Appendix C

Biological Resources – Vegetation and Wildlife

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Attachments

C1 Scientific and Common Names of Plant Species in the Project Area of Potential Effects

C2 Scientific and Common Names of Animal Species in the Project Area of Potential Effects

C3 CNDDB Wide Tabular Report for the Project Area of Potential Effects

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Attachment C1

Scientific and Common Names of Plant Species for the Project Area of Potential Effects

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Table C-1. Scientific and Common Names of Plant Species for the Project Area of Potential Effects

Scientific Name	Common Name
Achillea millefolium	common yarrow
Alopecurus saccatus	pacific foxtail
Amaranthus retroflexus	pigweed
Ammannia robusta	grand redstem
Amsinckia intermedia	common fiddleneck
Anagallis arvensis	scarlet pimpernell
Anemopsis californica	yerba mansa
Anthemis cotula	mayweed
Apocynum cannabinum	dogbane
Artemisia biennis	biennial wormwood
Artemisia douglasiana	mugwort
Asclepias speciosa	showy milkweed
Atriplex lentiformis	quail brush
Atriplex prostrata	spearscale
Atriplex sp.	saltbush
Avena fatua	wild oats
Azolla filiculoides	water velvet
Baccharis salicifolia	mulefat
Bacharris pilularis	coyote bush
Brassica nigra	black mustard
Bromus diandrus	ripgut brome
Bromus hordeaceus	soft chess
Bromus madritensis ssp. rubens	foxtail brome
Bulboschoenus maritimus	alkali bulrush
Capsella bursa-pastoris	shepherd's purse
Carex barbarae	basket sedge
Centaurea solstitialis	yellow star-thistle
Centromadia fitchii	tarplant
Centromadia parryi	pappose tarweed
Cephalanthus occidentalis var. californicus	button bush
Chamaesyce sp.	spurge
Chenopodium album	lamb's quarters
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Convolvulus arvensis	morning glory

Table C-1. Scientific and Common Names of Plant Species for the Project Area of Potential Effects

Scientific Name	Common Name
Conyza bonariensis	hairy fleabane
Cressa truxillensis	alkali weed
Croton setiger	doveweed
Crypsis schoenoides	swamp timothy
Cynodon dactylon	Bermuda grass
Cyperus eragrostis	tall umbrella sedge
Cyperus esculentus var. esculentus	yellow nutsedge
Datura stramonium	jimsonweed
Datura wrightii	tolguacha, Jimson weed
Distichlis spicata	salt grass
Echinochloa crus-galli	barnyard grass
Eleocharis macrostachya	spike rush
Elymus glaucus	blue wildrye
Elymus triticoides	beardless wild rye
Epilobium brachycarpum	tall willowherb
Epilobium campestre	vernal pool willow herb
Erigeron canadensis	horseweed
Erodium cicutarium	redstem stork's bill
Euthamia occidentalis	western goldenrod
Festuca perennis	Italian ryegrass
Frankenia salina	alkali heath
Grindelia camporum var. *camporum*	Great Valley gumweed
Helenium puberulum	sneezeweed
Helianthus annuus	common sunflower
Heliotropium curassavicum	heliotrope
Helminthotheca echioides	bristly ox-tongue
Hirschfeldia incana	short-pod mustard
Hordeum marinum ssp. *gussoneanum*	Mediterraneum barley
Hordeum murinum ssp. *leporinum*	common foxtail
Hydrocotyle verticillata	pennywort
Juncus balticus	baltic rush
Juncus effusus	bog rush
Juncus mexicanus	Mexican rush
Lactuca saligna	willowleaf lettuce
Lactuca serriola	prickly lettuce

Table C-1. Scientific and Common Names of Plant Species for the Project Area of Potential Effects

Scientific Name	Common Name
Lemna minor	common duckweed
Lepidium didymum	lesser swinecress
Lepidium latifolium	perennial peppergrass
Leptochloa fusca ssp. *uninervia*	Mexican sprangeltop
Lotus corniculatus	trefoil
Ludwigia peploides	yellow waterweed
Lythrum californicum	California loostrife
Lythrum hyssopifolia	hyssop loostrife
Malva neglecta	common mallow
Malva parviflora	cheese-weed
Malvella leprosa	alkali mallow
Medicago sativa	alfalfa
Melilotus indicus	Indian melilot, sour clover
Navarretia sp.	navarretia
Nicotiana accuminata	manyflower tobacco
Nitrophila occidentalis	boraxweed
Paspalum dilatatum	dallis grass
Paspalum distichum	knot grass
Persicaria amphibia	water smartweed
Persicaria lapathifolia	smartweed
Phalaris aquatica	Harding grass
Phalaris minor	littleseed canarygrass
Phoradendron leucarpum ssp. *macrophyllum*	big leaf mistletoe
Phyla nodiflora	common lippia
Plagiobothrys sp.	popcorn flower
Plantago lanceolata	english plantain
Plantago major	common plantain
Poa annua	annual bluegrass
Pogogyne douglasii	Douglas' mesamint
Polygonum aviculare	common knotweed
Polypogon monspeliensis	rabbitsfoot grass
Populus fremontii ssp. *fremontii*	Fremont cottonwood
Psilocarphus brevissimus	woollymarbles
Quercus lobata	valley oak
Rosa californica	wild rose

Table C-1. Scientific and Common Names of Plant Species for the Project Area of Potential Effects

Scientific Name	Common Name
Rubus ursinus	California blackberry
Rumex crispus	curly dock
Rumex dentatus	toothed dock
Rumex fueginus	golden dock
Sagittaria latifolia	broadleaf arrowhead
Salix exigua	sandbar willow
Salix goodingii	black willow
Salix lasiolepis	arroyo willow
Salsola tragus	Russian thistle
Sambucus nigra ssp. *caerulea*	elderberry
Shoenoplectus acutus var. *occidentalis*	hardstem bulrush
Silybum marianum	milk thistle
Sparganium eurycarpum ssp. eurycarpum	giant bur reed
Sporobolus airoides	alkali sacaton
Stutzia covillei	Coville's orach
Suaeda nigra	seablite
Symphyotrichum subulatum	annual marsh aster
Torilis arvensis	hedge parsley
Tribulus terrestris	puncture vine
Trifolium sp.	clover
Typha angustifolia	narrow-leaf cattail
Typha latifolia	common cat-tail
Urtica dioica	stinging nettle
Urtica urens	dwarf nettle
Veronica anagalis-aquatica	water speedwell
Veronica peregrina ssp. *xalapensis*	purselane speedwell
Xanthium strumarium	cocklebur
Zeltnera muehlenbergii	Muhlenberg's centaury

