

Memo



To: George Booth – Sacramento County
From: Lynn Hermansen and Eric Htain
cc: Jeffrey Twitchell
Date: January 23, 2020
Re: Biological Resources Assessment for the Community of East Walnut Grove
Small Communities Flood Risk Reduction Feasibility Study
Sacramento County, CA
GEI Project 1800779

GEI Consultants, Inc. (GEI) is assisting the Sacramento County Department of Water Resources in conducting a feasibility study to evaluate structural and non-structural actions to reduce the risk of flooding to the East Walnut Grove study area. The feasibility study is being funded under the California Department of Water Resources (DWR) Small Communities Flood Risk Reduction Program. As part of this feasibility study, GEI conducted a biological resources assessment to identify potential biological resources constraints within the study area. This Technical Memorandum summarizes the findings of the biological resources constraints assessment.

Project Location and Setting

The East Walnut Grove study area is located in Sacramento County, California, along the east bank of the Sacramento River and Georgiana Slough, between Snodgrass Slough to the east and the Delta Cross Channel to the north. The study area includes areas covered by Reclamation Districts 554 and 563 (Tyler Island). The study area encompasses approximately 1.5 miles of levee along the east bank of the Sacramento River, approximately 1.8 miles of levee along Snodgrass Slough, and approximately 0.7 miles of cross levee adjacent to the Delta Cross Channel (**Figure 1**). Major roadways in the study area include River Road located on the east bank of the Sacramento River, Lambert Road bisecting the northern portion of the study area, and Twin Cities Road bisecting the southern portion of the study area.

Land use supports urban and residential development, and agriculture. Urban and residential development is situated entirely in the historic town of Walnut Grove. Agriculture land uses consist primarily of vineyards and pear orchards.

Methodology

Information on the biological resources known or with potential to occur in the project area and vicinity is based on information obtained by reviewing historical aerial photographs and biological resources databases, including the U.S. Fish and Wildlife Service [(USFWS) Information, Planning, and Consultation System; USFWS 2018], National Marine Fisheries Service [(NMFS) California Species List; NMFS 2018] California Department of Fish and Wildlife (CDFW) California Natural Diversity Database [(CNDDDB); CNDDDB 2018] and the California Native Plant Society (CNPS) online inventory of rare and endangered plants (CNPS 2018). These sources were queried for the Isleton and Thornton U.S Geological Survey 7.5-minute quadrangle, within which the study area is located, and the

surrounding quadrangles: Liberty Island, Courtland, Bruceville, Galt, Lodi North, Lodi South, Terminous, Bouldin Island, Jersey Island, and Rio Vista. Copies of the database results are provided in **Appendix A**.

The U.S. Fish and Wildlife Service National Wetland Inventory (NWI) was reviewed to identify any sensitive aquatic features that may have been previously mapped within the study area (NWI 2018). The Natural Resource Conservation Service (NRCS) Web Soil Survey (NRCS 2018) was also queried for the study vicinity and is depicted in **Figure 2**.

In 2012, RD 554 and RD 563 developed Five-Year Plans (Plans) to outline an anticipated repair and improvements schedule for flood protection around the study area (DCC 2012; KSN 2012, respectively). The Plans provide, among other things, assessments of the existing levee systems of the districts and identification of opportunities for multi-objective projects. Part of the identification of multi-objective projects is the consideration of ecosystem restoration and habitat enhancement activities. In order to conduct these evaluations of ecosystem restoration and habitat enhancement opportunities, habitat assessments to determine the existing habitat conditions .

Habitat assessments were prepared for the Plans by the California Department of Fish and Wildlife in 2007 and 2002, respectively for RD 554 and 563. The habitat assessments included a baseline of habitat values on and around the levees and mapping of habitat types in the same area. The assessments and mapping were restricted to the area on and immediately adjacent to the levees and therefore captured primarily riparian, shrub scrub, and some wetland habitat types.

GEI reviewed the Plans and additional existing databases, documents, and maps to establish an environmental baseline condition for the entire East Walnut Grove study area. GEI Restoration Ecologist Lynn Hermansen and Biologist Devin Barry conducted a reconnaissance survey in November 2018 to record the site conditions in and around the study area. The survey included photographing the extent of the study area and mapping or confirming previous maps of the general vegetation communities and other biological resources in the study area to verify the information presented in the Plans and update or revise the information if necessary. Based on the review of the database and literature searches and reconnaissance survey, GEI prepared Tables 1 and 2 in **Appendix A** which describe the potential for special-status species to occur within the East Walnut Grove study area.

Biological Resources

Elevations in the study area vary from approximately -3 to 40 feet national geodetic vertical datum (NGVD88), with the highest elevations located on the non-project levee along Sacramento River and the lowest elevations are located towards the interior of agricultural land.

