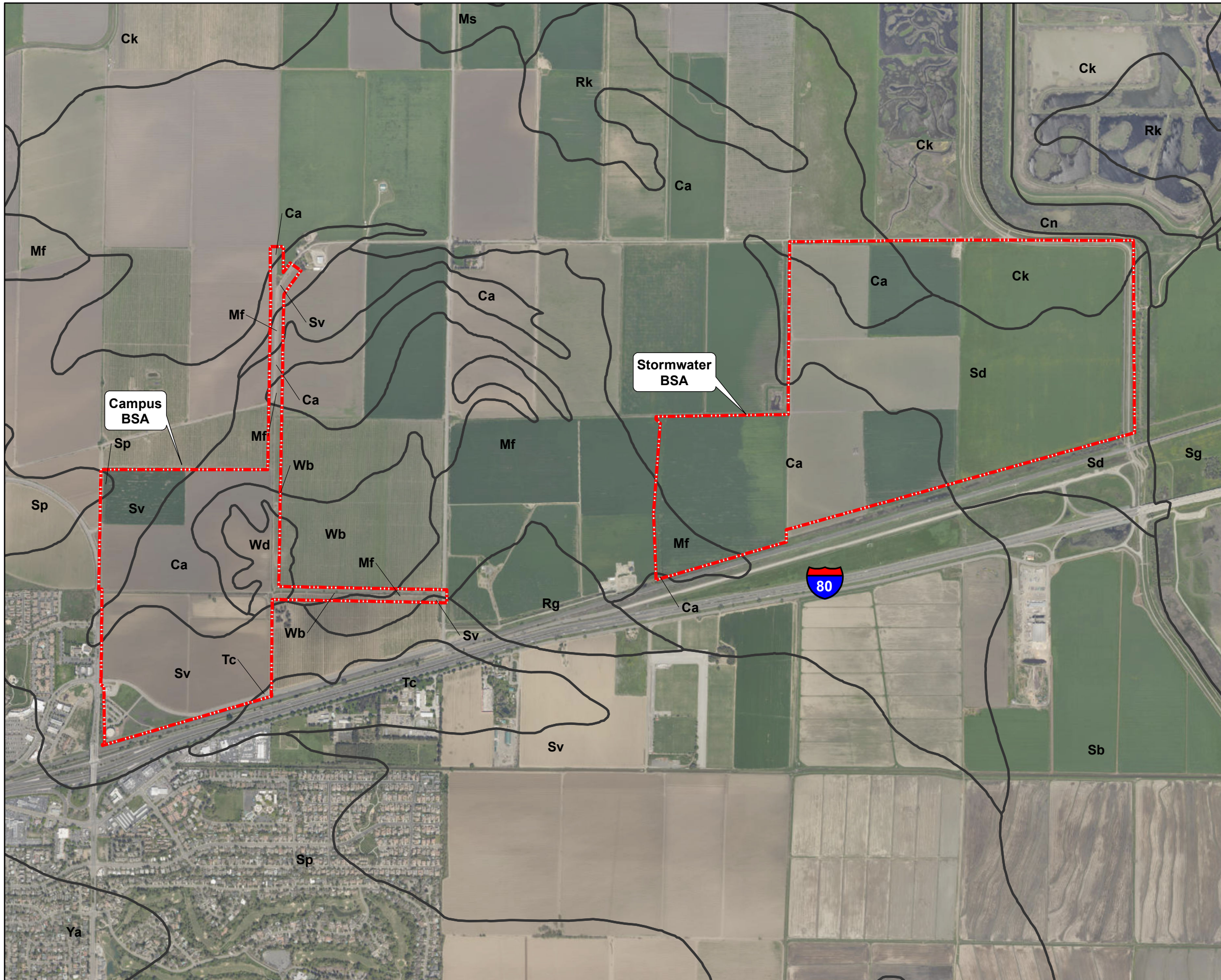
Soil Types (In the BSA):

- Ca Capay silty clay, 0 to 1 percent slopes
- Ck Clear Lake clay
- Mf Marvin silty clay loam, 0 to 1 percent slopes
- Sd Sacramento clay, drained
- Sp Sycamore silt loam, drained, 0 to 1 percent slopes
- Sv Sycamore complex, drained, 0 to 1 percent slopes
- Tc Tyndall very fine sandy loam, drained 0 to 1 percent slopes
- Wb Willows clay 0 to 1 percent slopes
- Wd Willows clay, alkali, drained 0 to 1 percent slopes



Aerial Photograph: 13 August 2018  
 2018 Yolo County Orthos Imagery  
 ESRI World Imagery Arcmap Service Layer

Soil Survey Geographic (SSURGO) Yolo County,  
 California (27 February 2007)  
 Hydric Soils National List (March 2014), USDA NRCS





## **B. Weather and Climate Conditions**

Accumulated precipitation was above 124% of normal preceding the biological, botanical, and wetland surveys on 10 December 2014 (Sycamore Environmental 2015e); 71% of normal preceding the 19 May 2015 botanical survey (Sycamore Environmental 2015d); and 84% of normal preceding the 11 September 2015 botanical survey (Sycamore Environmental 2015f). Accumulated precipitation was 176% of normal preceding the 7 August 2019 biological and botanical survey (based on precipitation data from the Davis 2WSW gauge, calculated for the period of 1 October through 7 August; CDEC 2020). Vegetation in the BSA appeared typical for the time of year during each of the surveys. Biological surveys were conducted during weather with good visibility. No surveys were conducted in dense fog or during precipitation events.

## **C. Biological Communities**

Biological communities are defined by species composition and relative abundance. Biological communities described below correlate where applicable with *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009), and the most recent *California Natural Communities List* (CDFW 2019c). Biological communities are mapped in Figure 4 and their acreages are in Table 3. Photographs of the BSA are in Appendix D. Mapping of biological communities in this report matches the land cover type mapping required by the Yolo HCP/NCCP.

Table 3. Biological Communities and Other Features in the BSA

Land Cover Type	Vegetation Alliances and CDFW Alliance Codes <sup>1</sup>	Rarity Rank <sup>2</sup>	Campus BSA Acreage <sup>3</sup>	Stormwater BSA Acreage <sup>3</sup>	Total BSA Acreage <sup>3</sup>
Field Crops	--	--	210.86	523.00	733.86
Deciduous Fruit/Nut	--	--	13.51	0	13.51
Semiagricultural/Incidental to Agriculture	<i>Brassica nigra</i> and other mustards (Upland mustards) Semi-natural Stands (CDFW 42.011.00) <i>Lepidium latifolium</i> (Perennial pepper weed patches) Semi-natural Stands (CDFW 52.205.00)	--	19.56	12.23	31.79
Mace Drainage Channel <sup>4</sup>	<i>Typha (angustifolia, domingensis, latifolia)</i> Herbaceous Alliance (CDFW 52.050.00) <i>Lepidium latifolium</i> (Perennial pepper weed patches) Semi-natural Alliance (CDFW 52.205.00)	G5 S5 --	1.66	0.13	1.79
Urban or Built Up	--	--	9.00	2.55	11.55
Urban Ruderal	<i>Brassica nigra</i> and other mustards (Upland mustards) Semi-natural Stands (CDFW 42.011.00) <i>Centaurea solstitialis</i> (Yellow star-thistle fields) Semi-natural Alliance (CDFW 42.042.00)	--	10.50	12.34	22.84
<b>Total:</b>			<b>265.09</b>	<b>550.25</b>	<b>815.34</b>

<sup>1</sup> Vegetation alliances based on descriptions and classification methods in Sawyer et al. (2009). Alliance codes from CDFW (2019c). Some communities may lack recognized vegetation alliances or contain multiple alliances.

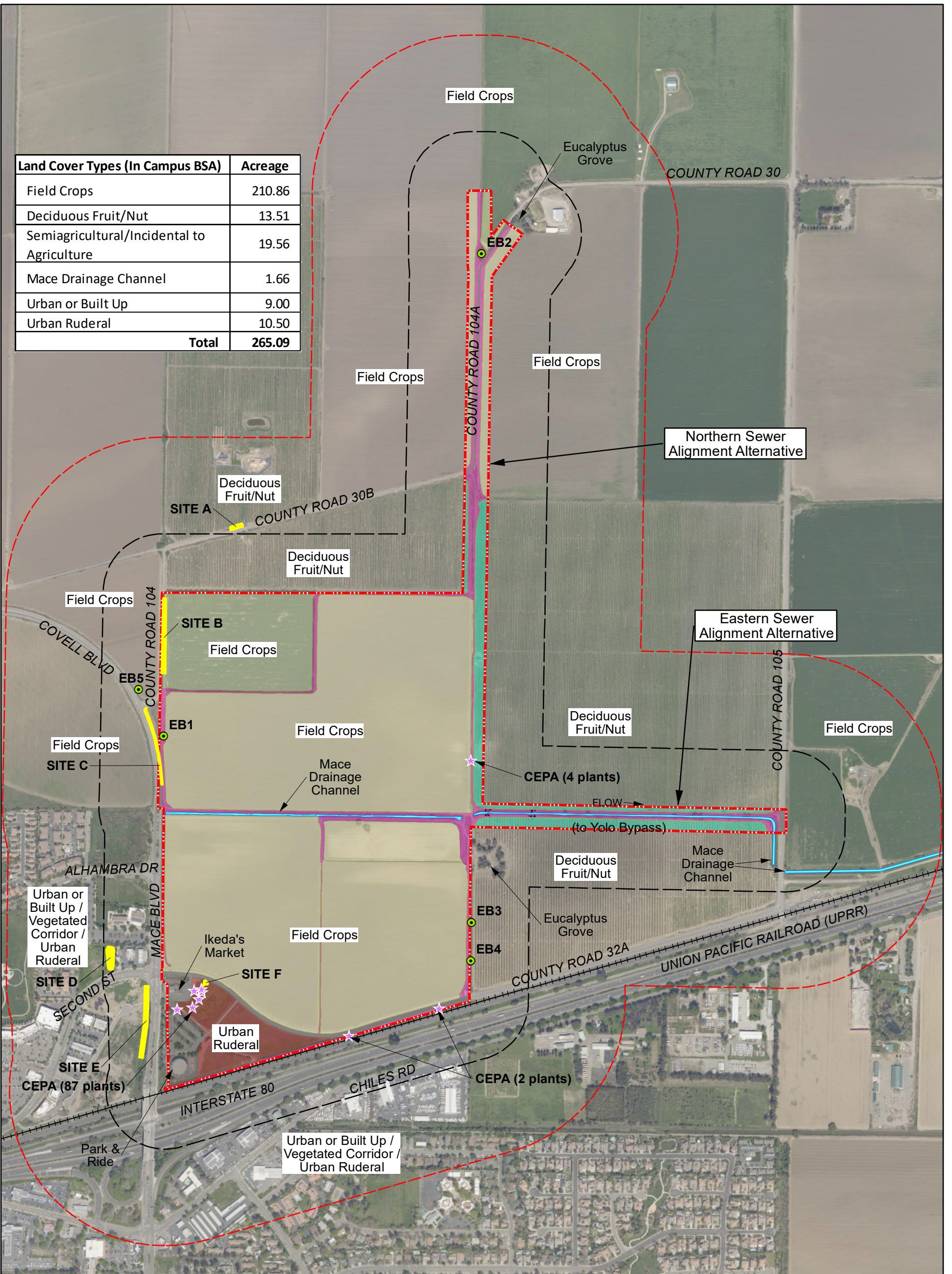
<sup>2</sup> Rarity ranking follows NatureServe's Heritage Methodology and is based on degree of imperilment as measured by rarity, trends, and threats. State (S) ranks of 1-3 are considered highly imperiled by CDFW (2019d). Nonnative vegetation has no rarity rank.

<sup>3</sup> Acreages were calculated using ArcMap functions.

<sup>4</sup> A portion of the Mace Drainage Channel in the Campus BSA may be classified as bulrush cattail wetland when vegetation is present. The City of Davis regularly removes vegetation from the Mace Drainage Channel for stormwater management pursuant to an existing agreement with CDFW. The bulrush cattail wetland present in the Stormwater BSA occurs in the southernmost portion of an irrigation drainage ditch that drains to the Railroad Channel. See discussion of the Mace Drainage Channel.



Land Cover Types (In Campus BSA)	Acreage
Field Crops	210.86
Deciduous Fruit/Nut	13.51
Semiagricultural/Incidental to Agriculture	19.56
Mace Drainage Channel	1.66
Urban or Built Up	9.00
Urban Ruderal	10.50
<b>Total</b>	<b>265.09</b>

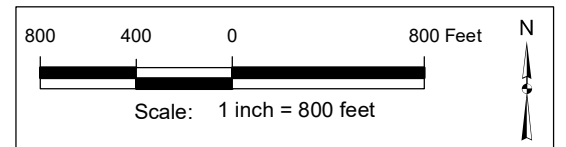


Aggie Research Campus  
Yolo County, CA  
3 February 2020

- Campus Biological Study Area (Campus BSA)
- 500 ft Buffer
- 1,320 ft Buffer
- Elderberry Shrub Location (EB)
- Burrowing Owl Occupied Site (SITE A to F)
- ★ Parry's rough tarplant (*Centromadia parryi* ssp. *rudis* CNPS Rank 4.2)(CEPA)
- Field Crops
- Deciduous Fruit/Nut
- Mace Drainage Channel
- Semiagricultural/Incidental to Agriculture
- Urban or Built Up
- Urban Ruderal

**Notes:**

- 1) Occupied burrowing owl sites reflect survey results through 24 January 2020.
- 2) Parry's rough tarplant mapped on 11 September 2015 and verified on 7 August 2020.



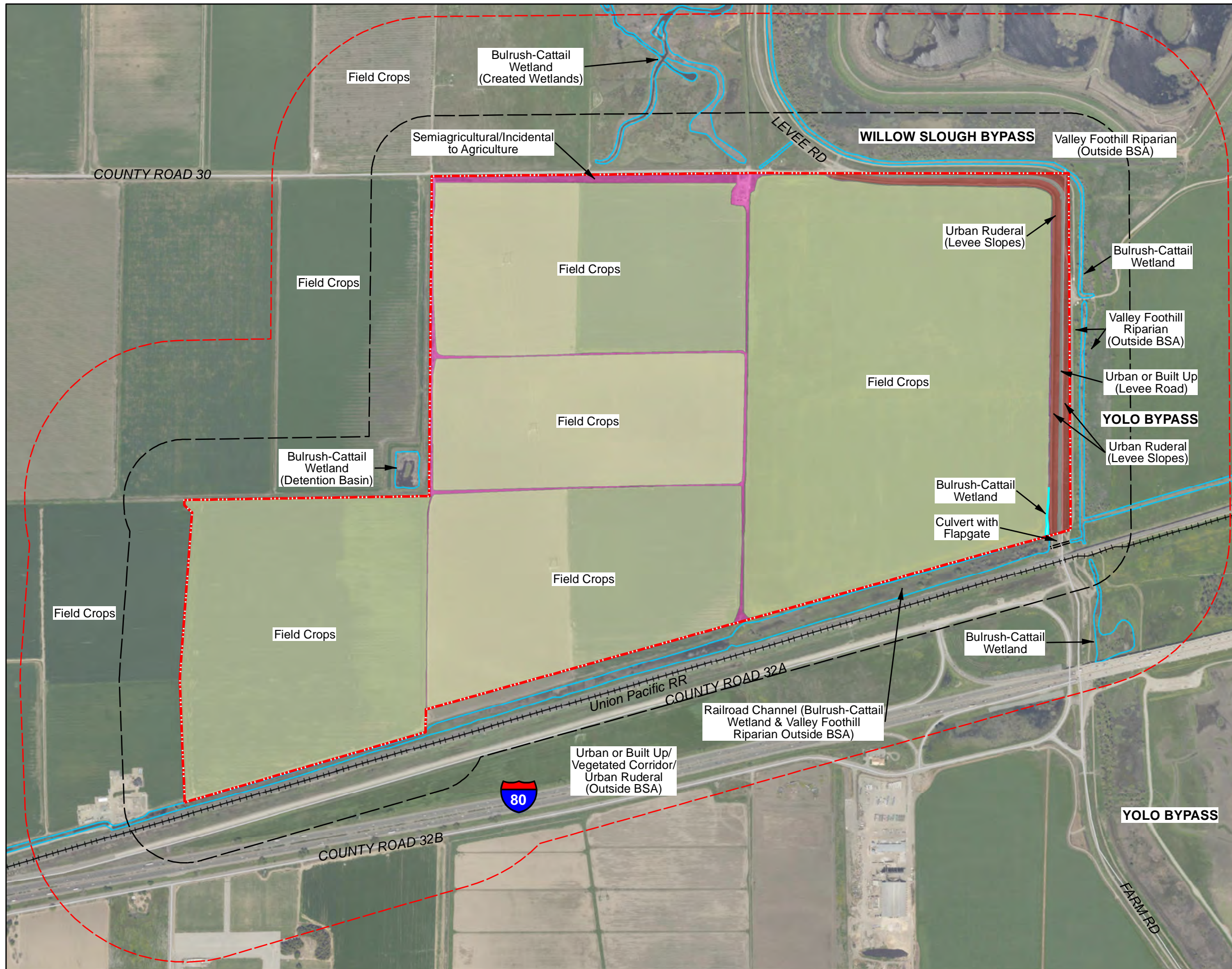
**SYCAMORE**  
Environmental  
Consultants, Inc.

Aerial Photograph: 13 August 2018  
2018 Yolo County Orthos Imagery  
ESRI World Imagery Arcmap Service Layer

Figure 4.  
Biological Resources Map  
Sheet 1 of 2

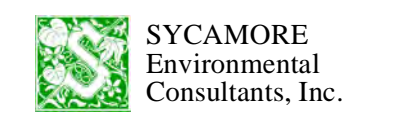
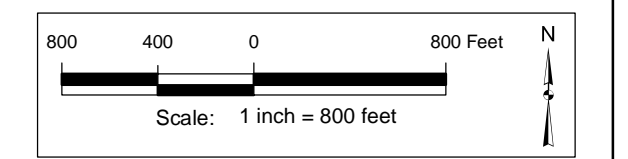


Figure 4.  
 Biological Resources Map  
 Sheet 2 of 2, Off-site  
 Stormwater Capacity Area



- Stormwater Capacity Biological Study Area (Stormwater BSA)
- 500 ft Buffer
- 1,320 ft Buffer
- Bulrush-Cattail Wetland
- Field Crops
- Semiagricultural/Incidental to Agriculture
- Urban Ruderal
- Urban or Built Up
- Bulrush-Cattail Wetland (Outside Stormwater BSA)

Land Cover Types (In Stormwater BSA)	Acreege
Field Crops	523.00
Semiagricultural/Incidental to Agriculture	12.23
Bulrush-Cattail Wetland	0.13
Urban or Built Up (Levee Road)	2.55
Urban Ruderal (Levee Slopes)	12.34
<b>Total</b>	<b>550.25</b>



Aerial Photograph: 13 April 2018  
 2018 Yolo County Orthos Imagery  
 ESRI World Imagery Arcmap Service Layer



## 1. Field Crops

A total of 210.86 ac of field crop agriculture occurs in the Campus BSA (see photos in Appendix D). A total of 523.00 ac of field crop agriculture occurs in the Stormwater BSA. The agricultural fields had recently been tilled during fieldwork and appear to be in active use. Fields are flat. Recent crops have included tomato, sunflower, alfalfa, and grain. The agricultural fields have been used for agriculture since at least 1937 (Ramcon 2003).

A 1200 x 330 ft detention basin occurs adjacent and south of the MDC near the eastern boundary of the Campus BSA. A concrete spillway allows water from MDC to flow into the detention basin during extreme high water events. Two one-way metal flap gates in the spillway allow water to flow back into the MDC as water drains out of the MDC. The basin was constructed in approximately 1993. This feature is visible on aerial photographs dating back to 1993 in Google Earth. None of the aerial photographs available in Google Earth show standing water in this feature. Prior to 2014, the detention basin had never held standing water (pers. comm., D. Ramos). On 10 December 2014 wrack deposition consistent with recent inundation was observed in this feature. The location of wrack deposition on the sides of the detention basin indicated that approximately 2-3 ft of water had been present in the detention basin sometime between 7 October and 10 December 2014. No water was observed in the detention basin on 10 December 2014. Soil pits dug throughout the basin as part of the concurrently prepared wetland delineation showed that soils in the detention basin are composed mostly of silt and sand. The detention basin was cultivated and planted with sunflower in 2019. It was thus classified as the field crops land cover type.

A few Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) trees occur in the detention basin, in the area mapped as field crops. The trees in the BSA are discussed in Section V.G.

## 2. Deciduous Fruit/Nut

A total of 13.51 ac of deciduous fruit/nut orchard occurs in the Campus BSA. The orchards are planted with almonds or peaches. The orchards occur east and north of the ARC site, and along both sewer line alternatives. The orchards were installed in 2015 or 2016.

## 3. Semiagricultural/Incidental to Agriculture

A total of 19.56 ac was mapped as semiagricultural/incidental to agriculture in the Campus BSA (see photos in Appendix D). A total of 12.23 acres was mapped in the Stormwater BSA. This community consists mainly of fallow farm field edges and farm roads. Dirt farm roads occur north of and adjacent to the MDC on the ARC site, on both sides of the MDC along the eastern sewer alignment alternative, and along most of the agricultural fields. Where present, vegetation in this community is dominated by nonnative weed species including mustard (*Brassica nigra* and other mustards), perennial pepperweed (*Lepidium latifolium*), Russian thistle (*Salsola tragus*), yellow-star thistle (*Centaurea solstitialis*), field bindweed (*Convolvulus arvensis*), poison hemlock, (*Conium maculatum*), prickly lettuce (*Lactuca serriola*), filaree (*Erodium* sp.), and nonnative annual grasses (*Bromus*, *Avena*, *Hordeum*, etc.). This community occurs predominantly along untilled field edges, along roadsides, along the MDC, in roadside and irrigation ditches. The vegetation in this community has no special status.

#### 4. Mace Drainage Channel

The MDC is a manmade storm drainage ditch that transports urban runoff from the Mace Ranch Drainage Basin in the City of Davis east through the center of BSA, to the Railroad Channel, and ultimately the Yolo Bypass approximately 2.5 air miles to the east (City of Davis 2007; see photos in Attachment D). Vegetation in the MDC is periodically removed by the City of Davis (City of Davis 2006; pers. comm., D. Ramos). Vegetation clearing had occurred in much of the ditch in approximately 2014.

A total of 1.66 ac of the Mace Drainage Channel (MDC) occurs in the Campus BSA. The portion of the MDC bisecting the ARC site (i.e. the portion between Mace Blvd and a farm road crossing at the eastern edge of the ARC site) occupies approximately 0.81 ac and is dominated by cattail (*Typha* sp.), bulrush (*Schoenoplectus acutus* var. *occidentalis*), annual saltmarsh aster (*Symphyotrichum subulatum*), nutsedge (*Cyperus eragrostis*), and smartweed (*Persicaria* sp.). A few young nonnative sycamores (*Platanus* sp.) one nonnative Chinese tallow tree (*Triadica sebifera*) sapling, one young native Goodding's black willow (*Salix gooddingii*), and one young Fremont's cottonwood (*Populus fremontii*) occur along this portion of the MDC (see Evaluation of Trees in Section V.G). Vegetation in this portion of the MDC is generally may be classified as *Typha* (*angustifolia*, *domingensis*, *latifolia*) herbaceous alliance (CDFW 52.050.00; rarity rank G5 S5), and would meet the definition of bulrush cattail wetland under the Yolo HCP/NCCP.

The portion of the MDC along the eastern sewer alignment (0.85 ac) does not contain cattails, bulrushes, or marsh vegetation, and is instead dominated by perennial pepperweed (*Lepidium latifolium*) and other nonnative ruderal plants typical of uplands, or infrequently inundated floodplains. The vegetation in this portion of the MDC may be classified as *Lepidium latifolium* Semi-natural Stand (CDFW 52.205.00, no rarity rank). A few cottonwoods and willows occur along the MDC along the eastern sewer alignment alternative.

The hydrology of the MDC was studied as part of an evaluation of giant garter snake habitat (see discussion of giant garter snake in Section V.C.2). The MDC appears to contain flowing water only immediately following winter storms. The fields bordering the MDC may be irrigated with temporary irrigation ditches, but no irrigation runoff has been observed flowing into the portion of the MDC on the ARC site. The MDC likely also receives landscape runoff from within the City of Davis, however no flow due to landscape runoff was observed in the MDC during any surveys.

The MDC drains to the east, turning south along County Road 105, before turning east again, draining to the east-northeast along the north side of the railroad berm (at which point it becomes the Railroad Channel). The Railroad Channel passes immediately south of the Stormwater BSA, and drains through a concrete culvert and flapgate into the Yolo Bypass. The portion of the Railroad Channel located south of the Stormwater BSA contains marsh vegetation and Valley foothill riparian vegetation. In the Stormwater BSA, the southernmost portion of an irrigation ditch at the southeast corner of the Stormwater BSA joins with the Railroad Channel near the culvert beneath the Yolo Bypass levee. The southernmost portion of this irrigation ditch contains approximately 0.13 ac of bulrush cattail wetland located within the Stormwater BSA. Bulrush cattail wetland is also abundant a detention basin located immediately northwest of the Stormwater BSA, in created wetlands located immediately north of the Stormwater BSA, and in the Yolo Bypass.

## **5. Urban or Built Up**

A total of 9.00 ac was mapped as urban or built up in the Campus BSA. A total of 2.55 ac was mapped as urban or built up in the Stormwater BSA. In the Campus BSA, this land cover type consists of developed lots, paved roads, structures, etc, including a portion of Road 32A, Road 104, Road 105, the Park and Ride driveway, the Park and Ride facility, Ikeda's Market, and associated parking lots. In the Stormwater BSA, this land cover type consists of the gravel road situated on top Yolo Bypass levee.

## **6. Urban Ruderal**

A total of 10.50 ac was mapped as urban ruderal in the Campus BSA. A total of 12.34 ac was mapped as urban ruderal in the Stormwater BSA. In the Campus BSA, this land cover type consists of the ruderal areas located between the Park & Ride, Ikeda's Market, County Road 32A, and the railroad berm / I-80. In the Stormwater BSA, this land cover type was mapped on the levee slope. Vegetation is dominated by nonnative weed species including mainly mustards (*Brassica nigra* and other mustards), yellow star-thistle (*Centaurea solstitialis*), and nonnative annual brome grasses (*Bromus* spp.).

