



Chapter 2

Biological Resources

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Introduction

This background report creates a foundation for updating goals, policies, and programs related to biological resources in the *Suisun City General Plan*. The environmental setting and regulatory setting are described, along with key General Plan issues and opportunities.

Environmental Setting

The majority of the land within the Suisun City limits is urbanized with some inclusions of annual grassland and wetland habitats. The City is adjacent to Suisun Marsh, the largest contiguous estuarine marsh remaining on the west coast of the United States. Vernal pool grasslands of statewide importance are located in the east and southeast portions of the City's Sphere of Influence. Following is a description of the existing biological resources.

Habitat Types

The descriptions of habitat types within the City's Sphere of Influence (which includes the City limits) were compiled from information in:

- Multisource Land Cover Data for the State of California (CAL FIRE 2002).
- 2009 Administrative Draft Solano Multi-species Habitat Conservation Plan (SMHCP) (SCWA 2009);
- Gentry-Suisun DEIR (City of Suisun City, 2007b);
- Railroad Road Widening and Realignment FEIR (City of Suisun City, 2004);
- Walters Road West Project FEIR (City of Suisun City 2007a);
- data collected for the Fairfield Train Station Specific Plan EIR (AECOM 2010); and
- field reconnaissance visit by an AECOM biologist and botanist on July 20, 2010.

The above referenced documents included vegetation data from various sources such as California Department of Forestry and Fire Protection (CALFIRE), the Department of Water Resources, National Wetlands Inventory, 1999 and 2004 aerial photography, Natural Resources Conservation Service (NRCS) soil type mapping, and field observations.

Biological resources are presented in a way that is encompassing of the entire Suisun City Sphere of Influence and City limits. In addition, to inform the General Plan Update, additional information is presented for 17 areas of possible land use change within the City's Sphere of Influence (Exhibit BIO-1). These areas are called "study areas" and represent vegetated, non-urbanized areas within the City's Sphere of Influence. Appendix to this report provides specific habitat information for each study area and general conservation issues associated with each.

The majority of land within the City limits is characterized by urban cover types that provide low habitat values to most wildlife and generally do not support special-status plant species. Non-urbanized portions of the City and its Sphere of Influence consist primarily of annual grasslands. A large percentage of these annual grasslands are

regularly disked or mowed and are currently dominated by ruderal (i.e., weedy) vegetation. However, some of the non-urbanized areas within the City's Sphere of Influence support annual grasslands that are grazed but not regularly mowed or disked and have more typical annual grassland characteristics.

Several creeks and other waterways traverse the City and Sphere of Influence and these waterways, including ditches and canals, often support small patches or narrow corridors of marsh and riparian habitat. In addition, open water estuarine and lacustrine habitats and saline and freshwater emergent wetlands extend into the City and Sphere of Influence from adjacent marshes and sloughs. Small inclusions of eucalyptus woodland, agricultural, and perennial grassland habitats are also present.

Exhibit Bio-2 shows the extent and location of the major habitat types, as mapped for the California Fire and Resource Assessment Program (FRAP) (CAL FIRE 2002). However, because of the size of its minimum mapping unit, the FRAP mapping does not capture all of the community types present or the full extent of each community type. Habitats not represented in the FRAP data include vernal pools and other seasonal wetlands that are typically smaller than the minimum mapping unit, or that are ephemeral and not easily identified without on-the-ground investigations.

Non-urbanized land in the City limits and Sphere of Influence is primarily confined to the 17 study areas. About half of the study areas have some type of wetland habitats, including vernal pools and marshes as well as degraded wetlands. There are a variety of unnamed ditches and canals within or adjacent to various study areas that drain water from nearby creeks as well as precipitation runoff. A few of these waterways are connected hydrologically to Suisun Slough.

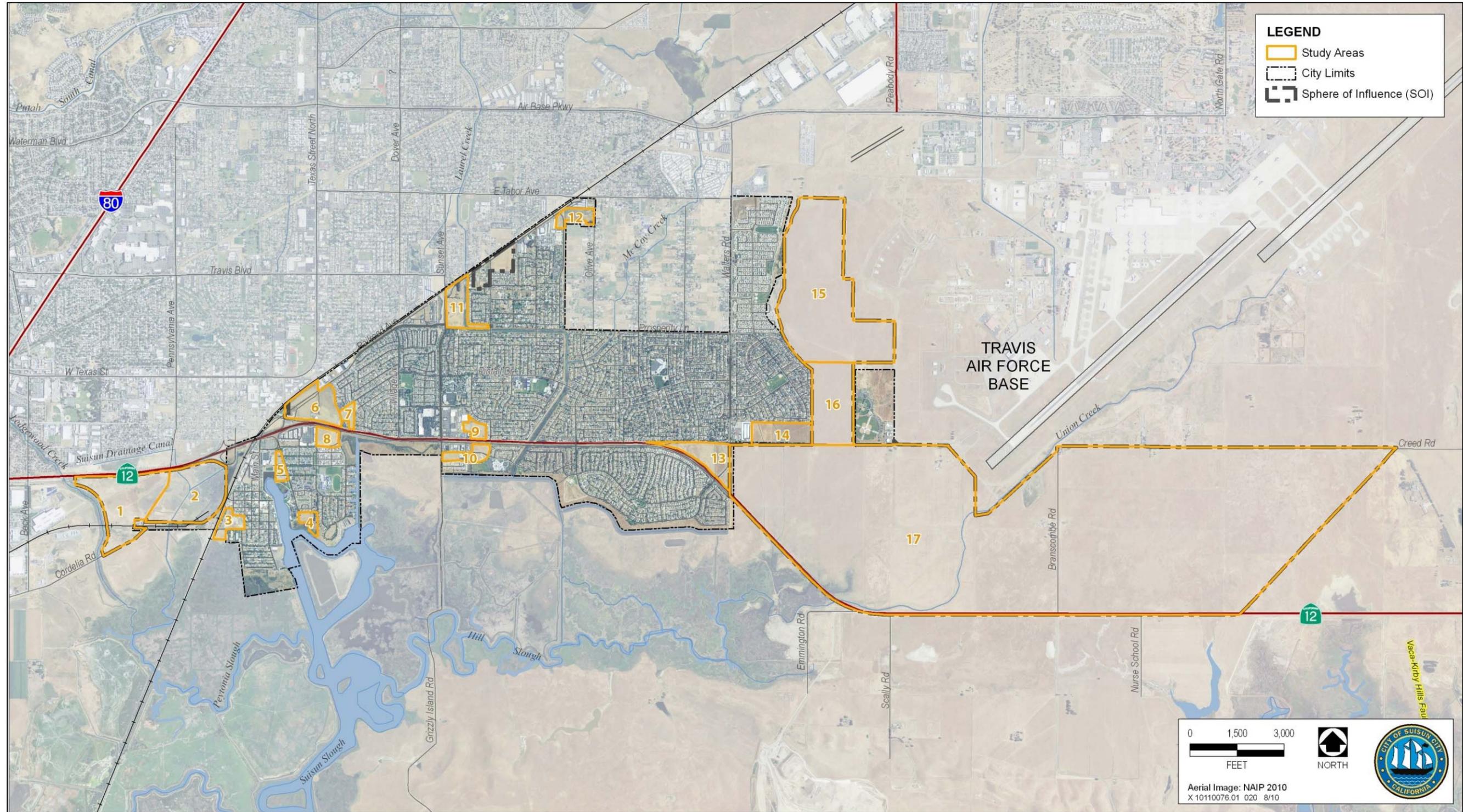
During the field reconnaissance visit, it was possible to access study areas 3, 4, 5, 6, and 9. There were adequate viewing opportunities for study areas 7, 8, 10, 13, 14, 15, 16 and 17. Study areas 11 and 12 were only partially visible from the road.

The following paragraphs describe the common habitat types included in Exhibit Bio-2 and provide more specific information for habitat conditions within the 17 study areas. Sensitive habitat types are discussed later in the *Sensitive Biological Resources* section.

Annual Grasslands

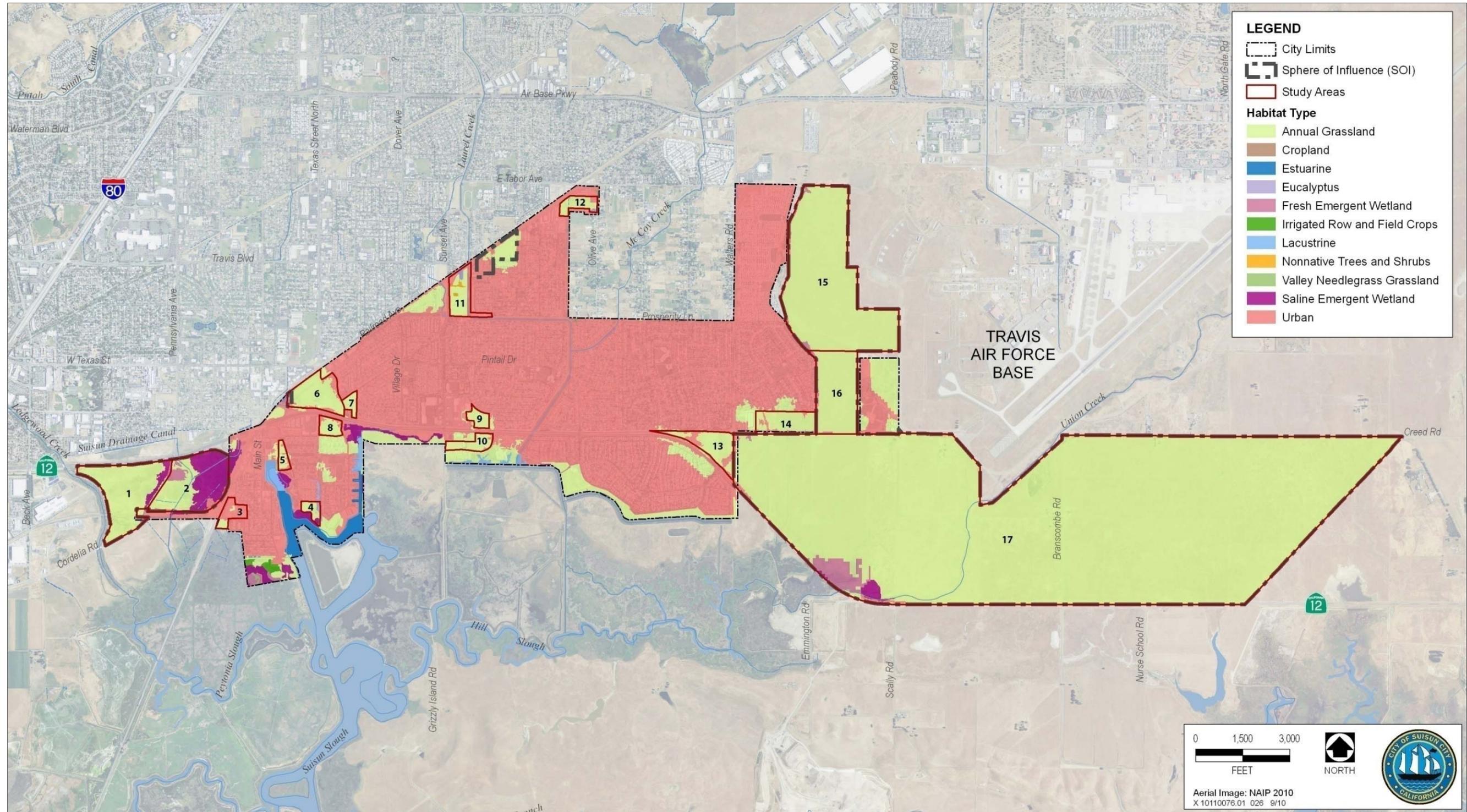
Annual grassland habitat is composed of an assemblage of native and nonnative annual grasses and, to a lesser extent, native perennial grasses and native and nonnative forbs. The species composition and abundance of this habitat varies over its large range, depending on site-specific factors, such as soil chemistry and texture, topography, and disturbance regime. Most of the historic grasslands in the region have been converted to agricultural, urban, and industrial uses, and the remaining valley floor grasslands have been substantially altered by introduced plants and livestock grazing. The native perennial grasses are almost entirely replaced by annual nonnative species. The majority of undeveloped land within the City limits is either mowed or disked regularly, which has resulted in substantial disturbance and alteration of these grassland habitats. These areas now consist primarily of ruderal vegetation characteristic of regularly disturbed lands in the region.

Study areas 3 through 13 and a portion of 14 are examples of annual grasslands that have been degraded to ruderal fields. Common associates of the ruderal plant communities observed include yellow starthistle (*Centaurea solstitialis*), bristly ox tongue (*Picris echioides*), Bermuda grass (*Cynodon dactylon*), wild oat (*Avena* sp.), prickly lettuce (*Lactuca serriola*), burr clover (*Medicago polymorpha*), and Italian rye grass (*Lolium multiflorum*).