According to the Natural Resource Conservation Service, four soil types intersect the study area boundary (**Figure 2**). All soils are typically associated with floodplain alluvial processes and are primarily silty clay loam in texture. Soil types include Scribner clay loam, Egbert clay, Laugenour loam, and Gazwell mucky clay.

According to the NWI database, riverine, freshwater forest/shrub wetland, freshwater pond, and palustrine farmed features are found in the study area. The Sacramento River is located adjacent to the northwestern boundary of the study area and flows into Georgina Slough, a wide waterway along the southwest boundary. Snodgrass Slough, situated on the entire eastern boundary of the study area, intersects the Delta Cross Channel bordering the northern portion of the study area. Irrigation ditches

throughout the interior of the study area, among parcels of agricultural land, provides drainage to the property owners, but the water is removed at a pumping plant before entering waterways.

Vegetation Communities

Vegetation classifications include a crosswalk between Central Valley Riparian Mapping Project (CVRMP) and the U. S. National Vegetation Classification Standard (NVCS), whereby habitat is defined by CVRMP and the associated vegetation included in the NVCS (Geographic Information Center 2012; USNVCS 2017, respectively). Extensive mapping of habitats was completed for the Central Valley Flood Protection Plan (CVFPP), including habitats in the study area, under the CVRMP. Habitat classifications in this memorandum are consistent with the classifications for the CVRMP. However, vegetation classifications follow the NVCS standard, which is applicable for future environmental analyses to support CEQA and permitting efforts. The crosswalk combines the two standards so that the information provided below can be used to inform both planning and environmental analysis efforts. According to the crosswalk, there are nine vegetation communities in the study area (**Figure 3**).

Orchard and Vineyard

Agricultural land in the study area is predominately vineyard (*Vitis* ssp.) with pear orchard (*Pyrus communis*) in the northern portion of the study area.

Cropland and Pasture

Within the interior of study area, patches of corn (*Zea mays*), small fields of alfalfa (*Medicago sativa*) and other miscellaneous row crops characterize the general agricultural landscape.

Riparian Forest

Riparian forest was identified primarily along the western boundary with small, narrow patches along meadows, slough, and around bodies of open water throughout the study area. Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), boxelder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), and black willow (*Salix gooddingii*) are the dominant species in this habitat.

Other Natural

Vegetation characterized as *Other natural*, is found predominately along levees and urban landscape, and includes annual grasses such as johnsongrass (*Sorghum haepense*), wild oats (*Avena fatua*), and rip-gut brome (*Bromus diandrus*), native trees and shrubs, and naturalized vegetation such as sweet fennel, (*Poeniculum vulgare*), black mustard (*Brassica nigra*), wild radish (*Raphanus sativus*), poison-hemlock (*Conium macalatum*), and milk thistle (*Silybum marianum*).

Riparian Scrub

Narrow patches of riparian scrub were identified throughout the study area and includes sandbar willow (*Salix exigua*), California mugwort (*Artemisia douglasiana*) and common buttonbush (*Cephalanthus occidentalis*). Intermixed within patches of riparian scrub also includes hydrophytic vegetation such as scouringrush horsetail (*Equisetum hyemale*) and common rush (*Juncus effusus*).

Marsh

Patches of tidal and non-tidal marsh are present along Snodgrass Slough, with narrow patches along aquatic features and small patches within the interior. Marsh vegetation includes freshwater emergent species such as hardstem bulrush (*Schoenoplectur acutus*) and broadleaf cattail (*Typha latifolia*), and non-native Himalayan blackberry (*Rubus armeniacus*).

Seasonal Wetland

A single patch of seasonal wetland was identified along an drainage ditch in the center of the of the study area, and includes species of naturalized warm-temperate species such as peppergrass (*Lepidium latifolium*) and floating aquatic vegetation such as water fern (*Azolla filiculoides*).

Urban

Urban landscape within the study area includes ground covered by backyard lawns, ornamental plantings, and small structures (e.g., retaining walls, planters, stairs) along the levee landside.

Aquatic

The Sacramento River, Georgiana Slough, Snodgrass Slough, and the Delta Cross Channel are the primary aquatic features within the study area. There are areas of floating vegetation on the surface on the river, especially surrounding boat docks. Species include water primrose (*Ludwigia peploides*) and water hyacinth (*Eichhornia crassipes*).

Special-Status Species

Review of the database resources mentioned above show that 14 special-status plant species and 34 special-status wildlife species are documented or have potential to occur in the study area, as shown on **Tables 1 and 2 in Appendix A. Figure 4** depicts CNDDDB occurrences of special-status plant and wildlife species within 1 mile of the study area.