SOURCE: ESA, 2012

Attachment C2

Scientific and Common Names of Animal Species for the Project Area of Potential Effects

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Table C-2. Scientific and Common Names of Animal Species for the Project Area of Potential Effects

Species Name	Common Name
Invertebrates	
Cambaridae	crayfish
Fish	
Carassius auratus	goldfish
Cyprinus carpio	common carp
Gambusia affinis	mosquitofish
Reptiles and Amphibians	
Pituophis catenifer	gopher snake
Pseudacris regilla	Pacific treefrog
Rana catesbeiana	American bullfrog
Sceloporus occidentalis	western fence lizard
Mammals	
Canis lutrans	coyote
Lepus californicus	black-tailed jackrabbit
Ondatra zibethicus	muskrat
Procyon lotor	raccoon
Sylvilagus audubonii	desert cottontail
Taxidea taxus[1]	American badger
Birds	
Agelaius phoeniceus	red-winged blackbird
Anas platyrhynchos	mallard
Ardea alba	great egret
Ardea herodias	great blue heron
Aytha affinis	lesser scaup
Bubo virginianus	great horned owl
Bubulcus ibis	cattle egret
Buteo jamaicensis	red-tailed hawk
Buteo swainsonii	Swainson's hawk
Callipepla californica	California quail
Carduelis tristis	American goldfinch
Carpodacus mexicanus	house finch
Cathartes aura	turkey vulture
Charadrius vociferus	killdeer
Chordeiles acutipennis	lesser nighthawk
Circus cyaneus	northern harrier
Cistothorus palustris	marsh wren

Table C-2. Scientific and Common Names of Animal Species for the Project Area of Potential Effects

Species Name	Common Name
Corvus brachyrhynchos	American crow
Eremophila alpestris	horned lark
Falco columbarius	merlin
Falco sparverius	American kestrel
Fulica americana	American coot
Grus canadensis canadensis	lesser sandhill crane
Himantopus mexicanus	black-necked stilt
Icterus bullockii	Bullock's oriole
Lanius ludovicianus	loggerhead shrike
Limnodromus scolopaceus	long-billed dowitcher
Melospiza melodia	song sparrow
Molothrus ater	brown-headed cowbird
Myiarchus cinerascens	ash-throated flycatcher
Passer domesticus	house sparrow
Pelecanus erythrorhynchos	American white pelican
Petrochelidon pyrrhonota	cliff swallow
Phalacrocorax auritus	double-crested cormorant
Phasianus colchicus	ring-necked pheasant
Picadae (gen, sp)	unknown woodpecker species
Plegadis chihi	white-faced ibis
Porzana carolina[2]	sora
Psaltriparus minimus	bushtit
Recurvirostra americana	American avocet
Riparia riparia	bank swallow
Sayornis nigricans	black phoebe
Sturnella neglecta	western meadowlark
Tachycineta bicolor	tree swallow
Thryomanes bewickii	Bewick's wren
Tyrannus verticalis	western kingbird
Tyto alba	barn owl
Zenaida macroura	mourning dove
Zonotrichia leucophrys	white-crowned sparrow

SOURCE: ESA, 2012.
Notes:
1 Dig marks observed at small mammal burrow (most likely *S. audobonii*)
2 Heard call among thick *Scirpus* sp. patches

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Attachment C3

CNDDB and CNPS Lists for the Project Area of Potential Effects

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Attachment C3 - Part 1

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE **RareFind**

Query Summary:
Quad IS (Arena (3712036) OR Delta Ranch (3712016) OR San Luis Ranch (3712027) OR Sandy Mush (3712025) OR Santa Rita Bridge (3712015) OR Stevinson (3712037) OR Turner Ranch (3712026))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	949	35	None	Candidate Endangered	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Ambystoma californiense	California tiger salamander	Amphibians	AAAAA01180	1150	11	Threatened	Threatened	G2G3	S2S3	null	CDFW_WL-Watch List, IUCN_VU-Vulnerable	Cismontane woodland, Meadow & seep, Riparian woodland, Valley & foothill grassland, Vernal pool, Wetland
Anniella pulchra pulchra	silvery legless lizard	Reptiles	ARACC01012	99	1	None	None	G3G4T3T4Q	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Coastal dunes, Coastal scrub
Ardea alba	great egret	Birds	ABNGA04040	38	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	138	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	5	None	None	G2T2	S2	1B.2	null	Alkali playa, Valley & foothill grassland, Vernal pool, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1932	1	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	10	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland
Atriplex depressa	brittlescale	Dicots	PDCHE042L0	61	2	None	None	G2	S2	1B.2	null	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Atriplex minuscula	lesser saltscale	Dicots	PDCHE042M0	37	3	None	None	G2	S2	1B.1	null	Alkali playa, Chenopod