## **D. The Existing Level of Disturbance**

The vast majority of the BSA has experienced recent soil disturbance due to typical agricultural operations, including tilling. Other recent or ongoing disturbance includes the Ikeda's Market, a water storage tank, and the Davis Park and Ride, associated parking lots and traffic, paved and unpaved roads, levee maintenance, and vegetation removal in the MDC.

## **V. BIOLOGICAL RESOURCES IN THE BIOLOGICAL STUDY AREA**

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### **A. Determination of Special-Status Species in the Biological Study Area**

Special-status species are those listed (or candidate or proposed) under the federal or state endangered species acts, under the California Native Plant Protection Act, as a California species of special concern or fully protected by the California Department of Fish and Wildlife (CDFW), or that are Rank 1 or 2 in the California Native Plant Society's Inventory of Rare and Endangered Plants of California (CNPS 2014). CNPS Rank 3 and Rank 4 plants may also be considered special-status when they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) or §15380. Special-status natural communities are waters, wetlands, riparian communities, and any natural community or vegetation alliance ranked S1, S2, or S3 by CDFW (2019c). Special-status species and communities may also include those considered locally important or sensitive.

File data from USFWS, CNDDDB, and CNPS were used to determine the special-status species that could occur in the BSA. A CNDDDB summary report and CNPS Inventory query for the Davis and eight surrounding USGS quads are in Appendix B. The USFWS list of special-status species that could occur in or be affected by the project is in Appendix C.

Biological field surveys were conducted by Sycamore Environmental biologists to determine if individuals or habitat for special-status species identified in the file data were present in the BSA. Special-status species for which suitable habitat is present are listed in Table 4.

Special status wildlife, plants, natural communities, and other biological resources that have potential to occur in the BSA are discussed in the sections that follow. The analysis of nearest known records presented for each species in Sections V.C and V.D was conducted using the Campus BSA. All known records overlapping or bordering any portion of the Campus BSA or the Stormwater BSA are discussed.

Table 4. Special-Status Species with the Potential to Occur in the BSA

Special-Status Species	Common Name	Federal Status <sup>a</sup>	State Status <sup>a</sup> & other codes <sup>b</sup>	Source <sup>c</sup>	Habitat Present?/ Species Observed?
<b>Invertebrates</b>					
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	T, CH	--	1,2,4	Yes/ No
<b>Reptiles</b>					
<i>Thamnophis gigas</i>	Giant garter snake	T	T	1,2,4	Yes/ No
<b>Birds</b>					
<i>Agelaius tricolor</i>	Tricolored blackbird	--	T, SC	2,4	Yes/ No
<i>Athene cunicularia</i>	Burrowing owl	--	SC	2,4	Yes/ No
<i>Buteo swainsoni</i>	Swainson's hawk	--	T	2,4	Yes/ No
<i>Charadrius montanus</i>	Mountain plover	--	SC	2	Yes/ No
<i>Circus hudsonius</i>	Northern harrier	--	SC	2	Yes/ <b>Yes</b>
<i>Elanus leucurus</i>	White-tailed kite	--	FP	2,4	Yes/ <b>Yes</b>
<i>Melospiza melodia</i>	Song sparrow ("Modesto" population)	--	SC	2	Yes/ No
Migratory Birds & Birds of Prey	--	--	--	5	Yes/ <b>Yes</b>
<b>Mammals</b>					
Protected & Locally Important Bats	--	--	--	5	Yes/ No
<b>Plants</b> /CNPS Rank <sup>b</sup>					
<i>Astragalus tener</i> var. <i>ferrisiae</i>	Ferris' milk vetch	--	--/ 1B.1	2,3	Yes/ No
<i>Astragalus tener</i> var. <i>tener</i>	Alkali milk-vetch	--	--/ 1B.2	2,3	Yes/ No
<i>Atriplex cordulata</i> var. <i>cordulata</i>	Heartscale	--	--/ 1B.2	2,3	Yes/ No
<i>Atriplex depressa</i>	Brittlescale	--	--/ 1B.2	2,3	Yes/ No
<i>Carex comosa</i>	Bristly sedge	--	--/ 2B.1	2,3	Yes/ No
<i>Centromadia parryi</i> ssp. <i>parryi</i>	Pappose tarplant	--	--/ 1B.2	2, 3	Yes/ No
<i>Centromadia parryi</i> ssp. <i>rudis</i>	Parry's rough tarplant	--	--/ 4.2	3	Yes/ <b>Yes</b>
<i>Eryngium jepsonii</i>	Jepson's coyote thistle	--	--/ 1B.2	2, 3	Yes/ No
<i>Etriplex joaquiniana</i>	San Joaquin spearscale	--	--/ 1B.2	2, 3	Yes/ No
<i>Hesperevax caulescens</i>	Hogwallow starfish	--	--/ 4.2	2, 3	Yes/ No
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	Woolly rose-mallow	--	--/1B.2	2,3	Yes/ No
<i>Lepidium latipes</i> var. <i>heckardii</i>	Heckard's pepper-grass	--	--/ 1B.2	2,3	Yes/ No
<i>Symphotrichum lentum</i>	Suisun Marsh aster	--	--/ 1B.2	2	Yes/ No
<i>Trifolium hydrophilum</i>	Saline clover	--	--/ 1B.2	2,3	Yes/ No

<sup>a</sup> **Listing Status** Federal status determined from USFWS (2020) letter . State status determined from CDFW (2019a; 2020a). Codes used: E = Endangered; T = Threatened; P = Proposed; C = Candidate; CH = Critical habitat designated; R = California Rare;

<sup>b</sup> **Other Codes** Other codes determined from CDFW (2019a; 2020a) and CNPS (2020). Codes used in table are:

SC = CDFW Species of Special Concern; FP = CDFW Fully Protected;

CNPS CA Rare Plant Rank: 1A = Presumed extirpated in CA and either rare or extinct elsewhere; 1B = Rare, threatened, or endangered in CA and elsewhere; 2A = Presumed extirpated in CA but common elsewhere; 2B = Rare, threatened, or endangered in CA but more common elsewhere; 3 = Review List: plants about which more information is needed; 4 = Watch List: plants of limited distribution.

CNPS CA Rare Plant Rank Decimal Extensions: .1 = Seriously threatened in CA (over 80% of occurrences threatened / high degree and immediacy of threat); .2 = Moderately threatened in CA (20-80% of occurrences threatened / moderate degree and immediacy of threat); .3 = Not very threatened in CA (< 20% of occurrences threatened / low degree and immediacy of threat or no threats known).

<sup>c</sup> **Sources** 1 = USFWS (2020) letter. 2 = CNDDDB query (CDFW 2020c). 3 = CNPS (2020). 4 = Yolo HCP/NCCP Covered Species. 5 = Included by Sycamore Environmental.

## B. Special-Status Species not in the Biological Study Area

Special-status species for which suitable habitat is not present, or whose distributional limits preclude the possibility of their occurrence in the BSA, are not discussed in Section V.C of this report. An evaluation of these species is in Appendix E.

## C. Evaluation of Special-Status Wildlife Species

### 1. Invertebrates

#### Valley elderberry longhorn beetle (VELB; *Desmocerus californicus dimorphus*)

**HABITAT AND BIOLOGY:** VELB is a 2-cm long beetle found only in association with its host plant, elderberry (*Sambucus mexicana* and *S. racemosa* var. *microbotrys*). Adults emerge from mid-March through June. During this period, adults feed on foliage, perhaps also the flowers, and mate. Eggs are deposited on living elderberry plants. The first larval instar bores through the center of an elderberry stem and develops for one to two years while feeding on the pith. Prior to pupation, the larva chews a hole through the bark and plugs it with wood shavings. The larva crawls back into its pupal chamber, metamorphoses, and emerges as an adult (USFWS 2006).

The elderberry host plant for VELB occurs in a variety of habitats, most commonly in riparian forests and margins and adjacent grassy savannas. Elderberries also occur in oak woodland and mixed chaparral-foothill woodland. VELB is found in population clusters that are unevenly distributed across available host plants. Host plants are typically large mature plants. Exit holes are circular or slightly oval and between 7 and 10 mm in diameter (USFWS 1991). VELB does not disperse long distances, which led Collinge (2001) to conclude that unoccupied drainages tend to remain unoccupied. Talley et al. (2007) describes aggregations of occupied shrubs on the order of about 0.5 miles, which is consistent with limited dispersal ability. Isolated elderberry shrubs separated from contiguous habitat by extensive development are not typically considered viable habitat for VELB (Yolo Natural Heritage Program 2009). The Yolo Natural Heritage Program (2009) defines potential VELB habitat as stands of elderberry shrubs adjacent to or contiguous with riparian forest, floodplains, or relict elderberry savannah. On 17 September 2014, the USFWS determined that proposed delisting of VELB was not warranted (USFWS 2014c). VELB will remain a federally threatened species for the foreseeable future.

**RANGE:** VELB is endemic to the Central Valley and occurs from southern Shasta County south to Fresno County, and from the east side of the Coast Range to the foothills of the Sierra Nevada.

**KNOWN RECORDS:** There are 16 CNDDDB records in the nine-quad area centered on the BSA. The closest record is approximately 2.1 mi west of the BSA. The record is for one adult collected in 1934 between Dixon and Sacramento. The exact collection location is unknown.

**HABITAT PRESENT IN THE BSA:** Blue elderberry (*Sambucus nigra* ssp. *caerulea*; formerly, *Sambucus mexicana*) shrubs in the Campus BSA provide marginal habitat for VELB. Habitat is considered marginal due to the non-riparian/agricultural context and the degree of shrub isolation.

**DISCUSSION:** A total of five elderberry shrubs occur either in the Campus BSA or within 200 ft (EB shrubs #1-5 shown on Figure 4). No elderberry shrubs were observed in the Stormwater BSA or within 200 ft. No VELB or potential VELB exit holes were observed on the shrubs during VELB exit hole inspections conducted on 10 December 2014, 23 December 2014, and 7 August 2019. Off-site, several

elderberry shrubs occur along the shoulder of I-80 south of the Project, but these individuals are over 100 ft from the BSA, and separated from the BSA by the railroad prism.

EB Shrub #1 occurs along the western edge of the Campus BSA. EB Shrub #2 occurs in a clump of roadside vegetation along the northern sewer alignment alternative. EB shrubs #3 and #4 occur along the eastern edge of the Campus BSA. EB Shrub # 5 occurs off-site, approximately 180 ft west of the Campus BSA along the north side of Mace Blvd. The elderberry shrubs in the BSA are isolated from other shrubs, and are growing in agricultural contexts. The elderberry shrubs in the BSA are not growing with or near riparian vegetation or in riparian contexts. Talley et al. (2007) modeled potentially suitable areas adjacent to the riparian zone as areas within 250 ft of potentially suitable riparian habitat. The nearest riparian habitat that may have elderberry shrubs appears to be over one mi north of the BSA along the Willow Slough Bypass, well beyond the dispersal capabilities of VELB.

There is no evidence that VELB occupy the elderberry shrubs in the BSA. VELB is unlikely to occur in the BSA.

## 2. Reptiles

### Giant garter snake (GGS: *Thamnophis gigas*)

**HABITAT AND BIOLOGY:** GGS historically inhabited natural wetlands, but now mostly inhabit agricultural wetlands and other waterways, such as irrigation and drainage canals, riceland, marshes, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands. Essential habitat components consist of:

- 1) adequate water during the snake's active season (early spring through mid-fall) to provide adequate permanent water to maintain dense populations of food organisms;
- 2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season;
- 3) upland habitat with grassy banks and openings in waterside vegetation for basking; and
- 4) higher elevation upland habitats for cover and refuge from flood waters during the snake's inactive season in the winter.

GGS are most active from spring to mid-fall (approximately April through the end of October). The breeding season begins after emergence from overwintering sites, approximately March through May, and resumes briefly in September. Females brood young internally and give birth to live young from late July through early September. Young scatter immediately into dense cover and absorb their yolk sacs and begin feeding on their own (USFWS 1999a).

GGS feed primarily on aquatic prey, such as fish and amphibians. They appear to take advantage of pools that trap and concentrate prey items. GGS are known to bask in openings in vegetation created by rip-rap placed around water control structures. Small mammal burrows and other soil crevices above the flood elevation are used during the winter. Burrows are typically located in sunny exposures along south and west facing slopes (USFWS 1999a).

Ideal marsh habitat contains shallow water, deep water, and high ground. This habitat is often found in rice fields where GGS appear to be the most numerous. GGS are generally absent from larger rivers and from wetlands with sand, gravel or rock substrates. Riparian woodlands do not typically provide suitable habitat because of excessive shade, lack of basking sites, and lack of aquatic prey (USFWS 1999a).

**RANGE:** GGS is endemic to wetlands in the Central Valley of CA, from Red Bluff to Bakersfield. Once common throughout the Central Valley, GGS is currently found in the Sacramento Valley and isolated populations in San Joaquin Valley. The GGS Recovery Plan (USFWS 1999a) recognizes 13 separate populations of GGS that coincide with riverine flood basins and tributary streams: Butte Basin, Colusa Basin, Sutter Basin, American Basin, Yolo Basin/Willow Slough, Yolo Basin/Liberty Farms, Sacramento Basin, Badger Creek/Willow Creek, Caldoni Marsh, East Stockton – Diverting Canal and Duck Creek, North and South Grasslands, Mendota, and Burrel/Lanare. These populations occur in Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo counties. Studies conducted by Hansen (1988) in Sacramento, Sutter, Butte, Colusa, and Glenn counties, showed that GGS populations were distributed in areas where rice was grown.

**KNOWN RECORDS:** There are 80 CNDDDB records of GGS in the nine-quad area centered on the BSA. The nearest record (Occurrence #80) is located 1.3 mi northwest of the BSA in an irrigation ditch north of Willow Slough and west of the Yolo County Central Landfill. Several other GGS records occur in or north/east of the Willow Slough Bypass within approximately 3 mi of the BSA. None of the records occur on the Project side of the Willow Slough Bypass. A cluster of GGS records also occurs southeast of the BSA in the Yolo Bypass (Occurrence #311) and in rice field ditches immediately west of the Yolo Bypass and south of I-80 (Occurrence #185; the closest of which is 2.3 miles southeast of the Campus BSA).

**HABITAT PRESENT IN THE BSA:** No habitat for GGS occurs in the Campus BSA or within 200 ft. The MDC is not habitat for GGS (see GGS Habitat evaluation in Appendix I). In the Stormwater BSA, potentially suitable aquatic habitat occurs in the southern portion of an irrigation ditch at the southeast corner of the Stormwater BSA. Within 200 ft of the Stormwater BSA, potentially suitable aquatic habitat occurs in the Railroad channel located immediately to the south, the detention basin located immediately to the northwest, the created wetlands located immediately to the north, and in ditches and canals present within the Yolo Bypass. Upland areas within 200 ft of aquatic habitat for GGS are typically considered suitable upland basking and refuge habitat for GGS. Suitable upland habitat for GGS occurs in the Stormwater BSA around the abovementioned aquatic habitat.

**DISCUSSION:** GGS were not observed during biological surveys. The closest known populations of GGS occur in the Willow Slough Bypass and the Yolo Bypass (see map of recent records and modeled GGS habitat in Appendix F; Yolo County Natural Heritage Program 2013). The Campus BSA and Stormwater BSA do not occur in an area of rice production. No rice production occurs in the region between I-80 and Willow Slough, west of the Yolo Bypass. Agricultural fields in the BSA and on all agricultural parcels located north of I-80 and south of Willow Slough consist of upland row crops and deciduous not/fruit orchards. No rice production occurs along the MDC or in the fields between the BSA and either the Willow Slough Bypass or the Yolo Bypass. The following discussion covers findings for the Campus BSA and Stormwater BSA separately.

**Campus BSA:** GGS habitat does not occur in the Campus BSA. There is no aquatic habitat connectivity between the Campus BSA and the GGS populations in the Yolo Bypass and in Willow Slough Bypass. The MDC does not provide suitable aquatic habitat for GGS. See GGS Habitat Evaluation in Appendix I.

**Stormwater BSA:** The southernmost portion of an irrigation ditch at the southeast corner of the Stormwater BSA contains cattails and bulrush vegetation, and may provide suitable aquatic habitat for GGS. Marginal aquatic habitat for GGS occurs in the following features, which may provide adequate water for GGS during the GGS active season, at least in some years: the Railroad Channel located



immediately south, the detention basin located immediately northwest, the created wetlands located immediately north, and canals and ditches with suitable hydrology within the Yolo Bypass located to the east of the Stormwater BSA. Upland areas within 200 ft of the aforementioned GGS aquatic habitat occur within the Stormwater BSA as shown on Figure 4, and on the map of Yolo HCP/NCCP biological resource avoidance buffers in Appendix H. GGS could occupy these features and surrounding uplands when adequate water is present. GGS known to occur in the Yolo Bypass may enter the Railroad Channel by traveling over the Yolo Bypass Levee.

### 3. Birds

#### Tricolored blackbird (*Agelaius tricolor*)

**HABITAT AND BIOLOGY:** Tricolored blackbirds form the largest breeding colonies of any North American inland bird species (Shuford and Gardali 2008). Colonies vary in size from a minimum of about 50 nests to over 20,000 in an area of 10 ac or less (CWHR 2020). Tricolored blackbird was formally listed as Threatened under CESA on 18 March 2019 (California Fish and Game Commission 2019).

Basic breeding site requirements are open, accessible water; a protected nesting substrate, including either flooded or thorny or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few kilometers of the nesting colony. Historically, most colonies nested in freshwater marshes dominated by cattails or tules, while some colonies nested in nettles, thistles, and willows. However, the use of freshwater marshes as breeding colony sites has decreased. An increasing percentage of colonies since the 1970s have been reported in Himalayan blackberry and thistles, and some of the largest recent colonies were in silage and grain fields near dairies in the San Joaquin Valley. Other less commonly used substrates include safflower, tamarisk, elderberry, western poison oak, giant reed, riparian scrublands, and riparian forests.

Ideal foraging conditions for this species are created when shallow flood irrigation, mowing, or grazing keeps the vegetation less than 6 inches tall. Preferred foraging habitats include crops such as rice, alfalfa, irrigated pastures, and ripening or cut grain fields, as well as annual grasslands, cattle feedlots, and dairies. Tricolored blackbirds also forage in native habitats, including wet and dry vernal pools and other seasonal wetlands, riparian scrub habitats, and open marsh borders. Proximity to suitable foraging habitat appears important for the establishment of colony sites (Shuford and Gardali 2008).

**RANGE:** In California, tricolored blackbird breeding occurs in the Sacramento and San Joaquin valleys, the foothills of the Sierra Nevada south to Kern County, the coastal slope from Sonoma County south to the Mexican border, and sporadically, the Modoc Plateau. Tricolored blackbirds are a permanent resident in California, but make extensive migrations and movements within their range, both in the breeding season and in winter. Individuals usually move north after first nesting efforts (March-April) in the San Joaquin Valley and Sacramento County to new breeding locations in the Sacramento Valley, northeastern CA, and rarely Oregon, Nevada, and Washington (Shuford and Gardali 2008).

**KNOWN RECORDS:** There are 18 CNDDDB records of this species in the nine-quad area centered on the BSA. The closest record (Occurrence #488) is located approximately 2.1 mi west of the BSA. The record is for approximately 28,000 nests recorded in 1932. CNDDDB considers this colony possibly extirpated. A second nearby record (Occurrence #489) is located approximately 2.1 mi northwest of the BSA. This second record is for an estimated 690 to 880 tricolored blackbirds observed on 15 April 2011,

some of which were carrying nesting material. No birds were observed at the location of this second record on 18 April 2014. There are numerous eBird (2020) sightings of foraging and migrating tricolored blackbirds along the edge of the Campus BSA, and in the Yolo Bypass east of the Stormwater BSA.

**HABITAT PRESENT IN THE BSA:** Marginal nesting habitat for this species occurs in the portion of the MDC within the Campus BSA. Nesting habitat is considered marginal due to frequent vegetation removal and the relatively small width of the MDC, which may not provide sufficient protection for a colony nesting species. Suitable nesting habitat occurs in the marsh vegetation in the Railroad Channel located south of the Stormwater BSA, in the Yolo Bypass east of the Stormwater BSA, in created wetlands north of the Stormwater BSA, and in the detention basin northwest of the Stormwater BSA. Agricultural and ruderal areas in the BSA provide suitable foraging habitat.

**DISCUSSION:** Tricolored blackbirds were not observed during biological surveys of the BSA. There are no known records of nesting tricolored blackbird in the BSA or within 1,300 ft (CDFW 2020c; eBird 2020). Although unlikely, tricolored blackbirds could nest in the MDC. Nesting could also occur in suitable nesting habitat within 1,300 feet of the Stormwater BSA. The agricultural fields in the BSA provide suitable foraging habitat.

### **Burrowing owl (*Athene cunicularia*)**

**HABITAT AND BIOLOGY:** Burrowing owls primarily inhabit open, dry grassland and desert habitats, such as grasses, forbs, and open shrub stages of pinyon-juniper and ponderosa pine habitats (CWHR 2020, Shuford and Gardali 2008). Main habitat components include burrows for roosting and nesting, and relatively short vegetation with sparse shrubs and taller vegetation (Shuford and Gardali 2008). Burrowing owls most commonly use ground squirrel burrows, but they may also use badger, coyote, and fox holes or dens; or human-made structures such as culverts, piles of concrete rubble, pipes and nest boxes (CWHR 2020; Shuford and Gardali 2008). An active nest chamber is often lined with excrement, pellets, debris, grass and feathers (CWHR 2020). This species also thrives in highly altered human landscapes. In agricultural areas, owls nest along roadsides, under water conveyance structures, and near and under runways and similar structures. In urban areas, burrowing owls persist in low numbers in highly developed parcels, busy urban parks, and adjacent to roads with heavy traffic. In the Imperial Valley, owls are able to excavate their own burrows in soft earthen banks of ditches and canals (Shuford and Gardali 2008).

Burrowing owls are a semi-colonial species that breed in CA from March through August, though breeding can begin as early as February and extend into December (Shuford and Gardali 2008; CWHR 2020). A large proportion of adults show strong nest site fidelity. Burrowing owls typically feed on a broad range of insects, but also on small rodents, birds, amphibians, reptiles, and carrion. Foraging usually occurs close to their burrow (Shuford and Gardali 2008).

**RANGE:** Burrowing owls are a year-round resident in most of CA, particularly in the Central Valley, San Francisco Bay region, Carrizo Plain, and Imperial Valley (Shuford and Gardali 2008). This species is generally absent from the humid coastal counties north of Marin and mountainous areas above 5,300 ft (Shuford and Gardali 2008; CWHR 2020).

**KNOWN RECORDS:** There are 79 CNDDDB records of burrowing owl in the nine-quad area centered on the BSA. The two closest records (Occurrence #614 and #695) are mapped partially overlapping the BSA, along Mace Blvd. A third record (Occurrence #734) occurs approximately 500 ft east of the eastern

sewer line alternative. A fourth record (Occurrence #994) occurs approximately 500 ft north of the Campus BSA, along County Road 30B.

Occurrence #614 occurs near the intersection of Mace Blvd and Road 104 and consists of several burrowing owls that were observed nesting in a disturbed dirt area surrounded by cultivated land and development in 2003 and 2004. The nests were located about 10 ft from the edge of Mace Road. According to the CNDDDB, the last sighting of owls at this location was on 29 July 2004. eBird.org sightings indicate owls have been using burrows at this location within the last year (eBird 2020).

Occurrence #695 occurs at the southwest corner of the Campus BSA and includes areas east and west of Mace Blvd. This record consists of at least eight owls and two active burrows observed in 2004, and six owls and four burrows observed in 2005. CNDDDB reports the location as “corner of frontage road (adjacent to I-80) and Mace Blvd, near Ikeda’s Market,” and the detailed location as “near road, between the two Park and Ride signs. Wintering burrow along the County Road 32A right-of-way.” Habitat is described as “mowed nonnative grassland, surrounded by a frontage road, a park and ride lot, and Ikeda’s Market. According to CNDDDB, the last sighting of owls at this location was on 10 October 2005. eBird.org sightings indicate owls have been using burrows at this location within the last year (eBird 2020).

Occurrence #734 occurs on the north side of I-80, approximately 500 ft east of County Road 105. The record consists of two adult owls observed at their burrow (presumably breeding), at a mostly barren site with some ruderal vegetation on 2 March 2005. According to CNDDDB, the 2 March 2005 sighting is the last known observation. eBird.org sightings indicate owls have been using burrows at this location within the last year (eBird 2020).

Occurrence #994 occurs along 0.25 to 0.40 mi west of the intersection of County Road 104A and County Road 30B. The record is for two occupied burrows, one with a pair, the other with a single individual, along County Road 30B. One pair and one single adult were observed in August and September 2007; two adults and five juveniles were observed on 13 July 2008. According to CNDDDB, the 13 July 2008 sighting is the last known observation. eBird.org sightings indicate owls have been using burrows at this location within the last year (eBird 2020).

There are no CNDDDB records of burrowing owl in the Stormwater BSA or within 500 ft. There are eBird.org sightings of burrowing owl with marker locations north of the Stormwater BSA, however it is not clear if these sightings correspond to nesting owls at the eBird marker locations. (Many of the sightings are part of eBird Traveling Protocol Surveys over 2+ miles, and include photos of burrowing owls from the known occurrences listed above).

**HABITAT PRESENT IN THE BSA:** Nesting habitat for burrowing owl occurs in the BSA. California ground squirrel burrows were observed along Mace Blvd, along the ruderal eastern edge of the Campus BSA, along the MDC, along the railroad berm located south of the BSA, and in the ruderal lot located east of Ikeda’s Market. Agricultural and ruderal areas in the BSA provide foraging habitat.