There are 11 special-status plant species with moderate potential to occur in the vicinity. Three species, woolly rose-mallow (*Hibiscus lasiocarpus* var. *occidentalis*), sanford's arrowhead (*Sagittaria sanfordii*), and Suisun Marsh aster (*Symphotricum lentum*), have high potential to occur, with known CNDDDB occurrences in the study area (**Table 1**). The study area supports suitable habitat for five special-status fish species. The following fish species are considered to have a high potential to occur: green sturgeon—southern Distinct Population Segment (DPS; *Acipenser medirostris*), California Central Valley steelhead DPS (*Oncorhynchus mykiss irideus*), Chinook Salmon—Sacramento River winter—run, Chinook Salmon—Central Valley spring—run (*Oncorhynchus tshawytscha*), and Delta smelt (*Hypomesus transpacificus*). Wildlife species with high potential are Swainson's hawk (*Buteo swainsonii*), Modesto song sparrow (*Melospiza melodia*), and Mexican free-tailed bat (*Tadarida brasiliensis*). An additional thirteen special-status wildlife species have a moderate potential to occur in the study area (**Table 2**).

Designated USFWS and NMFS critical habitat and Essential Fish Habitat (EFH) occur within the Sacramento River and border the study area. Critical habitat for five species is present in the study area: green sturgeon DPS, California Central Valley DPS steelhead, Sacramento River chinook salmon, Central Valley chinook salmon, and Delta smelt. The study area also provides EFH for groundfish and chinook salmon.

Findings and Recommendations

Based on review of existing documents, databases, and literature searches, in combination with a reconnaissance field visit of the study area, the study area contains several sensitive vegetation communities and habitat for several special-status species. Sensitive vegetation communities in the study area include riparian forest, riparian scrub, marsh, seasonal wetland, and open water (aquatic). The majority of these sensitive vegetation communities are present on the water side of the levees surrounding the study area. Seasonal wetlands occur both on the water side of the levees surrounding the study area and in patches within the interior study area near sloughs and ditches. Project activities that have the potential to affect these vegetation communities may require additional studies and environmental permits.

The study area contains habitats that support known occurrences of three special-status plant species. The study area also has the potential to support 11 additional special-status plant species and 23 special-status wildlife species. In addition, the Sacramento River, Mokelumne River, Snodgrass Slough, and Georgiana Slough are considered critical habitat and Essential Fish Habitat (EFH) for several fish species.

Implementation of the project is expected to require compliance with environmental regulations including preparation of a document under the California Environmental Quality Act (CEQA) and regulatory permits including Clean Water Act Section 404 and 401 permits, a permit under Section 10 of the Rivers and Harbors Act of 1899, approvals under the federal Endangered Species Act and California Endangered Species Act, and a Streambed Alteration Agreement from the California Department of Fish and Wildlife.

Prior to coordination with regulatory agencies on the specific compliance document and permits needed for the project, GEI recommends conducting the following studies:

- A wetland delineation of the study area, in accordance with the 1987 USACE Wetland Delineation Manual and Sacramento District standards; and
- Focused habitat classification and assessments to determine the potential impacts of the project on special-status species.

References

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- California Native Plant Society (CNPS). 2018. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society. Sacramento, California. Available at: <http://www.cnps.org/cnps/rareplants/inventory/>. (accessed October 24, 2018).
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Figures