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												scrub, Valley & foothill grassland
Atriplex persistens	vernal pool smallscale	Dicots	PDCHE042P0	41	12	None	None	G2	S2	1B.2	null	Vernal pool, Wetland
Atriplex subtilis	subtle orache	Dicots	PDCHE042T0	24	2	None	None	G1	S1	1B.2	BLM_S-Sensitive	Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	233	1	None	None	G3G4	S1S2	null	null	null
Branchinecta conservatio	Conservancy fairy shrimp	Crustaceans	ICBRA03010	43	4	Endangered	None	G2	S2	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta longiantenna	longhorn fairy shrimp	Crustaceans	ICBRA03020	18	1	Endangered	None	G1	S1S2	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	755	6	Threatened	None	G3	S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	126	3	None	None	G2	S2S3	null	null	Vernal pool, Wetland
Branta hutchinsii leucopareia	cackling (=Aleutian Canada) goose	Birds	ABNJB05035	19	1	Delisted	None	G5T3	S3	null	null	Artificial standing waters, Sacramento/San Joaquin standing waters, Valley & foothill grassland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2425	54	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Chloropyron molle ssp. hispidum	hispid salty bird's-beak	Dicots	PDSCR0J0D1	35	10	None	None	G2T2	S2	1B.1	BLM_S-Sensitive	Alkali playa, Meadow & seep, Wetland
Circus cyaneus	northern harrier	Birds	ABNKC11010	48	3	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Coastal scrub, Great Basin grassland, Marsh & swamp, Riparian scrub, Valley & foothill grassland, Wetland
Cismontane Alkali Marsh	Cismontane Alkali Marsh	Marsh	CTT52310CA	4	2	None	None	G1	S1.1	null	null	Marsh & swamp, Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	1	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Delphinium recurvatum	recurved larkspur	Dicots	PDRAN0B1J0	100	1	None	None	G2?	S2?	1B.2	BLM_S-Sensitive	Chenopod scrub, Cismontane woodland, Valley & foothill grassland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1217	10	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eryngium racemosum	Delta button-celery	Dicots	PDAPI0Z0S0	26	15	None	Endangered	G1	S1	1B.1	null	Riparian scrub, Wetland
		Dicots	PDEUP0D150	29	1	Threatened	None	G1	S1	1B.2	null	

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Euphorbia hooveri	Hoover's spurge											Vernal pool, Wetland
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	109	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland
Gambelia sila	blunt-nosed leopard lizard	Reptiles	ARACF07010	315	1	Endangered	Endangered	G1	S1	null	CDFW_FP-Fully Protected, IUCN_EN-Endangered	Chenopod scrub
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	97	3	None	None	G4T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Marsh & swamp, Salt marsh, Vernal pool, Wetland
Lepidium latipes var. heckardii	Heckard's pepper-grass	Dicots	PDBRA1M0K1	14	1	None	None	G4T1	S1	1B.2	null	Valley & foothill grassland, Vernal pool
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	320	10	Endangered	None	G4	S3S4	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	432	4	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Lithobates pipiens	northern leopard frog	Amphibians	AAABH01170	22	1	None	None	G5	S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Freshwater marsh, Great Basin flowing waters, Great Basin standing waters, Marsh & swamp, Wetland
Mylopharodon conocephalus	hardhead	Fish	AFCJB25010	32	1	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters
Navarretia prostrata	prostrate vernal pool navarretia	Dicots	PDPLM0C0Q0	60	6	None	None	G2	S2	1B.1	null	Coastal scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Neostapfia colusana	Colusa grass	Monocots	PMPOA4C010	62	4	Threatened	Endangered	G1	S1	1B.1	null	Vernal pool, Wetland
Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	4	None	None	G1	S1.1	null	null	Vernal pool, Wetland
Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	2	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	754	1	None	None	G3G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon & juniper woodlands, Riparian scrub, Riparian woodland, Valley & foothill grassland
Puccinellia simplex	California alkali grass	Monocots	PMPOA53110	71	1	None	None	G3	S2	1B.2	null	Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	93	3	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Spea hammondii	western spadefoot	Amphibians	AAABF02020	450	6	None	None	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland

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Taxidea taxus	American badger	Mammals	AMAJF04010	533	3	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	363	8	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp, Riparian scrub, Wetland
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Dicots	PDAST9F031	9	2	None	None	G4T3	S1	2B.1	null	Marsh & swamp, Meadow & seep, Riparian forest, Vernal pool, Wetland
Valley Sacaton Grassland	Valley Sacaton Grassland	Herbaceous	CTT42120CA	9	2	None	None	G1	S1.1	null	null	Valley & foothill grassland
Valley Sink Scrub	Valley Sink Scrub	Scrub	CTT36210CA	29	2	None	None	G1	S1.1	null	null	Chenopod scrub
Vulpes macrotis mutica	San Joaquin kit fox	Mammals	AMAJA03041	981	12	Endangered	Threatened	G4T2	S2	null	null	Chenopod scrub, Valley & foothill grassland

California Native Plant Society Rare and Endangered Plant Inventory

Combined Plant List for the Special-Status Plants Found on the Arena, Delta Ranch, San Luis Ranch, Sandy Mush, Santa Rita Bridge, Stevinson, and Turner Ranch U.S. Geological Survey Quadrangles

Scientific Name	Common Name	Family	Lifeform	CRPR	CESA	FESA
Astragalus tener var. *tener*	alkali milk-vetch	Fabaceae	annual herb	1B.2	None	None
Atriplex cordulata var. *cordulata*	heartscale	Chenopodiaceae	annual herb	1B.2	None	None
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	1B.2	None	None
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	1B.1	None	None
Atriplex persistens	vernal pool smallscale	Chenopodiaceae	annual herb	1B.2	None	None
Atriplex subtilis	subtle orache	Chenopodiaceae	annual herb	1B.2	None	None
Centromadia parryi ssp. *rudis*	Parry's rough tarplant	Asteraceae	annual herb	4.2	None	None
Chloropyron molle ssp. *hispidum*	hispid bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.1	None	None
Delphinium recurvatum	recurved larkspur	Ranunculaceae	perennial herb	1B.2	None	None
Eryngium racemosum	Delta button-celery	Apiaceae	annual / perennial herb	1B.1	CE	None
Euphorbia hooveri	Hoover's spurge	Euphorbiaceae	annual herb	1B.2	None	FT
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	1B.2	None	None
Hordeum intercedens	vernal barley	Poaceae	annual herb	3.2	None	None
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	Asteraceae	annual herb	1B.1	None	None
Lepidium latipes var. *heckardii*	Heckard's pepper-grass	Brassicaceae	annual herb	1B.2	None	None
Myosurus minimus ssp. *apus*	little mousetail	Ranunculaceae	annual herb	3.1	None	None
Navarretia prostrata	prostrate vernal pool navarretia	Polemoniaceae	annual herb	1B.1	None	None
Neostapfia colusana	Colusa grass	Poaceae	annual herb	1B.1	CE	FT
Puccinellia simplex	California alkali grass	Poaceae	annual herb	1B.2	None	None
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	1B.2	None	None
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	Asteraceae	annual herb	2B.1	None	None

Source: CNPS 2017

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Attachment C4

Sacramento Fish and Wildlife Office Federal Endangered and Threatened Species List for the Project Area of Potential Effects