**DISCUSSION:** Six burrow complexes occupied by burrowing owl occur in the BSA or within 500 ft (Figure 4). Burrowing owls and/or their sign (e.g., feathers, whitewash, pellets) have been observed at these burrows within the last three years. Sycamore Environmental has completed numerous surveys covering the BSA, as described in Table 1. Within the last year, surveys specifically targeting burrowing owl in the BSA and within 500 ft were completed on 7 August 2019 and 24 January 2020. The 24 January 2020 survey is the first of approximately nine CDFW (2012) guideline burrowing owl surveys planned to be conducted ahead of and during the burrowing owl breeding season in 2020. Appendix G

contains the preliminary results of this survey effort, including a map of the survey areas, potentially suitable burrows, and the six known occupied sites (Sites A-F). Sites A-F are shown in Figure 4. Sites A-F are associated with known records as follows:

- **Site A** is part of CNDDDB Occurrence #994. The most recent sighting of burrowing owl at Site A during surveys occurred on 24 January 2020 (two owls observed at a burrow). Breeding has occurred at this location within the last three years based on eBird.org sightings of pairs and/or juveniles (eBird 2020).
- **Site B** does not appear to be part of a CNDDDB record. The most recent sighting of burrowing owl at Site B during surveys occurred on 7 August 2019 (one owl observed at a burrow). Breeding has occurred at this location within the last three years based on eBird.org sightings of pairs and/or juveniles (eBird 2020).
- **Site C** is part of CNDDDB Occurrence #614. The most recent sighting of burrowing owl at Site C during surveys occurred on 8 October 2019 (one owl observed at a burrow). There is no indication from eBird.org sightings that breeding has occurred in this location within last three years (eBird 2020).
- **Site D** may be part of CNDDDB Occurrence #695. The most recent sighting of burrowing owl at Site D during surveys occurred on 7 August 2019 (one owl observed at a burrow). There are no eBird.org sightings at this location within the last three years (eBird 2020).
- **Site E** is part of CNDDDB Occurrence #695. The most recent sighting of burrowing owl at Site E during surveys occurred on 7 August 2019 (three owls observed at burrows). Breeding has occurred at this location within the last three years based on eBird.org sightings of pairs and/or juveniles (eBird 2020).
- **Site F** is part of CNDDDB Occurrence #695. Burrowing owl has not been observed at Site F during surveys. Burrowing owl sign (whitewash and potential prey item remains) was observed at one burrow at Site F during the survey on 24 January 2020. Site F may be the “wintering burrow along the County Road 32A right-of-way” noted in CNDDDB. There is no indication of breeding at this location within the last three years based on eBird.org sightings (eBird 2020).

Burrowing owls show high site fidelity. The location of occupied sites within 500 ft of the BSA are well known based on numerous surveys and eBird.org sightings. The distribution and abundance of occupied sites is not expected to change substantially as the results of additional surveys for burrowing owl become available. Regardless the final result of surveys, burrowing owl may become established in any potentially suitable burrow, including the large number of potentially suitable burrows that have so far been mapped in the BSA and within 500 ft (Appendix G). Nesting and foraging habitat occurs onsite in the BSA.

### **Swainson’s hawk (*Buteo swainsoni*)**

**HABITAT AND BIOLOGY:** Swainson’s hawks nest in open riparian habitat, in scattered trees or in small groves in sparsely vegetated flatlands. Nesting areas are usually located near water, but are occasionally found in arid regions. Typical habitat includes open desert, grassland, or cropland containing scattered, large trees or small groves (CWHR 2020). Swainson’s hawk breeds from late March to late October (CWHR 2020). They forage in adjacent grasslands, suitable grain or alfalfa fields, or in livestock pastures, feeding on rodents, small mammals, small birds, reptiles, large arthropods, amphibians, and, rarely, fish (Bloom 1980; CWHR 2020).

**RANGE:** Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert (CWHR 2020). Swainson's hawks breed and forage in the California Central Valley in spring and summer. California populations of this species are believed to overwinter in Mexico.

**KNOWN RECORDS:** There are 500 CNDDDB records for this species in the nine-quad area centered on the BSA. Two records (Occurrence #409 and #465) are mapped partially overlapping the Campus BSA, and one record (Occurrence #1466) is mapped partially overlapping the Stormwater BSA. A fourth record (Occurrence #111) occurs within 1,320 ft of the Campus BSA.

Occurrence #409 is in a eucalyptus grove located east of the Campus BSA and south of the MDC and eastern sewer alignment alternative. The record is for two Swainson's hawks observed nesting in 1987 and 1988 in a eucalyptus tree surrounded by farm houses. The nest site was inactive in 1994.

Occurrence #465 is in a eucalyptus grove located north of the Campus BSA, at the northern end of the northern sewer alignment alternative. The record is for Swainson's hawk nesting activity in a farmyard eucalyptus from 1992 to 2002, with successful young last detected in 1992, and hawks last detected in 2002. The nest tree was reported as being in poor condition, and the nest site was reported as inactive in 2004 and 2005.

Occurrence #1466 represents two separate nest trees, the closest of which occurs in riparian vegetation along the Railroad Channel immediately south of the Stormwater BSA. This nearby nest tree is described as a cottonwood with an active Swainson's hawk nest in 2005. The second nest tree occurs approximately 0.2 mi south of the Stormwater BSA, in a eucalyptus on the south side of I-80. An active nest was observed in the eucalyptus tree in 2010.

Occurrence #111 represents at four separate nest tree polygons, all located along I-80. The closest nest polygon is located approximately 0.2 miles south of the eastern end of the eastern sewer alignment, on the south side of I-80. A second polygon is located a similar distance southeast of the eastern end of the sewer alignment, in riparian vegetation in the Railroad Channel. Occurrence #111 includes pine, willow, walnut, and Chinese elm nest trees with active nests reported most years between 1987-2009.

**HABITAT PRESENT IN THE BSA:** Within the Campus BSA, the Fremont cottonwood trees in the detention basin and willows and cottonwoods along the MDC provide marginal nesting habitat. Nesting habitat is considered marginal because the trees are young. Within 1,320 ft of the Campus BSA, potential nesting habitat occurs in the groves of eucalyptus trees located east and north of the Campus BSA (and have in the past, as noted above for CNDDDB Occurrence #409 and #465). Suitable off-site nesting habitat also occurs in landscaping corridors with large trees located along I-80, Mace Blvd, and Chiles Rd; and large willows and cottonwoods present along portions of the MDC and Railroad Channel. No potential nest trees occur in the Stormwater BSA. Within 1,320 ft of the Stormwater BSA, suitable off-site nesting habitat occurs in landscaping corridors with large trees located along I-80 and in large willows and cottonwoods present along portions of the off-site Railroad Channel, detention basin, created wetlands, and Yolo Bypass. Agricultural and ruderal areas in the Campus BSA and Stormwater BSA provide foraging habitat.

**DISCUSSION:** Swainson's hawks were observed soaring over the Campus BSA on 11 September 2015 and 7 August 2019. No potential Swainson's hawk nests were detected in the Campus BSA or Stormwater BSA during biological surveys. No potential Swainson's hawk nests were detected in the areas located within 1,320 ft of the Campus BSA and Stormwater BSA. Active nests could become established in the Fremont cottonwoods present in the Campus BSA, or in any of the suitable nest trees

known to occur within 1,320 ft (see discussion of Habitat Present in the BSA, above), especially in eucalyptus groves located immediately east and north of the Campus BSA, which previously contained active Swainson's hawk nests. Agricultural and ruderal areas in the Campus BSA and Stormwater BSA provide foraging habitat.

### **Mountain Plover (*Charadrius montanus*)**

**HABITAT AND BIOLOGY:** Mountain plover is a winter resident from September through March. Mountain plover occurs in open grasslands, plowed fields with little vegetation, and open sagebrush areas. Areas with high and dense cover are avoided. Foraging occurs in short grasslands and plowed fields, and their diet consists of large insects, especially grasshoppers. This species is not known to nest in California. Mountain plover winters below 3,200 ft (CWHR 2020).

**RANGE:** In California, known from the Central Valley from Sutter and Yuba counties southward (CWHR 2020). Also found in foothill valleys west of the San Joaquin Valley, Imperial Valley, in plowed fields of Los Angeles and western San Bernardino counties, and along the central Colorado River valley.

**KNOWN RECORDS:** There are four CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1970, approximately 7.5 mi northwest of the BSA. Ten mountain plovers were observed in an area with basins and ponds surrounded by cultivated fields. The record states that the ponds are no longer found in the area and no plovers were observed during a 2009 survey.

**HABITAT PRESENT IN THE BSA:** Agricultural and ruderal areas in the BSA provide foraging habitat.

**DISCUSSION:** Mountain plover was not observed during biological surveys. This species does not nest in California. Nonbreeding/wintering sites are of concern to CDFW (2019a). Ample foraging and wintering habitat similar to that in the BSA occurs in the agricultural areas surrounding the City of Davis.

### **Northern harrier (*Circus hudsonius*)**

**HABITAT AND BIOLOGY:** Northern harriers breed and forage in a variety of open (treeless) habitats that provide adequate vegetative cover, an abundance of suitable prey, and scattered hunting, plucking, and lookout perches such as shrubs and fence posts. In California, such habitats include freshwater marshes, brackish and saltwater marshes, wet meadows, weedy borders of lakes, rivers and streams, annual and perennial grasslands, vernal pool complexes, weed fields, ungrazed or lightly grazed pastures, low-growing crop fields, sagebrush flats, and desert sinks (Shuford and Gardali 2008). Northern harriers feed mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and rarely on fish (CWHR 2020).

Northern harriers nest on the ground, mostly at marsh edge of emergent wetlands or along rivers or lakes (CWHR 2020), and generally within patches of dense vegetation in undisturbed areas (Shuford and Gardali 2008). They may also nest in grasslands, grain fields, or on sagebrush flats several miles from water. Nests are built of large mounds of sticks on wet areas, and a smaller cup of grasses on dry sites. Breeding occurs from April to September, with peak activity occurring June through July. Single clutches are produced annually. The nestling period lasts about 53 days (CWHR 2020).

**RANGE:** Northern harriers occur from sea level up to lodgepole pine and alpine meadow habitats. They can occur at elevations as high as 10,000 ft in the eastern Sierra Nevada mountains. Northern harriers

breed from sea level to 5,700 ft in the Central Valley and southern Sierra Nevada, and up to 3,600 ft in northeastern California. Northern harriers are a permanent resident of the northeastern Modoc plateau and coastal areas and a less common resident of the Central Valley (Shuford and Gardali 2008, CWHR 2020).

**KNOWN RECORDS:** There is one CNDDDB record for this species in the nine-quad area centered on the BSA. The record is approximately 4 mi northwest of the BSA. The record is based on an observation of an adult nesting pair and one nestling in a wheat field on 25 June 2015.

**HABITAT PRESENT IN THE BSA:** One northern harrier was observed foraging over the MDC and perching in trees located in the detention basin on 24 January 2020. The BSA does not provide suitable nesting habitat for Northern harrier. There are no marshes, rivers, or lakes present in the BSA. The MDC is narrow, deep, and regularly maintained, and does not provide suitable nesting habitat. The agricultural fields in the BSA are regularly disked and have been planted primarily with tomatoes, corn, and sunflower. The agricultural fields are not suitable for nesting. Agricultural and ruderal areas in the BSA provide suitable foraging habitat.

### **White-tailed kite (*Elanus leucurus*)**

**HABITAT AND BIOLOGY:** White-tailed kite is a CDFW Fully Protected species. White-tailed kites occur in herbaceous and open stages of most habitats in cismontane CA. Areas with substantial groves of dense, broad-leaved deciduous trees are used for nesting and roosting. They also roost in saltgrass and Bermuda grass in southern CA. White-tailed kites breed from February to October, with peak activity from May to August. Nests are typically located near the top of dense oak, willow, or other tree stands from 20 to 100 ft above the ground, and are often located near an open foraging area with a dense population of voles (CWHR 2020).

**RANGE:** White-tailed kites are a year-round resident of coastal and valley lowlands in cismontane CA; they are absent from higher elevations in the Sierra Nevada, the Modoc Plateau, and from most desert regions (CWHR 2020).

**KNOWN RECORDS:** There are ten CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is approximately 0.1 mi north of the BSA. The record is for two nesting trees (a cedar and an olive) in habitat consisting of agricultural fields of wheat, alfalfa, and safflower. The CNDDDB indicates that in 1999 all of the trees at the site were removed.

**HABITAT PRESENT IN THE BSA:** Fremont cottonwood trees in the detention basin and along the MDC provide marginal nesting habitat. Nesting habitat is considered marginal because the trees are young and isolated. Just north of the BSA and east of the BSA are groves of eucalyptus trees that could serve as nesting habitat. Riparian willows and cottonwoods present in the Railroad Channel south of the Stormwater BSA, and in the Yolo Bypass east of the Stormwater BSA, provide suitable nesting habitat. Agricultural and ruderal areas in the BSA provide foraging habitat.

**DISCUSSION:** White-tailed kites were observed perched in the cottonwoods in the detention basin or flying over in the BSA on both 7 October and 10 December 2014. Nesting sites are of concern to CDFW (2019a). During their breeding season, white-tailed kites could nest in the Fremont cottonwood trees in the BSA, in the eucalyptus groves located east and north of the site, or in the riparian willows and cottonwoods located to the south and east of the Stormwater BSA. Trees in the BSA are unlikely to be used because they are young and isolated and because there are larger trees nearby.

## **Song Sparrow--Modesto Population (*Melospiza melodia*)**

**HABITAT AND BIOLOGY:** The Modesto song sparrow is a year-round resident that prefers emergent freshwater marshes dominated by tules and cattails as well as riparian willow thickets. Modesto song sparrows also nest in riparian forests of valley oak with sufficient understory of blackberry, along vegetated irrigation canals and levees (Shuford and Gardali 2008). Seeds are the most important foods in annual diet, but insects, spiders, other small invertebrates, make up almost half of diet in nesting season. Berries and other small fruits are minor foods. Usually forages on ground or in low vegetation, under cover of dense thickets or wetland vegetation. Sometimes forages a short distance from cover (CWHR 2020).

**RANGE:** The Modesto song sparrow is restricted to California where it is locally numerous in the Sacramento Valley, Sacramento-San Joaquin River Delta, and the northern San Joaquin Valley. The Modesto song sparrow remains locally numerous in areas where extensive wetlands remain. The highest densities occur in the Butte Sink area of the Sacramento Valley and in the Sacramento-San Joaquin River Delta. Immediately adjacent to the Butte Sink, song sparrows breed in sparsely vegetated irrigation canals, yet are almost entirely absent from the main stem and tributaries of the Sacramento River above Sacramento (Shuford and Gardali 2008).

**KNOWN RECORDS:** There are nine CNDDDB records of this species in the nine-quad area centered on the BSA. The closest record is approximately 5 mi east of the BSA. A nest was observed in 1877. Eggs were collected in 1900 from “wheat at edge of field, a few feet from brush and willows along a canal.”

**HABITAT PRESENT IN THE BSA:** Marginal nesting habitat for this species occurs in the MDC. Nesting habitat is considered marginal due to regular vegetation removal and the relatively small width of the MDC. Agricultural and ruderal areas in the BSA provide marginal foraging habitat. Foraging habitat is considered marginal because there is little vegetation cover.

**DISCUSSION:** Modesto song sparrow was not observed during biological surveys. Nesting is not expected in the BSA since the only potential nesting habitat, the MDC, is regularly cleared of emergent wetland vegetation and may not provide sufficient cover for nesting.

## **Migratory Birds and Birds of Prey**

Fish and Game Code 3503.5 protects all birds in the orders Falconiformes and Strigiformes (collectively known as birds of prey). Birds of prey include raptors, falcons, and owls. Migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10 including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). All migratory bird species are protected by the MBTA. Any disturbance that causes direct injury, death, nest abandonment, or forced fledging of migratory birds, is restricted under the MBTA. Any removal of active nests during the breeding season or any disturbance that results in the abandonment of nestlings is considered a ‘take’ of the species under federal law.

**HABITAT PRESENT IN THE BSA:** The BSA provides nesting and foraging habitat for birds of prey and other protected migratory birds.

**DISCUSSION:** No potential raptor nests were observed in the BSA during biological surveys. It is unlikely that raptors would nest in the isolated, young trees in the BSA. Groves of mature eucalyptus



trees occur adjacent to the Project to the east and north and provide potential nesting habitat for raptors. Migratory birds could nest in the trees, the MDC, ruderal vegetation, and on disturbed ground in or adjacent to the BSA. One small, inactive cup nest was observed in the MDC on 10 December 2014, most likely that of a red-winged blackbird (*Agelaius phoeniceus*). Occupied burrowing owl burrows are discussed separately in the burrowing owl discussion. Bird species observed in or soaring above the BSA are listed in Appendix A.

## 4. Mammals

### Protected and Locally Important Bats

Documented occurrences of bat species within the nine quads surrounding the BSA include hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), pallid bat (*Antrozous pallidus*), and Mexican free-tailed bat (*Tadarida brasiliensis*) (CDFW 2020; Ding 2019; STE 2018). None of the bats known from the region are listed under the state or federal endangered species acts. Of the four bat species mentioned above, only the pallid bat is designated as a Species of Special Concern by the CDFW (2019a). A large local population of Mexican free-tailed bats with an estimated 250,000 individuals is known to roost in the I-80 freeway overpass in the Yolo Bypass.

**HABITAT PRESENT IN THE BSA:** The BSA provides suitable foraging habitat for pallid bat and other locally important bats. Due to the lack of caves, crevices, mines, buildings, and large and/or hollow trees, the BSA does not provide suitable roosting habitat for any bat species (see also the evaluation of pallid bat in Appendix E).

**DISCUSSION:** No bats or potential bat roosts were observed in the BSA. Bats known to occur in the region would be expected to forage in and over the BSA during summer evenings, when conditions are appropriate (i.e., warm and calm). The foraging habitat in the BSA is marginal and of minor extent when compared to the quality and extent of foraging habitat available in the greater region in and surrounding the Yolo Bypass. The area surrounding the Project provides several hundred thousand acres of similar bat foraging habitat over agricultural fields.

Based on the foraging ranges of bats known from the region (e.g., 1 to 6 mi for pallid bat, CWHR 2020, Gervais 2016; and 25 to 30 mi for Mexican free-tailed and hoary bats, CWHR 2020, Bassett 1982, BCI 2020), and the availability of foraging habitat in the surrounding landscape, the Project will not significantly reduce available foraging habitat or food resources for protected or locally important bats.

### D. Evaluation of Special-Status Plant Species

No State or federal listed special-status plant species were observed in the BSA during protocol botanical surveys conducted in 2015 and 2019. One CNPS California Rare Plant Rank 4.2 plant species was observed in the BSA (Parry's rough tarplant, *Centromadia parryi* ssp. *rudis*, near Ikeda's Market). Parry's rough tarplant and other special-status plant species with potential to occur are discussed below. The location of the Parry's rough tarplants observed in the BSA are shown on Figure 4.

**Ferris' milk vetch (*Astragalus tener* var. *ferrisiae*)**

**HABITAT AND BIOLOGY:** Annual herb found in vernal mesic meadows and seeps and subalkaline flats in Valley and foothill grassland from 7 to 250 ft (CNPS 2020). Blooms March through June (Jepson eFlora 2020; CNPS 2020).

**RANGE:** Endemic to California. Known from Butte, Colusa, Glenn, Sutter, and Yolo counties. Presumed extirpated from Solano County (CNPS 2020).

**KNOWN RECORDS:** There are four CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1954 and is located approximately 2.5 mi east of the BSA.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Ferris' milk vetch was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

**Alkali milk vetch (*Astragalus tener* var. *tener*)**

**HABITAT AND BIOLOGY:** Annual herb found in alkaline conditions of playas, adobe clay Valley and foothill grassland, and vernal pools from 3 to 200 ft. Blooms March through June (Jepson eFlora 2020; CNPS 2020).

**RANGE:** Endemic to California. Known from Alameda, Merced, Napa, Solano, and Yolo counties (CNPS 2020).

**KNOWN RECORDS:** There are ten CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1951 and is located approximately 1.8 mi west of the BSA. The exact location of this record is unknown. The location is described as "1.1 mi north of Davis." Surveys in 2002 and 2006 found no plants and no natural habitat. CNDDDB considers this occurrence probably extirpated.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Alkali milk vetch was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

**Heartscale (*Atriplex cordulata* var. *cordulata*)**

**HABITAT AND BIOLOGY:** Annual herb found in saline or alkaline conditions of chenopod scrub, meadows and seeps, and sandy Valley and foothill grassland from 3 to 1,850 ft. Blooms April through October (CNPS 2020); June through July (Jepson eFlora 2020).

**RANGE:** Endemic to California. Known from Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Madera, Merced, Solano, and Tulare counties. Presumed extirpated from San Joaquin, Stanislaus, and Yolo counties (CNPS 2020).

**KNOWN RECORDS:** There is one CNDDDB record for this species in the nine-quad area centered on the BSA. This record is from 1952 and is located approximately 1.7 mi west of the BSA. CNDDDB considers this occurrence extirpated.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Heartscale was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

**Brittlescale (*Atriplex depressa*)**

**HABITAT AND BIOLOGY:** Annual herb found in alkaline and clay soils of chenopod scrub, meadows and seeps, playas, Valley and foothill grassland, and vernal pools from 3 to 1,050 ft. Blooms April through October (CNPS 2020); June through October (Jepson eFlora 2020).

**RANGE:** Endemic to California. Known from Alameda, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Solano, Stanislaus, Tulare, and Yolo counties (CNPS 2020).

**KNOWN RECORDS:** There are five CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1996 and is located approximately 2.4 mi west of the BSA. An estimated 70 plants were observed in 1996, in habitat described as highly disturbed (plowed) alkali sink with *Hemizonia pungens*, *Atriplex argentea* ssp. *mohavensis*, *A. joaquinana*, *Spergularia* sp., and *Hordeum depressum*.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Brittlescale was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

**Bristly sedge (*Carex comosa*)**

**HABITAT AND BIOLOGY:** Perennial rhizomatous herb found in coastal prairie, Valley and foothill grassland, and in marshes and swamps along lake margins from 0 to 2,051 ft. Blooms May through September (CNPS 2020); July through September (Jepson eFlora 2020).

**RANGE:** Known from Contra Costa, Lake, Mendocino, Sacramento, Santa Cruz, Shasta, San Joaquin, and Sonoma counties (CNPS 2020).

**KNOWN RECORDS:** There is one CNDDDB record for this species in the nine-quad area centered on the BSA. The record is from 2009, approximately 15.7 mi southeast of the BSA. The record is for 54 plants observed in riparian habitat.

**HABITAT PRESENT IN THE BSA:** The MDC provides marginal habitat for this species. Habitat is considered marginal due to vegetation maintenance.

**DISCUSSION:** Bristly sedge was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

**Pappose tarplant (*Centromadia parryi* ssp. *parryi*)**

**HABITAT AND BIOLOGY:** Annual herb found in chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, and vernal mesic valley and foothill grassland from 7 to 1,380 ft. Often found in alkaline conditions (CNPS 2020). Blooms from May through November (CNPS 2020); June through October (Jepson eFlora 2020).

**RANGE:** Endemic to California. Known from Butte, Colusa, Glenn, Lake, Napa, San Mateo, Solano, Sonoma, and Yolo counties (CNPS 2020).

**KNOWN RECORDS:** There are two CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 2011, approximately 2.3 mi east of the BSA.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous and ongoing soil disturbance.

**DISCUSSION:** Pappose tarplant was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **Parry's rough tarplant (*Centromadia parryi* ssp. *rudis*)**

**HABITAT AND BIOLOGY:** Annual herb found in alkaline, vernal mesic seeps in Valley and foothill grassland, vernal pools, and sometimes along roadsides from 0 to 328 ft (CNPS 2020). Blooms May through October (CNPS 2020); June through October (Jepson eFlora 2020).

**RANGE:** Endemic to California. Known from Butte, Colusa, Glenn, Lake, Merced, Sacramento, San Joaquin, Solano, Sutter and Yolo counties. (CNPS 2020).

**KNOWN RECORDS:** CNDDDB has no geographical record information available for this species. The Consortium of California Herbaria has specimen records for 11 Parry's rough tarplant specimens collected within 5 mi of the BSA; 25 specimens collected in the Davis-Vacaville-Woodland area; and approximately 105 specimens from the Central Valley from Chico to Merced (CCH 2020).

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and in areas with ruderal vegetation outside tilled fields. Habitat is considered marginal because of previous and ongoing soil disturbance.

**DISCUSSION:** A total of 93 Parry's rough tarplant (*Centromadia parryi* ssp. *rudis*) plants were documented in the BSA during the 11 September 2015 botanical survey (Sycamore Environmental 2015f; plant locations shown on Figure 4). These plants were verified as still present in approximately the same abundance during the botanical survey conducted on 7 August 2019. Eighty-seven (87) of the Parry's rough tarplant plants were found near the parking area of Ikeda's market. Two (2) of the plants were found along the south side of County Road 32. Four (4) of the plants were found on the east side of the irrigation ditch along the eastern edge of the site, approximately 700 ft north of the Eucalyptus grove. Parry's rough tarplant is a CNPS California Rare Plant Rank 4.2 species (a watch list species of limited distribution; CNPS 2020). CNPS Rank 4.2 species may be considered under CEQA at the Lead Agency's discretion. Based on herbarium specimen records (see known records discussion above), this species is not especially uncommon locally or regionally (CCH 2020). The Parry's rough tarplant individuals observed in the BSA are not at the periphery of the taxon's range. Sycamore Environmental botanists have encountered this taxon on many disturbed/agricultural sites in the Central Valley within the last 10 years. The Parry's rough tarplant individuals observed in the BSA did not exhibit unusual morphology and they were not observed on unusual substrate. The Parry's rough tarplant observed in the BSA does not meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) or §15380.

### **Jepson's coyote thistle (*Eryngium jepsonii*)**

**HABITAT AND BIOLOGY:** Perennial herb found on clay soils in Valley and foothill grasslands and vernal pools from 9 to 985 ft. Blooms April through August (Jepson eFlora 2020; CNPS 2020).

**RANGE:** Endemic to California. Known from Alameda, Amador, Calaveras, Contra Costa, Fresno, Napa, San Mateo, Solano, Stanislaus, Tuolumne, and Yolo counties (CNPS 2020).

**KNOWN RECORDS:** There are two CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 2007 and is located approximately 8 mi south of the BSA.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Jepson's coyote thistle was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **San Joaquin spearscale (*Extriplex joaquinana*)**

**HABITAT AND BIOLOGY:** Annual herb found in alkaline soils in chenopod scrub, meadows and seeps, playas, and Valley and foothill grassland from 3 to 2,750 ft. Blooms April through September (Jepson eFlora 2019); April through October (CNPS 2020).