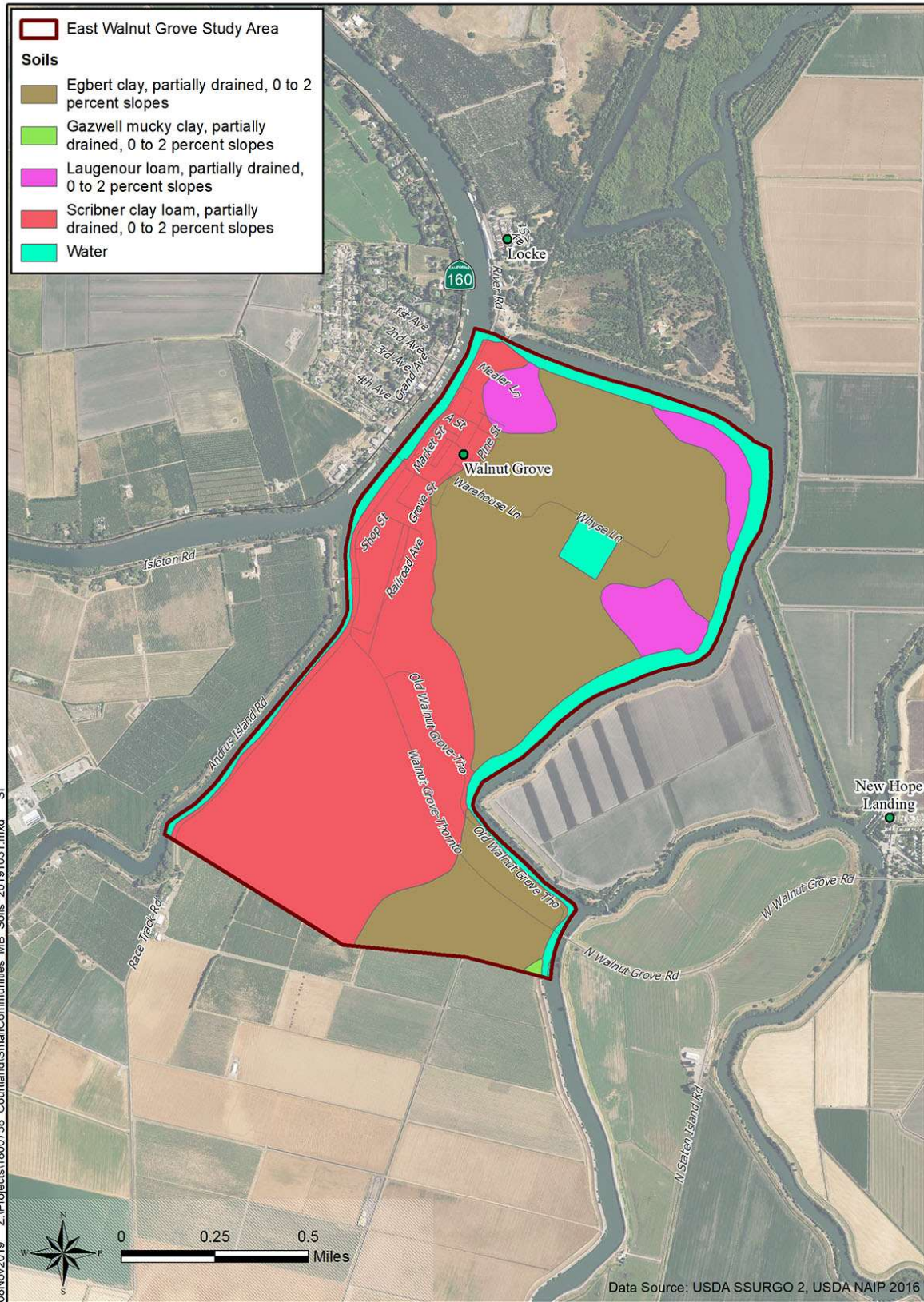
Figure 1. East Walnut Grove Study Area