Biological Resources – Vegetation and Wildlife Appendix

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
FEDERAL BUILDING, 2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
PHONE: (916)414-6600 FAX: (916)414-6713

Consultation Code: 08ESMF00-2017-SLI-1458 March 16, 2017
Event Code: 08ESMF00-2017-E-03595
Project Name: SJRRP Reach 4B

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

To Whom It May Concern:

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

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

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

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

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2)

of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

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

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

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

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

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

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

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: SJRRP Reach 4B

Official Species List

Provided by:

Sacramento Fish and Wildlife Office
FEDERAL BUILDING
2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
(916) 414-6600

Consultation Code: 08ESMF00-2017-SLI-1458
Event Code: 08ESMF00-2017-E-03595

Project Type: LAND - RESTORATION / ENHANCEMENT

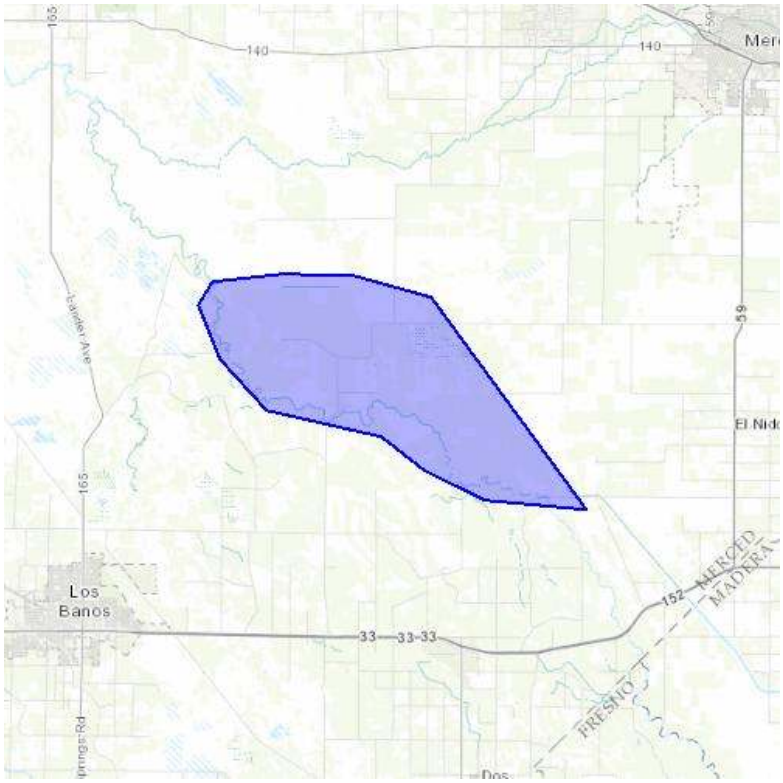
Project Name: SJRRP Reach 4B
Project Description: The project involves restoring fish passage along Reach 4B of the San Joaquin River.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: SJRRP Reach 4B

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-120.57014465332033 37.108312670488736, -120.6233596801758 37.11187196945251, -120.65494537353517 37.12446506865014, -120.67760467529298 37.13842453422676, -120.73837280273439 37.149644982329626, -120.76274871826173 37.170986604838866, -120.77442169189455 37.19396315161421, -120.76686859130861 37.204081555898526, -120.73047637939455 37.20708946859004, -120.69236755371095 37.2065425842904, -120.6515121459961 37.19751842118354, -120.57014465332033 37.108312670488736)))

Project Counties: Merced, CA

United States Department of Interior
Fish and Wildlife Service

Project name: SJRRP Reach 4B

Endangered Species Act Species List

There are a total of 14 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Amphibians	**Status**	**Has Critical Habitat**	**Condition(s)**
California red-legged frog *(Rana draytonii)* Population: Wherever found	Threatened	Final designated	
California tiger Salamander *(Ambystoma californiense)* Population: U.S.A. (Central CA DPS)	Threatened	Final designated	
Crustaceans			
Conservancy fairy shrimp *(Branchinecta conservatio)* Population: Wherever found	Endangered	Final designated	
Vernal Pool fairy shrimp *(Branchinecta lynchi)* Population: Wherever found	Threatened	Final designated	
Vernal Pool tadpole shrimp *(Lepidurus packardi)* Population: Wherever found	Endangered	Final designated	
Fishes			
Delta smelt *(Hypomesus*	Threatened	Final designated	

United States Department of Interior
Fish and Wildlife Service

Project name: SJRRP Reach 4B

transpacificus) Population: Wherever found			
steelhead *(Oncorhynchus (=salmo) mykiss)* Population: Northern California DPS	Threatened	Final designated	
Flowering Plants			
Colusa grass *(Neostapfia colusana)* Population: Wherever found	Threatened	Final designated	
Hoover's spurge *(Chamaesyce hooveri)* Population: Wherever found	Threatened	Final designated	
Insects			
Valley Elderberry Longhorn beetle *(Desmocerus californicus dimorphus)* Population: Wherever found	Threatened	Final designated	
Mammals			
Fresno kangaroo rat *(Dipodomys nitratoides exilis)* Population: Wherever found	Endangered	Final designated	
San Joaquin Kit fox *(Vulpes macrotis mutica)* Population: wherever found	Endangered		
Reptiles			
Blunt-Nosed Leopard lizard *(Gambelia silus)* Population: Wherever found	Endangered		
Giant Garter snake *(Thamnophis gigas)*	Threatened		

United States Department of Interior
Fish and Wildlife Service

Project name: SJRRP Reach 4B

Population: Wherever found			

United States Department of Interior
Fish and Wildlife Service

Project name: SJRRP Reach 4B

Critical habitats that lie within your project area

The following critical habitats lie fully or partially within your project area.