**RANGE:** Endemic to California. Known from Alameda, Contra Costa, Colusa, Fresno, Glenn, Merced, Monterey, Napa, San Benito, Solano, Yolo and possibly San Luis Obispo counties. (CNPS 2020).

**KNOWN RECORDS:** There are nine CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1996 and is located approximately 2.4 mi west of the BSA. The record is for an estimated 85 plants observed in disturbed (plowed) alkali sink habitat with *Hemizonia pungens*, *Atriplex argentea* ssp. *mohavensis*, *A. joaquiniana*, *Spergularia* sp., and *Hordeum depressum*.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** San Joaquin spearscale was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **Hogwallow starfish (*Hesperex caulescens*)**

**HABITAT AND BIOLOGY:** Annual herb found in Valley and foothill grassland in mesic and clay soils and in shallow vernal pools from 0 to 1,650 ft. Blooms March through June (Jepson eFlora 2020; CNPS 2020).

**RANGE:** Endemic to California. Known from Alameda, Amador, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Monterey, Sacramento, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama, and Yolo counties. (CNPS 2020).

**KNOWN RECORDS:** CNDDDB has no geographical record information available for this species. The Consortium of California Herbaria shows approximately 12 hogwallow starfish specimens collected in the Davis-Vacaville-Woodland area (CCH 2020). The closest herbarium record is from 1962, approximately 7 mi southwest of the BSA. The plants were collected from a vernal pool in a valley grassland barley field.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Hogwallow starfish was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **Woolly rose-mallow (*Hibiscus lasiocarpus* var. *occidentalis*)**

**HABITAT AND BIOLOGY:** Perennial rhizomatous herb found in freshwater marshes and swamps from 0 to 394 ft. Often found on river banks, low peat islands in sloughs, or in riprap on sides of levees. Blooms June through September (CNPS 2020); July through November (Jepson eFlora 2020).

**RANGE:** Endemic to California. Known from Butte, Contra Costa, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties. (CNPS 2020).

**KNOWN RECORDS:** There are seven CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1996 and is located approximately 7.2 mi northeast of the BSA. The record is for a single shrub observed on the bank of a canal, along the edge of the water.

**HABITAT PRESENT IN THE BSA:** The MDC provides marginal habitat for this species. Habitat is considered marginal due to vegetation maintenance.

**DISCUSSION:** Woolly rose-mallow was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **Heckard's pepper-grass (*Lepidium latipes* var. *heckardii*)**

**HABITAT AND BIOLOGY:** Annual herb found in alkaline flats of valley and foothill grassland from 6 to 660 ft. Blooms March through May (CNPS 2020); March through June (Jepson eFlora 2020).

*Lepidium latipes* var. *heckardii* is no longer recognized as distinct from the common *Lepidium latipes* var. *latipes* in the *The Jepson manual: Vascular plants of California, 2nd edition* (Al-Shehbaz 2012).

**RANGE:** Endemic to California. Known from Glenn, Merced, Sacramento, Solano, and Yolo counties. (CNPS 2020).

**KNOWN RECORDS:** There are six CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 1957 and is located approximately 1.3 mi northwest of the BSA. The exact location of this record is unknown, and mapped as a best guess by CNDDDB 3 mi northeast of Davis. The habitat is described as alkaline flats.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Heckard's pepper-grass was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **Suisun Marsh aster (*Symphotrichum lentum*)**

**HABITAT AND BIOLOGY:** Perennial rhizomatous herb found in brackish and freshwater marshes and swamps from 0 to 10 ft. Blooms April through November (CNPS 2020); May through November (Jepson eFlora 2020).

**RANGE:** Endemic to California. Known from Contra Costa, Napa, Sacramento, San Joaquin, Solano, and Yolo counties. (CNPS 2020).

**KNOWN RECORDS:** There is one CNDDDB record for this species in the nine-quad area centered on the BSA. The record is from 2013 and is located approximately 4.5 mi east of the BSA.

**HABITAT PRESENT IN THE BSA:** The MDC provides marginal habitat for this species. Habitat is considered marginal due to vegetation maintenance.

**DISCUSSION:** Suisun marsh aster was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

### **Saline clover (*Trifolium hydrophilum*)**

**HABITAT AND BIOLOGY:** Annual herb found in marshes, mesic and alkaline soils of Valley and foothill grassland, and vernal pools from 0 to 985 ft. Blooms April through June (Jepson eFlora 2020; CNPS 2020).

**RANGE:** Endemic to California. Known from Alameda, Contra Costa, Lake, Monterey, Napa, Sacramento, San Benito, Santa Clara, Santa Cruz, San Joaquin, San Luis Obispo, San Mateo, Solano, Sonoma, and Yolo counties, and potentially from Colusa County. (CNPS 2020).

**KNOWN RECORDS:** There are three CNDDDB records for this species in the nine-quad area centered on the BSA. The closest record is from 2011, approximately 5.1 mi northwest of the BSA. The record is for five plants observed growing in hydric alkaline grassland on the edge of vernal pool habitat with *Plagiobothrys stipitatus*, *Hordeum brachyantherum*, *H. marinum*, and *Festuca perennis*.

**HABITAT PRESENT IN THE BSA:** Marginal habitat for this species occurs in the detention basin and along the fallow margins of agricultural fields. Habitat is considered marginal because of previous soil disturbance and because the detention basin may not be sufficiently mesic/alkaline.

**DISCUSSION:** Saline clover was not observed in the BSA during botanical surveys conducted during the evident and identifiable period.

## E. Evaluation of Special-Status Natural Communities

Special-status natural communities are waters, wetlands, riparian communities, and any natural community or vegetation alliance ranked S1, S2, or S3 by CDFW (2019c). Special-status communities may also include those considered locally important or sensitive. The MDC contains freshwater marsh vegetation (bulrush cattail wetland with *Typha* alliance), a special-status natural community. Freshwater marsh vegetation does not occur in the portion of the MDC located between the MRIC site and Road 105. Vegetation in the MDC is regularly removed by the City. The MDC is discussed in Section IV.C. In the southeast corner of the Stormwater BSA, the southernmost portion of an irrigation ditch contains bulrush cattail wetland.

## F. Potentially Jurisdictional Waters

Fieldwork for a wetland delineation was conducted on 10 December 2014 and a wetland delineation report has been prepared. Based on the wetland delineation report, no Clean Water Act jurisdictional wetlands or waters are present in the BSA. The detention basin is not a wetland. The MDC is not a Clean Water Act jurisdictional water. Roadside ditches roughly 1-2 ft wide occur along Mace Blvd, along Road 32A, along the Davis Park and Ride driveway, and a dirt road between the Davis Park and Ride and Ikeda's Market. Irrigation ditches roughly 1-2 ft wide occur along the east side of the MRIC site, north of the MDC, and along both sides of Road 105. The roadside and irrigation ditches are man-made features excavated in uplands and draining only uplands. They are not jurisdictional waters. Vegetation in the roadside and irrigation ditches is ruderal (described in Section IV.C.2).

In the Stormwater BSA, the southernmost portion of an irrigation ditch contains bulrush cattail wetland vegetation. This portion of the irrigation ditch may become inundated for extended periods if water backs up in the Railroad Channel located south of the Stormwater BSA. The portion of the irrigation ditch with wetland vegetation is shown on Figure 4 (sheet 2), and is potentially jurisdictional under the Clean Water Act.

## G. Evaluation of Trees

An arborist survey and tree appraisal consistent with City of Davis Municipal Code was conducted by certified arborist Chuck Hughes, M.S. (ISA WE-6885A; ISA Tree Risk Assessment Qualified) on 23

December 2014 (Sycamore Environmental 2015a). The City of Davis requires permits for the removal of some species and sizes of trees pursuant to Chapter 37 of Davis Municipal Code. The term “protected tree” (§37.01) includes City trees and street trees on City land, easements, or right-of-way, as well as some trees that may occur outside of public easements on private land including trees of significance and landmark trees. The Code contains a list of trees which are considered “trees of significance.” Table 5 identifies the potentially affected protected trees that occur on the ARC site based on the certified arborist report (Sycamore Environmental 2015a). Trees in the parking lot of the park-and-ride near Mace Blvd are not included.

Table 5. Summary of Potentially Affected Trees.

<b>Tree</b>	<b>Species</b>	<b>Location</b>	<b>Diameter at breast height (DBH) in inches <sup>1</sup></b>	<b>City Status</b>
1	London plane ( <i>Platanus x acerifolia</i> )	Adjacent to Mace Drainage Channel	7	Tree of Significance
2	London plane ( <i>Platanus x acerifolia</i> )	Adjacent to Mace Drainage Channel	4.6	--
3	Fremont cottonwood ( <i>Populus fremontii</i> ssp. <i>fremontii</i> )	Detention Basin	15.3, 23.5, 8.6	Tree of Significance
4	Fremont cottonwood ( <i>Populus fremontii</i> ssp. <i>fremontii</i> )	Detention Basin	24.8	Tree of Significance
5	Fremont cottonwood ( <i>Populus fremontii</i> ssp. <i>fremontii</i> )	Detention Basin	8.4, 9.5, 9.7, 16.2	Tree of Significance
6	Goodding’s black willow ( <i>Salix gooddingii</i> )	Adjacent to Mace Drainage Channel	9.2, 5.7	Tree of Significance
7	Fremont cottonwood ( <i>Populus fremontii</i> ssp. <i>fremontii</i> )	Adjacent to Mace Drainage Channel	16.2	Tree of Significance
8	Chinese elm ( <i>Ulmus parvifolia</i> )	Along Mace Blvd	6, 6.3, 7	Tree of Significance Street Tree

<sup>1</sup> The DBH for each trunk of a multi-trunk tree are listed.

As a discretionary project, this project requires a permit for the removal of the trees of significance pursuant to Davis Municipal Code (§37.03.070). There are no landmark trees on the ARC site.



## VI. LITERATURE CITED & PERSONAL COMMUNICATIONS

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## **B. Personal Communications**

Dan Ramos, Vice President, Ramco Enterprises, Inc. 7 October 2014. Onsite interview regarding off-site improvements, agricultural history, detention basin history and use, and drainage feature.

## VII. PREPARERS

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**Jeffery Little, Vice President.** Principal with over 27 years experience working with environmental review, permitting, biological, and cultural issues. Mr. Little serves as project manager during all phases of project development. He evaluates environmental and regulatory constraints to assist his clients determine realistic schedules of permits and entitlements. He prepares and manages CEQA/ NEPA documents and identifies the necessary technical studies during project evaluation. He develops project design recommendations to achieve regulatory compliance with the numerous applicable local, state, and federal environmental laws and regulations.

Responsibilities: Principal-in-Charge

**Michael Bower, M.S.,** Ecology, University of California, Davis, CA. Over 10 years of experience as a biologist/ botanist with Sycamore Environmental. Mr. Bower serves as both field biologist and technical report writer. He conducts wetland delineations and surveys for special-status plants and wildlife. He prepares reports used in CEQA/NEPA that quantify resources, identify impacts, and recommend mitigation measures. He prepares restoration, weed management, and monitoring plans. He is a certified Ecologist and Professional Wetland Scientist (#2230).

Responsibilities: Biological, botanical, wetland, burrowing owl survey fieldwork, report preparation, and plant identification.

**Juan Mejia, B.S.,** Environmental Science and Management (emphasis Ecology, Conservation and Biodiversity), University of California, Davis, CA. Over 6 years of experience as a biologist. Mr. Mejia serves as both field biologist and technical report writer. He conducts plant and wildlife surveys, performs preconstruction and construction monitoring, and prepares biological resource evaluations and permit applications.

Responsibilities: Biological, botanical, wetland, burrowing owl survey fieldwork.

**Monica Coll, B.A.,** Environmental Science and Conservation Biology, Clark University, Worcester, MA. Two years experience as a biologist. Her background is in conservation biology and a range of experience from project management assistance to wildlife biology fieldwork. Ms. Coll serves as both field biologist and technical report writer. She conducts preconstruction and construction monitoring, assists with plant and wildlife surveys, and assists with wetland delineations and biological resource evaluations.

Responsibilities: Report preparation

**Aramis Respoll, GIS Analyst/ CAD Operator.** Over 20 years experience in drafting and spatial analysis using AutoCAD map and ArcGIS for public and private projects. He prepares figures for biological and permitting documents. Mr. Respoll provides geospatial analysis and support for projects involving geodesy, hydrology, watershed studies, project impact and mitigation analyses, listed species, and designated critical habitat.

Responsibilities: Figure preparation, spatial analysis

**Cynthia Little,** Principal, Sycamore Environmental.

Responsibilities: Senior editor, quality control.

## **APPENDIX A.**

### Plant and Wildlife Species Observed

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Plant and Wildlife Species Observed

*Note: This list of species is cumulative. It includes species observed on the Project site during all biological and botanical surveys conducted by Sycamore Environmental 2015-2020)*

Plant Species Observed. Taxonomy follows Baldwin et al. (2012).

Family	Scientific Name	Common Name	N/I <sup>1</sup>	Cal-IPC <sup>2</sup>
<b>FERNS</b>				
Azollaceae	<i>Azolla filiculoides</i>	Mosquito fern	N	
<b>EUDICOTS</b>				
Adoxaceae	<i>Sambucus nigra</i> ssp. <i>caerulea</i>	Blue elderberry	N	
Amaranthaceae	<i>Amaranthus albus</i>	Tumbleweed	I	
	<i>Amaranthus blitoides</i>	Procumbent pigweed	N	
	<i>Amaranthus retroflexus</i>	Redroot pigweed	I	
Anacardiaceae	<i>Pistacia chinensis</i> <sup>3</sup>	Chinese pistache	I	
Apiaceae	<i>Ammi visnaga</i>	Bisnaga	I	
	<i>Anethum graveolens</i>	Dill	I	
	<i>Conium maculatum</i>	Poison hemlock	I	Moderate
	<i>Daucus carota</i>	Carrot, Queen Anne's lace	I	
	<i>Torilis arvensis</i>	Tall sock-destroyer	I	Moderate
Apocynaceae	<i>Asclepias fascicularis</i>	Narrow-leaf milkweed	N	
	<i>Nerium oleander</i> <sup>3</sup>	Common oleander	I	
Asteraceae	<i>Anthemis cotula</i>	Mayweed	I	
	<i>Baccharis pilularis</i>	Coyote brush	N	
	<i>Carduus pycnocephalus</i> ssp. <i>pycnocephalus</i>	Italian thistle	I	Moderate
	<i>Carthamus tinctorium</i> <sup>3</sup>	Safflower	I	
	<i>Centaurea solstitialis</i>	Yellow star-thistle	I	High
	<i>Centromadia parryi</i> ssp. <i>rudis</i>	Parry's rough tarplant	N	
	<i>Centromadia pungens</i> ssp. <i>pungens</i>	Common spikeweed	N	
	<i>Cichorium intybus</i>	Chicory	I	
	<i>Cirsium vulgare</i>	Bull thistle	I	Moderate
	<i>Dittrichia graveolens</i>	Stinkwort	I	Moderate
	<i>Erigeron bonariensis</i>	Flax-leaved horseweed	I	
	<i>Erigeron canadensis</i>	Horseweed	N	
	<i>Grindelia</i> sp.	Gumplant	--	
	<i>Helianthus</i> sp. (crop)	Sunflower	--	
	<i>Helianthus annuus</i>	Sunflower	N	
	<i>Heterotheca grandiflora</i>	Telegraph weed	N	
	<i>Helminthotheca echioides</i>	Bristly ox-tongue	I	Limited
	<i>Hypochaeris glabra</i>	Smooth cat's-ear	I	Limited
	<i>Lactuca saligna</i>	Lettuce	I	
	<i>Lactuca serriola</i>	Prickly lettuce	I	
	<i>Leontodon saxatilis</i>	Hairy hawkbit	I	
	<i>Matricaria discoidea</i>	Pineapple weed, rayless chamomile	I	
	<i>Senecio vulgaris</i>	Common groundsel	I	
	<i>Silybum marianum</i>	Milk thistle	I	Limited
	<i>Sonchus asper</i> ssp. <i>asper</i>	Prickly sow thistle	I	



	<i>Sonchus oleraceus</i>	Common sow thistle	I	
	<i>Symphotrichum subulatum</i>	Annual saltmarsh aster	--	
	<i>Tragopogon porrifolius</i>	Salsify, oyster plant	I	
	<i>Xanthium strumarium</i>	Cocklebur	N	
Bignoniaceae	<i>Catalpa bignonioides</i>	Southern catalpa	I	
Boraginaceae	<i>Heliotropium curassavicum</i> var. <i>oculatum</i>	Seaside heliotrope, alkali heliotrope	N	
	<i>Amsinckia menziesii</i>	Common fiddleneck, small-flowered fiddleneck	N	
	<i>Plagiobothrys</i> sp.	Popcornflower	N	
Brassicaceae	<i>Brassica nigra</i>	Black mustard	I	Moderate
	<i>Capsella bursa-pastoris</i>	Shepherd's purse	I	
	<i>Cardamine oligosperma</i>	Bitter-cress	N	
	<i>Hirschfeldia incana</i>	Perennial, shortpod, or summer mustard	I	Moderate
	<i>Raphanus sativus</i>	Radish	I	Limited
	<i>Lepidium latifolium</i>	Perennial pepperweed	I	High
Cannabaceae	<i>Celtis</i> sp. <sup>3</sup>	Hackberry	I	
Caryophyllaceae	<i>Spergularia rubra</i>	Red sand-spurrey	I	
Chenopodiaceae	<i>Atriplex prostrata</i>	Fat-hen	I	
	<i>Atriplex</i> sp. <sup>4</sup>	Saltbush, orach	--	
	<i>Chenopodium album</i>	Lamb's quarters	I	
	<i>Salsola tragus</i>	Russian thistle, tumbleweed	I	Limited
Convolvulaceae	<i>Convolvulus arvensis</i>	Bindweed, orchard morning-glory	I	
	<i>Cressa truxillensis</i>	Alkali weed	N	
Ericaceae	<i>Arctostaphylos</i> sp. <sup>3</sup>	Manzanita	N	
Euphorbiaceae	<i>Chamaesyce maculata</i>	Spotted spurge	I	
	<i>Chamaesyce serpens</i>	Prostrate spurge	I	
	<i>Croton setigerus</i>	Turkey-mullein	N	
	<i>Triadica sebifera</i>	Chinese tallowtree	I	Moderate
Fabaceae	<i>Acmispon americanus</i> var. <i>americanus</i>	Deervetch, deerweed	N	
	<i>Medicago polymorpha</i>	California burclover	I	Limited
	<i>Medicago sativa</i>	Alfalfa	I	
	<i>Melilotus albus</i>	White sweetclover	I	
	<i>Melilotus indicus</i>	Sourclover	I	
	<i>Prosopis</i> sp.	Mesquite	--	
	<i>Trifolium</i> sp. (growing in disturbed upland; likely <i>T. subterraneum</i> )	Clover	--	
	<i>Trifolium hirtum</i>	Rose clover	I	Limited
	<i>Vicia sativa</i>	Vetch	I	
	<i>Vicia villosa</i> ssp. <i>villosa</i>	Hairy vetch, winter vetch	I	
Fagaceae	<i>Quercus agrifolia</i> <sup>3</sup>	Coast live oak, encina	N	
	<i>Quercus lobata</i>	Valley oak, roble	N	
	<i>Quercus suber</i> <sup>3</sup>	Cork oak	I	
Frankeniaceae	<i>Frankenia salina</i>	Alkali heath	N	
Geraniaceae	<i>Erodium cicutarium</i>	Redstem filaree	I	Limited
	<i>Erodium botrys</i>	Storksbill, filaree	I	
	<i>Erodium moschatum</i>	Greenstem filaree	I	
	<i>Geranium dissectum</i>	Cranesbill, geranium	I	Limited

	<i>Geranium molle</i>	Cranesbill, geranium	I	
Lamiaceae	<i>Lavandula</i> sp. <sup>3</sup>	Lavender	I	
	<i>Rosmarinus</i> sp. <sup>3</sup>	Rosemary	I	
Lythraceae	<i>Lythrum hyssopifolia</i>	Loosestrife	I	Limited
	<i>Lagerstroemia</i> sp.	Crapemyrtle	I	
Malvaceae	<i>Abutilon theophrasti</i>	Velvet-leaf	I	
	<i>Malva nicaeensis</i>	Bull mallow	I	
	<i>Malva parviflora</i>	Cheeseweed, little mallow	I	
	<i>Malvella leprosa</i>	Alkali-mallow, white-weed	N	
Martyniaceae	<i>Proboscidea lutea</i>	Unicorn-plant	I	
Oleaceae	<i>Fraxinus latifolia</i>	Oregon ash	N	
Onagraceae	<i>Epilobium ciliatum</i>	Willowherb	N	
Papaveraceae	<i>Eschscholzia californica</i>	California poppy	N	
Plantaginaceae	<i>Kickxia elatine</i>	Kickxia	I	
Platanaceae	<i>Platanus x acerifolia</i>	London plane tree	I	
	<i>Veronica</i> sp.	Speedwell, brooklime	--	
Polygonaceae	<i>Persicaria</i> sp.	Smartweed	--	
	<i>Polygonum aviculare</i> ssp. <i>depressum</i>	Knotweed, knotgrass	I	
	<i>Rumex crispus</i>	Curly dock	I	Limited
Portulacaceae	<i>Portulaca oleracea</i>	Purslane	I	
Rosaceae	<i>Malus</i> sp. (seedling)	Apple	I	
	<i>Heteromeles arbutifolia</i> <sup>3</sup>	Christmas berry, toyon	N	
	<i>Prunus</i> sp. <sup>3</sup>	Prunus	--	
	<i>Pyrus communis</i>	Common pear	I	
	<i>Rubus armeniacus</i>	Himalayan blackberry	I	High
Rubiaceae	<i>Galium aparine</i>	Goose grass	N	
Salicaceae	<i>Populus fremontii</i> ssp. <i>fremontii</i>	Freemont cottonwood	N	
	<i>Salix gooddingii</i>	Goodding's black willow	N	
Solanaceae	<i>Datura wrightii</i>	Jimson weed	N	
	<i>Lycopersicon</i> sp. <sup>3</sup>	Tomato	I	
	<i>Solanum nigrum</i>	Black nightshade	I	
	<i>Solanum</i> sp.	Nightshade	--	
Tamaricaceae	<i>Tamarix</i> sp. (likely <i>parviflora</i> or <i>ramosissima</i> )	Tamarisk, saltcedar	I	High
Ulmaceae	<i>Ulmus parvifolia</i>	Chinese elm	I	
	<i>Zelkova</i> sp. <sup>3</sup>	Zelkova	I	
Zygophyllaceae	<i>Tribulus terrestris</i>	Puncture vine, caltrop	I	
<b>MONOCOTS</b>				
Araceae	<i>Lemna</i> sp.	Duckweed	N	
Arecaceae	<i>Phoenix</i> sp. (fan palm seedlings)	Palm	I	
Asparagaceae	<i>Asparagus</i> sp.	Asparagus	I	
Cyperaceae	<i>Cyperus eragrostis</i>	Nutsedge	N	
	<i>Schoenoplectus acutus</i> var. <i>occidentalis</i>	Common tule	N	
Poaceae	<i>Avena fatua</i>	Wild oat	I	Moderate
	<i>Avena barbata</i>	Slender wild oat	I	Moderate
	<i>Bromus diandrus</i>	Rippgut grass	I	Moderate
	<i>Bromus hordeaceus</i>	Soft chess	I	Moderate
	<i>Crypsis</i> sp.	Prickle grass	I	
	<i>Cynodon dactylon</i>	Bermuda grass	I	Moderate
	<i>Distichlis spicata</i>	Salt grass	N	
	<i>Elymus caput-medusae</i>	Medusa head	I	High

	<i>Elymus glaucus</i>	Blue or western wild-rye	N	
	<i>Elymus triticoides</i>	Beardless wild rye	N	
	<i>Festuca perennis</i>	Rye grass	I	Moderate
	<i>Festuca myuros</i>	Rattail sixweeks grass	I	Moderate
	<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley	I	Moderate
	<i>Hordeum murinum</i> ssp. <i>leporinum</i>	Hare barley	I	Moderate
	<i>Muhlenbergia rigens</i> <sup>3</sup>	Deer grass	N	
	<i>Phalaris</i> sp.	Canary grass	--	
	<i>Pennisetum</i> sp.	Fountain grass	I	
	<i>Polypogon monspeliensis</i>	Annual beard grass, rabbitfoot grass	I	Limited
	<i>Setaria</i> sp.	Bristle grass	--	
	<i>Sorghum halepense</i>	Johnson grass	I	
	<i>Stipa pulchra</i>	Purple needle grass	N	
	<i>Triticum aestivum</i>	Wheat, goat grass	I	
	<i>Zea mays</i> <sup>3</sup>	Corn	I	
Typhaceae	<i>Typha domingensis</i>	Southern cattail	N	

<sup>1</sup> N = Native to CA; I = Introduced.

<sup>2</sup> Degree of negative ecological impact (Cal-IPC 2019).

<sup>3</sup> Observed only as a horticultural planting or agricultural crop.

<sup>4</sup> Specimen could not be identified to species. Specimen was not *A. cordulata* ssp. *cordulata*, *A. depressa*, or *A. joaquinana* based on plant height, inflorescence, and fruit bract characteristics. Specimen observed in a recently tilled agricultural field and most likely a nonnative agricultural weed.