Source: AECOM 2010
Exhibit BIO-1

Study Areas



Source: AECOM 2010

Exhibit BIO-2

Habitat Types



Study areas 1, 2, 14 (partial), 15, 16 and 17 are composed of grazed annual grasslands, with vernal pools dispersed throughout the grassland matrix. Because these study areas are grazed, their species composition differs from grasslands that are disked or mowed and become ruderal fields. The grazed annual grasslands have a lower occurrence of weedy species, such as yellow starthistle and greater cover of annual grasses and native wildflower species than the ruderal study areas.

The grasslands on these study areas are dominated by several species of introduced annual grasses, such as wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), foxtail fescue (*Vulpia myuros*), and barley (*Hordeum murinum*). Characteristic native and nonnative herbs include butter-and-eggs (*Triphysaria eriantha* ssp. *eriantha*), valley tassels (*Castilleja attenuata*), miniature lupine (*Lupinus bicolor*), harvest brodiaea (*Brodiaea elegans*), and filaree (*Erodium* spp.).

In low-lying areas and areas bordering wetlands, species composition shifts to include some marginal wetland indicator species such as Italian ryegrass and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*). There are a few commonly shared species between these grazed grassland study areas and the ruderal study areas, such as wild oats, Italian rye grass, and burr clover, but the abundance of these species is lower in the grazed annual grassland and there is greater species diversity, including greater diversity of native plants.

Stands of nonnative ornamental trees are present on some of the lots mapped as annual grasslands. For example, there are stands of large eucalyptus on **study areas 4 and 11** and stands of green wattle (*Acacia decurrens*) on **study area 11**.

Seasonally Saturated Annual Grassland

Study areas 1 and 2 contain broad transitional wetland areas between the low-lying seasonal wetlands (vernal pools and alkali seasonal wetlands) and the surrounding upland annual grasslands. These transitional areas have prolonged periods of surface and subsurface saturation, but are rarely inundated. The dominant plants include a mix of facultative wetland species associated with both the annual grasslands and alkali seasonal wetlands. Common species include Italian ryegrass, Mediterranean barley, alkali weed, and alkali heath. A substantial decrease in the historical seasonally saturated annual grassland habitat of the Suisun Marsh region has been documented (Goals Project, 1999). Wildlife species found here are similar to those found in both annual grasslands and the seasonally wet vernal pool habitats described above.

Other Common Habitats

Small areas of other common habitats are also present in the City planning area as shown in Exhibit BIO-2. These are cropland, irrigated row and field crops, eucalyptus stands, and stands of other nonnative trees and shrubs. These are anthropogenic (human-made) habitats dominated by nonnative species and typically have low value to wildlife and do not support special-status plants.

Sensitive Biological Resources

Sensitive biological resources addressed below include special-status plant and wildlife species and sensitive habitat that are afforded special protection under CEQA, the California Fish and Game Code (including the California Endangered Species Act

[CESA]), the federal Endangered Species Act (ESA), the Clean Water Act (CWA), the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and local or regional plans, policies, and ordinances.

Sensitive Habitats

For the purposes of this report, sensitive habitats are defined as habitats with particularly high ecological values or functions, of limited distribution, or otherwise of concern to federal, state, and/or local resource agencies. This includes plant communities that are designated as sensitive natural communities (i.e., communities that are of limited distribution statewide or within a county or region and often vulnerable to environmental effects of projects) by the California Department of Fish and Wildlife (CDFW) and habitats that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, or Section 404 of the CWA. Sensitive habitats are of special concern because they have high potential to support special-status plant and animal species and can provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality. Sensitive habitats present in the City planning area are described in detail below.

Saline Emergent Wetland

Suisun Marsh is a saline emergent wetland (a.k.a coastal brackish marsh) habitat bordering the City to the south and extending into the southwestern edge of the City limits (CNDDDB 2014). This marsh habitat develops in shallow, standing or slow moving waters in coastal bays, estuaries and lagoons, where fresh water and salt water converge. The soils are perennially inundated or saturated and generally subject to some level of tidal fluctuation. In addition, water levels become elevated during the rainy season and gradually lower through the spring through evaporation, transpiration, and drainage. This is especially true for the northern portion of the marsh. Salinity may vary daily and seasonally depending on the tide and the level of freshwater input. Brackish marsh usually intergrades with salt marsh toward the saline water body and with freshwater marsh at the mouths of rivers, especially in the Sacramento-San Joaquin River Delta. This habitat generally contains similar species to both coastal saltmarsh and freshwater marsh and is typically dominated by perennial, emergent, herbaceous plants up to two meters in height. The most common species are cattails (*Typha* spp.) and species of bulrush (*Scirpus* spp.), especially alkali rush (*Scirpus robustus*). Depending on the salinity, other species of sedge (*Carex* spp.), rush (*Juncus* spp.), pickleweed (*Salicornia virginica*), cordgrass (*Spartina* sp.), and others may be present.

Saline emergent wetland habitat is present on **study areas 2, 4, and 17** and other areas subject to tidal fluctuations that extend from Suisun Bay, up tidal sloughs, and into drainage ditches and canals that traverse the Suisun City area. **Study area 4** is located on the northern end of Suisun Slough and contains an area of cattail and tule marsh habitat present in the slough. The eastern portion of **study area 2** is dominated by coastal brackish marsh. A smaller brackish marsh was also observed in a drainage ditch that traverses this study area. The deepest saline emergent wetland areas are dominated by a mix of dense, tall-growing perennial marsh species including tule, Olney's bulrush (*Scirpus americanus*), California bulrush (*Scirpus californicus*), saltmarsh bulrush (*Scirpus maritimus*), and cattail. Slightly higher areas are dominated by low-growing species, especially pickleweed. The shallowest marsh areas include additional low-growing species such as saltgrass and sand-spurrey (*Spergularia marina*), sicklegrass, and annual beard grass.



Freshwater Emergent Wetland

This marsh habitat forms in permanently flooded or saturated soils in depressions or at the edges of streams, rivers, ponds, and lakes, as well as ditches and canals. Distinct vegetation zones often form, as rings, strips, or patches, in response to varying water depths and hydroperiods. Freshwater wetlands, or marshes, are dominated by large, perennial herbaceous plants, particularly tules and cattails, but do not support pickleweed, cordgrass and other species adapted to saline environments. Freshwater emergent wetland habitat is found in study areas 6 and 17 and within most of the waterways throughout the City's planning area outside of the areas influenced by the tides and the influx of saltwater from the bay.

Vernal Pools

Vernal pools are natural ephemeral wetlands that form in shallow depressions underlain by an impervious or restrictive soil layer (claypan, hardpan or bedrock) near the surface that reduces the percolation of water. They pond during the wet season and typically become dry by late spring. Vernal pools are distinguished from other seasonal wetlands by having a restrictive soil layer, a naturally ephemeral period of inundation and saturation, and predominance of annual plant species considered to be vernal pool indicator species.

Vernal pool grasslands on northern claypan soils occur in the City planning area (CNDDDB 2014, NRCS 2004). Organisms that thrive in this unique, harsh habitat coevolved with the geologic and climatic conditions that formed the vernal pools and, consequently, these wetlands contain a high number of endemic and rare species of plants, animals, and invertebrates. Many of these species are listed as threatened or endangered. Historically there were an estimated 111,647 acres of claypan vernal pool grasslands in Solano County (NRCS 2004). Due to impacts from development and agriculture, there are currently an estimated 46,285 acres of northern claypan vernal pool grasslands remaining.

Thirteen of the 17 study areas occur on vernal pool soils. Vernal pools in the City are within the Solano-Colusa Vernal Pool Region as defined by CDFW (Keeler-Wolf *et al.* 1998). These discrete geographic regions are based on endemic species, soils and geomorphology. In 2005 the United States fish and Wildlife Service (USFWS) published a *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* based on 33 species of rare, endangered or threatened plants and animals. The boundaries of the Solano Colusa Vernal Pool Region described in the Recovery Plan were adjusted to encompass species occurrences and vernal pool habitats in areas surrounding the Jepson Prairie and Rodeo Creek core areas (USFWS 2005). A vernal pool grassland region surrounding Potrero Hills represents an important transition habitat between Jepson Prairie Preserve and Suisun Marsh (SCWA 2009). **Study area 17** is located within this Jepson Prairie-Suisun Marsh Corridor.

Vernal pools are present in **study areas 1, 2, and 13 through 17**. Many of these wetlands have been disturbed by past agricultural activities, such as plowing and grading, and may therefore have drastically altered size, depth, and hydrologic characteristics compared to what existed in the area historically. There is an existing habitat mitigation site in the eastern portion of study area 17. This area contains restored and created vernal pools.

Vernal pools on **study areas 1 and 2** appear to have been enhanced with the construction of berms and ditches and partially blocked culverts. The partially blocked

culverts and berms and ditches may collect and block the flow of water across the landscape. The largest, deepest vernal pool occurs on **study area 1** and may be the result of, or enhanced by, the adjacent berm that runs parallel to Pennsylvania Avenue and a blocked culvert at the southernmost end of the vernal pool. Dominant species observed within the pools in the study areas include a mix of classic vernal pool indicator species such as Vasey's coyote-thistle (*Eryngium vaseyi*), California semaphore grass (*Pleuropogon californica*), flat-faced downingia (*Downingia pulchella*), smooth goldfields (*Lasthenia glaberrima*), annual hairgrass (*Deschampsia danthonioides*), and stipitate popcornflower (*Plagiobothrys stipitatus* var. *micranthus*), as well as low cover of some alkali-tolerant species (halophytes) such as alkali heath (*Frankenia salina*), pickleweed, and alkali weed (*Cressa truxillensis*).

Degraded Seasonal Wetlands

Seasonal wetlands in the area are distinguished from vernal pools by longer or altered hydrology, the presence of more persistent emergent vegetation dominated by species such as rush and spike rush (*Eleocharis* spp.), nonnative plant species such as ryegrass and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and a reduced number of native forbs that typically grow in vernal pools.

Study areas 6 and 9 historically supported vernal pool, but the topography has been substantially altered on these study areas through disking, and possibly other activities, resulting in breaking down the banks of natural depressions that may have historically functioned as vernal pools. The remnants of some of these historic pools still retain moisture long enough to support a prevalence of vegetation adapted for life in saturated soil conditions. Dominant plant species observed in these degraded seasonal wetland habitats are mostly nonnative, generalist wetland species such as hyssop loosestrife (*Lythrum hyssopifolia*), swamp picklegrass (*Crypsis schoenoides*), and rabbit's foot grass (*Polypogon monspeliensis*). However, native species typical of vernal pool communities were also observed including coyote thistle, smooth boisduvalia (*Epilobium pygmaeum*), and Oregon woolly marbles (*Psilocarphus oregonus*). These types of seasonal wetlands can provide important areas for vernal pool restoration. Similar wetland depressions may be present on **study areas 11 and 12**.

Between **study areas 11 and 12**, there is a seasonal wetland depression located on the south side of Railroad Avenue approximately 50 feet east of the intersection with Blossom Avenue. This wetland depression was surveyed for the Railroad Road Widening and Realignment FEIR (City of Suisun City 2004). This area historically contained vernal pools, which are no longer present or are seriously degraded. The depression was dry at the time of the site survey and supported California goldfields (*Lasthenia californica*), Dwarf woolly-heads (*Psilocarphus brevissimus* var. *brevissimus*), Mediterranean barley, and stipitate popcorn flower.

Study area 13 was surveyed for the Walters Road West Project FEIR (City of Suisun City, 2008). There is a berm consisting of excavated material on the west edge of the drainage ditch that largely prevents surface flows from the western portion of the property from reaching the ditch. The property contains several shallow depressions that seasonally pond during the rainy season. These seasonal wetlands continue to support some native vernal pool flora despite biannual disking. However, nonnative species that are more upland and invasive in nature dominate these depressions, including hyssop loosestrife, Rabbit's foot grass, spiny-fruited buttercup (*Ranunculus muricatus*), and Mediterranean barley. Species more typical of vernal pool communities occurring in these depressions include brass buttons (*Cotula coronopifolia*), dwarf sack clover (*Trifolium depauperatum* var. *depauperatum*), flowering quillwort (*Lilaea scilloides*), stipitate popcorn flower, flat-faced downingia, water starwort (*Callitriche*



sp.), and coyote thistle. The wetlands contain ruts from past disking and have uneven surfaces throughout. Depending upon the duration of inundation, the plant species within the individual pools vary.

Study area 6 contains a long, mostly linear seasonal wetland. This seasonal wetland may be the result of excavation as it has a somewhat unnatural shape with very straight edges. The vegetation in this seasonal wetland is dominated by cocklebur (*Xanthium strumarium*) and curly dock (*Rumex crispus*), but also contains species found in the previously described degraded wetland depressions.

Valley Needlegrass Grassland

Valley needlegrass grassland was once extensive in the Central Valley and is much reduced today. It is considered a sensitive plant community by CNDDDB. This grassland grows to about 2 feet in height and occurs on fine-textured (often clay) soils that are typically moist or even waterlogged in the winter and very dry in the summer.