Crustaceans	**Critical Habitat Type**
Conservancy fairy shrimp *(Branchinecta conservatio)* Population: Wherever found	Final designated
Vernal Pool fairy shrimp *(Branchinecta lynchi)* Population: Wherever found	Final designated
Vernal Pool tadpole shrimp *(Lepidurus packardi)* Population: Wherever found	Final designated
Flowering Plants	
Colusa grass *(Neostapfia colusana)* Population: Wherever found	Final designated
Hoover's spurge *(Chamaesyce hooveri)* Population: Wherever found	Final designated

Attachment C5

Special Status Species Tables

Biological Resources – Vegetation and Wildlife Appendix

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1 **Table C-5. Potentially Occurring Special-status Species for the Project Area of Potential Effects**

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Plants				
Astragalus tener var. *tener* Alkali milk-vetch	--/--1B.2	Annual herb found in playas; valley and foothill grasslands with adobe clay soils; and vernal pools with alkaline soils. Blooms March-June. Elevation: 3 to 180 feet.	High. Suitable habitat may be present in the inaccessible portions of the Reach 4B/ESB Project Area; known occurrences are present in the Reach 4B/ESB Project Area and the vicinity of the Reach 4B/ESB Project Area.	Perennial grassland Annual grassland Vernal pools
Atriplex cordulata heartscale	--/--/1B.2	Annual herb found in chenopod scrub, meadows and seeps, and valley and foothill grasslands with saline or alkaline soils. Blooms April-Oct. Elevation: 3 to 960 feet.	High. Suitable habitat may be present in the inaccessible portions of the Reach 4B/ESB Project Area; known occurrences are present in the Reach 4B/ESB Project Area and the vicinity of the Reach 4B/ESB Project Area.	Alkali desert scrub Perennial grassland Annual grassland
Atriplex depressa brittlescale	--/--/1B.2	Annual herb found in chenopod scrub; meadows and seeps; playas; alkali vernal pools with clay soil; and valley and foothill grassland. Blooms April-Oct. Elevation 3 to 1,050 feet.	Medium. Suitable habitat may be present in the inaccessible portions of the Reach 4B/ESB Project Area; known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland Vernal pools
Atriplex minuscula lesser saltscale	--/--/1B.1	Annual herb found in chenopod scrub; playas; and valley and foothill grasslands with sandy, alkali soil. Blooms May-Oct. Elevation: 49 to 656 feet.	Medium. Suitable habitat may be present in the inaccessible portions of the Reach 4B/ESB Project Area; known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland
Atriplex persistens vernal pool smallscale	--/--/1B.2	Annual herb found in alkali vernal pools. Blooms June-Oct. Elevation: 33 to 377 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Vernal pools
Atriplex subtilis sublte orache	--/--/1B.2	Valley and foothill grassland up to 400 feet.	High. Suitable habitat may be present in the inaccessible portions of the Reach 4B/ESB Project Area; known occurrences are present in the Reach 4B/ESB Project Area and Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Chloropyron molle ssp. hispidus hispid salty bird's beak	--/--/1B.1	Annual hemiparasitic herb found in meadows and seeps; playas; and alkali valley and foothill grasslands. Blooms June-Sept. Elevation: 3 to 508 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland
Delphinium recurvatum recurved larkspur	--/--/1B.2	Perennial herb occurring in chenopod scrub; cismontane woodland; and in alkali valley and foothill grassland. Blooms March-June. Elevation: 10 to 2,460 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland
Eryngium racemosum delta button-celery	--/SE/1B.1	Annual or perennial herb found within vernally mesic clay depressions in riparian scrub habitat. Blooms June-Oct. Elevation: 10 to 98 feet.	High. Suitable habitat is present in the Merced NWR and has been previously identified during plant surveys on the refuge. However, this species was not observed during 2012 field surveys.	Willow scrub/riparian scrub Valley foothill riparian
Euphorbia hooveri Hoover's spurge	--/--/1A Critical Habitat	Annual herb found in inland dune and sandy soils of valley and foothill grassland habitat. Blooms April-May. Elevation: 30 to 495 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland
Extriplex joaquinana San Joaquin spearscale	--/--/1B.2	Annual herb found in Chenopod scrub, meadows and seeps, playas, and valley and foothill grasslands. Blooms April-Oct. Elevation 1-2,750 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	--/--/1B.2	Annual herb found in coastal salt marshes and swamps, playas, and vernal pools. Blooms Feb-June. Elevation: 3 to 4,000 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Vernal pools
Lepidium latipes var. *heckardii* Heckard's pepper-grass	--/--/1B.2	Annual herb found in valley and foothill grasslands (alkaline flats). Blooms March-May. Elevation: 6 to 656 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area however there are no known occurrences in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Navarretia prostrata prostrate vernal pool navarretia	--/--/1B.1	Annual herb found in coastal scrub, meadows and seeps, valley and foothill grassland with alkaline soil, and vernal pools. Blooms April-June. Elevation: 49 to 2,297 feet.	Low. Suitable habitat is not present in the Reach 4B/ESB Project Area and there are no known occurrences in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland Vernal pools
Neostapfia colusana Colusa grass	FT/CE/1B.1 Critical Habitat	Annual herb found in large, deep vernal pools with adobe soil. Blooms May-Aug. Elevation: 16 to 656 feet.	Medium. Suitable habitat may be present in the inaccessible portions of the Reach 4B/ESB Project Area; known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Vernal pools
Puccinellia simplex California alkali grass	--/--/1B.2	Annual herb found in alkaline vernally mesic sinks, flats, and lake margins, chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Blooms March-May. Elevation 6-3,000 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Perennial grassland Annual grassland Vernal pools
Sagittaria sanfordii Sanford's arrowhead	--/--/1B.2	Perennial rhizomatous emergent herb found in assorted shallow freshwater marshes and swamps. Blooms May-Oct. Elevation: 0 to 2,133 feet.	Medium. Suitable habitat is present in the Reach 4B/ESB Project Area and known occurrences are present in the Reach 4B/ESB Project Area vicinity.	Lacustrine Riverine/open water
Trichocoronis wrightii var. *wrightii* Wright's trichocoronis	--/--/2.1	Alkaline areas of meadows and seeps, marshes and swamps, riparian forest, and vernal pools. Elevation: 16 to 1,427 feet.	Low. This species has a limited range and is not known to occur in the Reach 4B/ESB Project Area vicinity.	Lacustrine Riverine/open water Vernal pools Willow scrub/riparian scrub Valley foothill riparian
Invertebrates				
Branchinecta conservatio Conservancy fairy shrimp	FE/--/-- Critical Habitat	Found in ephemeral freshwater habitats including alkaline pools, clay flats, vernal pools, vernal lakes, vernal swales, and other types of seasonal wetlands.	Present. Suitable habitat is present in the Reach 4B/ESB Project Area, with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Vernal pools/vernal swales Seasonal wetlands