Wildlife Species Observed

COMMON NAME	SCIENTIFIC NAME
<b>BIRDS</b>	
American crow	<i>Corvus brachyrhynchos</i>
American goldfinch	<i>Spinus tristis</i>
American kestrel	<i>Falco sparverius</i>
Anna's hummingbird	<i>Calypte anna</i>
Black phoebe	<i>Sayornis nigricans</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Burrowing owl <sup>1</sup>	<i>Athene cunicularia</i>
Cattle egret	<i>Bubulcus ibis</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Common raven	<i>Corvus corax</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Eurasian collared dove	<i>Streptopelia decaocto</i>
European starling	<i>Sturnus vulgaris</i>
Great horned owl	<i>Bubo virginianus</i>
House finch	<i>Carpodacus mexicanus</i>
Killdeer	<i>Charadrius vociferus</i>
Mourning dove	<i>Zenaida macroura</i>
Northern flicker	<i>Colaptes auratus</i>
Northern harrier	<i>Circus hudsonius</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Rock dove	<i>Columbia livia</i>
Swainson's Hawk <sup>2</sup>	<i>Buteo swainsoni</i>
Tree swallow	<i>Tachycineta bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
Western meadowlark	<i>Sturnella neglecta</i>
Western kingbird	<i>Tyrannus verticalis</i>
Western tanager	<i>Piranga ludoviciana</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
White-tailed kite	<i>Elanus leucurus</i>
Yellow-billed magpie	<i>Pica nuttalli</i>
<b>FISH</b>	
Mosquitofish	<i>Gambusia affinis</i>
<b>REPTILES</b>	
Western fence lizard	<i>Sceloporus occidentalis</i>
<b>MAMMALS</b>	
California ground squirrel	<i>Otospermophilus beecheyi</i>
Coyote (sign)	<i>Canis latrans</i>
Jackrabbit	<i>Lepus californicus</i>

<sup>1</sup> See discussion for locations observed.

<sup>2</sup> Observed soaring overhead north of the site.

## **APPENDIX B.**

CNDDDB Summary Report  
CNPS Inventory Query  
(Davis and eight surrounding quads)

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# Summary Table Report

## California Department of Fish and Wildlife

### California Natural Diversity Database



**Query Criteria:** Quad<span style='color:Red'> IS </span>(Davis (3812156)<span style='color:Red'> OR </span>Woodland (3812167)<span style='color:Red'> OR </span>Grays Bend (3812166)<span style='color:Red'> OR </span>Taylor Monument (3812165)<span style='color:Red'> OR </span>Merritt (3812157)<span style='color:Red'> OR </span>Sacramento West (3812155)<span style='color:Red'> OR </span>Dixon (3812147)<span style='color:Red'> OR </span>Saxon (3812146)<span style='color:Red'> OR </span>Clarksburg (3812145))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Agelaius tricolor</i> tricolored blackbird	G2G3 S1S2	None Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	10 93	955 S:18	1	0	0	0	8	9	12	6	10	6	2
<i>Ambystoma californiense</i> California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	50 50	1231 S:2	0	0	0	0	1	1	2	0	1	0	1
<i>Ammodramus savannarum</i> grasshopper sparrow	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	25 240	27 S:2	0	1	1	0	0	0	0	2	2	0	0
<i>Antrozous pallidus</i> pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	50 70	420 S:2	0	0	0	0	0	2	2	0	2	0	0
<i>Archoplites interruptus</i> Sacramento perch	G2G3 S1	None None	AFS_TH-Threatened CDFW_SSC-Species of Special Concern	10 10	5 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Ardea alba</i> great egret	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	15 25	43 S:2	2	0	0	0	0	0	1	1	2	0	0
<i>Ardea herodias</i> great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	25 25	155 S:1	1	0	0	0	0	0	0	1	1	0	0
<i>Astragalus tener var. ferrisiae</i> Ferris' milk-vetch	G2T1 S1	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	15 15	18 S:4	1	0	0	0	0	3	3	1	4	0	0
<i>Astragalus tener var. tener</i> alkali milk-vetch	G2T1 S1	None None	Rare Plant Rank - 1B.2	15 50	65 S:10	1	4	0	0	5	0	5	5	5	4	1



# Summary Table Report

## California Department of Fish and Wildlife

### California Natural Diversity Database



Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Athene cunicularia</i> burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	10 100	1989 S:79	2	14	31	6	10	16	39	40	69	7	3
<i>Atriplex cordulata var. cordulata</i> heartscale	G3T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	35 35	66 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Atriplex depressa</i> brittlescale	G2 S2	None None	Rare Plant Rank - 1B.2	30 40	60 S:5	0	1	1	1	0	2	3	2	5	0	0
<i>Bombus crotchii</i> Crotch bumble bee	G3G4 S1S2	None Candidate Endangered		50 50	234 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Bombus occidentalis</i> western bumble bee	G2G3 S1	None Candidate Endangered	USFS_S-Sensitive XERCES_IM-Imperiled	50 50	280 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	G2 S2	Endangered None	IUCN_EN-Endangered	15 15	43 S:1	1	0	0	0	0	0	0	1	1	0	0
<i>Branchinecta lynchi</i> vernal pool fairy shrimp	G3 S3	Threatened None	IUCN_VU-Vulnerable	10 100	770 S:13	0	3	5	0	0	5	3	10	13	0	0
<i>Branchinecta mesovallensis</i> midvalley fairy shrimp	G2 S2S3	None None		15 15	128 S:2	0	1	1	0	0	0	0	2	2	0	0
<i>Buteo swainsoni</i> Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	0 135	2518 S:500	75	141	57	15	5	207	61	439	494	4	2
<i>Carex comosa</i> bristly sedge	G5 S2	None None	Rare Plant Rank - 2B.1	5 5	29 S:1	0	1	0	0	0	0	0	1	1	0	0
<i>Centromadia parryi ssp. parryi</i> pappose tarplant	G3T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	5 20	39 S:2	0	0	0	0	1	1	1	1	1	0	1



# Summary Table Report

## California Department of Fish and Wildlife

### California Natural Diversity Database



Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Charadrius alexandrinus nivosus</i> western snowy plover	G3T3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	40 55	138 S:2	0	0	0	0	0	2	2	0	2	0	0
<i>Charadrius montanus</i> mountain plover	G3 S2S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	35 40	90 S:4	0	2	1	0	1	0	3	1	3	1	0
<i>Chloropyron palmatum</i> palmate-bracted bird's-beak	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	30 40	25 S:3	0	1	0	0	1	1	2	1	2	0	1
<i>Cicindela hirticollis abrupta</i> Sacramento Valley tiger beetle	G5TH SH	None None		2 50	6 S:2	0	0	0	0	2	0	2	0	0	0	2
<i>Circus hudsonius</i> northern harrier	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	48 48	53 S:1	0	1	0	0	0	0	0	1	1	0	0
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	G5T2T3 S1	Threatened Endangered	BLM_S-Sensitive NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	5 70	156 S:3	0	0	0	0	2	1	2	1	1	0	2
<i>Desmocerus californicus dimorphus</i> valley elderberry longhorn beetle	G3T2 S2	Threatened None		13 100	271 S:16	0	0	3	1	0	12	9	7	16	0	0
<i>Egretta thula</i> snowy egret	G5 S4	None None	IUCN_LC-Least Concern	15 15	20 S:1	1	0	0	0	0	0	1	0	1	0	0
<i>Elanus leucurus</i> white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	19 65	180 S:10	0	6	0	2	1	1	8	2	9	1	0





## Summary Table Report

### California Department of Fish and Wildlife California Natural Diversity Database



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Elderberry Savanna</i> Elderberry Savanna	G2 S2.1	None None		30 30	4 S:1	0	0	1	0	0	0	1	0	1	0	0
<i>Emys marmorata</i> western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	32 50	1385 S:2	0	1	0	0	0	1	0	2	2	0	0
<i>Eryngium jepsonii</i> Jepson's coyote-thistle	G2 S2	None None	Rare Plant Rank - 1B.2	10 20	19 S:2	0	0	0	0	0	2	0	2	2	0	0
<i>Extriplex joaquinana</i> San Joaquin spearscale	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	15 40	127 S:9	0	2	4	1	0	2	3	6	9	0	0
<i>Falco columbarius</i> merlin	G5 S3S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	40 40	37 S:1	0	1	0	0	0	0	0	1	1	0	0
<i>Fritillaria pluriflora</i> adobe-lily	G2G3 S2S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCBBG-UC Berkeley Botanical Garden		112 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Great Valley Cottonwood Riparian Forest</i> Great Valley Cottonwood Riparian Forest	G2 S2.1	None None		15 15	56 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Hibiscus lasiocarpus var. occidentalis</i> woolly rose-mallow	G5T3 S3	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCBBG-UC Berkeley Botanical Garden	5 40	173 S:7	0	0	5	1	0	1	2	5	7	0	0
<i>Lasionycteris noctivagans</i> silver-haired bat	G5 S3S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority		139 S:2	0	0	0	0	0	2	2	0	2	0	0
<i>Lasiurus cinereus</i> hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority		238 S:3	0	0	0	0	0	3	3	0	3	0	0



# Summary Table Report

## California Department of Fish and Wildlife

### California Natural Diversity Database



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Laterallus jamaicensis coturniculus</i> California black rail	G3G4T1 S1	None Threatened	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	15 15	303 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Lepidium latipes var. heckardii</i> Heckard's pepper-grass	G4T1 S1	None None	Rare Plant Rank - 1B.2	5 35	14 S:6	2	3	0	0	0	1	1	5	6	0	0
<i>Lepidurus packardii</i> vernal pool tadpole shrimp	G4 S3S4	Endangered None	IUCN_EN-Endangered	10 50	325 S:8	2	2	2	0	0	2	2	6	8	0	0
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	G2 S2	None Rare	Rare Plant Rank - 1B.1		197 S:1	0	1	0	0	0	0	0	1	1	0	0
<i>Linderiella occidentalis</i> California linderiella	G2G3 S2S3	None None	IUCN_NT-Near Threatened	10 25	438 S:8	0	1	0	3	0	4	0	8	8	0	0
<i>Melospiza melodia</i> song sparrow ("Modesto" population)	G5 S3?	None None	CDFW_SSC-Species of Special Concern	0 20	92 S:9	0	0	0	0	0	9	2	7	9	0	0
<i>Myrmosula pacifica</i> Antioch multilid wasp	GH SH	None None		50 50	3 S:1	0	0	0	0	0	1	1	0	0	1	0
<i>Navarretia leucocephala ssp. bakeri</i> Baker's navarretia	G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	15 20	58 S:2	1	0	0	0	0	1	0	2	2	0	0
<i>Neostapfia colusana</i> Colusa grass	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1	25 25	64 S:3	0	1	1	1	0	0	0	3	3	0	0
<i>Nycticorax nycticorax</i> black-crowned night heron	G5 S4	None None	IUCN_LC-Least Concern	15 15	37 S:1	1	0	0	0	0	0	1	0	1	0	0
<i>Oncorhynchus mykiss irideus pop. 11</i> steelhead - Central Valley DPS	G5T2Q S2	Threatened None	AFS_TH-Threatened		31 S:3	0	0	0	0	0	3	0	3	3	0	0
<i>Oncorhynchus tshawytscha pop. 6</i> chinook salmon - Central Valley spring-run ESU	G5 S1	Threatened Threatened	AFS_TH-Threatened	20 20	13 S:1	0	0	0	1	0	0	0	1	1	0	0



## Summary Table Report

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Oncorhynchus tshawytscha</i> pop. 7 chinook salmon - Sacramento River winter-run ESU	G5 S1	Endangered Endangered	AFS_EN-Endangered	20 20	2 S:1	0	0	0	1	0	0	0	1	1	0	0
<i>Plagiobothrys hystriculus</i> bearded popcornflower	G2 S2	None None	Rare Plant Rank - 1B.1	16 16	14 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Plegadis chihi</i> white-faced ibis	G5 S3S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	30 30	20 S:1	0	1	0	0	0	0	1	0	1	0	0
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	GNR S3	None None	AFS_VU-Vulnerable CDFW_SSC-Species of Special Concern IUCN_EN-Endangered	20 20	15 S:1	0	1	0	0	0	0	1	0	1	0	0
<i>Progne subis</i> purple martin	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	24 24	71 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Puccinellia simplex</i> California alkali grass	G3 S2	None None	Rare Plant Rank - 1B.2	25 50	80 S:10	0	0	0	0	5	5	9	1	5	4	1
<i>Sidalcea keckii</i> Keck's checkerbloom	G2 S2	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	12 100	50 S:4	0	0	0	0	0	4	2	2	4	0	0
<i>Spirinchus thaleichthys</i> longfin smelt	G5 S1	Candidate Threatened		20 20	46 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Symphotrichum lentum</i> Suisun Marsh aster	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	1 1	175 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Taxidea taxus</i> American badger	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	5 70	592 S:4	0	0	0	0	0	4	4	0	4	0	0
<i>Thamnophis gigas</i> giant gartersnake	G2 S2	Threatened Threatened	IUCN_VU-Vulnerable	5 50	366 S:80	6	35	13	5	7	14	25	55	73	7	0
<i>Trifolium hydrophilum</i> saline clover	G2 S2	None None	Rare Plant Rank - 1B.2	10 38	49 S:3	0	1	1	0	0	1	0	3	3	0	0



## Summary Table Report

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<b><i>Tuctoria mucronata</i></b> Crampton's tuctoria or Solano grass	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	25 25	4 S:2	0	1	1	0	0	0	0	2	2	0	0
<b><i>Valley Oak Woodland</i></b> Valley Oak Woodland	G3 S2.1	None None		50 50	91 S:1	0	0	0	0	0	1	1	0	1	0	0
<b><i>Vireo bellii pusillus</i></b> least Bell's vireo	G5T2 S2	Endangered Endangered	IUCN_NT-Near Threatened NABCI_YWL-Yellow Watch List	15 15	503 S:2	0	1	0	0	0	1	1	1	2	0	0
<b><i>Xanthocephalus xanthocephalus</i></b> yellow-headed blackbird	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	5 5	13 S:1	0	0	0	0	0	1	1	0	1	0	0

\*The database used to provide updates to the Online Inventory is under construction. [View updates and changes made since May 2019 here.](#)

## Plant List

26 matches found. [Click on scientific name for details](#)

### Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4], Found in Quads 3812167, 3812166, 3812165, 3812157, 3812156, 3812155, 3812147 3812146 and 3812145;

[Modify Search Criteria](#) [Export to Excel](#) [Modify Columns](#) [Modify Sort](#) [Display Photos](#)

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
<a href="#">Astragalus pauperculus</a>	depauperate milk-vetch	Fabaceae	annual herb	Mar-Jun	4.3	S4	G4
<a href="#">Astragalus tener var. ferrisiae</a>	Ferris' milk-vetch	Fabaceae	annual herb	Apr-May	1B.1	S1	G2T1
<a href="#">Astragalus tener var. tener</a>	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S1	G2T1
<a href="#">Atriplex cordulata var. cordulata</a>	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
<a href="#">Atriplex depressa</a>	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
<a href="#">Carex comosa</a>	bristly sedge	Cyperaceae	perennial rhizomatous herb	May-Sep	2B.1	S2	G5
<a href="#">Centromadia parryi ssp. parryi</a>	pappose tarplant	Asteraceae	annual herb	May-Nov	1B.2	S2	G3T2
<a href="#">Centromadia parryi ssp. rudis</a>	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	4.2	S3	G3T3
<a href="#">Chloropyron palmatum</a>	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	1B.1	S1	G1
<a href="#">Eryngium jepsonii</a>	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
<a href="#">Extriplex joaquinana</a>	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
<a href="#">Fritillaria pluriflora</a>	adobe-lily	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2S3	G2G3
<a href="#">Hesperervax caulescens</a>	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	4.2	S3	G3
<a href="#">Hibiscus lasiocarpus var. occidentalis</a>	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	1B.2	S3	G5T3
<a href="#">Juglans hindsii</a>	Northern California black walnut	Juglandaceae	perennial deciduous tree	Apr-May	1B.1	S1	G1
<a href="#">Lepidium latipes var. heckardii</a>	Heckard's pepper-grass	Brassicaceae	annual herb	Mar-May	1B.2	S1	G4T1

<a href="#">Lessingia hololeuca</a>	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	3	S2S3	G3?
<a href="#">Lilaeopsis masonii</a>	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	1B.1	S2	G2
<a href="#">Myosurus minimus ssp. apus</a>	little mousetail	Ranunculaceae	annual herb	Mar-Jun	3.1	S2	G5T2Q
<a href="#">Navarretia leucocephala ssp. bakeri</a>	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2
<a href="#">Neostapfia colusana</a>	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
<a href="#">Plagiobothrys hystriculus</a>	bearded popcornflower	Boraginaceae	annual herb	Apr-May	1B.1	S2	G2
<a href="#">Puccinellia simplex</a>	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
<a href="#">Symphyotrichum lentum</a>	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	1B.2	S2	G2
<a href="#">Trifolium hydrophilum</a>	saline clover	Fabaceae	annual herb	Apr-Jun	1B.2	S2	G2
<a href="#">Tuctoria mucronata</a>	Crampton's tuctoria or Solano grass	Poaceae	annual herb	Apr-Aug	1B.1	S1	G1

### Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website <http://www.rareplants.cnps.org> [accessed 03 February 2020].

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#### Questions and Comments

[rareplants@cnps.org](mailto:rareplants@cnps.org)

## **APPENDIX C.**

### USFWS Species List

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# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Sacramento Fish And Wildlife Office  
Federal Building  
2800 Cottage Way, Room W-2605  
Sacramento, CA 95825-1846  
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:

January 22, 2020

Consultation Code: 08ESMF00-2020-SLI-0012

Event Code: 08ESMF00-2020-E-02633

Project Name: Aggie Research Campus

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

[http://www.nwr.noaa.gov/protected\\_species/species\\_list/species\\_lists.html](http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html)

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.



The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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Attachment(s):

- Official Species List

# Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Sacramento Fish And Wildlife Office**

Federal Building

2800 Cottage Way, Room W-2605

Sacramento, CA 95825-1846

(916) 414-6600

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## Project Summary

Consultation Code: 08ESMF00-2020-SLI-0012

Event Code: 08ESMF00-2020-E-02633

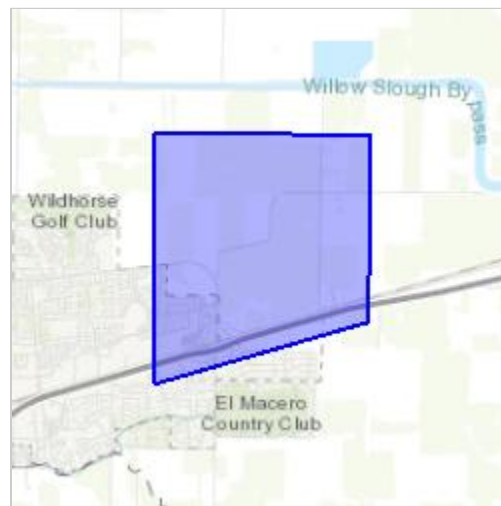
Project Name: Aggie Research Campus

Project Type: DEVELOPMENT

Project Description: Approximately 265 acre mixed use development. Project in the planning phase.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/38.565278533418294N121.68601528159672W>



Counties: Yolo, CA

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## Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Birds

NAME	STATUS
Western Snowy Plover <i>Charadrius nivosus nivosus</i> Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast) There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/8035">https://ecos.fws.gov/ecp/species/8035</a>	Threatened

## Reptiles

NAME	STATUS
Giant Garter Snake <i>Thamnophis gigas</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/4482">https://ecos.fws.gov/ecp/species/4482</a>	Threatened

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## Amphibians

NAME	STATUS
California Red-legged Frog <i>Rana draytonii</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/2891">https://ecos.fws.gov/ecp/species/2891</a> Species survey guidelines: <a href="https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf">https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf</a>	Threatened
California Tiger Salamander <i>Ambystoma californiense</i> Population: U.S.A. (Central CA DPS) There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/2076">https://ecos.fws.gov/ecp/species/2076</a>	Threatened

## Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/321">https://ecos.fws.gov/ecp/species/321</a>	Threatened

## Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle <i>Desmocerus californicus dimorphus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/7850">https://ecos.fws.gov/ecp/species/7850</a> Habitat assessment guidelines: <a href="https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf">https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf</a>	Threatened

## Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp <i>Branchinecta conservatio</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/8246">https://ecos.fws.gov/ecp/species/8246</a>	Endangered
Vernal Pool Fairy Shrimp <i>Branchinecta lynchi</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/498">https://ecos.fws.gov/ecp/species/498</a>	Threatened
Vernal Pool Tadpole Shrimp <i>Lepidurus packardii</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/2246">https://ecos.fws.gov/ecp/species/2246</a>	Endangered



## **Critical habitats**

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## **APPENDIX D.**

### Photographs

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Photo 1. View north from southeast corner of site. Tilled agricultural fields occur through most of the BSA. 7 October 2014.



Photo 2. View west toward Mace Channel in western portion of site. Two adjacent culverts pass water beneath Mace Blvd., one of which is visible in distance. 7 October 2014.



Photo 3. View looking downstream (east) toward the Mace Channel as it leaves the Project site. 7 October 2014.



Photo 4. View west in a recently maintained portion of the Mace Channel near the center of the site. 7 October 2014.



Photo 5. View east from bed of Mace Channel in central portion of BSA. Vegetation has recently been removed. No water is present. 10 December 2014.



Photo 6. View west toward the detention basin from its eastern edge. Several young Fremont's cottonwoods occur in distance. 7 October 2014.





Photo 7. View south toward the blue elderberry shrub located approximately 80 ft east of Mace Blvd., along western boundary of the BSA. 7 October 2014.



Photo 8. View northeast along eastern boundary of BSA toward offsite eucalyptus grove site. 7 October 2014.



Photo 9. View west along Co. Rd. 32A, outside the BSA to the south. Railroad tracks and upland swale on left. 7 October 2014.



Photo 10. View northeast along the Park and Ride driveway. Ruderal weeds occur along the driveway. The BSA is in the background. 7 October 2014.



Photo 11. View southwest toward patch of blue elderberry shrubs and tamarisk located along west side of Road 104 in northern portion of BSA. 7 October 2014.



Photo 12. View north along Road 104 in north part of BSA. Ruderal weeds and alfalfa agriculture on right. 7 October 2014.





**Photo 13. Google Street View, May 2014.** View west from along Road 105 showing Mace Channel with no water present and ruderal weeds on bed and banks.



**Photo 14. Google Street View, May 2012.** View west from along Road 105 showing Mace Channel with no water present and ruderal weeds on bed and banks.



**Photo 15. Google Street View, May 2014.** View east from along Road 105 showing Mace Channel with no water present and ruderal weeds on bed and banks.



**Photo 16. Google Street View, May 2012.** View east from along Road 105 showing Mace Channel with no water present and ruderal weeds on bed and banks.



**Photo 17. 10 December 2014.** View south along Road 105 showing Mace Channel with ruderal weeds (perennial pepperweed and yellow star-thistle) on bed and banks and no water present.





**Photo 18. 10 December 2014.** View east (downstream) toward Mace Channel from Road 105. No water is present. Little to no emergent wetland vegetation is present.





**Photo 19. 10 December 2014.** View of Mace Channel, looking downstream (east), from a location approximately 500 ft east of the BSA. Ruderal weeds dominate. Little to no emergent wetland vegetation is present.



**Photo 20. 10 December 2014.** View of Mace Channel, looking upstream (west) toward the BSA, from a location approximately 500 ft east of the BSA. Ruderal weeds dominate in the channel. Little to no emergent wetland vegetation is present.



**Photo 21. 7 October 2014.** Mace Channel inlet under the Yolo Bypass levee. No water is present.





**Photo 22. 7 October 2014.** Mace Channel outlet, with large metal flapgate resting in closed position, on the Yolo Bypass side of the Yolo Bypass levee. No water is present.

## **APPENDIX E**

### Species Evaluated Table

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Species Evaluated Table

Special-Status Species/ Common Name	Federal Status <sup>a</sup>	State Status <sup>a,b</sup>	Source <sup>c</sup>	Habitat Requirements	Potential to Occur in the BSA?
<b>Invertebrates</b>					
<i>Bombus occidentalis</i> <i>occidentalis</i> Western bumble bee	--	C	2	Colony-nesting bumble bee found in meadows and grasslands with abundant floral sources. Requires adequate nectar and pollen supplies from February to November. Common nectar sources include <i>Cirsium</i> , <i>Eriogonum</i> , <i>Solidago</i> , <i>Aster</i> , and <i>Ceanothus</i> . Requires floral resources distributed over the spring, summer, and fall. Nests in underground cavities such as squirrel burrows and in open west- and southwest-facing slopes often bordered by trees. Occasionally nests above ground in logs. Isolated patches of habitat are not sufficient to fully support bumble bee populations. Historically common on the west coast of North America from southern British Columbia, through central CA, south to NM. In CA, western bumble bee is now restricted to high-elevation Sierra Nevada sites and a few records along the north coast (Xerces 2018).	No. The BSA is mostly disked agricultural fields. The primarily agricultural region lacks sufficient floral resources distributed over the spring, summer, and fall. This species has been extirpated from the valley floor. There are no CNDDDB records of this species in the Central Valley after 1980.
<i>Bombus crotchii</i> Crotch bumble bee	--	C	2	Inhabits open grassland and scrub habitats. Primarily nests underground. Generalist foragers visiting a wide variety of flowering plants including plants in the Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, and Boraginaceae plant families. Requires floral resources distributed over the spring, summer, and fall. Isolated patches of habitat are not sufficient to fully support bumble bee populations. Historically common in the Central Valley, now considered extirpated from the northernmost part of the Valley, and nearly absent from Arbuckle, south (Hatfield et al. 2014; Xerces 2018).	No. The BSA is mostly disked agricultural fields. The primarily agricultural region lacks sufficient floral resources distributed over the spring, summer, and fall. This species is potentially extirpated from the valley floor. There are no CNDDDB records of this species in the Central Valley after 2007.
<i>Branchinecta</i> <i>conservatio</i> Conservancy fairy shrimp	E, CH	--	1,2	Occurs in grassland communities (USFWS 1994) where it inhabits large (greater than 300 sq ft), deep (between 10 and 27 cm), usually turbid vernal pools where rooted vegetation is absent. Habitat must provide continuous pooling for a duration sufficient to support reproduction (46 days to reproduce) (Helm 1998). Known from eight populations in CA: Vina Plains, Butte and Tehama cos.; Sacramento National Wildlife Refuge, Glenn Co.; Yolo Bypass Wildlife Area, Yolo Co.; Jepson Prairie, Solano Co.; Mapes Ranch, Stanislaus Co.; University of California, Merced, Merced Co.; Grasslands Ecological Area, Merced Co.; and Los Padres National Forest, Ventura Co. (USFWS 2007b).	No. There are no vernal pools in the BSA. The BSA is in active agriculture.
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	T, CH	--	1,2	Inhabits a wide variety of vernal pool habitats. Most commonly found in small (< 0.05 ac), clear to tea-colored vernal pools with mud, grass, or basalt bottoms in unplowed grasslands (USFWS 2005).	No. There are no vernal pools in the BSA. The BSA is in active agriculture.
<i>Desmocerus</i> <i>californicus</i> <i>dimorphus</i> Valley elderberry longhorn beetle	T, CH	--	1,2,4	Requires an elderberry shrub ( <i>Sambucus nigra</i> ssp. <i>caerulea</i> or <i>Sambucus racemosa</i> var. <i>racemosa</i> ) as a host plant (USFWS 1999b).	Yes. See discussion.