The dominant species is purple needlegrass (*Nassella pulchra*) which is the state grass of California. Other typical native grass species include California fescue (*Festuca californica*), and creeping wildrye (*Leymus triticoides*). Wildflowers often found in grasslands with a native component include yarrow (*Achillea borealis*), California dandelion (*Agoseris grandiflora*), California goldfields, brodiaeas (*Brodiaea* spp., *Triteleia* spp. *Dichelostemma* spp.), and mariposa lilies (*Calochortus* spp.). CNDDDB records indicate there is valley needlegrass grassland within 5 miles of the City, much of it in Jepson Prairie Reserve (CNDDDB 2014), and a small patch of it was mapped southwest of the waterfront area within the City limits.

Alkali Seasonal Wetland

Alkali seasonal wetlands occur in **study areas 1 and 2**. These wetlands form in low-lying basins and clay flats, become seasonally inundated or saturated during the rainy season and gradually dry through the spring and early summer. The salinity comes from residual salts concentrated in a buried silty clay loam soil horizon within the predominant soil type (Sycamore silty clay, saline). Dominant plant species within the wetlands on these study areas include several halophytes (salt-loving plants) including sickle grass (*Parapholis incurva*), alkali weed, and alkali heath. Slightly lower areas within the wetlands are dominated by pickleweed. Alkali seasonal wetlands generally lack vernal pool indicator species.

Waterways

There are four main creeks that drain into the City and ultimately connect to the Suisun Marsh, including Ledgewood Creek, Laurel Creek, McCoy Creek and Union Creek. In addition, there are sloughs, canals, and ditches located in the City's Sphere of Influence and there are estuarine and lacustrine habitats extending into the City from Suisun Slough. Estuarine habitats are the open water portions of semi-enclosed coastal waters in tidal areas where fresh and salt water mix. Lacustrine habitats are open freshwater habitats of lakes, ponds, dammed rivers, sloughs and inland depressions.

Manmade drainage ditches are located on seven of the study areas and all of these ditches supported flowing water at the time of the site visit in July. A segment of Ledgewood Creek that supports willows (*Salix* sp.) and other riparian vegetation forms the western boundary of **study area 1**. Suisun Drainage Canal runs north to south

through **study area 2**. This ditch carries stormwater runoff from the City of Fairfield, and may also convey runoff from natural drainages north of Fairfield. The Suisun Drainage Canal converges with Ledgewood Creek, which then flows directly to a slough (Peytonia Slough) feeding into Suisun Bay and is subject to tidal fluctuation.

A 24-foot wide ditch borders the western edge of **study area 4** and connects to Suisun Slough to the south. It supports a narrow margin of marsh vegetation dominated by sedges (*Carex* spp.) at the ordinary high water line and eucalyptus trees on its upper banks. To the west of this ditch beyond **study area 4**, is a larger 100-foot canal that connects to Suisun Slough and travels north and east to the perimeter of **study area 6**. Here, it supports sparse cover of aquatic plant species including water plantain (*Alisma plantago-aquatica*). The ditch along the northern perimeter of **study area 6** is approximately 9 feet wide at the high water line. The banks are characterized primarily by ruderal vegetation and the channel is heavily littered with garbage, such as old appliances and furniture, lumber, bottles and cans, clothing, and toys.

Approximately two miles north of **study area 11**, a small meandering creek (Laurel Creek) becomes a diversion channel that runs north to south through the City. A portion of this diversion channel runs along the eastern edge of **study area 11** and contains two concrete-lined and riprapped segments. No vegetation was observed growing on the riprapped sidewalls and the channel supports patches of cattails with willows along its banks. This ditch is approximately 13 feet wide at the high water line. Along the west side of **study area 12**, an unnamed channelized drainage ditch carries water from a small inlet under Railroad Avenue. This ditch supports thick tules and small willows and feeds the Laurel Creek Diversion Channel, which drains to Suisun Marsh.

A constructed drainage ditch bisects **study area 13** in a north to south direction. The drainage ditch conveys runoff from the residential neighborhood on the north side of Petersen Road and ultimately empties into Suisun Marsh. The drainage ditch has been colonized by disturbance tolerant forbs and emergent vegetation including along the banks Harding grass (*Phalaris aquatica*), sweet fennel (*Foeniculum vulgare*), black mustard (*Brassica nigra*), and pepper grass (*Lepidium latifolium*). The in-channel vegetation includes cattail, curly dock (*Rumex crispus*), Mexican rush (*Juncus mexicanus*), rabbit's foot grass, sapling willow (*Salix lasiolepis*), sapling cottonwood (*Populus fremontii*), and water plantain.

Study area 14 is bisected by two drainage ditches. The western-most ditch is characterized by a mix of wetland plants including tall flatsedge (*Cyperus eragrostis*), curly dock, cattail, and cottonwood seedlings. This ditch is approximately 11 feet in width at the high water line. The ditch on the eastern portion of study area 9 is approximately 15 feet wide at the high water line and characterized by marsh vegetation dominated by cattail.

Riparian Habitat

As described above, several ditches and modified stream channels present in the Suisun City vicinity support patches or narrow corridors of immature riparian vegetation.

Riparian habitat is located within **study area 1** in an inactive channel. This riparian habitat is likely a remnant cut-off oxbow of the original channel of Ledgewood Creek which is located on the western boundary of this study area. Dominant tree species include arroyo willow (*Salix lasiolepis*) and Goodding's black willow (*Salix gooddingii*). California blackberry (*Rubus ursinus*) and mugwort (*Artemisia douglasiana*) are the understory dominant species. The riparian habitat appears to be fed by a metal culvert within a concrete structure adjacent to the railroad right of way. Ledgewood Creek is



adjacent to the western border of **study area 1** and transitions to coastal brackish marsh habitat south of **study area 1**.

Study area 11 has a strip of nonnative vegetation that supports invasive riparian species including giant reed (*Arundo donax*) and tamarisk (*Tamarix spp.*), although the source of water that supports these species could not be determined.

Special-Status Species

Special-status species are plants and wildlife that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- species listed or proposed for listing under the ESA and/or CESA as threatened, or endangered;
- species considered candidates for state or federal listing as threatened or endangered; wildlife species identified by CDFW as California species of special concern (SSC);
- wildlife species identified as fully protected under the California Fish and Game Code;
- species afforded protection under local or regional planning documents; and
- plant species considered by CDFW to be “rare, threatened, or endangered in California” And assigned a California Rare Plant Rank (CRPR). The CDFW system includes six rarity and endangerment ranks for categorizing plant species of concern, which are summarized as follows:
 - CRPR 1A—Plants presumed to be extinct in California;
 - CRPR 1B—Plants that are rare, threatened, or endangered in California and elsewhere;
 - CRPR 2A—Plants presumed to be extinct in California, but more common elsewhere
 - CRPR 2B—Plants that are rare, threatened, or endangered in California, but more common elsewhere;
 - CRPR 3— Plants about which more information is needed (a review list); and
 - CRPR 4—Plants of limited distribution (a watch list).

All plants with a CRPR are considered "special plants" by CDFW. The term "special plants" is a broad term used by CDFW to refer to all of the plant taxa inventoried in CDFW's CNDDDB, regardless of their legal or protection status. Plants ranked as CRPR 1A, 1B, 2A, and 2B may qualify as endangered, rare, or threatened species within the definition of State CEQA Guidelines Section 15380. CDFW recommends that potential impacts to CRPR 1 and 2 species be evaluated in CEQA documents. In general, CRPR 3 and 4 species do not meet the definition of endangered, rare, or threatened pursuant to State CEQA Guidelines Section 15380. However, these species may be evaluated by the lead agency on a case-by-case basis.

The sensitive species information for this report came from the SMSHCP (SCWA 2012), the Gentry-Suisun DEIR (City of Suisun City, 2007b), the Railroad Road Widening and Realignment FEIR (City of Suisun City 2004), the Walters Road West Project FEIR (City of Suisun City, 2007a), the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005), the list of federally threatened and endangered

species (USFWS), the Online Inventory of Rare and Endangered Plants (CNPS 2014), the CDFW lists of threatened and endangered species and species of special concern and a CNDDDB search for plants, animals and sensitive habitats (June 2014).

Special-Status Plants

Based on the results of CNDDDB and CNPS database searches of sensitive natural resource occurrences within the planning area and a surrounding five-mile buffer area, it was determined that habitats present in the planning area have the potential to support 31 special-status plant species. Five of these species are federally listed as endangered and one is federally listed as threatened. Three species are state listed as endangered and two are state listed as rare; additionally, all of the 27 species are included in CDFW’s CRPR system, which lists 25 of them as CRPR 1B species and two as CRPR 2B species. These species are listed below in Table BIO-1 along with their status, habitat, and potential to occur in Suisun City’s Sphere of Influence. The locations of known special-status plant and sensitive natural community occurrences are shown in Exhibit BIO-3.

**Table BIO-1
Special-Status Plant Species With
Potential to Occur Within and Surrounding the Sphere of Influence**

Species	Status ¹			Habitat	Potential for Occurrence ²
	USFWS	CDFW	CRPR		
Plants					
Ferris' milk-vetch (<i>Astragalus tener</i> var. <i>ferrisae</i>)	--	--	1B.1	Subalkaline vernal pools and grassland clay flats	Not likely to occur. Suitable habitat is present. There are no CNDDDB occurrences within 5 miles of the site.
Alkali milk-vetch (<i>Astragalus tener</i> var. <i>tener</i>)	--	--	1B.2	Subalkaline vernal pools and clay flats in grasslands	Known to occur. Observed on study area 1. Suitable habitat is present and there are CNDDDB occurrences within 5 miles.
Heartscale (<i>Atriplex cordulata</i> var. <i>cordulata</i>)	--	--	1B.2	Sandy, saline or alkali flats, scrub, meadows, and valley and foothill grassland.	Could occur. There are CNDDDB occurrences within 5 miles. Suitable habitat is present.
Brittlescale (<i>Atriplex depressa</i>)	--	--	1B.2	Alkaline clay soils within scrub, meadows, playas, vernal pools, and valley and foothill grassland. Occasionally found in riparian marshes.	Likely to occur. There are a number of CNDDDB occurrences within 1-5 miles of the City's SOI. Suitable habitat is present.
San Joaquin spearscale (<i>Atriplex joaquiniana</i>)	--	--	1B.2	Seasonal alkali wetlands and alkali sinks in scrub, meadows, playas, and valley and foothill grassland	Likely to occur. CNDDDB occurrences in the immediate vicinity of project. Suitable habitat is present.



**Table BIO-1
Special-Status Plant Species With
Potential to Occur Within and Surrounding the Sphere of Influence**

Species	Status ¹			Habitat	Potential for Occurrence ²
	USFWS	CDFW	CRPR		
Vernal pool smallscale (<i>Atriplex persistens</i>)	--	--	1B.2	Alkali vernal pools, flats, and swales	Could occur. CNDDDB occurrences within 5 miles of the site. Suitable habitat is present.
Congdon's tarplant (<i>Centromadia parryi</i> ssp. <i>congdonii</i>)	--	--	1B.1	Alkaline soils in valley and foothill grassland	Could occur. CNDDDB occurrences within 5 miles of the site. Suitable habitat is present.
Pappose tarplant (<i>Centromadia parryi</i> ssp. <i>parryi</i>)	--	--	1B.2	Vernally mesic, often alkaline sites in coastal prairie, coastal salt marsh, valley and foothill grassland, and meadows and seeps	Likely to occur. Suitable habitat is present. CNDDDB occurrences within immediate vicinity.
Hispid bird's-beak (<i>Chloropyron molle</i> ssp. <i>hispidum</i>)	--	--	1B.1	Alkaline meadows, seeps, vernal pools, and playas	Could occur. Suitable habitat present. CNDDDB occurrence within 2 miles.
Soft bird's-beak (<i>Chloropyron molle</i> ssp. <i>molle</i>)	FE	CR	1B.2	Brackish tidal marsh and seasonal alkali marsh.	Could occur. CNDDDB occurrences within 5 miles of site. Suitable habitat present.
Bolander's water hemlock (<i>Cicuta maculata</i> var. <i>bolanderi</i>)	--	--	2B.1	Coastal fresh or brackish water marshes	Could occur. CNDDDB occurrences within 5 miles of site. Suitable habitat present.
Suisun thistle (<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>)	FE	--	1B.1	Coastal brackish marsh. Endemic to Suisun Marsh	Could occur. Habitat is present. CNDDDB occurrences in proximity to the site.
Recurved larkspur (<i>Delphinium recurvatum</i>)	--	--	1B.2	Alkaline areas, in scrub, cismontane woodland, and valley and foothill grassland. It often grows in vernal moist or inundated areas.	Not expected to occur. No CNDDDB occurrences within 5 miles. Suitable habitat present.
Dwarf downingia (<i>Downingia pusilla</i>)	--	--	2B.2	Vernal pools, playa pools, margins of vernal lakes and other mesic areas within valley and foothill grassland	Could occur. CNDDDB occurrences within 5 miles. Suitable habitat present.
Mt. Diablo buckwheat (<i>Eriogonum truncatum</i>)	--	--	1B.1	Dry, exposed, clay or sandy substrates in chaparral or coastal scrub habitats.	Not expected to occur. No suitable habitat present, one historical CNDDDB occurrence within 5 miles. Only known extant occurrences are on Mt Diablo.