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Branchinecta longiantenna longhorn fairy shrimp	FE/--/-- Critical Habitat	Found in clear to rather turbid vernal pools in or near the eastern foothills of the Central Coast Mountains. Typically found in clear-water depressions in sandstone outcroppings near Tracy, grass-bottomed pools in Merced County, and claypan pools around Soda Lake in San Luis Obispo County.	Present. Suitable habitat is present in the Reach 4B/ESB Project Area, with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Vernal pools/vernal swales Seasonal wetlands
Branchinecta lynchi vernal pool fairy shrimp	FT/--/-- Critical Habitat	Found in ephemeral freshwater habitats including alkaline pools, clay flats, vernal pools, vernal lakes, vernal swales, and other types of seasonal wetlands.	Present. Suitable habitat is present in the Reach 4B/ESB Project Area, with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Vernal pools/vernal swales Seasonal wetlands
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT/--/--	Breeds and forages exclusively on elderberry shrubs (*Sambucus nigra* ssp. *canadensis*) with steams at least one inch in diameter at ground level, typically associated with riparian forests, riparian woodlands, elderberry savannas, and other Central Valley habitats. Occurs only in the Central Valley and adjacent foothills of California.	Medium. Habitat for this species (elderberry shrubs) is present within the Reach 4B/ESB Project Area along the San Joaquin River.	Elderberry shrubs could occur throughout the site, but VELV most likely to occur in shrubs near valley foothill riparian
Lepidurus packardi vernal pool tadpole shrimp	FE/--/-- Critical Habitat	Found in ephemeral freshwater habitats including alkaline pools, clay flats, vernal pools, vernal lakes, vernal swales, and other types of seasonal wetlands which range in size from small, clear, well-vegetated vernal pools to highly turbid, alkali scald pools to large winter lakes.	Present. Suitable habitat is present in the Reach 4B/ESB Project Area, with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Vernal pools/vernal swales Seasonal wetlands

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Amphibians				
Ambystoma californiense California tiger salamander (central population)	FT/ST/--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Present. Suitable habitat is present within the Reach 4B/ESB Project Area with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Vernal pools/vernal swales Seasonal wetlands Managed wetlands Annual grassland Perennial grassland
Rana draytonii California red-legged frog	FT/--/--	Breeds in slow moving streams, ponds, and marshes with emergent vegetation; forages in nearby uplands within about 200 feet. Extant records in the Sierra Nevada range are over 800 feet. Below this elevation, aquatic habitat supports stronger populations of non-native predators associated with warm water habitats such as bullfrogs and Centrarchid fish (Rana Resources 2013). Believed extirpated from the floor of the Central Valley prior to the 1960s.	None. Although suitable habitat is present within the Reach 4B/ESB Project Area, there are no recorded occurrences of this species within the Reach 4B/ESB Project Area or immediate vicinity. The Reach 4B/ESB Project Area occurs outside of the known extant geographic range for this species.	N/A
Spea hammondii western spadefoot	--/SSC/--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Vernal pools/vernal swales Seasonal wetlands Managed wetlands Annual grassland Perennial grassland

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Reptiles				
Actinemys marmorata western pond turtle	--/SSC/--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area with the exception of the active agricultural fields. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Riverine/open water Lacustrine Freshwater emergent wetland
Gambelia sila blunt-nosed leopard lizard	FE/SE; SFP/--	Found in semiarid grasslands, alkali flats, and washes. Prefers flat areas with open space for running, avoiding densely vegetated areas. Habitat present north of the Mariposa Bypass and west of the Eastside Bypass.	Medium. Marginally suitable habitat is present north of the Mariposa Bypass and west of the Eastside Bypass within the Reach 4B/ESB Project Area; this species has not been observed despite numerous surveys conducted within portions of the Reach 4B/ESB Project Area.	Annual grassland north of the Mariposa Bypass and west of the Eastside Bypass
Thamnophis gigas giant garter snake	FT/ST/--	Found primarily in marshes, sloughs, drainage canals, and irrigation ditches, especially around rice fields, and occasionally in slow-moving creeks in California's interior.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Riverine Freshwater emergent wetland Managed wetland Adjacent annual grassland Perennial drainage
Birds				
Agelaius tricolor tricolored blackbird	--/SC/--	Largely endemic to California, most numerous in the Central Valley and nearby vicinity. Typically requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water. Also nests in agricultural crops (e.g., silage), where colonies are threatened during harvest.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area. This species has been observed within the Reach 4B/ESB Project Area during past surveys and documented in the CNDDB.	Foraging: annual grassland Cropland Nesting: willow scrub/riparian scrub Valley foothill riparian

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Ardea alba Great egret (rookery)	--/--/--	Great egrets nest in medium to large trees in communal nesting grounds called rookeries and return to these trees year after year.	Medium. Suitable habitat is present throughout the Reach 4B/ESB Project Area; however, there are no recorded occurrences of this species within or adjacent to the Reach 4B/ESB Project Area.	Rookeries in willow scrub/riparian scrub Valley foothill riparian
Ardea herodias Great blue heron (rookery)	--/--/--	Great blue herons nest in medium to large trees in communal nesting grounds called rookeries and return to these trees year after year.	Medium. Suitable habitat is present throughout the Reach 4B/ESB Project Area; however, there are no recorded occurrences of this species within or adjacent to the Reach 4B/ESB Project Area.	Valley foothill riparian
Athene cunicularia burrowing owl	--/SSC/--	Found in open grasslands with low vegetation, golf courses, and disturbed/ruderal habitat in urban areas.	Medium. Suitable habitat is present throughout the Reach 4B/ESB Project Area; however, there are no recorded occurrences of this species within or adjacent to the Reach 4B/ESB Project Area.	Annual grassland Perennial grassland
Buteo swainsonii Swainson's hawk	--/ST/--	Forages in open and agricultural fields and nests in mature trees usually in riparian corridors.	Present. Suitable habitat is present throughout Reach 4B/ESB Project Area and this species was observed foraging and nesting during field surveys conducted in 2012.	Foraging: annual grassland Cropland Nesting: Valley foothill riparian and mature trees in the vicinity of aquatic waterways
Circus cyaneus northern harrier	--/SSC/--	Nests in wet meadows and tall grasslands, forages in grasslands and marshes.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area and this species was observed foraging during field surveys conducted in 2012.	Annual grassland Perennial grassland Wet herbaceous
Elanus leucurus white-tailed kite	--/SFP/--	Forages in open grasslands and agricultural fields and marshes. Nests in scattered mature trees within foraging habitat.	Medium. Suitable habitat is present within the Reach 4B/ESB Project Area; however, this species was not observed during the 2012 field surveys and there are no recorded occurrences in the Reach 4B/ESB Project Area vicinity.	Valley foothill riparian and mature trees in the vicinity of cropland, annual grassland, and perennial grassland.