Special-Status Species/ Common Name	Federal Status <sup>a</sup>	State Status <sup>a,b</sup>	Source <sup>c</sup>	Habitat Requirements	Potential to Occur in the BSA?
<i>Lepidurus packardii</i> Vernal pool tadpole shrimp	E, CH	--	1,2	Typically occurs in large, deep vernal pools (USFWS 2005), but can also make use of smaller pools within larger vernal pool complexes (Helm 1998).	No. There are no vernal pools in the BSA. The BSA is in active agriculture.
<b>Fish</b>					
<i>Archoplites interruptus</i> Sacramento perch	--	SC	2	Inhabits freshwater sloughs, slow-moving rivers, lakes, reservoirs, and farm ponds. Often found near submerged or emergent vegetation. Tolerates variable conditions, including a wide range of turbidity, temperature, salinity, and pH. Occurs mainly in inshore areas of larger lakes (Moyle 2002).	No. The Mace Drainage Channel is dry for much of the year. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.
<i>Hypomesus transpacificus</i> Delta smelt	T, CH	T	1	Euryhaline (tolerant of a wide salinity range) species that spawns in freshwater dead-end sloughs and shallow edge-waters of channels of the Delta (USFWS 2010). Restricted to the San Pablo Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo cos. (Moyle 2002). Their historic range extended from San Pablo Bay upstream to at least the city of Sacramento on the Sacramento River and the city of Mossdale on the San Joaquin River (USFWS 2010).	No. The Mace Drainage Channel is dry for much of the year. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.
<i>Oncorhynchus mykiss</i> Central Valley steelhead distinct population segment (DPS)	T, CH	--	1,2	Anadromous salmonid historically distributed throughout the Sacramento and San Joaquin river drainages. While steelhead are found elsewhere in the Sacramento River system, the principal remaining wild populations are a few hundred fish that spawn annually in Deer and Mill Creeks in Tehama Co. and a population of unknown size in the lower Yuba River. Spawning occurs in small tributaries on coarse gravel beds in riffle areas (Busby et al. 1996). With the possible exception of a small population in the lower Stanislaus River, steelhead appear to have been extirpated from the San Joaquin basin (Moyle 2002).	No. The Mace Drainage Channel does not have appropriate spawning substrate or hydrology. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.
<i>Oncorhynchus tshawytscha</i> Central Valley spring- run Chinook salmon evolutionarily significant unit (ESU)	T, CH	T	1,2	Anadromous salmonid that enters the Sacramento River from March to July and spawns from late August through early October. Adult females prepare spawning beds in streams with suitable gravel composition, water depth, and velocity. After hatching, fry and subyearlings return to the ocean to complete development (McGinnis 1984). Extant populations of this ESU spawn in the Sacramento River and its tributaries. Populations in the San Joaquin River are believed to be extirpated (NMFS 2005).	No. The Mace Drainage Channel does not have appropriate spawning substrate or hydrology. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.
<i>Oncorhynchus tshawytscha</i> Winter-run Chinook salmon, Sacramento River	E, CH	E	1,2	Anadromous salmonid once found throughout the upper Sacramento River basin, now confined to the mainstem Sacramento River below Keswick Dam (Moyle 2002). Adults enter the Sacramento River from December through July and spawn from April to July. Spawning beds are prepared in streams with suitable gravel composition, water depth, and velocity (McGinnis 1984). This ESU is believed to be extirpated from the San Joaquin River Basin. However, an intermittent run has been reported in the lower Calaveras River (NMFS 1998).	No. The Mace Drainage Channel does not have appropriate spawning substrate or hydrology. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.

Special-Status Species/ Common Name	Federal Status <sup>a</sup>	State Status <sup>a,b</sup>	Source <sup>c</sup>	Habitat Requirements	Potential to Occur in the BSA?
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	--	SC	2	This minnow of the backwater slough areas spawns either over shoreline vegetation or over gravel in creek tributaries of rivers during spring high water levels (McGinnis 1984).	No. The Mace Drainage Channel does not have appropriate hydrology. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.
<i>Spirinchus thaleichthys</i> Longfin smelt	C	T	2	Spawns from November to June in freshwater over sandy-gravel substrates, rocks, or aquatic plants. After hatching, larvae move up into surface waters and are transported downstream into brackish-water nursery areas. In the San Francisco estuary, longfin smelt are usually found downstream of Rio Vista on the Sacramento River and from the vicinity of Medford Island downstream on the San Joaquin River. They are occasionally found upstream of these locations (Moyle 2002).	No. The Mace Drainage Channel does not have appropriate hydrology. A metal flap gate at the Yolo Bypass prevents migration into the Mace Drainage Channel.
<b>Amphibians</b>					
<i>Ambystoma californiense</i> California tiger salamander, central population	T, CH	T	1,2,4	Breed and lay eggs primarily in vernal pools and other temporary rainwater ponds. Specific habitat requirements include annual grasslands and open woodlands with animal burrows for summer dormancy, shallow ponds for larval development that do not contain fish, and quiet waterways supporting prey which includes snails, frogs, tadpoles, fish, and invertebrates (CWHR 2020).	No. The BSA is in active agriculture. There are no vernal pools or other suitable breeding habitat in the BSA.
<i>Rana draytonii</i> California red-legged frog	T, CH	SC	1	Inhabits quiet pools of streams, marshes, and occasionally ponds with dense, shrubby, or emergent vegetation. Requires permanent or nearly permanent pools for larval development (CWHR 2020; USFWS 2002). The range extends from near sea level to approximately 5,200 ft, though nearly all sightings have occurred below 3,500 ft. CRLF has been extirpated from the floor of the Central Valley (USFWS 2002).	No. The BSA is in active agriculture. There is no suitable breeding habitat in the BSA.
<b>Reptiles</b>					
<i>Emys marmorata</i> Western pond turtle	--	SC	2,4	Associated with permanent or nearly permanent water in a wide variety of habitat types, normally in ponds, lakes, streams, irrigation ditches, or permanent pools along intermittent streams, from sea level to 4,690 ft (CWHR 2020).	No. The Mace Channel is dry for much of the year and does not contain sufficient water for this species.
<i>Thamnophis gigas</i> Giant garter snake	T	T	1,2,4	Habitat requisites consist of 1) adequate water during the snake's active season (early spring through mid-fall) to provide food and cover; 2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; 3) grassy banks and openings in waterside vegetation for basking; and 4) higher elevation uplands for cover and refuge from flood waters during the snake's winter dormant season (Stebbins 2003).	Yes. This species could occur in the aquatic habitat located near the proposed stormwater capacity improvements. See discussion.
<b>Birds</b>					
<i>Agelaius tricolor</i> Tricolored blackbird	--	T, SC	2,4	Common locally throughout the Central Valley and in coastal districts from Sonoma Co. south. Breeds near freshwater, preferably in emergent wetland of tall, dense cattails or tules, and also in thickets of willow, blackberry, tall herbs and wild rose. The nesting area is highly colonial, supporting a minimum of 50 pairs (CWHR 2020).	Yes. The Mace Channel provides marginal nesting habitat. See discussion.



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<i>Ammodramus savannarum</i> Grasshopper sparrow	--	SC	2	An uncommon and local summer resident and breeder in foothills and lowlands west of Cascade-Sierra Nevada crest from Mendocino and Trinity cos., south to San Diego Co. Occurs in dry, dense grasslands, especially with scattered shrubs for sitting perches. A thick cover of grasses and forbs is essential for concealment. Nests are built of grasses and forbs in slight depression in ground hidden by a clump of grasses or forbs. Usually nests solitarily from early April to mid-July. May form semicolonial breeding groups of 3-12 pairs (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	No. The BSA is in active agriculture.
<i>Athene cunicularia</i> Burrowing owl	--	SC	2,4	Yearlong resident of open, dry grassland and desert habitat, and in grass, forb, and open shrub stages of pinyon-juniper and Ponderosa pine habitats. Uses small mammal burrows, often those of ground squirrels, for roosting and nesting cover (CWHR 2020). Burrowing sites and some wintering sites are of concern to CDFW (2019a).	Yes. See discussion.
<i>Buteo swainsoni</i> Swainson's hawk	--	T	2,4	Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen Co., and Mojave Desert. Nests in stands with few trees in juniper-sage flats, in riparian areas, and in oak savannah in the Central Valley. Forages in adjacent grasslands, livestock pastures, or suitable (i.e., low growing) crop fields. Feeds on small birds, rodents, mammals, reptiles, large arthropods, amphibians, and, rarely, fish (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	Yes. See discussion.
<i>Charadrius alexandrinus nivosus</i> Western snowy plover	T	SC	1,2	Nests, feeds, and takes cover on sandy or gravelly beaches along the Pacific coast, at sand pits, dune-backed beaches at creek and river mouths, salt pans at lagoons and estuaries, and alkali lakes (USFWS 2007a; CWHR 2020). Common on sandy marine and estuarine shores in fall and winter. Inland nesting areas occur at the Salton Sea, Mono Lake, and at isolated sites on the shores of alkali lakes in northeastern CA, the Central Valley, and southeastern CA deserts. Requires a sandy, gravelly or friable soil substrate for nesting (CWHR 2020). Nesting sites are of concern to CDFW (2019a). Federal status applies only to the Pacific coastal population.	No. Suitable habitat does not occur in the BSA.
<i>Charadrius montanus</i> Mountain plover	--	SC	2	This species does not nest in CA. It is a winter resident from September through March in the Central Valley from Sutter and Yuba cos. southward into Mexico at elevations below 3,200 ft. Also found in foothill valleys west of the San Joaquin Valley, the Imperial Valley, and plowed fields of Los Angeles and western San Bernardino cos. Mountain plover forage in short and open grasslands, plowed fields with little vegetation, and open sagebrush areas (CWHR 2020). Nonbreeding/wintering sites are of concern to CDFW (2019a).	Yes. Foraging habitat only. See discussion.
<i>Circus hudsonius</i> Northern harrier	--	SSC	2	Occurs in annual grassland up to lodgepole pine and alpine meadow habitat as high as 10,000 ft. Breeds from sea level to 5,700 ft in the Central Valley and Sierra Nevada Mountains, and up to 3,600 ft in northeastern CA. Frequents meadows, grasslands, open rangelands, desert sinks, and both fresh and saltwater emergent wetlands. Seldom found in wooded areas. Uses tall grasses and forbs in wetlands, or at the wetland/field border, for cover. Roosts and nests on the ground in shrubby vegetation, usually at marsh edges. Typically nests in emergent wetlands or along rivers or lakes, but may nest in grasslands, grain fields, or on sagebrush flats several miles from water (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	Yes. Foraging habitat only. See discussion.

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<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	T	E	2,4	Uncommon to rare summer resident of valley foothill and desert riparian habitats in scattered locations in CA. Breeding populations known from the Colorado River, Sacramento and Owens valleys, along the South Fork of the Kern River (Kern Co.), along the Santa Ana River (Riverside Co.), and along the Amargosa River (Inyo & San Bernardino cos.). They may also nest along San Luis Rey River (San Diego Co.). Nests in dense cover of deciduous trees and shrubs, especially willows, which usually abut a slow-moving watercourse, backwater or seep. Also utilizes adjacent orchards, especially walnuts, in the Central Valley (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	No. There is no suitable habitat in the BSA. The few isolated trees in the BSA do not provide foraging or nesting habitat.
<i>Elanus leucurus</i> White-tailed kite	--	FP	2,4	Yearlong resident in coastal and valley lowlands; rarely found away from agricultural areas. Inhabits herbaceous and open stages of most habitats mostly in cismontane CA. Substantial groves of dense, broad-leaved deciduous trees are used for nesting and roosting. Nest placed near top of dense oak, willow, or other tree stand located near open foraging area. Forages in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	Yes. See discussion.
<i>Laterallus jamaicensis coturniculus</i> California black rail	--	T	2	Inhabits saline, brackish, and freshwater emergent wetlands in the Bay Area, Sacramento-San Joaquin Delta, the Salton Sea, the lower Colorado River, a few locations in coastal southern CA, and the northern Sierra foothills of Butte, Nevada, Placer, and Yuba cos. Typically found in the immediate vicinity of tidal sloughs near the upper limit of tidal flooding in tidal emergent wetlands dominated by pickleweed and in brackish marshes supporting bulrushes in association with pickleweed. In freshwater areas, generally found in marshes dominated by bulrush, cattail, or saltgrass (CWHR 2020). Water regime is a critical habitat factor; black rails are often found in wetlands with perennial standing or flowing water. Black rails use wetland zones with shallower water than other North American rails, generally less than 1.2 in. Wetlands in the Sacramento Valley managed for waterfowl or rice typically lack sufficient shallow water habitat (Richmond et al. 2010).	No. There is no suitable habitat in the BSA. The band of cattail in the Mace Drainage Channel is of limited extent, is periodically cleared, does not provide sufficient cover, and does not contain sufficient water during the summer and fall. This species was not observed during biological surveys.
<i>Melospiza melodia</i> Song sparrow ("Modesto" population)	--	SC	2	A year-round resident that prefers emergent freshwater marshes dominated by tules and cattails as well as riparian willow thickets. Modesto song sparrows also nest in riparian forests of valley oak with sufficient understory of blackberry, along vegetated irrigation canals and levees, and in recently planted valley oak restoration sites. The Modesto song sparrow is restricted to CA where it is locally numerous in the Sacramento Valley, Sacramento-San Joaquin River Delta, and the northern San Joaquin Valley. The Modesto song sparrow remains locally numerous in areas where extensive wetlands occur. Hence, highest densities occur in the Butte Sink area of the Sacramento Valley and in the Sacramento-San Joaquin River Delta. Immediately adjacent to the Butte Sink, song sparrows breed in sparsely vegetated irrigation canals, yet are almost entirely absent from the main stem and tributaries of the Sacramento River above Sacramento (Shuford and Gardali 2008).	Yes. Marginal nesting habitat occurs along Mace Channel. See discussion.

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<i>Progne subis</i> Purple martin	--	SC	2	Found throughout nearly the entire U.S. east of the Rocky Mtns. In the western U.S, occurs in OR, WA, CA, UT, CO, AZ, and NM. Winters in South America and arrives in central CA in late March, Breeding occurs from April into August. Generally inhabits open areas with an open water source nearby. Purple martins nest colonially or singly in cavities both natural and man-made. Purple martins are not as likely to use nest boxes in CA as they are in the eastern U.S. All current known nesting sites in Sacramento are in vertical weep holes beneath bridges built of steel and concrete box girders over urban areas and railroad tracks (Airola and Grantham 2003). Nesting sites are of concern to CDFW (2019a).	No. There is no suitable nesting habitat in the BSA.
<i>Riparia riparia</i> Bank swallow	--	T	4	Found primarily west of CA deserts in riparian and other lowland habitats during the spring-fall period. In summer, restricted to riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with fine textured sandy soils, into which it digs nesting holes. Approximately 75% of the breeding population in CA occurs along banks of the Sacramento and Feather Rivers in the northern Central Valley. Other colonies are known from the central coast from Monterey to San Mateo cos., and in northeastern CA in Shasta, Siskiyou, Lassen, Plumas, and Modoc cos. Breeding colonies can have between 10 and 1,500, but typically between 100 and 200, nesting pairs (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	No. There is no suitable nesting habitat in the BSA.
<i>Vireo bellii pusillus</i> Least Bell's vireo	E	E	2,4	Inhabits willows and other low, dense, foothill riparian habitat below approximately 2,000 ft. Currently known from canyons in San Benito and Monterey cos., coastal areas from Santa Barbara Co. south, and the western edges of southern CA deserts. Usually found near water or intermittent streams. Winters in Mexico from September through the end of March. Peak egg-laying season is May through early June (CWHR 2020). In 2010/2011, least Bell's vireo was observed in Yolo Co. for the first time in decades, along Putah Creek in the Yolo Bypass. The birds were utilizing riparian habitat dominated by sandbar willow, adjacent to riverine and freshwater marsh (CDFW 2020c). Nesting sites are of concern to CDFW (2019a).	No. Dense, willow-dominated riparian habitat does not occur in the BSA. Suitable habitat for this species does not occur in the BSA.
<i>Xanthocephalus xanthocephalus</i> Yellow-headed blackbird	--	SC	2	Breeds commonly, but locally, east of the Cascade Range and the Sierra Nevada, in the Imperial and Colorado River valleys, the Central Valley, and at selected locations in the coast ranges west of the Central Valley. Nests in freshwater emergent wetland with dense vegetation and deep water, often along the borders of lakes or ponds. Feeds on seeds and cultivated grains and eats insects in the breeding season. Breeding season lasts from mid-April to late July (CWHR 2020). Nesting sites are of concern to CDFW (2019a).	No. Lakes, ponds, and deep water do not occur in the BSA. Suitable nesting habitat for this species does not occur in the BSA.

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<b>Mammals</b>					
<i>Antrozous pallidus</i> Pallid bat	--	SC	2	Locally common at low elevations where it occupies a wide variety of habitats including desert, grasslands, shrublands, woodlands, rocky canyons, lower elevation oak savannah, coast redwood, open farmland and mixed conifer forest from sea level up to 3,000 ft in elevation (Bolster 1998, CWHR 2020). Prefers open, dry habitats with rocky areas for roosting, and rock outcrops, cliffs, and crevices with access to open habitats for foraging. Day roosts in caves, crevices, mines, and occasionally buildings and hollow trees. Night roosts may be more open, such as porches and open buildings. Social, often roosting in groups of 20 or more. Absent in the high Sierra Nevada from Shasta to Kern cos. and northwest CA from Del Norte and western Siskiyou cos. south to northern Mendocino Co. (CWHR 2020). May be somewhat dependent on tree roosts. They have been located in tree cavities in oak, Ponderosa pine, coast redwood and giant Sequoia (Bolster 1998).	No. The BSA does not provide roosting habitat for this species. The few trees in the BSA are young and do not have hollows.
<i>Taxidea taxus</i> American badger	--	SC	2	Found throughout most of CA except the northern North Coast. Abundant in drier open stages of many shrub, forest, and herbaceous habitats with friable soils. Feeds on fossorial rodents, some reptiles, insects, earthworms, bird eggs, and carrion (CWHR 2020).	No. The BSA is in active agricultural adjacent to a urban land use. There are no recent badger records near the BSA.
<b>Plants</b> <span style="float: right;">CNPS <sup>b</sup></span>					
<i>Astragalus pauperculus</i> Depauperate milk-vetch	--	--/ 4.3	3	Annual herb found on vernal mesic, volcanic substrates in chaparral, cismontane woodland, and Valley and foothill grassland from 197 to 3,986 ft. Known from Butte, Placer, Shasta, Tehama, and Yuba cos. Blooms March through May (Jepson eFlora 2020); March through June (CNPS 2020).	No. The BSA is below the elevation range and does not contain vernal mesic, volcanic substrates.
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris' milk vetch	--	--/ 1B.1	2,3	Annual herb found in vernal mesic meadows and seeps and subalkaline flats in Valley and foothill grassland from 7 to 250 ft. Known from Butte, Colusa, Glenn, Sutter, and Yolo cos. Presumed extirpated from Solano Co. Blooms March through June (Jepson eFlora 2020); April through May (CNPS 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Astragalus tener</i> var. <i>tener</i> Alkali milk-vetch	--	--/ 1B.2	2,3	Annual herb found in alkaline conditions of playas, adobe clay Valley and foothill grassland, and vernal pools from 3 to 197 ft. Known from Alameda, Merced, Napa, Solano, and Yolo cos. Presumed extirpated from Contra Costa, Monterey, San Benito, Santa Clara, San Francisco, San Joaquin, Sonoma and Stanislaus cos. (CNPS 2020). Blooms March through June (Jepson eFlora 2020; CNPS 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Atriplex cordulata</i> var. <i>cordulata</i> Heartscale	--	--/ 1B.2	2,3	Annual herb found in saline or alkaline conditions of chenopod scrub, meadows and seeps, and sandy Valley and foothill grassland from 0 to 1,837 ft. Known from Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Madera, Merced, Solano, and Tulare cos. Presumed extirpated from San Joaquin, Stanislaus, and Yolo cos. (CNPS 2020). Blooms April through October (CNPS 2020); June through July (Jepson eFlora 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Atriplex depressa</i> Brittlescale	--	--/ 1B.2	2,3	Annual herb found in alkaline and clay soils of chenopod scrub, meadows and seeps, playas, Valley and foothill grassland, and vernal pools from 3 to 1,050 ft. Known from Alameda, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Solano, Stanislaus, Tulare, and Yolo cos. (CNPS 2020). Blooms April through October (CNPS 2020); June through October (Jepson eFlora 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.

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<i>Carex comosa</i> Bristly sedge	--	--/ 2B.1	2,3	Perennial rhizomatous herb found in coastal prairie, Valley and foothill grassland, and in marshes and swamps along lake margins from 0 to 2,051 ft. Known from Contra Costa, Lake, Mendocino, Sacramento, Santa Cruz, Shasta, San Joaquin, and Sonoma cos. Presumed extirpated in San Bernardino and San Francisco cos. (CNPS 2020). Blooms May through September (CNPS 2020); July through September (Jepson eFlora 2020).	Yes. Marginal habitat occurs only in the Mace Channel. In See discussion.
<i>Centromadia parryi</i> ssp. <i>parryi</i> Pappose tarplant	--	--/ 1B.2	2,3	Annual herb found in chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, and vernal mesic valley and foothill grassland from 7 to 1,380 ft. Often found in alkaline conditions. Known from Butte, Colusa, Glenn, Lake, Napa, San Mateo, Solano, Sonoma, and Yolo cos. Blooms from May through November (CNPS 2020); June through October (Jepson eFlora 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Centromadia parryi</i> ssp. <i>rudis</i> Parry's rough tarplant	--	--/ 4.2	3	Annual herb found in alkaline, vernal mesic seeps in Valley and foothill grassland, vernal pools, and sometimes along roadsides from 0 to 328 ft. Known from Butte, Colusa, Glenn, Lake, Merced, Sacramento, San Joaquin, Solano, Sutter and Yolo cos. Blooms May through October (CNPS 2020); June through October (Jepson eFlora 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Chloropyron palmatum</i> (= <i>Cordylanthus palmatus</i> ) Palmate-bracted bird's-beak	E	E/ 1B.1	2,3,4	Annual hemiparasitic herb found in alkaline soil of chenopod scrub and Valley and foothill grassland from 16 to 509 ft. Known from Alameda, Colusa, Fresno, Glenn, Madera, and Yolo cos. Presumed extirpated in San Joaquin Co. (CNPS 2020). Blooms May through October (CNPS 2020); June through August (Jepson eFlora 2020).	No. Seasonally flooded saline-alkali soils do not occur in the BSA. The closest record for this species is 5.5 mi to the northwest.
<i>Eryngium jepsonii</i> Jepson's coyote-thistle	--	--/1B.2	2,3	Perennial herb found on clay soils in Valley and foothill grasslands and vernal pools from 9 to 985 ft. Known from Alameda, Amador, Calaveras, Contra Costa, Fresno, Napa, San Mateo, Solano, Stanislaus, Tuolumne, and Yolo cos. Blooms April through August (Jepson eFlora 2020; CNPS 2020).	Shallow clay depressions along the edges of agricultural fields and in other open areas not subject to active cultivation provide potential habitat for this species.
<i>Extriplex joaquinana</i> San Joaquin spearscale	--	--/ 1B.2	2,3	Annual herb found in alkaline soils in chenopod scrub, meadows and seeps, playas, and Valley and foothill grassland from 3 to 2,740 ft. Known from Alameda, Contra Costa, Colusa, Fresno, Glenn, Merced, Monterey, Napa, San Benito, Solano, Yolo and possibly San Luis Obispo cos. Presumed extirpated in Santa Clara, San Joaquin, and Tulare cos. (CNPS 2020). Blooms April through September (Jepson eFlora 2019); April through October (CNPS 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Fritillaria pluriflora</i> Adobe-lily	--	--/ 1B.2	2,3	Perennial bulbiferous herb often found in adobe soils of chaparral, cismontane woodland, and Valley and foothill grassland from 195 to 2,315 ft. Known from Butte, Colusa, Glenn, Lake, Napa, Solano, Tehama, and Yolo cos. Blooms February through April (Jepson eFlora 2020; CNPS 2020). Baldwin, et al. (2012) describe soils as "adobe, generally serpentine of interior foothills."	No. The BSA is in active agriculture, has a history of soil disturbance, does not contain serpentine, and is dominated by silt soils.