**Table BIO-1
Special-Status Plant Species With
Potential to Occur Within and Surrounding the Sphere of Influence**

Species	Status ¹			Habitat	Potential for Occurrence ²
	USFWS	CDFW	CRPR		
Fragrant fritillary (<i>Fritillaria liliacea</i>)	--	--	1B.2	Generally in heavy clay soils (often serpentine) in woodland, coastal prairie, coastal scrub, and valley and foothill grassland.	Could occur. Suitable habitat present. CNDDDB occurrences within 4-5 miles.
Bogg's Lake hedge hyssop (<i>Gratiola heterosepala</i>)	--	CE	1B.2	Vernal pools and margins of vernal lakes.	Could occur. Larger vernal pools in the area may provide suitable habitat present. CNDDDB occurrences within 4-5 miles.
Carquinez goldenbush (<i>Isocoma arguta</i>)	--	--	1B.1	Alkaline soils in valley and foothill grassland.	Known to occur. Observed in study area 17. Suitable habitat present and there are several CNDDDB occurrences within 2-5 miles.
Contra Costa goldfields (<i>Lasthenia conjugens</i>)	FE	--	1B.1	Vernal pools, swales, and other depressions in open grassland and woodland communities, often in alkaline soils.	Known to occur. Observed on study areas 1, 2, and 17. CNDDDB detections within 5 miles. Suitable habitat present.
Delta tule pea (<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>)	--	--	1B.2	Tidally influenced freshwater and brackish marshes, commonly on slough edges and levees.	Known to occur. CNDDDB detections within the City and within 5 miles. Suitable habitat present.
Legenere (<i>Legenere limosa</i>)	--	--	1B.1	Vernal pools	Could occur. Suitable habitat present. CNDDDB detections within 5 miles.
Heckard's peppergrass (<i>Lepidium latipes</i> var. <i>heckardii</i>)	--	--	1B.2	Alkaline soils in valley and foothill grassland, sometimes at the edges of vernal pools	Could occur. Suitable habitat present. CNDDDB detections within 5 miles.
Mason's lilaepsis (<i>Lilaeopsis masonii</i>)	--	CR	1B.1	Edges of mudflats in brackish marsh and riparian scrub.	Could occur. Suitable habitat present. CNDDDB detections adjacent to SOI.
Baker's navarretia (<i>Navarretia leucocephala</i> ssp. <i>bakeri</i>)	--	--	1B.1	Vernal pools, valley and foothill grassland with adobe or alkaline soils.	Could occur. Suitable habitat present and CNDDDB occurrences within 2-5 miles.
Colusa grass (<i>Neostaphia colusana</i>)	FT	CE	1B.1	Large vernal pools and vernal lakes, occasionally stock ponds	Not expected to occur. Requires large vernal pools. One CNDDDB detection within 3 miles.



**Table BIO-1
Special-Status Plant Species With
Potential to Occur Within and Surrounding the Sphere of Influence**

Species	Status ¹			Habitat	Potential for Occurrence ²
	USFWS	CDFW	CRPR		
Bearded popcorn flower (<i>Plagiobothrys hystriculus</i>)	--	--	1B.1	Vernal pools, valley and foothill grassland in wet sites.	Could occur. Suitable habitat present and CNDDB detections with 5 miles.
Slender-leaved pondweed (<i>Stuckenia filiformis</i> ssp. <i>alpina</i>)	--	--	2B.2	Shallow freshwater marshes and swamps.	Could occur. Suitable habitat present. CNDDB detection within 5 miles.
Suisun Marsh aster (<i>Symphotrichum lentum</i>)	--	--	1B.2	Banks of sloughs and bays.	Known to occur. Observed on study area 2. CNDDB detections within 5 miles. Suitable habitat present
Showy Rancheria clover (<i>Trifolium amoenum</i>)	FE	--	1B.1	Valley and foothill grassland and coastal bluff scrub, sometimes on serpentine soils	Could occur. Suitable habitat present and CNDDB detections with 5 miles.
Saline clover (<i>Trifolium hydrophilum</i>)	--	--	1B.2	Subalkaline, vernal mesic grasslands and edges of vernal pools	Known to occur. Observed on study areas 1 and 2 and on an adjacent area to the south. CNDDB detections within 5 miles.
Solano grass (<i>Tuctoria mucronata</i>)	FE	CE	1B.1	Large vernal pools and vernal lakes	Not expected to occur. Large vernal pools are not present and there is only one CNDDB detection within 5 miles.

Notes:

¹ Legal Status Definitions

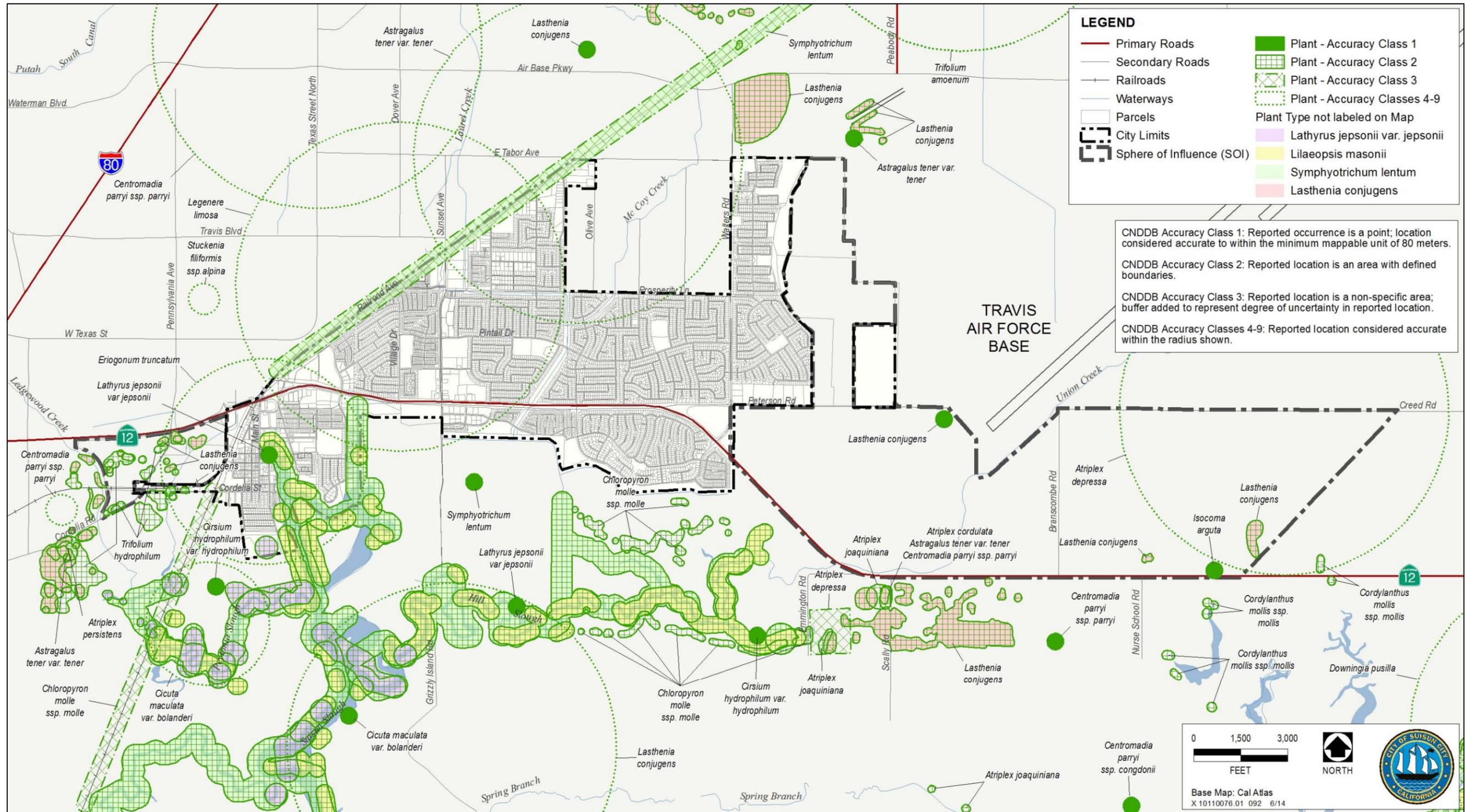
U.S. Fish and Wildlife Service (USFWS):
 FC = candidate
 FE =endangered (legally protected)
 FT =threatened (legally protected)
 California Department of Fish and Wildlife (CDFW):
 CE = endangered
 CT = threatened (legally protected)
 CR= California rare

California Rare Plant Rank (CRPR Categories):
 1B= plants rare, threatened, or endangered in California and elsewhere
 2B = Plants rare, threatened, or endangered in California, but more common elsewhere
 0.1 = seriously endangered in California
 0.2 = fairly endangered in California
 -- = no status.

² Potential Occurrence Definitions

Known to occur – Species has been documented in the planning area and suitable habitat is present.
 Likely to occur – Species could potentially occur due to suitable habitat in the planning area and nearby documented occurrences.
 Could occur – Suitable habitat is available at the project site; however, there are little to no other indicators that the species might be present.
 Not expected to occur – None of the species life history requirements are provided by habitat in the Planning Area and/or the Planning Area is outside of the species known distribution and/or the species is not likely to occur because of marginal habitat quality or distance from known occurrences.

Sources: CNDDB 2014, CNPS 2014, data compiled by AECOM in 2014



Source: CNDDB 2014

Exhibit BIO-3

Special-Status Plant Species



Ferris' Milk Vetch

Astragalus tener var. *ferrisae* is a member of the legume family (Fabaceae) and is associated with meadows, seeps and grasslands on alkaline, moist clay soils and is not found within vernal pools per se. Ferris's milk-vetch historically occurred in the north Central Valley, from Solano County north to Glenn and Butte counties (USFWS 2005). It was thought to be extinct until it was rediscovered in Butte Sink, WA, in 1989. The CNPS designates the one known Solano County location as uncertain or extirpated. The nearest extant location is a few miles over the Solano County line in southern Yolo County. It is included as a sensitive species in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

Alkali Milk-Vetch

Astragalus tener var. *tener* is a small, purple-flowered annual in the legume family and is associated with seasonally saturated grasslands with alkaline soils, playas, grasslands, as well as the upper margins of alkaline vernal pools. Its historical range included the Central Coast, San Francisco Bay, Delta and mid Central Valley regions. Alkali milk vetch has been extirpated from the Central Coast and Bay regions and most areas in the Central Valley due to habitat loss. There are 16 CNDDDB occurrences within 5 miles of the City. This species was observed on **study area 1** in 2005 (Vollmar Consulting 2005). It is included as a sensitive species in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

Brittlescale

Atriplex depressa is a grayish annual herb in the goosefoot family (Chenopodiaceae). It grows in relatively barren areas with alkaline clay soils within scrub, meadows, playas, vernal pools, and valley and foothill grassland. Occasionally, it is found in riparian marshes. This species ranges from Butte County in the north to Kern County in the south. There are 5 CNDDDB occurrences within 1-5 miles of the City (CNDDDB 2014).

Heartscale

Atriplex cordulata is a gray-scaly, annual herb in the goosefoot family. It ranges from Butte County in the north to Kern County in the south. It grows in sandy, saline or alkaline flats, in scrub, meadows, and valley and foothill grassland. It has been found growing with or near three other special-status species including dwarf downingia (*Downingia pusilla*), Carquinez goldenbush (*Isocoma arguta*), and legenere (*Legenere limosa*). *Atriplex* species are relatively tolerant of disturbance. There are 3 CNDDDB occurrences within 5 miles of the City (CNDDDB 2014).

San Joaquin Spearscale

Atriplex joaquinia is an annual herb in the goosefoot family. It ranges from San Benito County through the Central Valley and Delta to Glenn County. It grows in seasonal alkali wetlands and alkali sinks in scrub, meadows, playas, and valley and foothill grassland. It has been found growing with rare plants such as Contra Costa goldfields (*Lasthenia conjugens*), alkali milkvetch (*Astragalus tener* var. *tener*), and crownscale (*Atriplex coronata*). There are 6 CNDDDB occurrences within 5 miles of the City including several within 0.1 mile (CNDDDB 2014).

Vernal Pool Smallscale

Atriplex persistens is a gray-green, annual herb in the goosefoot family. Vernal pool smallscale is known from scattered locations in the Delta and Central Valley basin (CNPS 2014). This plant grows in alkaline grasslands as well as in large and small claypan and alkaline vernal pools. There are 2 CNDDDB detections within 5 miles of the City (CNDDDB 2014).

Pappose Tarplant

Centromadia parryi ssp. *parryi* is an annual herb in the sunflower family (Asteraceae). It is endemic to California and has been detected in seven counties in the Sacramento Valley and inner North Coast Ranges (CNPS 2014). This species occurs most frequently in mesic areas in coastal prairie, meadow, and grassland habitats, often on alkaline substrates. It is reported to grow with several other rare plant species, including heartscale (*Atriplex cordulata*), and bearded popcorn flower (*Plagiobothrys hystriculus*). This species was identified in study area 13 during surveys conducted for the proposed Walters Road West project during spring and summer 2006 and spring 2007. There are 9 occurrences within 5 miles of the City, some of which are in the immediate vicinity of study areas 1 and 2.