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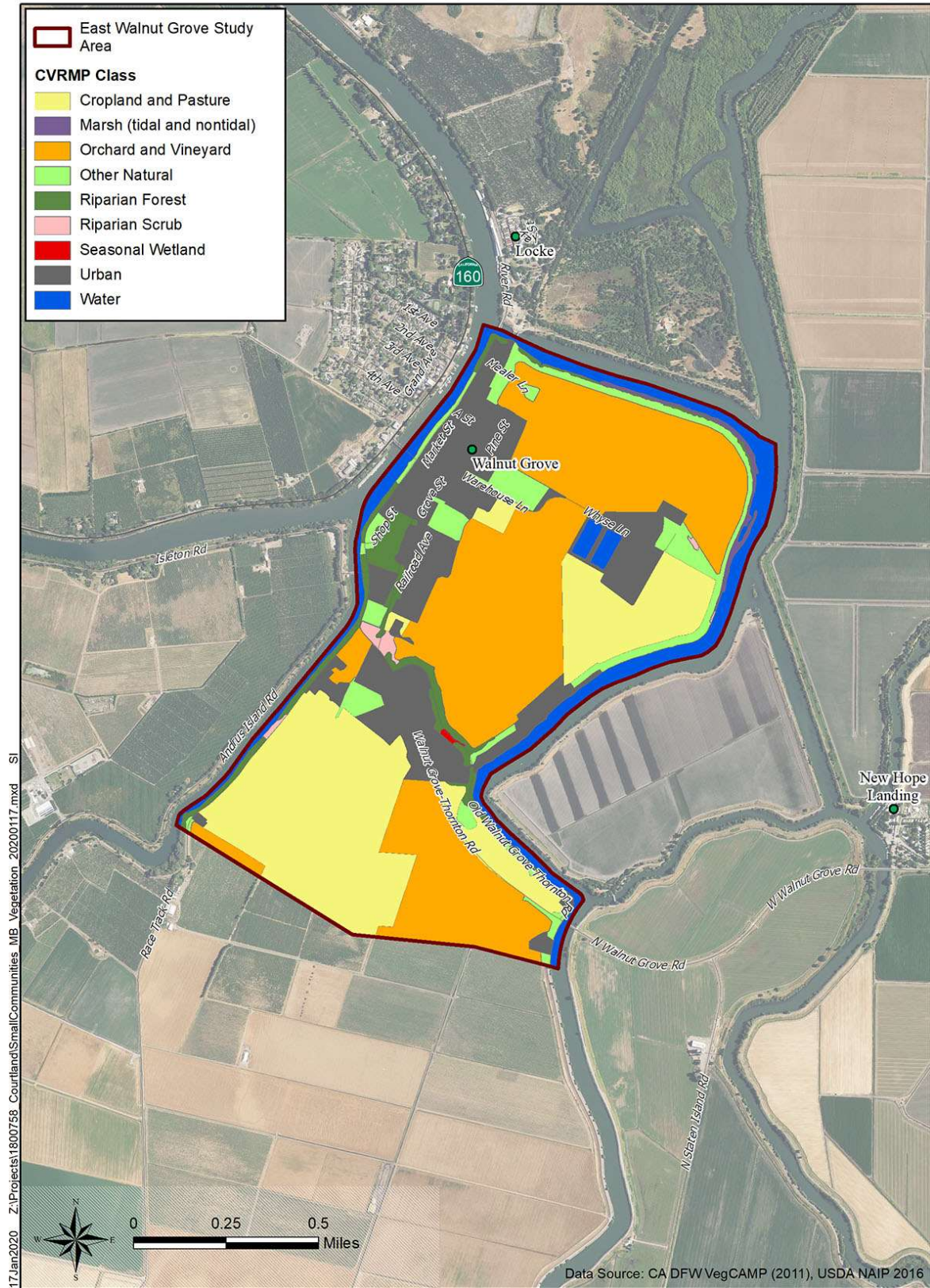
Source: GEI Consultants, Inc., 2019