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<i>Hesperervax caulescens</i> Hogwallow starfish	--	--/ 4.2	3	Annual herb found in Valley and foothill grassland in mesic and clay soils and in shallow vernal pools from 0 to 1,650 ft. Known from Alameda, Amador, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Monterey, Sacramento, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama, and Yolo cos. Presumed extirpated from Napa and San Diego cos. Blooms March through June (Jepson eFlora 2020; CNPS 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i> Woolly rose-mallow	--	--/ 1B.2	2,3	Perennial rhizomatous herb found in freshwater marshes and swamps from 0 to 394 ft. Often found on river banks, low peat islands in sloughs, or in riprap on sides of levees. Known from Butte, Contra Costa, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo cos. (CNPS 2020). Blooms June through September (CNPS 2020); July through November (Jepson eFlora 2020).	Yes. Marginal habitat occurs only along the Mace Channel. See discussion.
<i>Juglans hindsii</i> Northern California black walnut	--	--/ 1B.1	2,3	Deciduous tree found in riparian forests and riparian woodlands from 0 to 1,444 ft. Known from Contra Costa and Napa cos, and possibly from Lake Co. Presumed extirpated in Sacramento, Solano, and Yolo cos. This species blooms April through May, but is identifiable for most of the year based on leaves and fruits (Jepson eFlora 2020; CNPS 2020). There is only one confirmed, native occurrence that CNPS considered viable as of 2003. Trees of this species have hybridized extensively with other <i>Juglans</i> sp., and have naturalized widely in areas of cismontane CA that are not part of its historic range (CNPS 2020). The 1B.1 status only applies to trees which recruited naturally long ago and have not hybridized.	No. The BSA does not contain a stand of native walnut.
<i>Lepidium latipes</i> var. <i>heckardii</i> Heckard's pepper-grass	--	--/ 1B.2	2,3	Annual herb found in alkaline flats of valley and foothill grassland from 6 to 660 ft. Known from Glenn, Merced, Sacramento, Solano, and Yolo cos. Blooms March through May (CNPS 2020); March through June (Jepson eFlora 2020). <i>Lepidium latipes</i> var. <i>heckardii</i> is no longer recognized as distinct from the common <i>Lepidium latipes</i> var. <i>latipes</i> in the <i>The Jepson manual: Vascular plants of California, 2nd edition</i> (Al-Shehbaz 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.
<i>Lessingia hololeuca</i> Woolly-headed lessingia	--	--/ 3	3	Annual herb found in clay, serpentine soils in broadleaved upland forest, coastal scrub, lower montane coniferous forest, and Valley and foothill grassland from 49 to 1,001 ft. Known from Alameda, Monterey, Marin, Napa, Santa Clara, San Mateo, Solano, Sonoma, and Yolo cos. Blooms June through October (Jepson eFlora 2020; CNPS 2020).	No. Serpentinite soils do not occur in the BSA.
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	--	R/ 1B.1	2,3	Perennial rhizomatous herb found in brackish or freshwater marshes and swamps and riparian scrub from 0 to 33 ft. Known from Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Solano, and Yolo cos. Locally common in Suisun Bay. (CNPS 2020). Blooms April through November (CNPS 2020); June through August (Jepson eFlora 2020). Habitat also described as, "intertidal marshes and streambanks" (Baldwin et al. 2012).	No. The BSA does not contain tidal waters. The BSA does not provide habitat for this species.
<i>Myosurus minimus</i> ssp. <i>apus</i> Little mousetail	--	--/ 3.1	3	Annual herb found in Valley and foothill grassland and alkaline vernal pools from 66 to 2,100 ft. Known from Alameda, Contra Costa, Colusa, Lake, Merced, Riverside, San Bernardino, San Diego, Solano, Tulare, and Yolo cos. Blooms March through June (CNPS 2020); April through June (Jepson eFlora 2020). Based on herbarium specimen collection records, this species is associated with vernal pools and similar wetlands (CCH 2020). This subspecies is not recognized by Baldwin, et al. (2012).	No. The BSA does not contain suitable habitat for this species.

Special-Status Species/ Common Name	Federal Status <sup>a</sup>	State Status <sup>a,b</sup>	Source <sup>c</sup>	Habitat Requirements	Potential to Occur in the BSA?
<i>Navarretia leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--/ 1B.1	2,3	Annual herb found in mesic soils in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland and vernal pools from 16 to 5,709 ft. Known from Colusa, Glenn, Lake, Lassen, Mendocino, Marin, Napa, Solano, Sonoma, Sutter, Tehama, and Yolo cos. Blooms April through June (Jepson eFlora 2020); April through July (CNPS 2020). Baldwin, et al. (2012) describe habitat as "vernal pools."	No. The BSA does not contain vernal pools.
<i>Neostapfia colusana</i> Colusa grass	T	E/ 1B.1	1,2,3	Annual herb found in large adobe vernal pools from 15 to 660 ft. Known from Glenn, Merced, Solano, Stanislaus, and Yolo cos. Presumed extirpated from Colusa co. Blooms May through August (Jepson eFlora 2020; CNPS 2020). Typically grows in large, deep pools that have long periods of inundation (68 FR 46693).	No. The BSA does not contain vernal pools.
<i>Plagiobothrys hystriculus</i> Bearded popcornflower	--	--/ 1B.1	2,3	Annual herb found in mesic soils in Valley and foothill grassland, along vernal pool margins, and in vernal swales from 0 to 899 ft. Known from Napa, Solano and Yolo cos. (CNPS 2020). Blooms March through May (Jepson eFlora 2020); April through May (CNPS 2020). This species was previously believed to be extinct in CA, but was rediscovered in 2005, and is known only from the Montezuma Hills (CNPS 2020). Baldwin, et al. (2012) describe habitat as "wet grassland, vernal pool margins."	No. The BSA does not contain vernal pools. The BSA is over 25 mi northeast of the Montezuma Hills.
<i>Puccinellia simplex</i> California alkali grass	--	--/1B.2	2,3	Annual herb found in alkaline, vernal mesic sinks, flats, and lake margins within chenopod scrub, meadows, seeps, Valley and foothill grassland, and vernal pools from 7 to 3,050 ft. Known from Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Lake, Los Angeles, Madera, Merced, Napa, San Bernardino, Santa Clara, Santa Cruz, San Luis Obispo, Solano, Stanislaus, Tulare, and Yolo cos. Presumed extirpated from Kings Co. Blooms March through May (Jepson eFlora 2020; CNPS 2020). Habitat also described as "saline flats, mineral springs" (Baldwin et al. 2012).	No. There are no saline flats or mineral springs in the BSA. There are no suitable vernal mesic habitats in the BSA.
<i>Sidalcea keckii</i> Keck's checkerbloom	E	R/1B.1	2	Annual herb found on serpentine and clay soils of cismontane woodland and valley and foothill grassland from 245 to 2,135 ft. Known from Fresno, Merced, and Tulare cos, and possibly from Colusa, Napa, Solano and Yolo cos. Blooms April through May (Jepson eFlora 2020); April through June (CNPS 2020). In Napa and Colusa cos. occur in a range of habitats including serpentine outcrops, serpentine chaparral, roadsides, blue-oak-dominated woodland, south-facing slopes, and grasslands within oak-gray pine woodland. Genetic analyses have identified Colusa and Yolo Co. plants as more closely related to a common <i>Sidalcea</i> species than to <i>S. keckii</i> (USFWS 2012).	No. The BSA is outside the geographic and elevation range. There is no suitable habitat in the BSA.
<i>Symphotrichum lentum</i> Suisun Marsh aster	--	--/ 1B.2	2,3	Perennial rhizomatous herb found in brackish and freshwater marshes and swamps from 0 to 10 ft. Known from Contra Costa, Napa, Sacramento, San Joaquin, Solano, and Yolo cos. (CNPS 2020). Blooms April through November (CNPS 2020); May through November (Jepson eFlora 2020).	Yes. Marginal habitat occurs only along Mace Channel. See discussion.
<i>Trifolium hydrophilum</i> Saline clover	--	--/ 1B.2	2,3	Annual herb found in marshes and swamps, mesic and alkaline soils of Valley and foothill grassland, and vernal pools from 0 to 984 ft. Known from Alameda, Contra Costa, Lake, Monterey, Napa, Sacramento, San Benito, Santa Clara, Santa Cruz, San Joaquin, San Luis Obispo, San Mateo, Solano, Sonoma, and Yolo cos., and potentially from Colusa Co. (CNPS 2020). Blooms April through June (Jepson eFlora 2020; CNPS 2020).	Yes. Marginal habitat occurs only in the detention basin and along field margins. See discussion.



Special-Status Species/ Common Name	Federal Status <sup>a</sup>	State Status <sup>a,b</sup>	Source <sup>c</sup>	Habitat Requirements	Potential to Occur in the BSA?
<i>Tuctoria mucronata</i> Solano grass	E	E/ 1B.1	1,2,3	Annual herb found in mesic soils in Valley and foothill grassland and vernal pools from 16 to 33 ft. Known from Solano and Yolo cos. Blooms April through August (Jepson eFlora 2020; CNPS 2020). Known from only four occurrences (CNPS 2020).	No. The BSA does not contain vernal pools. The BSA is located ~4 mi north of the population located south of Davis.
<b>Natural Communities</b>					
Elderberry Savanna	--	--/ --	2	Open shrub savannah dominated by <i>Sambucus mexicana</i> , usually with an understory of nonnative annual herbs. Requires grazing, fire, or flooding to prevent succession to Great Valley Mixed Riparian Forest. Occurs in areas of fine-textured alluvium that are set back from active river channels, but still subject to flooding and silt deposition. Additional characteristic species include: <i>Bromus</i> spp., <i>Centaurea solstitialis</i> , and <i>Marrubium vulgare</i> . Scattered among surviving stands of riparian vegetation throughout the Sacramento and northern San Joaquin valleys beyond Merced County (Holland 1986).	No. This community does not occur in the BSA.
Great Valley Cottonwood Riparian Forest	--	--/ --	2	Deciduous riparian forest dominated by <i>Populus fremontii</i> and <i>Salix gooddingii</i> with dense understory. Lianas such as <i>Vitis californica</i> are common. Frequent flooding prevents other trees, such as <i>Acer negundo californica</i> and <i>Fraxinus latifolia</i> , from reaching canopy height. Additional characteristic species include: <i>Cephalanthus occidentalis</i> , <i>Elymus triticoides</i> , and <i>Salix</i> spp. (Holland 1986).	No. This community does not occur in the BSA.
Valley Oak Woodland	--	--/ --	2	An oak woodland dominated by Valley oak ( <i>Quercus lobata</i> ). Occurs on deep, well-drained alluvial soils, usually in valley bottoms, apparently with more moisture in summer than in blue oak woodland. Intergrades with Valley oak riparian forest near rivers and with blue oak woodland on drier slopes. Found on non-alluvial setting in the South Coast and Transverse ranges. Typically open stands with grassy-understoried savanna rather than a closed woodland. Valley oak is usually the only tree present. Most stands consist of open-canopy growth form trees and seldom exceed 30-40% absolute cover (Holland 1986).	No. This community does not occur in the BSA.

<sup>a</sup> **Status:** Endangered (E); Threatened (T); Proposed (P); Candidate (C), Delisted (D), Fully Protected (FP); Rare (R); State Species of Special Concern (SC); Proposed Critical Habitat (PCH); Critical Habitat (CH) - Project footprint is located within a designated critical habitat unit, but does not necessarily mean that appropriate habitat is present.

<sup>b</sup> **CNPS CA Rare Plant Rank:** **1A** = Presumed extirpated in CA and either rare or extinct elsewhere; **1B** = Rare, threatened, or endangered in CA and elsewhere; **2A** = Presumed extirpated in CA but common elsewhere; **2B** = Rare, threatened, or endangered in CA but more common elsewhere; **3** = Review List: plants about which more information is needed; **4** = Watch List: plants of limited distribution.

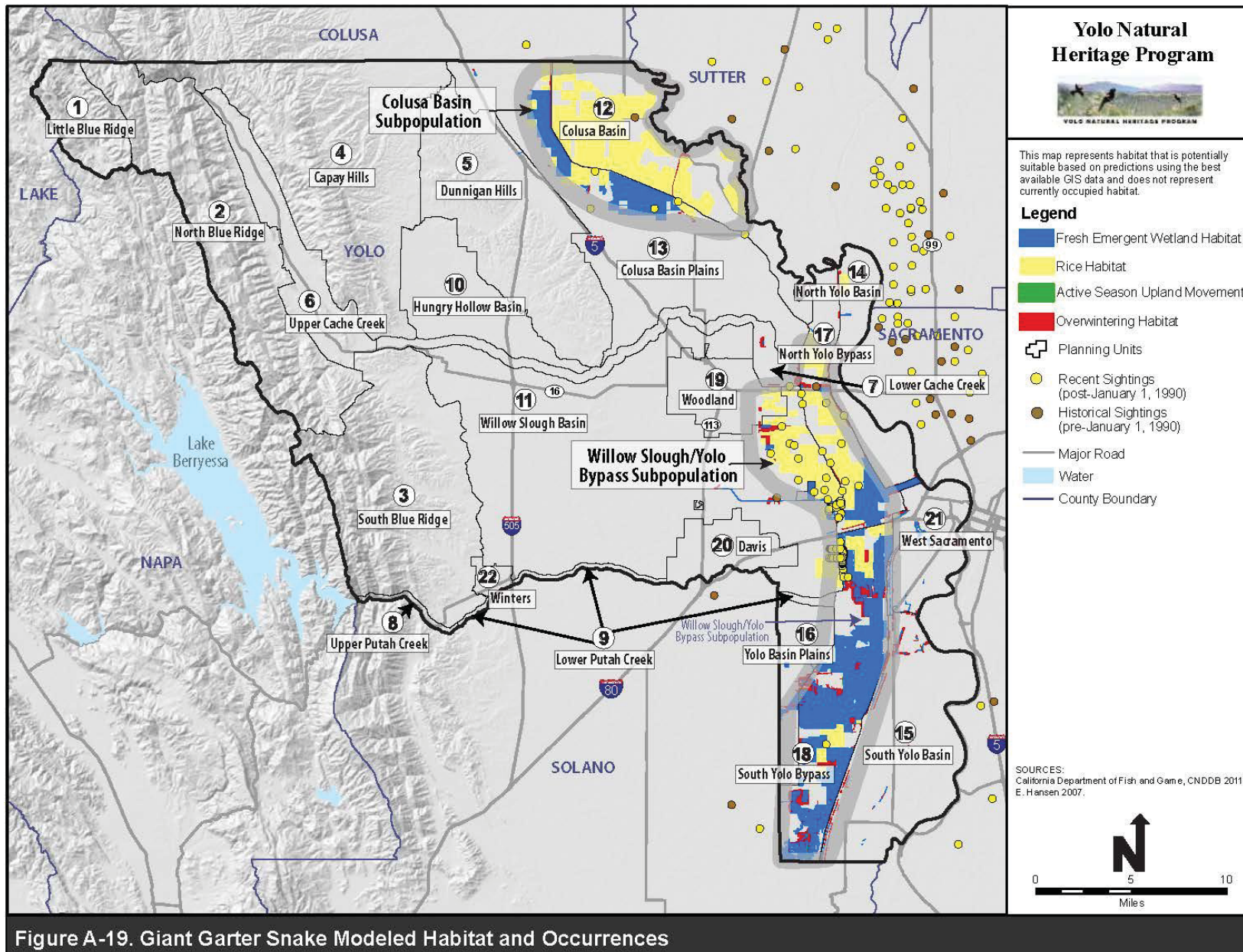
**CNPS CA Rare Plant Rank Decimal Extensions:** **.1** = Seriously threatened in CA (over 80% of occurrences threatened / high degree and immediacy of threat); **.2** = Moderately threatened in CA (20-80% of occurrences threatened / moderate degree and immediacy of threat); **.3** = Not very threatened in CA (< 20% of occurrences threatened / low degree and immediacy of threat or no threats known).

<sup>c</sup> **Sources:** 1 = USFWS (2020) letter; 2 = CDFW (2020c) CNDDDB query; 3 = CNPS (2020) query; 4 = Yolo HCP/NCCP.

## **APPENDIX F.**

Map of GGS Habitat by the Yolo Heritage Program

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## **APPENDIX G.**

### **Preliminary Burrowing Owl Survey Results (as of January 2020)**

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# SYCAMORE ENVIRONMENTAL CONSULTANTS, INC.

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30 January 2020

Troy Estacio, SVP Acquisitions & Development Services  
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Sacramento, CA 95814

Phone: (916) 379-3800  
Email: troyestacio@buzzoates.com

**Subject: January 2020 Burrowing Owl Survey Update for the Aggie Research Campus Project, Yolo County, CA**

Dear Mr. Estacio,

On 24 January 2020, Sycamore Environmental biologists commenced burrowing owl (*Athene cunicularia*) surveys for the Aggie Research Campus (ARC) Project located just east of the City of Davis in Yolo County, CA. This letter transmits initial results. A total of eight more surveys are planned. A final report documenting the results of the full set of breeding season surveys for burrowing owl will follow the final survey in June/July 2020.

## METHODS

Surveys are being conducted in accordance with the CDFW 2012 *Staff Report on Burrowing Owl Mitigation* guidelines (CDFW Guidelines). Table 1 summarizes the area surveyed, biological staff conducting the surveys, and the date and hours of the surveys.

Table 1. Summary of Burrowing Owl Surveys Conducted 2019-2020

DATE	AREA SURVEYED	BIOLOGISTS <sup>1</sup>	HOURS
7 Aug 2019	Project Site & 500-foot buffer	Mike Bower, M.S. Juan Mejia, B.S.	9:00 AM - 2:30 PM
24 Jan 2020	Project Site, Stormwater Capacity Area, & 500-foot buffer	Mike Bower, M.S. Juan Mejia, B.S. Elliot Maldonado, B.S.	6:30 AM - 4:00 PM

<sup>1</sup> Mike Bower, Juan Mejia, and Elliot Maldonado are Certified Yolo HCP/NCCP Qualified Biologists for burrowing owl.

The Burrowing Owl Survey Area is shown on the map in Attachment A. The Survey Area includes 1) the Project site, 2) annexation areas south of the Project site, 3) the northern and eastern sewer line alternatives, 4) the parcels considered for stormwater capacity work approximately 2 miles east of the Project site, and 5) suitable habitat within 500 feet of the aforementioned areas. The survey was performed by biologists with experience surveying for burrowing owl. The biologists walked transects through suitable habitat while searching for burrowing owl and potentially suitable burrows, as defined in the CDFW Guidelines. Binoculars were used to increase visual coverage and detection distances. The locations of reported burrowing owl sightings noted on eBird.org were closely inspected during surveys to verify whether the sightings corresponded with occupied burrows.



The CDFW Guidelines consider burrow sites to be *occupied* if a burrowing owl has been observed occupying a burrow, or burrowing owl sign has been observed at a burrow, within the last three years.

**PRELIMINARY RESULTS**

Table 2 is a summary of survey results thus far.

Table 2. Summary of Burrowing Owl Occupancy

SITE	LOCATION DESCRIPTION	OWLS/SIGN OBSERVED		OWLS LAST OBSERVED
		7 AUG 2019	24 JAN 2020	
A	Approximately 530 feet north of the Project Site, along north side of County Rd 30B	2 owls	2 owls	24 Jan 2019
B	Northwestern edge of Project Site, along east side of County Rd 104	1 owl		7 Aug 2019
C	Western edge of the Project Site, along east side of Mace Blvd, south of intersection with County Rd 104			8 Oct 2018 (survey for another project)
D	Approximately 400 feet west of the Project Site, in vacant lot north of 2nd St	1 owl		7 Aug 2019
E	Approximately 100 feet west of the Project Site, along west side of Mace Blvd; includes artificial burrows southwest of Mace Blvd/ 2nd St intersection	3 owls		7 Aug 2019
F	Approximately 360 feet east of the Mace Blvd / County Rd 32A intersection, along the south side of County Rd 32A		Whitewash & sm. mammal bones	No owls observed

Attachment A contains a map showing the locations of occupied and unoccupied burrow complexes documented thus far. A total of six occupied burrow complexes occur within approximately 500 feet of the Project (Sites A through F). Hundreds of currently unoccupied burrows occur in the Burrowing Owl Survey Area, mostly within the 500-foot survey buffer as shown on Attachment A.

These results are preliminary. An additional eight burrowing owl survey events are planned, including a full set of breeding season surveys in accordance with the CDFW Guidelines.

Please contact me if you have any questions.

Yours truly,



Mike Bowel, M.S.  
 Botanist/Biologist

Attachment A. Preliminary Burrowing Owl Survey Results Map

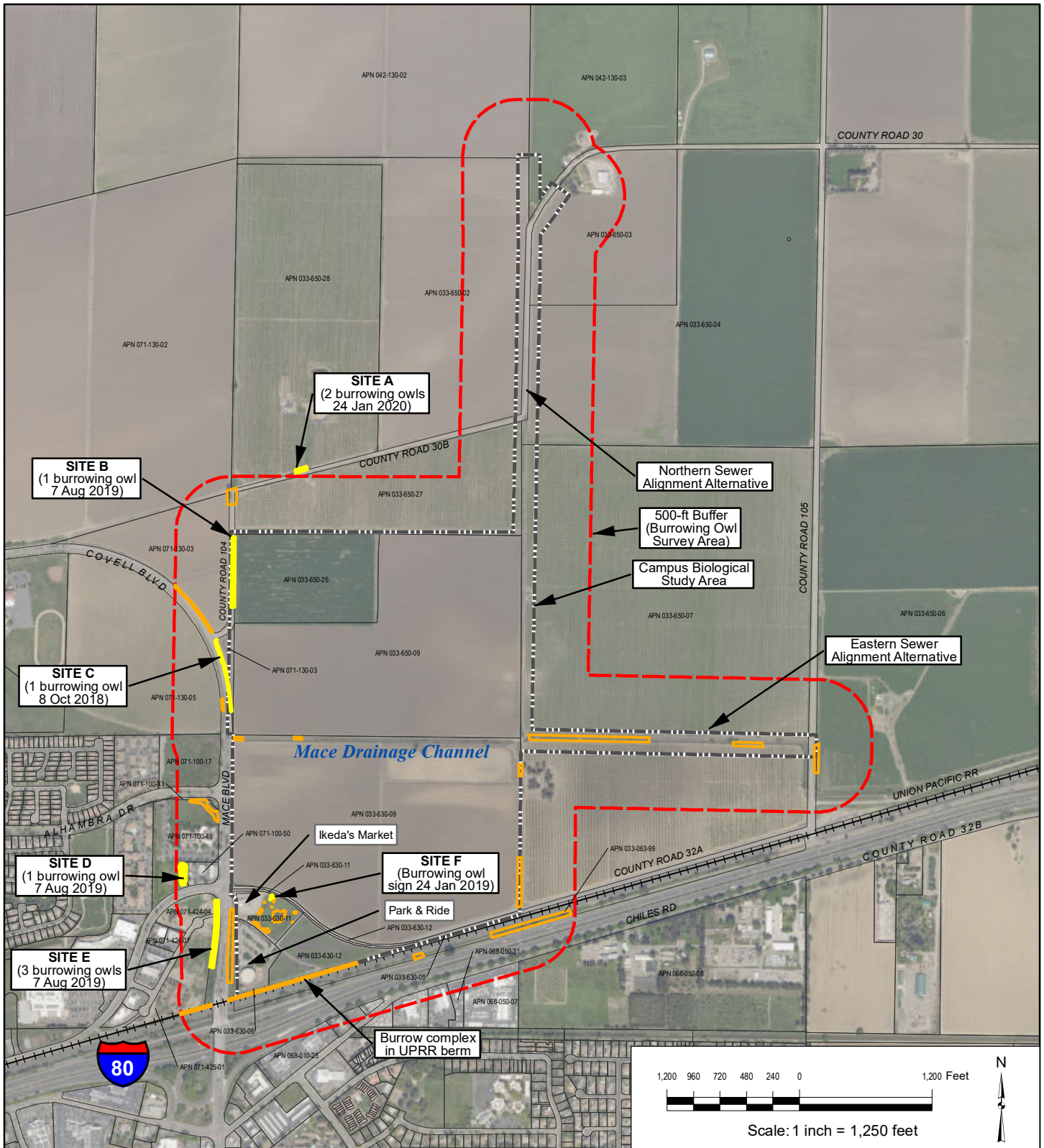
## **Attachment A.**

### **Preliminary Burrowing Owl Survey Results Map**

**January 2020**






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Aggie Research Campus  
 Yolo County, CA  
 30 January 2020

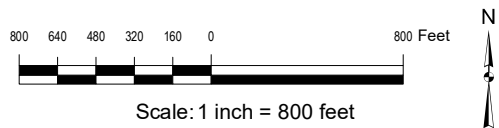
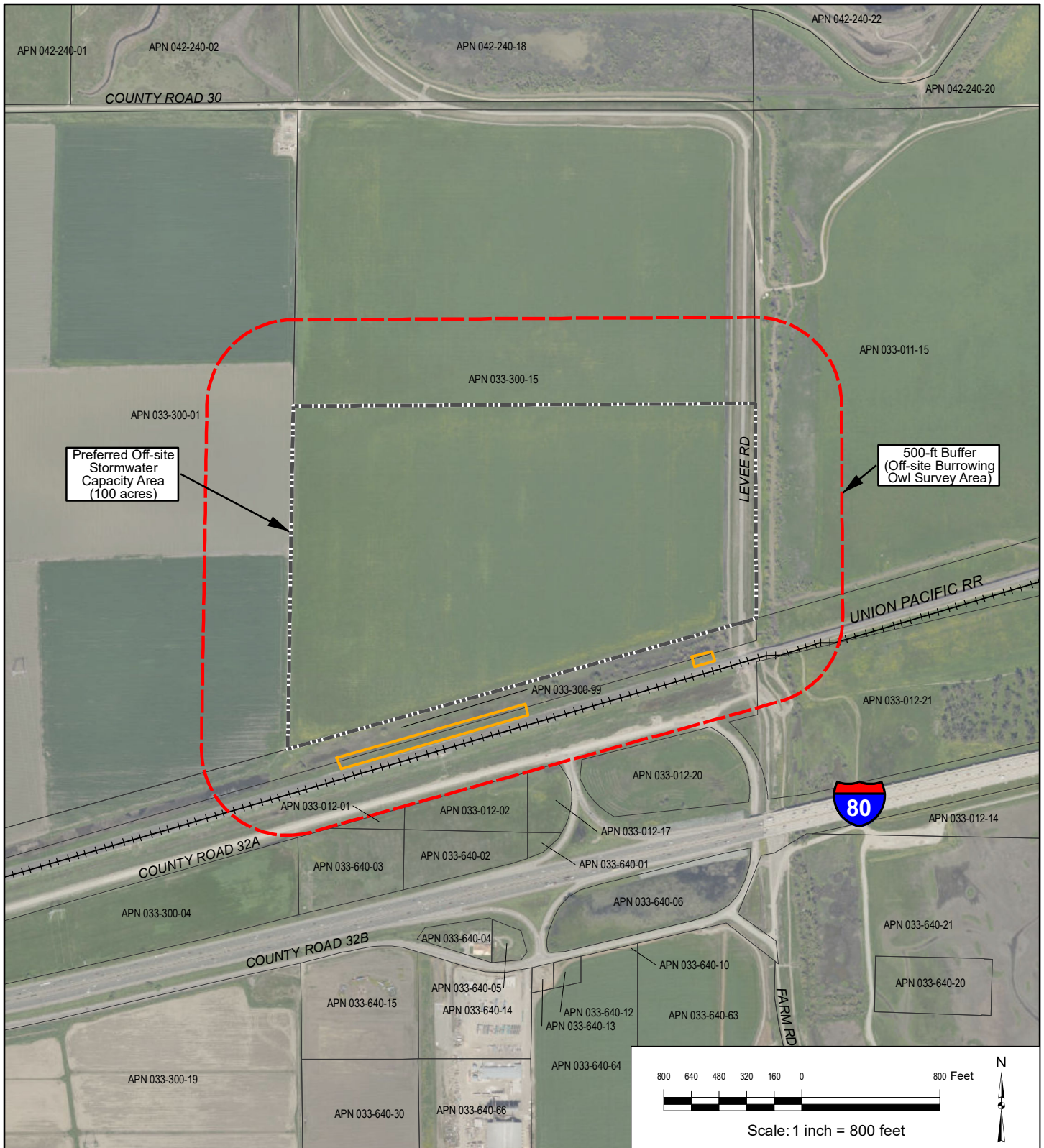
Attachment A.  
 Preliminary Burrowing Owl  
 Survey Results Map  
 Sheet 1 of 2, (Main Site)