Bolander's Spotted Water-Hemlock

Cicuta maculata var. *bolanderi* is a very rare perennial herb in the carrot family (Apiaceae) that was historically "conspicuous and abundant" in Suisun Marsh (Greene 1894). It occurs in small, rare populations there today, mostly along the banks of tidal creeks in brackish marsh (B. Grewell, unpubl. data). Its extreme decline was only recently recognized. It is not currently Federally or State-listed, but is under evaluation because of its apparent extreme rarity and habitat decline. There are 3 CNDDDB detections within 0.3 to 5 miles of the City (CNDDDB 2014).

Suisun Thistle

Cirsium hydrophilum var. *hydrophilum* is a short-lived perennial herb in the thistle tribe (Cardueae) of the sunflower family. It is endemic to Solano County, occurring only in Suisun Marsh and was thought to be extirpated until it was rediscovered in 1989. Suisun thistle grows in the upper reaches of tidal marshes, most often near small watercourses such as sloughs or ditches. There are 4 CNDDDB detections within 0.5 to 3 miles of the City. Population sizes reported for Suisun thistle on Grizzly Island range from "five plants" to "three colonies" to "thousands of plants" (CNDDDB 2014).

Hispid Bird's-beak

Cordylanthus mollis ssp. *hispidus* is an annual herb in the figwort family (Scrophulariaceae) endemic to California. It is found in meadows and seeps, playas, and alkaline valley and foothill grasslands in scattered locations throughout the Central Valley. In the southern portion of the valley most of its habitat has been converted to agriculture, leading to the extirpation of most of the populations there. There are 2 occurrences in Solano County (CNPS 2014) one of which is less than 2 miles from the City in the Jepson Prairie Reserve (CNDDDB 2014).

Soft Bird's-beak

Cordylanthus mollis ssp. *mollis* is a gray-green annual herb in the figwort family. It grows in brackish tidal marshes, commonly in the marsh/upland transition zone. A natural hydrologic connection to a tidal slough system is an important habitat requirement for



this species. It is endemic to the north San Francisco Bay marshes and is currently known only from Solano and Contra Costa counties (CNPS 2014). There are 11 CNDDDB detections within 0.3 to 4 miles of the City (CNDDDB 2014)

Recurved Larkspur

Delphinium recurvatum is a perennial herb and a member of the buttercup family (Ranunculaceae). It is found in sandy or clay alkaline soils, generally in annual grasslands or in association with saltbush scrub or valley sink scrub habitats. Historically, this species was widely distributed in the Central Valley, ranging from Butte County to Kern County. Most of the known occurrences are from Merced County to San Luis Obispo and Kern counties. The species now appears to be very rare outside the southern San Joaquin Valley (CNDDDB 2005). There are two occurrences within Solano County (CNPS 2014) but none occur within 5 miles of the City (CNDDDB 2014). Very little ecological information is available for this species.

Dwarf Downingia

Downsingia pusilla is an annual herb in the bellflower family (Campanulaceae) found in the Sacramento and northern San Joaquin valleys and foothills, and the Bay/Delta region. It grows in vernal pools, playa pools, and on margins of vernal lakes other mesic areas within valley and foothill grassland, both in alkaline (saline) and non-alkaline soils. Other rare wetland and vernal pool species that occur with it include alkali milkvetch, legenere, and Bogg's Lake hedge-hyssop. There are 11 occurrences within 2 to 5 miles of the City (CNDDDB 2014).

Mt. Diablo Buckwheat

Erigonum truncatum is a small pink annual in the buckwheat family (Polygonaceae) believed to have been extinct since 1936 until its rediscovery in 2005 (CNPS 2014). The species is only known from one occurrence on Mt. Diablo in Contra Costa County south of Solano County. It occurs in chaparral, coastal scrub, and valley and foothill grasslands on sandy soil. There is one historical occurrence (from 1888) within the vicinity of **study areas 1 and 2** that is thought to be extirpated (CNDDDB 2014, CNPS 2014).

Fragrant fritillary

Fritillaria liliacea is a perennial herb in the lily family (Liliaceae) and grows in heavy clay soils (often with a serpentine influence) in woodlands, coastal prairie, coastal scrub, and valley and foothill grasslands. It is found in the Bay/Delta and northern edge of the Central Coast region. There are 3 detections within 5 miles of the City (CNDDDB 2014)

Bogg's Lake Hedge Hyssop

Gratiola heterosepala is an annual herb in the plantain family (Plantaginaceae) that ranges from the Modoc Plateau, to the Central Valley and Bay/Delta regions. It grows on clay substrates in vernal pools, playa-type pools, marshy areas, on the margins of reservoirs and lakes, and in man-made habitats such as borrow pits and cattle ponds. Habitat for this species is found within annual grassland, oak woodland, juniper woodland, and conifer forest communities. There are 5 detections within 5 miles of the City (CNDDDB 2014).

Carquinez Goldenbush

Isocoma arguta is a small shrub in the sunflower family that grows in alkaline soils, on flats and low hills in valley and foothill grassland. It often occurs on low benches near drainages and on mounds in areas with mound swale topography. This species is restricted to Solano County (and potentially to Contra Costa County). There is a CNDDDB record of this species in the southeast corner of **study area 17** and seven other detections within 2 to 5 miles of the City (CNDDDB 2014).

Contra Costa Goldfields

Lasthenia conjugens is a small, yellow-flowered annual in the sunflower family. It is associated with vernal pools and seasonally saturated flats and depressions in annual grasslands. There have also been historical observations in a saline-alkaline transition zone between vernal pools and tidal marshes and a salt evaporation pond (P. Baye *in litt.* 2000). This species is found in the Bay/Delta region centered in Solano County (CNPS 2014). There are 4 detections within the City and 9 more within 5 miles (CNDDDB 2014). Thirty to 40 plants were observed on **study areas 1 and 2** in a small depression within the seasonally saturated annual grasslands (City of Suisun City, 2007b). These study areas are within Vernal Pool Critical Habitat Unit 5B for Contra Costa goldfields (USFWS 2006). This species was also found in several locations within the northwest portion of **study area 17** (LSA 2006). Study areas 14, 15, 16, and 17 are within Vernal Pool Critical Habitat Units 4B and 4c for Contra Costa goldfields (USFWS 2006).

Delta Tule Pea

Lathyrus jepsonii var. *jepsonii* is a perennial, climbing herb in the legume family and grows in tidally influenced freshwater and brackish marshes, commonly on slough edges and levees. It has been observed growing with other rare plants, such as soft bird's-beak, Mason's lilaeopsis, Suisun Marsh aster, and delta mudwort. The majority of occurrences are centered in Solano County (CNPS 2014).

Study areas 1 and 2 contain marginal habitat for this species and it does occur along the slough channels south of the site (City of Suisun City, 2007b). There are 2 detections within the City and 35 within 5 miles of the City in Suisun Marsh (CNDDDB 2014)

Legenere

Legenere limosa is an emergent aquatic, or terrestrial, annual herb in the bellflower family. It is known from scattered occurrences in the Delta, north Central Valley, and north SF Bay (CNPS 2014). This species grows in a variety of habitats including vernal pools, vernal marshes, artificial ponds, and floodplains of intermittent streams (USFWS 2005). There are 5 detections within 5 miles of the City, four of which are thought to be extant (CNDDDB 2014). The one 1983 detection thought to be extirpated is estimated to occur within a one-mile radius of a point on the northwestern border of the City (CNDDDB 2014).

Heckard's Peppergrass

Lepidium latifolium var. *heckardii* is an annual herb in the mustard family (Brassicaceae). It grows in alkaline soils in moist grassland sites and vernal pools. There are currently only 15 known occurrences of Heckard's peppergrass extending from Glenn County to Merced County and it is known from the Jepson Prairie area of Solano County. There is one CNDDDB record of this species within 5 miles of the City (CNDDDB 2014).



Mason's Lilaepsis

Lilaepsis masonii is a small, perennial herb in the carrot family that is found in the Bay/Delta region. It grows in regularly flooded tidal zones, freshwater marshes, brackish marshes, and riparian scrub that are influenced by saline water. It is also found on mud-banks and flats along erosional creek-banks, sloughs, and rivers (Fiedler and Zebell 1995; CSCC 2003). This species is locally common in Suisun Marsh and found in close proximity to the City including Suisun Slough near the waterfront area of the City (CNDDDB 2014).

Baker's Navarreti

Navarretia eucocephala ssp. *bakeri* is an annual herb in the phlox family (Polemoniaceae). It is found only in northern San Francisco Bay and the Sacramento Valley (CNPS 2014). It grows in vernal pools and other wet depressions from 15 to 3000 ft. in adobe or alkaline soils. There are 2 CNDDDB detections within 2-5 miles of the City (CNDDDB 2014).

Colusa Grass

Neostapfia colusana is a robust, annual, grass in the Orcutt tribe (Orcuttieae) of the grass family (Poaceae). All three genera of this tribe are vernal pool or wetland grasses endemic to California. It occurs in large or deep vernal pools, in lakes and shallow playas, in saline/alkaline adobe clay soils. Most occurrences are within the San Joaquin Valley. There is only one CNDDDB detection within 2.5 miles of the City (CNDDDB 2014).

Bearded Popcorn Flower

Plagiobothrys hystriculus is an annual herb in the waterleaf family (Boraginaceae) that is endemic to California and known only from the Jepson Prairie and Montezuma Hills in Solano County. It had not been seen since 1892 and was presumed extinct until it was rediscovered in 2005 in the Montezuma Hills (CNPS 2014). Field observations suggest that it grows in mesic grasslands at the upper edges of vernal pools. There are 8 CNDDDB detections within 2.5 to 5 miles of the City (CNDDDB 2014).

Slender-leaved Pondweed

Stuckenia filiformis ssp. *alpina* is a perennial aquatic herb in the pondweed family (Potamogetonaceae). It grows in shallow, freshwater habitats with clear water. Its range includes the Klamath Ranges, central Sierra Nevada, the Central Coast, San Francisco Bay area, and the Great Basin (Baldwin et al. 2012). There is one CNDDDB record of this species within 5 miles of the City (CNDDDB 2014).

Suisun Marsh Aster

Symphyotrichum lentum is a perennial herb in the aster tribe (Astereae) of the sunflower family. It is endemic to Suisun Bay and the Sacramento-San Joaquin River Delta (CNPS 2014). It grows in brackish or freshwater marshes and along the banks of sloughs and watercourses, often occurring with cattails, bulrushes, and blackberry. This species was observed on **study area 2** adjacent to a perennial brackish marsh ditch (Vollmar Consulting 2005). There are 15 CNDDDB detections of this species in Suisun Bay within 0.4 to 5 miles of the City.

Showy Indian Clover

Trifolium amoenum is an annual herb in the legume family. This species was thought to be extinct until it was rediscovered near Occidental, California in 1993 (USFWS 1997). Another natural population was discovered in Marin County in 1996. Historically, it was distributed through seven counties in the San Francisco Bay region. It grows in moist, heavy soils in grassland habitats (USFWS 1997). There are two historic CNDDDB records of this species within 5 miles of the City. One is from the vicinity of Vanden Station and one from the historical vicinity of the Jepson Family's Little Oak Ranch, but exact locations of these occurrences is unknown (CNDDDB 2014).

Saline Clover

Trifolium hydrophilum is an annual herb in the legume family. It is found in the Bay/Delta region and the northern central coast (CNPS 2014). It grows in salt marshes and alkaline soils in moist valley and foothill grasslands and vernal pools and has been observed growing at the margins of vernal pools. It is known to occur with dwarf downingia and Contra Costa goldfields. Saline clover was observed at 17 locations on **study areas 1 and 2**, 32 locations on an adjacent parcel to the south in 2005 (Vollmar Consulting 2005), and one location in the southwest portion of **study area 17** (LSA 2006). CNDDDB records indicate 2 other documented detections within 1-5 miles of the City (CNDDDB 2014).

Solano Grass

Tuctoria mucronata is an annual grass of the Orcutt tribe (Orcuttieae) of the grass family. It is endemic to Solano and Yolo counties and is presently known from only three locations (CNPS 2014). It only occurs in the northern claypan vernal pools within annual grasslands. There is one detection within 5 miles of the City (CNDDDB 2014).

Special Status Wildlife

Based on the results of CNDDDB database searches within the planning area and the surrounding five-mile buffer area, it was determined that the habitat in the planning area had the potential to support 24 special-status wildlife species. Five of these species are federally listed as threatened and four are federally listed as endangered. Four species are state listed as threatened, three are state listed as endangered, two are California fully protected species, and 9 are state species of special concern. These species are listed below in Table BIO-2, along with their status, habitat, and potential to occur in the planning area. The locations of known special-status wildlife occurrences are shown in Exhibit BIO-4. Brief descriptions of these species are provided following Table BIO-2.