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Grus canadensis canadensis lesser sandhill crane	--/SFP; ST/--	Nests in wet meadows interspersed with emergent marsh habitat in northeastern California. Winters in agricultural croplands, marshlands, and irrigated pastures.	Present. Suitable wintering habitat is present within the Reach 4B/ESB Project Area and this species was observed foraging during field surveys conducted in 2012.	Winters: managed wetlands Cropland
Lanius ludovicianus loggerhead shrike	--/SSC/--	Inhabits a variety of woodland and open grassland habitats throughout California.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area and this species was observed foraging during field surveys conducted in 2012.	Throughout
Pelecanus erythrorhynchos American white pelican	--/SSC/--	Breeds primarily in the interior of North America, including areas of northern California. It forages in shallow, inland waters at the edge of marshes, lakes and rivers. During the winter, it roosts on the ground near the water's edge.	Present. Suitable habitat is present along the Eastside Bypass throughout the Reach 4B/ESB Project Area and this species was observed foraging during field surveys conducted in 2012.	Foraging: managed wetlands Lacustrine Riverine/open water
Riparia riparia bank swallow	--/ST; SSC/--	Bank swallows live in low areas along rivers, streams, ocean coasts, or reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past bank swallows were most commonly found around natural bluffs or eroding streamside banks, more and more often these swallows populate human-made sites, such as sand and gravel quarries or road cuts.	Present. Suitable habitat is present throughout the Reach 4B/ESB Project Area and this species was observed foraging and utilizing burrows along the banks of the irrigation canals during field surveys conducted in 2012.	Banks of riverine/open water
Xanthocephalus xanthocephalus Yellow-headed blackbird	--/SSC/--	Nests in shrubs near freshwater marshes or reedy lakes; during migration and winter prefers open cultivated lands, fields, and pastures.	Medium. Suitable habitat is present within the Reach 4B/ESB Project Area; however, this species was not observed during the 2012 field surveys.	Nesting: Valley foothill riparian Willow scrub/riparian scrub

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Mammals				
Corynorhinus townsendii Townsend's big-eared bat	--/SSC/--	Habitat associations include: coniferous forests, mixed meso-phytic forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types.	Medium. Suitable habitat is present within the riparian corridor along the San Joaquin River; however, there are no recorded occurrences within or adjacent to the Reach 4B/ESB Project Area.	Valley foothill riparian Willow scrub/riparian scrub
Dipodomys nitradoides exilis Fresno kangaroo rat	FE/SE/--	Restricted to native grasslands in Fresno County within the San Joaquin Valley. Prefers arid, often strongly alkaline, flat plains with sparse vegetation of grasses and alkali forbs.	None. Suitable habitat is available throughout the Reach 4B/ESB Project Area, with the exception of the active agricultural fields, however there are no recorded occurrences of this species in the Reach 4B/ESB Project Area vicinity, the species is not known to occur within Merced County, and this species was not captured during trapping events conducted in Reach 4A upstream of the Reach 4B/ESB Project Area and the lower portion of the Eastside Bypass (Reclamation 2016).	Annual grassland Perennial grassland
Eumops perotis californicus western mastiff bat	--/SSC/--	Cliff-dwelling species that roosts under exfoliating rock slabs (e.g., granite, sandstone or columnar basalt) and in crevices in large boulders and buildings. Roosts are generally high above the ground, usually allowing a clear vertical drop of at least 30 feet below the entrance for flight. Most frequently encountered in broad open areas and foraging habitat includes dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas.	Medium. Suitable foraging habitat was noted in the Reach 4B/ESB Project Area; however, there are no recorded occurrences within or adjacent to the Reach 4B/ESB Project Area.	Foraging: cropland Annual grassland Perennial grassland

Species	Fed/State/ CRPR Status	General Habitat	Potential to Occur in the Reach 4B/ESB Project Area	Type of Suitable Habitat within the Reach 4B/ESB Project Area
Lasiurus blossevillii western red bat	--/SSC/--	Roosts primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas.	Medium. Suitable habitat was observed within the Reach 4B/ESB Project Area in the riparian corridor along the San Joaquin River. There are no recorded occurrences within or adjacent to the Reach 4B/ESB Project Area.	Valley foothill riparian Willow scrub/riparian scrub
Sylvilagus bachmani riparius riparian brush rabbit	FE/SE/--	Found in dense, brushy areas of Central Valley riparian forests, marked by extensive thickets of wild rose (*Rosa* spp.), blackberries (*Rubus* spp.), and willows (*Salix* spp.). Not known to occur in Merced County. The species is limited to 3 locations, the South Delta San Joaquin County, The San Luis NWR in Stanislaus County, and Caswell State Memoral Park in San Joaquin County.	None. This species was not observed during the 2012 surveys and the project area occurs outside of the known geographical range for the species.	Valley foothill riparian Willow scrub/riparian scrub
Taxidea taxus American badger	--/SSC/--	Found in dry, open grasslands, fields, and pastures. Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	High. Suitable habitat is available throughout the Reach 4B/ESB Project Area. Claw marks indicative of badger were observed at the San Luis NWR during the 2012 surveys.	Annual grassland Perennial grassland
Vulpes macrotis mutica San Joaquin kit fox	FE/ST/--	Grassland or grassy open stages with scattered shrubby vegetation; requires loose textured sandy soils for burrowing; requires suitable prey base of small rodents.	Medium. Suitable foraging habitat is available throughout the Reach 4B/ESB Project Area. No dens were observed during the 2012 surveys. The species may use the Reach 4B/ESB Project Area as a movement corridor to more suitable denning habitat.	Annual grassland Perennial grassland