Figure 2. Community of East Walnut Grove Soils Map



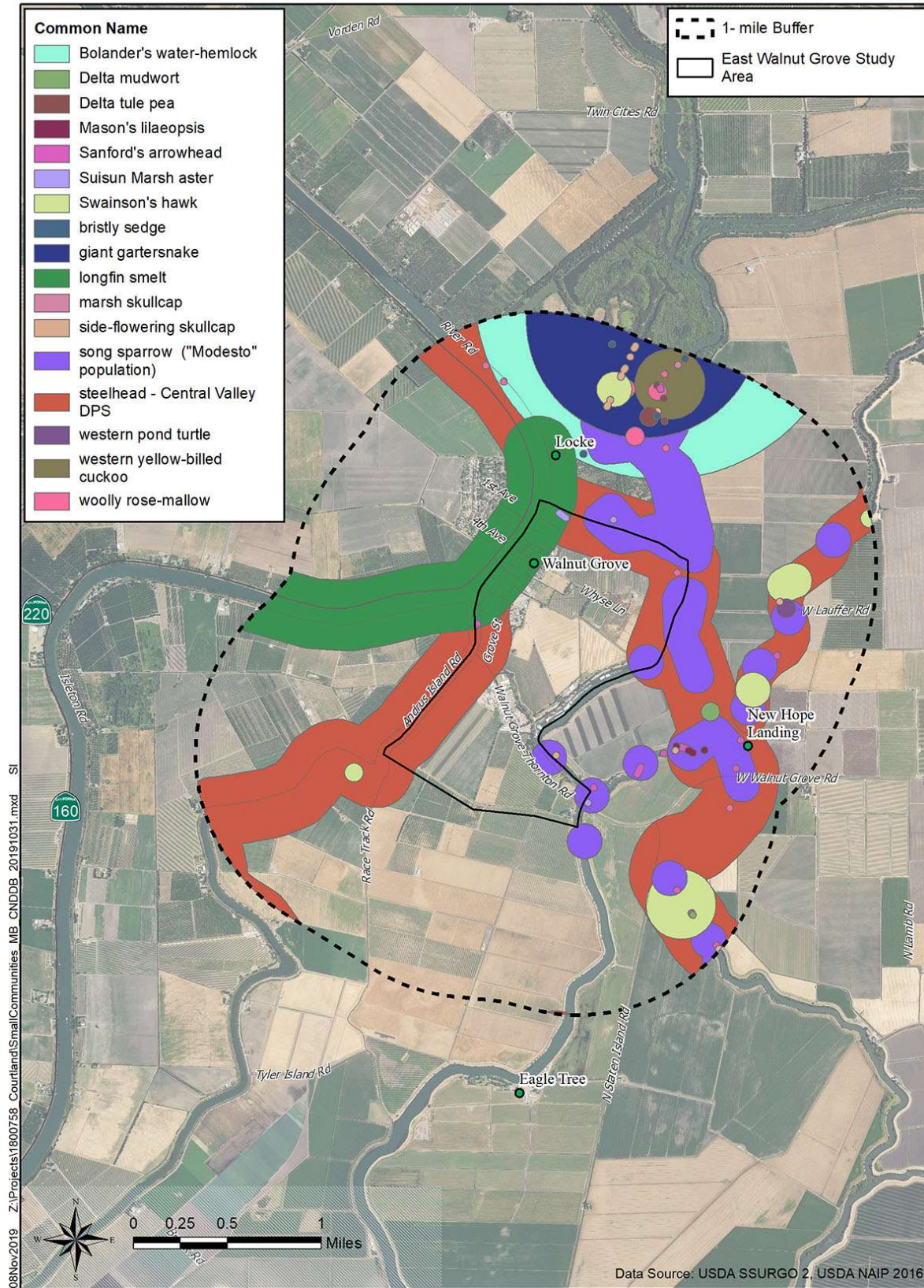
Source: GEI Consultants, Inc., 2019

Figure 3. Community of East Walnut Grove Vegetation Map



• Source: GEI Consultants, Inc., 2019

Figure 4. East Walnut Grove Special Status Species per CNDDB



Source: GEI Consultants, Inc., 2019

Appendix A. Database Results

Table 1. Special-Status Plant Species Occurrence Potential within the Study Area

Species	Blooming Period	Status ¹			Habitat Associations	Potential for Occurrence in the Study Area
		Federal	State	CRPR		
Large-flowered fiddleneck <i>Amsinkia grandiflora</i>	April–May	FE	–	1B.1	Valley and grassland and foothill woodland; grassy slopes.	Moderate: suitable habitat present in study area.
Watershield <i>Brasenia schreberi</i>	Jun–Sept	–	–	2B.3	Marshes and swamps.	Moderate: suitable habitat present in study area.
Bristly sedge <i>Carex comosa</i>	May–Sept	–	–	2B.1	Coastal prairie; marshes and swamps, valley and foothill grassland.	Moderate: suitable habitat present in study area.
Soft bird's-beak <i>Chloropyron molle</i> ssp. <i>molle</i>	Jun–Nov	–	–	1B.2	Marshes and swamps (coastal salt)	Low; suitable habitat adjacent to survey area; however, suitable soil lacking in study area.
Bolander's water-hemlock <i>Cicuta maculata</i> var. <i>bolanderi</i>	Jul–Sept	–	–	2B.1	Marshes and swamps; Coastal, fresh or brackish water.	Moderate: suitable habitat present in and adjacent to study area.
Woolly rose-mallow <i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	June–Sep	–	–	1B.2	Freshwater wetlands, wet banks, marshes below 300 feet; often in riprap on sides of levees.	High; known CNDDDB occurrence within study area.
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	May–Sep	–	–	1B.2	Coastal and estuarine marshes, freshwater marsh slopes, and tidal river banks.	Moderate: suitable habitat present in and adjacent to study area.
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	April–Nov	–	–	1B.1	Brackish and freshwater marshes and streambanks; regularly inundated tidal zones, on mud-banks and flat along erosional creek-banks, sloughs, and rivers.	Moderate; suitable habitat present in and adjacent to study area.
Delta mudwort <i>Limosella australis</i>	May– Aug	–	–	2B.1	Muddy or sandy intertidal flats, brackish water.	Moderate; suitable habitat present in and adjacent to study area.
Eel-grass pondweed <i>Potamogeton zosteriformis</i>	Jun–Jul	–	–	2B.2	Freshwater and brackish marshes and swamps.	Moderate; suitable habitat present in and adjacent to study area.
Sanford's arrowhead <i>Sagittaria sanfordii</i>	May–Nov	–	–	1B.2	Slow-moving or standing freshwater ponds, marshes, and ditches.	High; known CNDDDB occurrence within study area.
Marsh skullcap <i>Scutellaria galericulata</i>	Jun–Sept	–	–	2B.2	Meadows and seeps, marshes and swamps, lower montane coniferous forest.	Moderate; suitable habitat present in and adjacent to study area.