Western Pond Turtle

Emys marmorata occur in a variety of aquatic habitats from sea level up to 6500 feet. They are found in rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters (Jennings and Hayes 1994.) They prefer aquatic areas with logs, rocks, algae or vegetation for cover and basking sites. Western pond turtles occur in approximately 90% of their historic range in the Central Valley and west of the Sierra Nevada, but in greatly reduced numbers (Jennings and Hayes 1994). There are 4 detections of the pond turtle within 1 to 5 miles of the City (CNDDDB 2014).



California Tiger Salamander

Ambystoma californiense is a large, stocky, terrestrial salamander with white or pale yellow spots or bars on a black background on the back and sides. It is associated with grassland and vernal pools in the Central Coast, Delta, and mid Central Valley. The Central Valley population of this species is federally listed as threatened and critical habitat has been designated (USFWS 2010). They are restricted to grasslands and low foothill regions where lowland aquatic sites are available for breeding. They prefer natural seasonal pools or ponds that mimic them (stock ponds that are allowed to go dry). Adults live underground in grasslands and the grassy understory of open woodlands, with abundant small-mammal burrows usually within 1 mile of breeding sites. Typical breeding sites include vernal pools, seasonal or fishless natural ponds, intermittent streams, or stock ponds. There are 23 detections within 1 to 5 miles of the City (CNDDDB 2014). Study areas 1, 2, and 13-17 are identified in the SMHCP as potential range for this species and potentially suitable habitat is present on these sites.

Swainson's Hawk

Buteo swainsoni breeds in North America and winters in South America. In California, breeding populations occur in desert, shrub steppe, grassland, and agricultural habitats. The overwhelming majority of the state's breeding sites are in the Great Basin and the Central Valley. In the Central Valley, nest sites are strongly associated with riparian forests located near suitable foraging habitat, typically grasslands and agriculture. Riparian systems provide the large trees required for nesting. There are 7 detections of this species within 5 miles of the City (CNDDDB 2014).

Northern Harrier

Circus cyaneus occurs throughout California, concentrated in the Central Valley and coastal valleys. They are found in a variety of habitats including freshwater marshes, brackish and saltwater marshes, wet meadows, weedy borders of lakes, rivers and streams, annual and perennial grasslands (including those with vernal pools), weed fields, ungrazed or lightly grazed pastures, some croplands, sagebrush flats, and desert



**Table BIO-2
Special-Status Wildlife Species With Potential to Occur
Within and Surrounding the Sphere of Influence**

Species	Listing Status ¹		Habitat	Potential for Occurrence ²
	Fed.	State		
Amphibians and Reptiles				
California Tiger Salamander (<i>Ambystoma californiense</i>)	FT	CT	Breeds in vernal pools/seasonal ponds and stock ponds in grasslands and woodlands	Could occur. CNDDB occurrences from 1-5 miles and suitable habitat present.
Western pond turtle (<i>Emys marmorata</i>)	--	SSC	Permanent or nearly permanent water with basking sites and suitable uplands for nesting.	Could occur. CNDDB occurrences within 5 miles and suitable habitat present.
Birds				
Swainson's Hawk (<i>Buteo swainsoni</i>) (nesting)	--	CT	Nests in riparian forest and scattered trees; forage in grasslands and agricultural fields.	Likely to occur. CNDDB occurrences within 5 miles and suitable habitat present.
Northern Harrier (<i>Circus cyaneus</i>) (nesting)	--	SSC	Forages and nests in grasslands, marshes, and agricultural fields.	Known to occur. Observed on study areas 1 and 2 foraging over perennial marsh and grassland habitats.
White-tailed Kite (<i>Elanus leucurus</i>) (nesting)	--	CFP	Nests in dense oaks, willows, other trees	Known to occur. Observed on site suitable habitat present.
Tricolored Blackbird (<i>Agelaius tricolor</i>) (nesting colony)	--	SSC	Forages in agricultural lands and grasslands; nests in marshes, riparian scrub, and other areas that support cattails or dense thickets of shrubs or herbs.	Could occur. Suitable habitat is present. No CNDDB detections within 5 miles.
San Francisco Common Yellowthroat (<i>Geothlypis trichas sinuosa</i>) (year round)	--	SSC	Forages and nests in dense fresh and saltwater marsh habitat	Known to occur. Suitable habitat present. CNDDB detections on site and within 5 miles. Observed on property adjacent to study area 2
Loggerhead Shrike (<i>Lanius ludovicianus</i>) (nesting)	--	SSC	Open areas such as desert, grasslands, and savannah. Nests in thick foliage in trees or tall shrubs. Forages from trees, fence posts, utility poles and other perches.	Known to occur. Observed on study area 1 or 2. There are no CNDDB detections within 5 miles and suitable habitat is present.
Western Burrowing Owl (<i>Athene cunicularia hypugea</i>) (burrow sites)	--	SSC	Nests in mammal burrows, rock cavities in grassland and scrub.	Known to occur. Observed between study areas 1 and 2. Numerous CNDDB records in vicinity and suitable habitat present.

**Table BIO-2
Special-Status Wildlife Species With Potential to Occur
Within and Surrounding the Sphere of Influence**

Species	Listing Status ¹		Habitat	Potential for Occurrence ²
	Fed.	State		
Short-eared owl (<i>Asio flammeus</i>) (nesting)	--	SSC	Nests in tule patches and tall grass in freshwater and salt marshes, meadows, and irrigated alfalfa fields.	Could occur. Suitable habitat present. CNDDDB detections within 5 miles.
California Black Rail (<i>Laterallus jamaicensis coturniculus</i>) (year round)	--	CT	Tidal salt and brackish marsh bordering sloughs and large bays.	Could occur. Suitable habitat present. CNDDDB detections within 5 miles.
California Clapper Rail (<i>Rallus longirostris obsoletus</i>) (year round)	FE	CE	Tidal salt and brackish marsh along larger sloughs and bays	Could occur. CNDDDB occurrences in immediate vicinity and suitable habitat present.
Mountain Plover (<i>Charadrius montanus</i>) (wintering)	--	SSC	Found in short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Needs short vegetation, bare ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.	Could occur. Suitable habitat present. CNDDDB detections within 5 miles.
Suisun Song Sparrow (<i>Melospiza melodia maxillaris</i>) (year round)	--	SSC	Forages and nests in dense marsh and scrub habitat along the margins of Suisun Bay.	Known to occur. Observed on study area 2. CNDDDB records in immediate vicinity and suitable habitat present.

Invertebrates

Vernal Pool Fairy Shrimp (<i>Branchinecta lynchi</i>)	FT	--	Vernal pools throughout the Delta and Central Valley.	Known to occur. CNDDDB record on site. Study areas 14, 15, 17 and portions of 16 are within designated critical habitat.
Vernal Pool Tadpole Shrimp (<i>Lepidurus packardii</i>)	FE	--	Vernal pools in scattered locations in the Delta and Central Valley.	Likely to occur. CNDDDB occurrences in immediate vicinity and suitable habitat present. Study areas 14, 15, 17 and portions of 16 are within designated critical habitat
Conservancy Fairy Shrimp (<i>Branchinecta conservatio</i>)	FE	--	Large vernal pools, often with turbid water	Likely to occur. CNDDDB occurrences in immediate vicinity and suitable habitat present. Study area 17 is within designated critical habitat.
Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	FT	--	Below 3,000 feet in elderberry shrubs, especially in elderberry shrubs within riparian habitats.	Could occur. Elderberry shrubs may be present. CNDDDB detections within 5 miles.



**Table BIO-2
Special-Status Wildlife Species With Potential to Occur
Within and Surrounding the Sphere of Influence**

Species	Listing Status ¹		Habitat	Potential for Occurrence ²
	Fed.	State		
Delta green ground beetle <i>Elaphrus viridis</i>	FT	--	Margins of large vernal pools in grassland.	Not expected to occur. Large vernal pools are not present and species is known only from Jepson Prairie, but CNDDDB detections exist within 5 miles.
Fish				
Delta Smelt <i>Hypomesus transpacificus</i>	FT	CE	Suisun Bay/Suisun Marsh sloughs.	Could occur. The slough in study area 2 may provide suitable spawning habitat. No CNDDDB detections within 5 miles.
Sacramento Splittail <i>Pogonichthys macrolepidotus</i>	--	SSC	Suisun Marsh, concentrating in the dead-end sloughs fed by small streams.	Could occur. The slough in study area 2 may provide suitable spawning habitat. CNDDDB detections within 5 miles.
Longfin Smelt <i>Spirinchus thaleichthys</i>	--	CT	Adults found throughout San Francisco Bay migrate to brackish or freshwater in Suisun Bay.	Could occur. The slough in study area 2 may provide suitable spawning habitat. No CNDDDB records within 5 miles.
Mammals				
Salt Marsh Harvest Mouse <i>Reithrodontomys raviventris</i>	FE	CE FP	Pickleweed salt marsh flats in the SF Bay and lower Delta.	Known to occur. CNDDDB occurrence on study area 2 and in immediate vicinity. Suitable habitat present.
Suisun Shrew <i>Sorex ornatus sinuosus</i>	--	SSC	Tidal marshes along the northern shores of San Pablo and Suisun Bays.	Likely to occur. CNDDDB occurrences in immediate vicinity and suitable habitat present.

Notes:

¹ **Legal Status Definitions**

U.S. Fish and Wildlife Service (USFWS):
 FT =threatened (legally protected)
 FE =endangered (legally protected)
 -- = no status.

California Department of Fish and Wildlife (CDFW):

E = endangered (legally protected)
 FP = fully protected (legally protected)
 SSC = species of special concern (no formal protection)
 CE = candidate for endangered
 CT=candidate for threatened

² **Potential Occurrence Definitions**

Likely to occur – Species could potentially occur due to suitable habitat in the Planning Area and nearby documented occurrences

Known to occur – Species has been documented in the Planning Area and suitable habitat is present

Could occur - Suitable habitat is available at the project site; however, there are little to no other indicators that the species might be present

Not expected to occur – None of the species life history requirements are provided by habitat in the Planning Area and/or the Planning Area is outside of the species known distribution and/or the species is not likely to occur because of marginal habitat quality or distance from known occurrences

Source: CNDDDB data compiled by AECOM in 2014

sinks (Shuford and Gardali eds. 2008). Harriers nest on the ground, within patches of dense, often tall, vegetation in undisturbed areas (MacWhirter and Bildstein 1996). This species was observed on **study areas 1 and 2** and may potentially have been nesting (City of Suisun City, 2007b). Between 1987 and 1992 an average of 25 nests per year were located in Suisun Marsh at Grizzly Island WA in Solano County (Loughman and McLandress 1994). The CNDDDB (2014) reports only one occurrence of this species within 5 miles of the City.

White-tailed Kite

Elanus leucurus is a medium-sized raptor that inhabits low elevation open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands (Dunk 1995). White-tailed kites have been reported to use any suitable tree that is of moderate height, such as oak, eucalyptus, cottonwood, toyon, and even coyote bush with the nests placed near the tops of these shrubs or trees (CDFG 2010). This species is common to uncommon and a year round resident in the Central Valley, other lowland valleys, and along the entire length of the coast (Dunk 1995). There is one CNDDDB record for this species within 5 miles of the City (CNDDDB 2014).

Tricolored Blackbird

Agelaius tricolor is a native colonial nesting songbird that occurs in the San Francisco Bay, the Delta, and Central Valley. Colonies may have up to 20,000 nests whereas historically there were up to 200,000 nests in a colony (DeHaven et al. 1975). This species typically nests in dense vegetation near open water or in emergent wetland vegetation especially cattails and tules, but sometimes in thickets of willow, blackberry, wild rose, tall herbs willow thickets (Granholm 1990, Terres 1980). Major wintering concentrations occur in and around the Sacramento–San Joaquin River Delta and coastal areas, including Monterey and Marin counties, where they are often associated with dairies (Shuford and Gardali eds. 2008). There are no CNDDDB detections within 5 miles of the City (CNDDDB 2014). There are six CNDDDB records for the tricolored blackbird in Solano County from 2003. Nesting colonies of the tri-colored blackbird have been observed on the Gridley Mitigation Bank and Jepson Prairie in 2003 (Steve Foreman, LSA, pers. obs. In: LSA 2004).

San Francisco Common Yellowthroat

Geothlypis trichas sinuosa is a resident songbird endemic to the greater San Francisco Bay region. They forage and nest in dense emergent vegetation in salt and brackish marsh habitats. In the Bay the habitats used by this species in decreasing order of preference include brackish marsh, riparian woodland/swamp, freshwater marsh, salt marsh, and upland (Shuford and Gardali eds. 2008). This species was observed in dense perennial brackish marsh habitat on a private property directly south of **study areas 1 and 2** in 2005 (HGB 2006, Vollmar Consulting 2005). The CNDDDB (2014) reports 11 detections within 5 miles of the City, including one detection on either **study area 1 or 2**.

Loggerhead Shrike

Lanius ludovicianus is found across most of California including the Bay, Delta and Central Valley regions. They breed mainly in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. They use tall shrubs or trees (also use fences or power lines) for hunting perches, open areas of short grasses, forbs, or bare ground for hunting; and large shrubs or trees for nesting. They are known for impaling their insect prey on sharp, thorny, or multistemmed plants and barbed-wire fences.