-  Parcel Boundary
-  500-ft Buffer (Burrowing Owl Survey Area)
-  Burrow Complex With Owl Occupancy (Year Observed Occupied)
-  Burrow Complex - No Occupancy
-  Campus Biological Study Area







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Aerial Photograph: 13 August 2018  
 2018 Yolo County Orthos Imagery  
 ESRI World Imagery Arcmap Service Layer



Aggie Research Campus  
 Yolo County, CA  
 30 January 2020

Attachment A.  
 Preliminary Burrowing Owl  
 Survey Results Map  
 Sheet 2 of 2, (Off-site)

-  Preferred Off-site Stormwater Capacity Area (100 acres)
-  500-ft Buffer (Off-site Burrowing Owl Survey Area)
-  Burrow Complex - No Occupancy
-  Parcel Boundary



**SYCAMORE**  
 Environmental  
 Consultants, Inc.

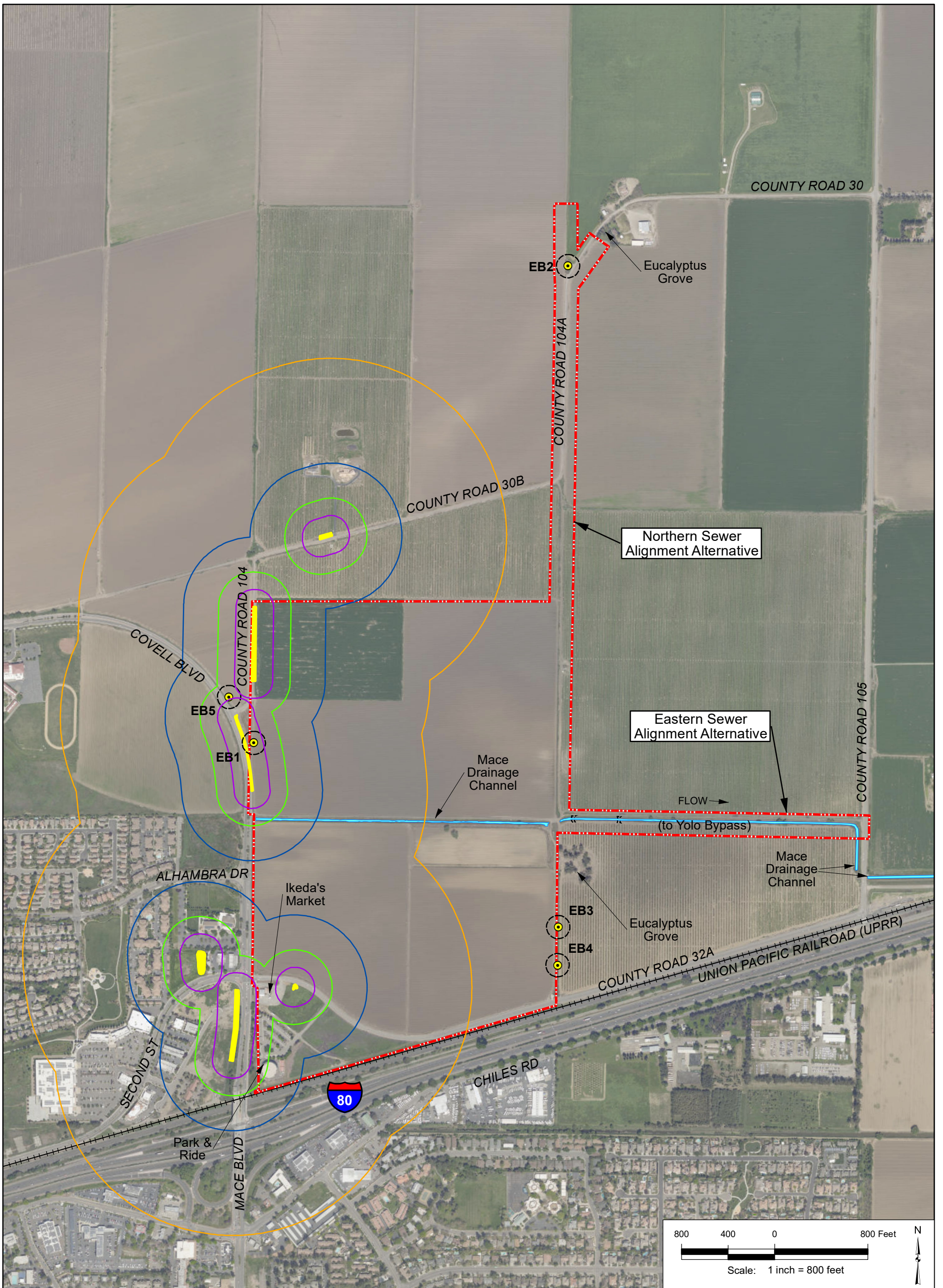
Aerial Photograph: 13 August 2018  
 2018 Yolo County Orthos Imagery  
 ESRI World Imagery Arcmap Service Layer

## **APPENDIX H.**

### Map of Yolo HCP/NCCP Resource Avoidance Buffers

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Aggie Research Campus  
 Yolo County, CA  
 3 February 2020

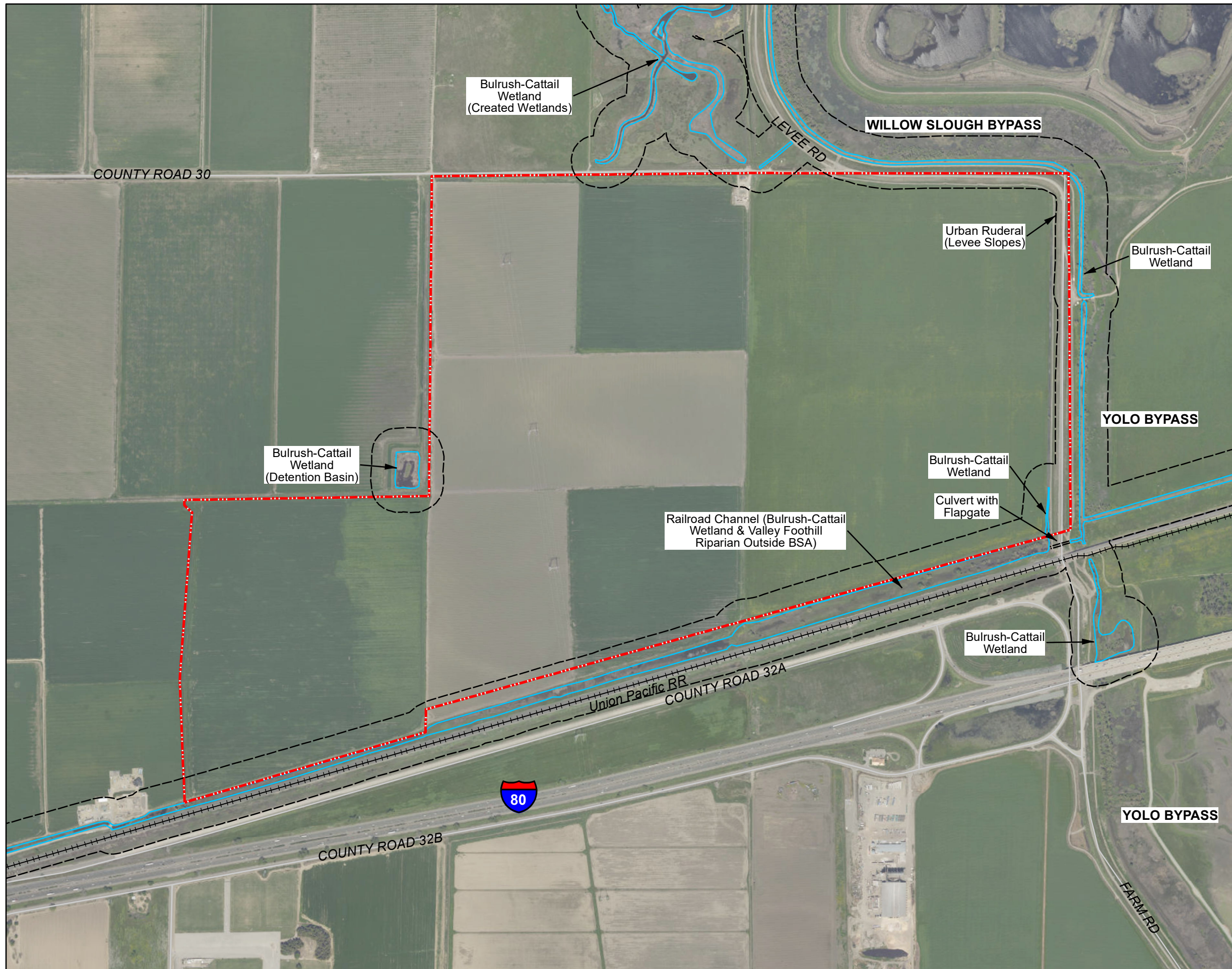
- Campus Biological Study Area (Campus BSA)
- Elderberry Shrub Location
- Elderberry Shrub Avoidance Buffer (100 ft)
- Burrow Complex With Owl Occupancy (Year Observed Occupied)
- Burrow Owl 150-ft Avoidance Buffer
- Burrow Owl 300-ft Avoidance Buffer
- Burrow Owl 600-ft Avoidance Buffer
- Burrow Owl 1,500-ft Avoidance Buffer



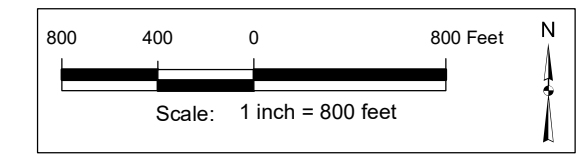
Aerial Photograph: 13 April 2018  
 2018 Yolo County Orthos Imagery  
 ESRI World Imagery Arcmap Service Layer  
 Avoidance Buffers from Table 2-2 of the  
 Yolo HCP/NCCP Permitting Guide  
 (November 2019).

Map of Yolo HCP/NCCP  
 Resource Avoidance Buffers  
 Sheet 1 of 2, Main Campus





- Stormwater Capacity Biological Study Area (Stormwater BSA)
- Giant Garter Snake Aquatic Habitat
- Giant Garter Snake Avoidance Buffer (200 ft)



Aerial Photograph: 13 April 2018  
 2018 Yolo County Orthos Imagery  
 ESRI World Imagery Arcmap Service Layer  
 Avoidance Buffers from Table 2-2 of the  
 Yolo HCP/NCCP Permitting Guide  
 (November 2019).



## **APPENDIX I.**

### GGG Habitat Evaluation

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## SYCAMORE ENVIRONMENTAL CONSULTANTS, INC.

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11 January 2016

Ms. Alisha Olson, Development Project Manager  
The Buzz Oates Group of Companies  
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Phone: 916/ 379-3838  
Email: [AlishaOlson@buzzoates.com](mailto:AlishaOlson@buzzoates.com)

**Subject: *Giant Garter Snake Habitat Evaluation for the Mace Ranch Innovation Center Project, Yolo County, CA***

Dear Ms. Olson,

Sycamore Environmental completed a year-long hydrological study and evaluation of giant garter snake (GGS; *Thamnophis gigas*) habitat for the Mace Ranch Innovation Center (MRIC) project site. The study supplements the results of the biological resources evaluation (BRE; Sycamore Environmental 2015) and may serve as partial satisfaction of the August 2015 Draft Environmental Impact Report (DEIR) mitigation measures for GGS (Attachment A).

The purpose of the study was to further characterize GGS habitat and potential to occur both on the main MRIC site and in the Mace Drainage Channel (MDC) downstream of the Project. The BRE concluded that:

*Urban influence, artificial hydrology, vegetation maintenance, culverts, and lack of water and suitable prey items during the active season make it unlikely that GGS would be able to travel to the site. Suitable GGS habitat is not present in the MDC within the BSA. GGS do not have the potential to occur in the BSA.*

This supplemental GGS habitat evaluation relies on much more data than the analysis in the BRE report and reaches the same conclusion.

### **STUDY AREA**

The MDC is the only potentially suitable aquatic habitat for GGS in or near the MRIC project and is the subject of this study. The MDC delivers stormwater and urban runoff from the City of Davis to the Yolo Bypass. The MDC enters the MRIC site through a pair of culverts beneath Mace Blvd. When sufficient water is present in the MDC, it flows east across the proposed MRIC project site, through a culvert beneath a farm road at the eastern edge of the MRIC site, eastward, under County Road 105, and ultimately under a 170-ft-wide levee and through a large metal flapgate to the Yolo Bypass, where GGS are known to occur.



## METHODS

Five long-term study sites were established along the MDC from Mace Blvd (upstream) to just west (downstream) of Road 105, spanning approximately 1.1 mi (see attached map and photos). The five sites were visited a total of 16 times, approximately once every 1 to 4 weeks, between 26 January 2015 and 30 November (see list of survey dates and study sites in Attachment D). During each site visit, the MDC was photographed and water present was noted at each study site. Dominant plant species in the MDC were identified and recorded at each study site (see photograph captions in Attachment C). Data were not collected from Study Site 4 and 5 on 30 January and 12 February 2015.

Precipitation preceding site visits would influence hydrologic observations. As noted in Attachment D, only the 9 April 2015 site visit was preceded by notable precipitation (approximately 1 inch recorded two days prior according to Sacramento Executive Airport Gauge data; NWS 2016).

Drought and irrigation practices could influence hydrologic observations in the MDC. On 30 September 2015, toward the end of the GGS active season, precipitation was 84% of normal based on observed and historic precipitation for the period between 1 October and 30 September 2015 (NWS 2016). Row-irrigated annual sunflower crops were grown along both sides of MDC on the MRIC site, and along the north side of the MDC east (downstream) of the MRIC site in 2015. Row-irrigated crops were also grown along the north side of the MDC farther downstream. Dry upland grain crops were grown on the north side of the channel near the Yolo Bypass. No rice was grown along the MDC in 2015. Rice farming has not occurred along the MDC for more than 20 years based on historical aerials available in Google Earth (Google, Inc. 2016). Some irrigation runoff was observed flowing into the MDC during fieldwork on 19 May and 11 July 2015. Precipitation and irrigation inputs into the MDC were typical in 2015 compared to most years.

## RESULTS AND DISCUSSION

**GGS Habitat in the Study Area:** GGS habitat requirements, biology, and known records are discussed in detail in the BRE (Sycamore Environmental 2015). Essential GGS habitat components include 1) adequate water during the snake's active season (early spring through mid-fall) to provide adequate permanent water to maintain dense populations of food organisms and 2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season (USFWS 1999). Both of these essential habitat components are lacking in the 1.1-mile long study reach.

No portion of the MDC within the study area provided permanent water in 2015. Study sites 2 through 5 were almost always dry. Water was intermittently present at study sites 2 through 5 immediately following precipitation events and during irrigation on adjacent farmland. While water was observed at Study Site 1 throughout most of the study duration (Attachment D), the water was restricted to an approximately 50-250-ft portion of the portion of the MDC adjacent to Mace Blvd, and it was typically no more than  $\pm 3$  inches deep. Water input from precipitation, urban runoff, and irrigation provided periodic short pulses of flow in the channel, but persistent pooling after these water inputs was not observed except as described above at Study Site 1 near Mace Blvd. Lack of permanent water greatly reduces the potential cover and prey base needed by GGS. Very shallow water does not provide adequate escape cover from GGS predators such as herons, and raccoons.

Vegetation in the MDC at study sites 2 through 5 was dominated by perennial pepperweed (*Lepidium latifolium*), bisnaga (*Ammi visnaga*), horseweed (*Erigeron* sp.; formerly *Conyza* sp.), yellow star-thistle

(*Centaurea solstitialis*) and nutsedge (*Cyperus eragrostis*) – most of which are not associated with permanent inundation. Cattails (*Typha* sp.) and bulrushes (*Schoenoplectus* sp.) consistent with permanent or near-permanent inundation were dominant in the MDC only at Study Site 1. Attachment C contains photographs of all five study sites on 11 August 2015, at the height of the GGS active season. The photographs show that most of the MDC was functioning as upland during the GGS active season. Vegetation in the MDC is periodically removed by the City of Davis to promote effective drainage of storm water (pers. comm., D. Ramos).

Anthropogenic (human-caused) changes in ecosystem dynamics may favor and subsidize populations of GGS predators such as domestic cats, especially in areas at the urban interface (USFWS 2006). While predators are not typically considered a substantial cause of GGS population-level decline, an abundance of predators would negatively affect the quality of potential habitat, especially in the absence of escape cover, and especially without other nearby sources of water.

Based on the lack of water (extent, depth, and duration) observed in the MDC study reach in 2015, the lack of emergent wetland vegetation present in 2015, periodic vegetation removal for drainage in the study reach, and urban influence, the portion of the MDC in the study reach does not provide suitable habitat for GGS.

**GGS Known Populations and Potential Dispersal to the Project Site:** The distribution of GGS is limited by both habitat suitability and relatively poor dispersal and colonization abilities (Halstead *et al.* 2015). Based on numerous studies, GGS show high site fidelity and occupy home ranges of approximately 0.066-0.170 mi<sup>2</sup> (USFWS 2015). Based on telemetry studies, GGS typically don't move more than about 1,000 feet in any single direction during any given season when in suitable habitat (USFWS 2015).

The nearest known populations of GGS are in Willow Slough north of the Project and in the Yolo Bypass, east of the Project. The MDC is not directly connected to Willow Slough. Both Willow Slough and the MDC drain to the Yolo Bypass. Water in the MDC drains into the Bypass through an approximately 8-ft wide, one-way metal flap gate that rests in the closed position. No water flows from the Bypass back into the MDC. There is no aquatic habitat connectivity between the MRIC site and known GGS populations. To reach the MDC within the Project site, GGS in the Yolo Bypass would need to travel over 170 ft of barren Yolo Bypass levee and then approximately 2.5 miles in the generally dry MDC, or roughly 13 times the distance GGS typically move in a season based on telemetry studies (USFWS 2015).

**CONCLUSION**

The portion of the MDC in the study area (including the MRIC site) does not provide suitable habitat for GGS. Although water was present in roughly 50-250 ft of the MDC near Mace Blvd during much of 2015, the water was not permanent, not deep enough to provide effective escape cover, and not of sufficient extent to support a GGS population. The MRIC site is not within dispersal distance of known GGS populations and the MDC is a poor GGS dispersal pathway.

Please contact me if you have any questions.

Yours truly,



Mike Bower, M.S.  
Botanist/Biologist

**Attachment A.** Copy of August 2015 DEIR Mitigation Measures for Giant Garter Snake

**Attachment B.** Map of GGS habitat study sites

**Attachment C.** Photographs of GGS habitat study sites

**Attachment D.** GGS Study Site Hydrological Data Table

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## **Personal Communication**

- Dan Ramos, Vice President, Ramco Enterprises, Inc. 7 October 2014. Onsite interview regarding offsite improvements, agricultural history, detention basin history and use, and drainage feature.

# ***GGs Habitat Evaluation***

## **Attachment A.**

Copy of August 2015 DEIR Mitigation Measures for Giant Garter Snake

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inactive season, GGS could seek refuge in burrows and cracks in the upland habitat. If an off-site volume storage pond is constructed within the southern portion of the area shown in Figure 4.4-3, near the Railroad Channel, the possibility exists for GGS to be adversely impacted should GGS occur in this upland habitat.

With implementation of the following mitigation measure, development of the MRIC site near the MDC, would have a *less-than-significant* impact to GGS.

Mitigation Measure(s)

*MRIC*

4.4-3(a) *To ensure avoidance and minimization of impacts to GGS, the project applicant for the MRIC shall implement the following measures:*

*Mace Drainage Channel – Preconstruction Surveys*

- *Within 15 days prior to conducting any work in the Mace Drainage Channel or existing on-site detention basin, the project applicant shall retain a qualified biologist to conduct a preconstruction survey to verify that no water is present in the channel within the project limits. The preconstruction survey shall be submitted to the City of Davis Department of Community Development and Sustainability for review.*
- *The qualified biologist shall document whether aquatic habitat is present in the Mace Drainage Channel downstream of the MRIC site. If aquatic habitat is not present in the Channel between the MRIC site and CR 105 (a distance of 0.5 miles), then aquatic habitat connectivity is not present in the Mace Drainage Channel and further preconstruction surveys or construction monitoring is not required.*
- *If water is present within the on- and off-site project limits, the Mace Drainage Channel shall be dewatered for a minimum of two weeks prior to construction activities in the Channel.*
- *If the first preconstruction survey reveals that aquatic habitat is present in the Channel between the project site and CR 105, a second preconstruction survey shall be conducted within 24 hours prior to construction. The second preconstruction survey shall be submitted to the City of Davis Department of Community Development and Sustainability for review. The second preconstruction survey shall cover the portion of the Mace Drainage Channel located on the MRIC site, and areas within 200 feet of the channel. If, based on the preconstruction surveys, it is determined that potentially occupied GGS aquatic habitat occurs*

# ***GGS Habitat Evaluation*** **Attachment B.**

Map of GGS habitat study sites




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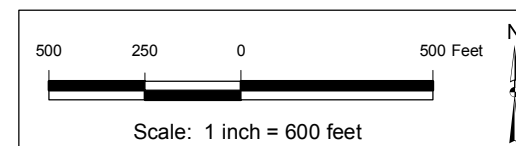




Mace Ranch Innovation Center  
 Yolo County, CA  
 8 January 2016

Map of giant garter snake  
 habitat study sites

-  Project Boundary
-  Mace Drainage Channel
-  GGS Study Sites



Aerial Photograph: 2 February 2010  
 US-CA-Sacramento, UC-G Microsoft Imagery  
 ESRI World Imagery Arcmap Service Layer



# ***GGG Habitat Evaluation*** **Attachment C.**

Photographs of GGS habitat study sites

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Photo 1. View from Mace Blvd (Study Site 1) looking east toward the Mace Drainage Channel (MDC). Water  $\pm 2$  inches deep visible in foreground. Cattails (*Typha* sp.) dominate this portion of the MDC. 11 August 2015.



Photo 2. View east toward the MDC near the middle of the MRIC site between Study Site 1 and 2. The MDC is dry and little wetland vegetation is present. 11 August 2015.



Photo 3. View west toward the MDC near the middle of the MRIC site between Study Site 1 and 2. The MDC is dry and little wetland vegetation is present. 11 August 2015.



Photo 4. View west toward the MDC at Study Site 2. The MDC is dry and vegetation is dominated by perennial pepperweed (*Lepidium latifolium*). 11 August 2015.



Photo 5. View east toward the MDC at Study Site 3, just east of the MRIC site. The MDC is dry and vegetation in the bed of the MDC (mostly *Ammi visnaga*, a plant typically found in disturbed uplands) is drying out. 11 August 2015.



Photo 6. View west toward the MDC from along Road 105 between Study Sites 3 and 4. The MDC is dry and vegetation in the MDC is dominated by perennial pepperweed and yellow star-thistle. 11 August 2015.





Photo 7. View west toward the MDC from along Road 105 at Study Site 4. The MDC is dry and dominated by perennial pepperweed. 11 August 2015.



Photo 8. View east toward the MDC from along Road 105 at Study Site 5. The MDC is dry and dominated by perennial pepperweed, Nutsedge (*Cyperus eragrostis*), and horseweed (*Erigeron* sp.). One young Chinese tallow tree (*Triadica sebifera*) on right. 11 August 2015.



***GGG Habitat Evaluation***  
**Attachment D.**

GGG Study Site Hydrological Data Table

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Mace Ranch Innovation Center – Hydrologic Observations

Date	Biologist	Water Present? (X = Yes)					Notes
		Site 1	Site 2	Site 3	Site 4	Site 5	
		East of Mace	West of Dirt Rd	East of Dirt Rd	West of Rd 105	East of Rd 105	
01/26/15	Noosheen Pouya	X	--	--	--	--	
01/30/15	Andy Loveall	X	--	--	No data	No data	
02/12/15	Andy Loveall	X	--	--	No data	No data	
02/20/15	Andy Loveall	X	--	--	--	--	
03/02/15	Andy Loveall	X	--	--	--	--	
03/13/15	Andy Loveall	X	--	--	--	--	
04/09/15	Noosheen Pouya	X	X	X	X	X	Water not flowing. Precipitation totaling 0.96 inches observed at Sac Executive Gauge on 7 April 2015.
04/23/15	Noosheen Pouya	X	--	--	--	--	
05/07/15	Mike Bower	X	--	--	X	X	Rd 105 water due to back up of water downstream, not flowing, unknown source, possibly irrigation related.
05/19/15	Mike Bower	X	X	--	--	--	West of Dirt Rd water due to irrigation runoff on MRIC site south of Mace Channel
06/22/15	Carly Rich	X	--	--	--	--	
07/11/15	Mike Bower	X	X	X	--	--	West of Dirt Rd water due to irrigation runoff on MRIC site south of Mace Channel.
08/11/15	Mike Bower	X	--	--	--	--	
09/11/15	Mike Bower	X	--	--	--	--	
10/10/15	Mike Bower	X	--	--	--	--	Almost no water near Mace.
11/30/15	Juan Mejia	--	--	--	--	--	No water present at all sites.