Table 1. Special-Status Plant Species Occurrence Potential within the Study Area

Species	Blooming Period	Status ¹			Habitat Associations	Potential for Occurrence in the Study Area
		Federal	State	CRPR		
Side-flowering skullcap <i>Scutellaria lateriflora</i>	July—Sept	–	–	2B.2	Meadows and seeps, marshes and swamps.	Moderate; suitable habitat present in and adjacent to study area.
Suisun Marsh aster <i>Symphoricarum lentum</i>	April–Nov	–	–	1B.2	Brackish or freshwater marshes and along streambanks and sloughs.	High; known CNDDDB occurrence recorded within the study area.

¹ Status Definitions

Federal Listing Categories (U.S. Fish and Wildlife Service)

- FT = Threatened
- FE = Endangered
- = No status

State Listing Categories (California Department of Fish and Wildlife)

- ST = Threatened
- SE = Endangered
- = No status

California Rare Plant Ranks

- 1B = Plants rare, threatened, or endangered in California and elsewhere
- 2B = Plants rare, threatened, or endangered in California, but more common elsewhere

Extensions:

- .1 = Seriously threatened in California (>80% of occurrences threatened/high degree and immediacy of threat)
- .2 = Moderately threatened in California (20–80% of occurrences threatened/moderate degree and immediacy of threat)
- .3 = Not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats)

Sources: CDFW 2018; CNPS 2018; USFWS 2018; based on data collected and compiled by GEI Consultants, Inc. in 2018.

Table 2. Special-Status Wildlife Species Occurrence Potential in the Study Area

Species	Status ¹		Habitat Associations	Potential for Occurrence in the Study Area
	Federal	State		
Invertebrates				
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	T	–	Closely associated with elderberry, which is an obligate host for the beetle larvae.	Low; elderberry shrubs were not observed in the study area.
Delta green ground beetle <i>Elaphrus viridis</i>	T	–	Open habitats in grassland-playa pool matrix, along edges of pools, trails, roads and ditches.	Low; suitable habitat is present in the study area; however, habitat conditions are poor.
Fish				
Green Sturgeon—southern DPS <i>Acipenser medirostris</i>	T	--	Anadromous; Estuaries and bays; spawn in deep pools or “holes” in large, turbulent, freshwater river mainstems.	High; suitable habitat present in the survey area.
Sacramento perch <i>Archoplites interruptus</i>	--	SSC	Heavily vegetated water of slough and lakes throughout the Central Valley	High, suitable habitat present in the study area.
Delta smelt <i>Hypomesus transpacificus</i>	T	E	Semi-anadromous; typically restricted to the Delta and the lower Sacramento River downstream of Isleton	Low; study area approximately 13 miles upstream of Isleton.
California Central Valley DPS Steelhead <i>Oncorhynchus mykiss irideus</i> pop. 11	T	–	Anadromous; typically found in the Sacramento-San Joaquin Delta.	High, suitable habitat present in the study area; known CNDDDB occurrence within study area.
Chinook Salmon— Sacramento River winter–run ESU <i>(Oncorhynchus tshawytscha)</i>	E	--	Anadromous; typically found in deep, large streams.	High; suitable habitat present in the study area.
Chinook Salmon—Central Valley spring–run ESU ESU <i>(Oncorhynchus tshawytscha)</i>	T	–	Anadromous; typically found in deep, large streams.	High; suitable habitat present in the study area.
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	–	SSC	Backwaters and pools of rivers, lakes, slow-moving waters and slough of main rivers and Delta.	High; suitable habitat present in the study area.

Table 2. Special-Status Wildlife Species Occurrence Potential in the Study Area

Species	Status ¹		Habitat Associations	Potential for Occurrence in the Study Area
	Federal	State		
Longfin smelt <i>Spirinchus thaleichthys</i>	–	T	Anadromous; typically found in the San Francisco Estuary and the Sacramento-San Joaquin Delta.	High; suitable habitat present in and adjacent to the study area; known CNDDDB occurrence within study area.
Reptiles				
Western pond turtle <i>Emys marmorata</i>	–	SSC	Permanent or nearly permanent water bodies in various habitats, including ponds, marshes, rivers, streams, and ditches.	Moderate; study area provides suitable aquatic habitat and upland areas.
Giant garter snake <i>Thamnophis gigas</i>	T	T	Open water and emergent vegetation in marshes, sloughs, and other aquatic habitats; also requires open upland habitat for basking and underground refuge.	Moderate; aquatic habitat and upland areas present in the study area.
Birds				
Tricolored blackbird <i>Agelaius tricolor</i>	–	SSC	Nests and forages in wetlands with cattails, bulrushes, and willows, and occasionally agricultural fields.	Moderate; suitable habitat present in and adjacent to the study area, but no nesting colonies in the vicinity.
Grasshopper sparrow <i>Ammodramus savannarum</i>	–	SSC	Open grasslands and prairies with patchy shrub cover.	Moderate; potentially suitable habitat is present in the study area.
Burrowing owl <i>Athene cunicularia</i>	–	SSC	Nests and forages in grasslands, agricultural lands, open shrublands, and open woodlands with natural or artificial burrows or friable soils.	Moderate; potentially suitable habitat is present in the study area.
Swainson's hawk <i>Buteo swainsoni</i>	–	T	Nests in riparian forest and scattered trees; forages in grasslands and agricultural fields.	High; scattered trees adjacent to survey area provides suitable nest habitat, agriculture in the study area provide foraging habitat.
Northern harrier <i>Circus cyaneus</i>	–	SSC	Nests and forages in grasslands, agricultural fields, and marshes; nests on the ground in patches of dense, often tall, vegetation in undisturbed areas.	Moderate; grasslands and marsh habitat in and adjacent to undeveloped portions of the survey area provide suitable foraging yet marginal nesting habitat.