This species was observed perched on the fence line along the western edge of **study area 2** in 2000 (Vollmar Consulting 2005) and again on study area 1 or 2 in 2005 (HGB 2006). Shrikes probably use these study areas for foraging and perching but there is very limited on-site riparian habitat and scrub for nesting (City of Suisun City, 2007b). There are no CNDDDB (2014) detections within 5 miles of the City.

Western Burrowing Owl

Athene cunicularia hypugea is found across much of California including the Delta and Central Valley regions. They occur in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. They require pre-existing burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation. They have been found in and around agricultural areas, airports and runways, golf courses, vacant lots and other human-altered areas (Shuford and Gardali eds. 2008). They typically use burrows made by California ground squirrels, but they have also been observed using concrete culverts; concrete, asphalt, or wood debris piles; or openings beneath concrete or asphalt pavement. Two adult burrowing owls and at least one active burrow were observed in 2006 on a small property adjacent to **study areas 1 and 2** (City of Suisun City, 2007b). In addition to this observation, CNDDDB reports 12 other detections that range from within 0.3 to 5 miles of the City (CNDDDB 2014).

Short-Eared Owl

Asio flammeus current breeding range in California is limited to the Modoc Plateau, Klamath Basin, and Great Basin area of northeastern California; a small portion of the Suisun Marsh and Sacramento-San Joaquin River Delta; and episodic breeding in areas of the San Joaquin Valley and adjacent Coast Range valleys and isolated areas along the coast (Shuford and Gardali 2008). Grizzly Island Wildlife Area supports a resident population of short-eared owl (Shuford and Gardali 2008). This species requires open habitat with large rodent prey populations and sufficient herbaceous cover to hide their nests, which are made in tule marshes or tall grasslands (Shuford and Gardali 2008). There is one CNDDDB record of this species within 5 miles of the City, which is the Grizzly Island population (CNDDDB 2014).

California Black Rail

Laterallus jamaicensis coturniculus is a rarely seen, scarce, yearlong resident of saline, brackish, and fresh emergent wetlands along the coast and portions of the interior of California. Most commonly found in tidal emergent wetlands dominated by pickleweed, or in brackish marshes supporting bulrushes in association with pickleweed. In freshwater, they are typically found in bulrushes, cattails, and saltgrass. There are 11 CNDDDB detections in Suisun Marsh ranging from the immediate vicinity out to 5 miles of the City (CNDDDB 2014).

California Clapper Rail

Rallus longirostris obsoletus is now restricted almost entirely to the marshes of San Francisco estuary, where the only known breeding populations are known to occur. They have occurred sporadically and in low numbers at various locations throughout the Suisun Marsh Area (Carquinez Strait to Browns Island, including tidal marshes adjacent to Suisun, Honker, and Grizzly Bays) (USFWS 2010). They occur within a range of salt and brackish marshes from typical salt marshes dominated by pickleweed and Pacific cordgrass to brackish marsh in the major sloughs and rivers of Suisun Marsh.

Clapper rails have rarely been recorded in nontidal marsh areas. There are 6 CNDDDB detections in Suisun Marsh from 0.3 to 5 miles of the City (CNDDDB 2014).

Mountain Plover

Charadrius montanus winters (primarily from September to mid-March) in the western Central Valley and isolated areas along the central and southern coast and southern deserts of California (Shuford and Gardali 2008). This species is found in short-grass prairie or similar habitats with sparse vegetative cover, such as grazed grasslands and ploughed fields. There is one CNDDDB record of this species within 5 miles of the City.

Suisun Song Sparrow

Melospiza melodia axillaries is restricted to Suisun Marsh and is one of three subspecies of song sparrow that are endemic to the San Francisco Bay region. The Suisun song sparrow occurs in virtually every tidal marsh in Suisun Bay, preferring the denser upland edges of large marshes especially where shrubs are present (Shuford and Gardali eds. 2008). This species is associated primarily with tidal channels, especially in marshes where pickleweed dominates and gumplant lines the channels (Shuford and Gardali eds. 2008).

This species was observed foraging in dense perennial marsh habitat along the eastern portion of **study area 2** in 2000 (Vollmar Consulting 2005) and on study areas 1 and 2 in 2005 (HBG 2005). The species may also nest on these study areas (City of Suisun City, 2007b). There are 11 other CNDDDB detections in Suisun Marsh ranging from the immediate vicinity to within 5 miles of the City (CNDDDB 2014).

Vernal Pool Fairy Shrimp

Branchinecta lynchi is a small crustacean in the Branchinectidae family and is currently found in 28 counties across the Central Valley and Coast Ranges of California, and in Jackson County of southern Oregon (USFWS 2005). This species occupies a variety of vernal pool habitats, from small, clear sandstone rock pools to large, turbid, alkaline, grassland valley floor pools ranging from 10 to 1,220 meters in elevation (Engman *et al.* 1990, Helm 1998). Vernal pool fairy shrimp typically inhabit smaller pools less than 0.02 hectares (Gallagher 1996, Helm 1998). There are 12 CNDDDB detections within 5 miles of the City including one observation on the northern border of the City in the vicinity of **study area 12**. This observation was located on a site that no longer supports vernal pools.

Vernal Pool Tadpole Shrimp

Lepidurus packardii is a small crustacean in the Triopsidae family. They occur in a wide variety of ephemeral wetland habitats in vernal pools ranging from 6.5 square feet to 88 acres in surface area (Helm 1998). Some of these vernal pools may be too small to remain inundated for the entire life cycle of the tadpole shrimp, but this species may be able to tolerate temporary drying conditions (Helm 1998). The vernal pool tadpole shrimp is currently distributed across the Central Valley and in the San Francisco Bay Area (USFWS 2005). There are 25 CNDDDB detections within 5 miles of the City, several of which are within 0.25 to 0.5 miles of the City (CNDDDB 2014).

Conservancy Fairy Shrimp

Branchinecta conservatio is a small crustacean in the Branchinectidae family known from a few isolated populations distributed over a large portion of the Central Valley and southern California (USFWS 2005). This fairy shrimp occurs in vernal pools found



on several different landforms, geologic formations and soil types. At Jepson Prairie Reserve in Solano County, this species is found in large playa-like depressions on deep alluvial soils on northern claypan soils. They have been observed in vernal pools ranging in size from 323 square feet to 88 acres (Helm 1998). There are 13 CNDDDB detections within 0.4 to 5 miles of the City (CNDDDB 2014).

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) is in the family. It is completely dependent on its host plant, blue elderberry (*Sambucus mexicanus*), during its entire life cycle, and is generally restricted to California's Central Valley and adjacent foothills. Larvae of these beetles live within the soft pith of the elderberry shrub where they feed for 1 to 2 years. Adults emerge from inside the wood of elderberry shrubs during the spring as the plant begins to flower. The adults feed on the elderberry foliage up until they mate. Females lay their eggs in the crevices of elderberry bark. Upon hatching, the larvae tunnel into the stems of the shrub to feed. The beetles typically use stems that are greater than one inch in diameter at ground level. Beetle populations in the state have decreased largely due to historical loss of riparian habitat in the Central Valley. However, a 5-year review of the species, required by Section 4(c)(2)(A) of the ESA, was completed by USFWS in October 2006 and the recommendation was that the beetle be delisted as a result of recent restoration efforts that have led to an increase in available habitat for the species (USFWS 2006). This recommendation is not a guarantee that the species will be delisted, however, because formal changes in the classification of listed species require a separate USFWS rulemaking process distinct from the 5-year review. There are four CNDDDB records of this species within 5 miles of the City (CNDDDB 2014).

Delta Green Ground Beetle

Delta green ground beetle is a member of the ground beetle (Carabidae) family. This species is known only from the greater Jepson Prairie area of Solano County where it is found in vernal pool-grassland habitat, especially at the edges of large vernal pools and in bare areas along roads and trails (USFWS 2009). The historic range of this species is unknown, but it may have once occurred throughout the Central Valley vernal pool region (SCWA 2012). The life cycle of the beetle is somewhat unknown, but appears to coincide with the wetting and drying cycles of the vernal pool habitats in which they live, emerging as the pools fill with water from February to mid-May and becoming dormant (entering diapause) in summer when the pools are dry (USFWS 2009). Soils crack are believed to be used as refugia for larvae and diapausing pupae. There are six CNDDDB records of this species within 5 miles of the City, including records from just 1 mile north of **study area 17**.

Delta Smelt

Hypomesus transpacificus is in the smelt family (Osmeridae). They are found only from Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano and Yolo counties (USFWS 2010). This species can tolerate a wide range of salinity. For a large part of their one-year life span, they live along the freshwater edge of the mixing zone of saltwater and freshwater. There are no CNDDDB detections within 5 miles of the City, but delta smelt are known to occur upstream of Suisun Bay in Solano County (SCWA 2009). Critical habitat for delta smelt occurs in Suisun Marsh south of the City. The slough in **study area 2** is hydrologically connected to Suisun Slough and may provide suitable spawning habitat.

Sacramento Splittail

Pogonichilus macrolepidotus is a large fish in the carp family (Cyprinidae). The Sacramento splittail inhabits the Sacramento-San Joaquin river system and the Delta. They occur primarily in the Suisun Bay area, but reach northern San Pablo Bay regularly in years of high river discharge. In Solano County, splittail are year round residents of Suisun Marsh, concentrating in the dead-end sloughs fed by small streams. There are 2 CNDDDB detections within 2 miles of the City. The slough in **study area 2** is hydrologically connected to Suisun Slough and may provide suitable spawning habitat.

Longfin Smelt

Spirinchus thaleichthys is an anadromous smelt (family Osmeridae) found in California's bay, estuary, and nearshore coastal environments from San Francisco Bay north to Lake Earl, near the Oregon border (CDFG 2009). The San Francisco Estuary and the Sacramento-San Joaquin Delta supports the largest longfin smelt population in California. Adult smelt migrate from San Francisco Bay into low salinity or freshwater reaches of coastal rivers and tributary streams to spawn. These migration routes include the rivers and streams of Suisun Bay (CDFG 2009). There are no CNDDDB records for longfin smelt within 5 miles of the City. The slough in **study area 2** is hydrologically connected to Suisun Slough and may provide suitable spawning habitat.

Saltmarsh Harvest Mouse

Reithrodontomys raviventris is a small native rodent in the Cricetidae family, which includes field mice, lemmings, muskrats, hamsters and gerbils. The northern subspecies lives in the marshes of the San Pablo and Suisun Bays (USFWS 2010). This species is dependent on dense cover of native salt tolerant plants, and prefer pickleweed-dominated (*Salicornia virginica*) saline emergent wetlands (Shellhammer 1977). They require non-submerged, salt tolerant vegetation to escape the high tide (Shellhammer *et al.* 1982). They may also move into the adjoining grasslands during the highest winter tides. There are 17 CNDDDB detections within 5 miles of the City several of which are within the City in suitable marsh habitat (CNDDDB 2014).

Suisun Shrew

Sorex ornatus sinuosus is currently restricted to isolated remnants of natural tidal and brackish marshes along the northern borders of San Pablo and Suisun bays (WESCO 1986). They typically inhabit tidal marshes characterized by cordgrass, pickleweed, and gumplant, and brackish marshes dominated by California bulrush and cattail (Rudd 1955). They appear to require dense, low-lying cover where invertebrates are abundant. There are 6 CNDDDB detections within 5 miles of the City and one of these is in the immediate vicinity of study areas 1 and 2 (CNDDDB 2014).

Regulatory Setting

Biological resources in California are protected and/or regulated by a variety of federal, state, and local laws and policies. Key regulatory and conservation planning issues applicable to the project are discussed below.



Federal Plans, Policies, Regulations, and Laws

Federal Endangered Species Act

The USFWS has jurisdiction over projects that may result in take of a species listed as threatened or endangered under the federal Endangered Species Act (ESA). Under the ESA (Title 16 of U.S. Code, Section 153 et seq. [16 USC 153 et seq.]), the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification that could result in take. If implementation of a project is likely to result in take of a federally listed species, then the project applicant must either obtain an incidental-take permit under ESA Section 10(a) or complete a federal interagency consultation process under ESA Section 7 before the take occurs. An incidental-take permit typically requires various types of mitigation to compensate for or minimize the take.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 USC 703–711) prohibits the killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the U.S. secretary of the interior. Most native bird species fall under the jurisdiction of this act.

Section 404 of the Clean Water Act (as amended in 1977)

Section 404 of the Clean Water Act (CWA) (33 USC 1252–1376) requires a project applicant to obtain a permit before engaging in any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries.

Under Section 404 of the CWA, the U.S. Army Corps of Engineers (USACE) regulates and issues permits for activities that involve the discharge of dredged or fill materials into waters of the United States. Fills of less than one-half acre of nontidal waters of the United States for residential, commercial, or institutional development projects can generally be authorized under USACE's nationwide permit (NWP) program, provided that the project satisfies the terms and conditions of the particular NWP. Fills that do not qualify for a NWP require a letter of permission or an individual permit.

Section 401 of the Clean Water Act

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board.

Section 10 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the construction of any structure in or over any navigable water of the United States. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures, from the smallest floating dock to the largest commercial undertaking. It further includes, without limitation, any wharf, dolphin, weir, boom breakwater, jetty, groin, bank protection (e.g. riprap, revetment, bulkhead), mooring structures such as pilings, aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessel, tunnel, artificial canal, boat ramp, aids to navigation, and any other permanent, or semi-permanent obstacle or obstruction.

In general, activities regulated under Section 10 of the Rivers and Harbors Act are similar to Section 404 of the Clean Water Act, but the geographic extent of jurisdiction is much more restricted and is limited to identified navigable waters of the United States. In Solano County, navigable waters are limited to the current and historic (as of 1899) tidal channels in Suisun Bay, Suisun Marsh, the Sacramento–San Joaquin River Delta (Delta), and the Sacramento River.

NOAA Fisheries Service

The authority to list species as threatened or endangered under the ESA is shared by the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) and USFWS. NOAA Fisheries is responsible for enforcing ESA regulations (described above) for most marine and “commercial” species. Within Solano County, their primary regulatory role is addressing impacts to steelhead and other listed salmonids.

Magnuson-Stevens Fishery Conservation Act

The Magnuson-Stevens Act mandates federal agencies which fund, permit or carry out activities that may adversely impact the essential fish habitat (EFH) of federally managed fish species to consult with NOAA Fisheries regarding the potential adverse effects of their actions on EFH. EFH is broadly defined by the Act to include “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” In this region, EFH waters essentially include the substrates and associated biological communities within bays and estuaries of the coasts of Washington, Oregon, and California, seaward from the high tide line (MHHW) or extent of upriver saltwater intrusion, including the Suisun Marsh and Delta.



State Plans, Policies, Regulations, and Laws

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code Section 2050 et seq.) establishes state policy to conserve, protect, restore, and enhance endangered or threatened species and their habitats. CESA mandates that state agencies should not approve projects that would jeopardize the continued existence of endangered or threatened species if reasonable and prudent alternatives are available that would avoid jeopardy. Definitions of endangered and threatened species in the CESA parallel those defined in the ESA; although, the CESA definition of take does not include "harm" or "harass." Take authorizations from CDFW are required for any unavoidable impact on state-listed species resulting from proposed projects.

Lake and Streambed Alteration

Pursuant to provisions included in Sections 1600–1603 of the California Fish and Game Code, CDFW is empowered to issue streambed alteration agreements for projects that would "divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake" (Fish and Game Code Section 1602[a]). Streams and rivers are defined by the presence of a channel bed, banks, and water that flows at least periodically or intermittently and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation and may incorporate areas that do not meet USACE criteria for wetland soils and/or hydrology (e.g., where riparian woodland canopy extends beyond the banks of a stream away from frequently saturated soils). CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife.

Porter-Cologne Water Quality Act

Under the Porter-Cologne Water Quality Control Act, waters of the state fall under jurisdiction of the appropriate regional water quality control board (RWQCB). Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that discharge waste to wetlands or waters of the state must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

More recently, the applicable RWQCB has also generally taken jurisdiction over "waters of the state" that are not subject to USACE jurisdiction under the CWA, in cases where USACE has determined that certain features do not fall under its jurisdiction. Mitigation requiring no net loss of wetlands functions and values of waters of the state is typically required.

Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., hawks, owls, eagles, and falcons), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction.

Regional and Local Plans, Policies, Regulations, and Ordinances

Solano County General Plan

The Solano County General Plan was updated in 2008 and is a guide for both land development and conservation in the unincorporated portions of Solano County. It contains the policy framework necessary to fulfill the community's vision for Solano County in 2030; a sustainable place with a thriving environment and an economy that maintains social equity. This theme of sustainability is carried throughout the plan in its goals, policies, and programs.

A vision was created to guide future conservation and development efforts in Solano County. This vision provided three major strategic directions for natural resources in the General Plan:

- preserving the county's valued natural, cultural, and scenic resources;
- enhancing and restoring the natural environment and the county's diverse landscapes; and
- ensuring sustainable provision of energy, water, and mineral resources.

The Solano County General Plan applies to those areas within the City's Sphere of Influence, but outside the City's boundaries. However, upon annexation, the City's policies, rather than those of Solano County, would apply to projects developed under the updated General Plan.

Suisun City General Plan

The 1992 General Plan, which relied partly on Solano County's General Plan (particularly the Noise and Safety Elements), is being updated to reflect developments and other changes in local conditions since 1992, technical studies and planning processes that have occurred since the early 1990s, and changes in state law and regulatory requirements, among other considerations. New information is now available that will be useful for the General Plan Update, including the 2008 Solano County General Plan and EIR (prepared by AECOM with County staff), and information generated for the preparation of the Solano Multispecies Habitat Conservation Plan, Travis Air Force Base, and the Suisun Marsh.

The 1992 Plan addresses open space and conservation objectives. The open space objective is to designate sufficient lands for various open space uses to meet parks and recreation requirements, provide flood protection for the City, preserve the Suisun



Marsh, preserve the natural resources and amenities and provide continued agricultural production as an interim use. The environmental preservation objective is to increase the accessibility of Suisun Marsh to residents of the city while assuring its protection and enhancement in accordance with State policies governing the management of lands within and adjacent to the marsh.

Solano Multi-Species Habitat Conservation Plan

A multi-species HCP for portions of Solano County is being prepared by the U.S. Bureau of Reclamation, Solano County Water Agency (SCWA), and its eight member agencies, including the City of Vacaville, the City of Fairfield, the City of Suisun City, the City of Vallejo, Solano Irrigation District, and Maine Prairie Water District. An administrative draft of the HCP was completed in 2009 and will be circulated for public review by fall/winter of 2010. The HCP is expected to be permitted by the end of 2011.

In March 1999, USFWS, in accordance with Section 7 of the ESA, issued a biological opinion (BO) regarding the renewal of the Solano Project water service contract between the U.S. Bureau of Reclamation and SCWA (USFWS 1999). The 25-year contract provides for continued delivery of Solano Project water for agricultural, municipal, and industrial purposes throughout the SCWA contract service area. The contract also provides for continued operations and maintenance of the Solano Project based on current operating parameters. Solano Project facilities include Lake Berryessa, Monticello Dam, Putah Diversion Dam, and the Putah South Canal.

The plan participants have agreed to implement conservation measures to ensure the protection of threatened and endangered species and their habitat within the SCWA contract service area. Full implementation of the conservation measures outlined in the BO for the renewal of the Solano Project water service contract (USFWS 1999) is key to the survival and recovery of listed species. As such, SCWA and the member agencies have developed an HCP for the Solano Project's contract service area. The Solano HCP is intended to support the issuance of a Section 10(a)1(B) "incidental take permit" under the ESA for activities associated with future water use in the Solano Project's contract service area. The plan participants also intend to secure incidental-take authorization from CDFW for state-listed species (California Fish and Game Code Section 2080.1).

The Solano HCP addresses compliance with the terms and conditions of the Solano Project BO (USFWS 1999) for the following plan participants:

- SCWA
- City of Vacaville
- City of Fairfield
- City of Suisun City
- City of Vallejo
- Solano Irrigation District
- Maine Prairie Water District

The following agencies have chosen to voluntarily participate in the Solano HCP:

- City of Rio Vista
- City of Dixon
- Reclamation District 2068

- Vallejo Sanitation and Flood Control District
- Fairfield-Suisun Sewer District

The expanded scope of the Solano HCP includes take coverage for additional species. These additional species include federally listed fish species under the jurisdiction of NMFS and species listed as threatened or endangered under the CESA. The Solano HCP further addresses other species of concern (i.e., species recognized by groups such as CDFW and CNPS as having declining or vulnerable populations, but not officially listed as threatened or endangered species). Thirty-six species are proposed to be covered under the Solano HCP.

General Plan Issues and Opportunities

Some of the key issues to be answered through the General Plan update include:

- **Increasing certainty.** The existing General Plan addresses many of the biological resources topics that would remain pertinent for guiding land use change in the City's Sphere of Influence. However, much of the information defers to planning efforts controlled by other agencies and planning designations to come later. Would it make more sense to incorporate regulatory requirements and habitat planning into the General Plan policy array? Does it make sense to include self-mitigating policies (including diagrammatic policies) to guide development and create a greater awareness of the mitigation that would be required through existing regulations anyway? Providing a policy framework that supports self mitigation and regulatory consistency is likely to result in better designed projects that can be implemented more swiftly and easily without costly delays due to unanticipated constraints.
- **Coordination with Habitat Conservation Plan.** Much of the developable land remaining within the City consists of infill lots that do not provide high biological resource values because they are disturbed and surrounded by existing urban development. However, many of these lots are bordered or traversed by waterways and canals that provide movement corridors and dispersal opportunities for regional wildlife. Some of these waterways are degraded and could be restored or enhanced to improve their value for wildlife use. Maintaining movement corridors is important for providing connectivity between open space areas to the north and west with valuable habitat to the south. Connectivity among the region's habitat patches is also important for facilitating local daily and seasonal movements (particularly by species with larger home ranges) and maintaining genetic connectivity among populations threatened with isolation. While there is currently abundant open space to the east for wildlife to move around the City, movement corridors through the City will become more and more valuable as growth continues through the City's Sphere of Influence and adjacent Fairfield. The General Plan could be crafted to ensure wildlife dispersal opportunities between surrounding natural habitat areas persist into the future. Upland movement corridors through the City from east to west are important for terrestrial wildlife species that cannot cross the deep water sloughs. It is also important that corridors that enter the City from open habitat patches outside of the City are connected to open space at the other end so that wildlife do not enter the corridor and become trapped in a habitat sink. The Jepson Prairie-Suisun Marsh corridor traverses the southeast portion of study area 17 and serves as a key movement corridor for the



region. The importance of preserving this key corridor is recognized in the Solano Multispecies Habitat Conservation Plan. The General Plan should maintain this corridor and avoid reducing the existing value of the corridor. Interfering with established wildlife corridors is a significant impact under CEQA.

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Appendix

Habitats and Conservation Issues

**Habitats and Conservation Issues Associated with the 17 Study Areas
in the Suisun City Sphere of Influence and City Limits**

Parcel No.	Habitat	VP Historic/ Current	VP Cons. Area HCP/USFWS CH	VP Recovery Area HCP	CC Goldfields HCP/USFWS CH	CTS Potential HCP	Key Corridor HCP	Environ. Doc
1	Annual grassland, vernal pools, saturated grassland, alkali marsh, slough	Yes/Yes	High	Yes	Core area/ Contra5B	Potential range	No	Gentry Suisun DEIR
2	Annual grassland, Alkali marsh, brackish marsh, vernal pools, ditch	Partial/Partial	High	Yes	Core area/ Contra 5B	Potential range	No	Gentry Suisun DEIR
3	Ruderal	No/No	No	No	No	No	No	Suisun City GPU
4	Ruderal, brackish marsh, ditch	No/No	No	No	No	No	No	Suisun City GPU
5	Ruderal	No/No	No	No	No	No	No	Suisun City GPU
6	Ruderal, degraded seasonal wetland, seasonal marsh, ditch	Partial/Partial	Low	No	No	Potential range	No	Suisun City GPU
7	Ruderal	Partial/ Partial	No	No	No	No	No	Suisun City GPU
8	Ruderal, ditch	No/No	No	No	No	No	No	Suisun City GPU
9	Ruderal, degraded seasonal wetland	Yes/Yes	Low	No	No	Potential range	No	Suisun City GPU
10	Ruderal	Yes/No	No	No	No	No	No	Suisun City GPU
11	Ruderal, tamarisk, arundo, eucalyptus, canal	Yes/No	No	No	No	No	No	Railroad Rd. Project DEIR
12	Ruderal, ditch	Yes/No	No	No	No	No	No	Railroad Rd. Project DEIR
13	Ruderal, ditch, seasonal wetlands	Yes/Yes	Medium	No	No	Potential range	No	Walters Rd. West FEIR
14	Ruderal, annual grasslands, vernal pools, ditches	Yes/Yes	High/ VERFS 16A/VERTS 11D	Yes	Core Area/ CONTRA 4C	Potential range	No	Suisun City GPU
15	Annual grasslands , vernal pools	Partial/Partial	Medium/VERFS 16B/VERTS 11C	Yes	Potential/ CONTRA 4B	Potential range	No	Suisun City GPU
16	Annual grasslands, vernal pools	Yes/Yes	Medium/VERFS 16B,A/VERTS 11C,D	Yes	Potential/ CONTRA 4B,C	Potential range	No	Suisun City GPU
17	Annual grasslands, vernal pools, ditches, brackish marsh, Union Creek	Yes/Yes	High/CONSFS 3/VERFS 16A/VERTS 11D	Yes	Core Area/ CONTRA 4C	Known range	Jepson Prairie-Suisun Marsh	Suisun City GPU

Notes:

CONSFS= Conservancy fairy shrimp, VERFS=Vernal pool fairy shrimp, VERTS=Vernal pool tadpole shrimp, CTS = California tiger salamander, VP= Vernal Pool, CH=Critical Habitat.