Table 2. Special-Status Wildlife Species Occurrence Potential in the Study Area

Species	Status ¹		Habitat Associations	Potential for Occurrence in the Study Area
	Federal	State		
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	T	E	Wooded riparian habitat with dense cover and water nearby; dense thickets along streams and marshes.	Low; suitable foraging habitat for migrant individuals is present adjacent to the survey area, but the area is outside the current breeding range of the species.
White-tailed kite <i>Elanus leucurus</i>	–	FP	Savanna, open woodland, marshes, and cultivated fields. Nests in isolated trees, or at edge of forest.	Moderate; potentially suitable habitat is present adjacent to the survey area.
American peregrine falcon <i>Falco peregrinus anatum</i>	–	FP	Open country near water where shorebirds feed. May nest in high cliffs near rivers, wetlands, lakes, and human-made structures; forages in grasslands, open woodland, and agricultural areas.	Moderate; river and human-made structures in the study area provide suitable nesting and foraging habitat.
California black rail <i>Laterallus jamaicensis coturniculus</i>	–	T	Wet meadows and shallow freshwater to saltwater marshes with dense vegetation.	Moderate; potentially suitable habitat is present in the study area.
Modesto Song sparrow <i>Melospiza melodia</i>	–	SSC	Nests and forages in dense vegetation in marsh, riparian forest and scrub, and along irrigation and drainage canals.	High; potentially suitable habitat is present in the study area; known CNDDDB occurrence within study area.
Bank swallow <i>Riparia riparia</i>	–	T	Burrow in sandy, vertical bluff or riverbanks, streams, coastal bluff and sand and gravel pits.	Moderate; potentially suitable habitat is present in the study area.
Mammals				
Western red bat <i>Lasiurus blossevillii</i>	–	SSC	Roosts in broad leaved trees, especially cottonwood and willows from sea level up through foothills and lower mountains. Forages in grasslands, shrublands, open woodland and forests, and croplands.	Moderate; potentially suitable roosting habitat present in the study area.
Mexican free-tailed bat <i>Tadarida brasiliensis</i>	–	SSC	Roosts in caves, in structures such as ceiling or walls, hollows of trees, and beneath fronds of palm trees.	High; suitable roosting habitat present in the study area.

Table 2. Special-Status Wildlife Species Occurrence Potential in the Study Area

Species	Status ¹		Habitat Associations	Potential for Occurrence in the Study Area
	Federal	State		
Riparian brush rabbit <i>Sylvilagus bachmani riparius</i>	E	E	Riparian thickets of willows, wild rose bushes, blackberry, coyote bushes and wild grape vines.	Moderate; potentially suitable habitat is present in the study area.
American badger <i>Taxidea taxus</i>	–	SSC	Grasslands, shrublands, and other open habitats.	Moderate; potentially suitable habitat is present in the study area.

Notes: CDFW = California Department of Fish and Wildlife; CNDDDB = California Natural Diversity Database; ESU = NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service

¹ Status Definitions:

Federal Listing Categories (NMFS/USFWS)

- T = Threatened
- E = Endangered
- SC = Species of concern
- = No status

State Listing Categories (CDFW)

- T = Threatened
- E = Endangered
- R = Rare
- SSC = Species of special concern
- FP = Fully Protected
- = No status

CDFW California Rare Plant Ranks

- 1B = Plants rare, threatened, or endangered in California and elsewhere
- 2B = Plants rare, threatened, or endangered in California, but more common elsewhere

Extensions:

- .1 = Seriously endangered in California (>80% of occurrences are threatened and/or high degree and immediacy of threat)
- .2 = Fairly endangered in California (20–80% of occurrences are threatened)

Sources: CDFW 2018; CNPS 2018; USFWS 2018; based on data collected and compiled by GEI in 2018.