1 SOURCE: USFWS 2017; CDFW 2017; CNPS 2017.
2 *Species with medium or high potential to occur in the Reach 4B/ESB Project study area are shown in **bold**.
3 KEY:

Federal: (USFWS)

FE = Listed as Endangered by the Federal Government

FT = Listed as Threatened by the Federal Government

State: (CDFW)

SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SR = Listed as Rare by the State of California (plants only)
SC = Candidate for listing by the State of California
SSC = California Species of Concern
SFP = Fully protected by the State of California

California Rare Plant Rank:

Rank 1A = Plants presumed extinct in California
Rank 1B = Plants rare, threatened, or endangered in California and elsewhere
Rank 2 = Plants rare, threatened, or endangered in California but more common elsewhere

0.1 = Seriously endangered in California
0.2 = Fairly endangered in California
0.3 = Not very endangered in California

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Attachment C6

Species Accounts

Biological Resources – Vegetation and Wildlife Appendix

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List of Abbreviations

CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society's
CDFW	California Department of Fish and Wildlife
ESA	Federal Endangered Species Act
NWR	National Wildlife Refuge
USFWS	U.S. Fish and Wildlife Service

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Attachment C6 Species Accounts

C6.1 Approach

Information was compiled and reviewed to develop lists and to describe special-status plant and wildlife species that are known to exist, could potentially exist, or historically existed in the Reach 4B/ESB Project study area. Several data sources were used to develop these lists, including records from the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB), updated 2017 (CDFW 2017), the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Plants of California, updated 2017 (CNPS 2017), and U.S. Fish and Wildlife Service (USFWS), updated 2017 (USFWS 2017). The following U.S. Geological Survey 7.5-minute quadrangles encompass the Reach 4B/ESB Project study area (within approximately 1,500 feet of the San Joaquin River and bypass systems) and its vicinity and were searched in the CNDDB and CNPS inventory: Stevinson, Sandy Mush, Turner Ranch, San Luis Ranch, Arena, Santa Rita Bridge, and Delta Ranch.

Special-status species as defined in this document are plants and wildlife that are legally protected under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA) or other State regulations and species that are considered sufficiently rare by the scientific community to warrant conservation concern.

Special-status plants and wildlife are species in the following categories:

- Species listed, proposed for listing, or candidates for possible future listing as threatened or endangered under the ESA
- Species listed or proposed for listing by the State of California as threatened or endangered under the CESA Plants designated as rare under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.)
- Plants considered by CNPS to be "rare, threatened, or endangered in California" (Ranks 1B and 2)
- Wildlife considered species of special concern or watch list species by CDFW
- Wildlife designated as fully protected by the California Fish and Game Code
- Wildlife species tracked by the CNDDB

For each of the plant and wildlife species addressed below, information is provided on the legal status, distribution, natural history, and threats. For listed species, information is also provided on relevant conservation efforts and guidance.

Accounts of nonnative invasive plant species are described in Section 4.0 of this appendix for invasive species that are known to occur in the Reach 4B/ESB Project study

area based on field surveys conducted in 2000 (DWR, 2002) and 2012. Invasive species are defined as those species that are introduced to a region, persist without human assistance, and have serious impacts on the ecosystem processes of their non-native environment (California Invasive Plant Council [Cal-IPC]). The Cal-IPC categorizes nonnative invasive plant species and maintains a list of species that have been designated as invasive in California. Invasive plant species are categorized in the following Cal-IPC inventory categories:

- High – Have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- Moderate – Have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. Reproductive biology and other attributes are conducive to moderate to high rates of dispersal, but establishment generally depends on ecological disturbance. Ecological amplitude and distribution range from limited to widespread.
- Limited – Invasive but ecological impacts are minor on a Statewide level, or not enough information was available to justify higher rating. Reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are limited, but these species may be locally persistent and problematic.
- Red Alert – plants with the potential to spread explosively; infestations currently small and localized.

Additionally, the term “noxious weed” is used by government agencies for nonnative plants that have been defined as pests by law or regulation (CDFA 2010). The California Department of Food and Agriculture rating for nonnative plants is as follows:

A. A pest of known economic or environmental detriment and is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment. A-rated pests are prohibited from entering the state because, by virtue of their rating, they have been placed on the of Plant Health and Pest Prevention Services Director’s list of organisms “detrimental to agriculture” in accordance with the FAC Sections 5261 and 6461. The only exception is for organisms accompanied by an approved CDFA or USDA live organism permit for contained exhibit or research purposes. If found entering or established in the state, A-rated pests are subject to state (or commissioner when acting as a state agent) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.

B. A pest of known economic or environmental detriment and, if present in California, it is of limited distribution. B-rated pests are eligible to enter the state if the receiving county has agreed to accept them. If found in the state, they are subject to state endorsed holding action and eradication only to provide for containment, as when

found in a nursery. At the discretion of the individual county agricultural commissioner they are subject to eradication, containment, suppression, control, or other holding action.

C. A pest of known economic or environmental detriment and, if present in California, it is usually widespread. C-rated organisms are eligible to enter the state as long as the commodities with which they are associated conform to pest cleanliness standards when found in nursery stock shipments. If found in the state, they are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.

C6.2 Special-Status Plants

Based on the results of database searches and review of existing environmental documentation, including the Program Environmental Impact Statement/Report (PEIS/R) for the San Joaquin River Restoration Program (SJRRP) (Reclamation 2011), 18 special-status plant species were identified as having potential to occur in the Reach 4B/ESB Project study area. Descriptions of these potentially occurring special-status plant species are provided below. Species descriptions are derived primarily from The Jepson Manual (Baldwin et al. 2012) and from the information available online at The Jepson Flora Project: Jepson Interchange for California Floristics (JFP 2012); additional habitat, known occurrence, and distribution information is from the CNDDB and CNPS databases, the Online CNPS Inventory of Rare and Endangered Plants of California (CNPS 2017), Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998), and Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005).

C6.2.1 Dicots

Dicots are one of two major groups of flowering plants. Dicots generally have an embryo with two cotyledons, which give rise to two seed leaves. The mature leaves generally have veins in a net-like pattern, and the flowers generally have four or five parts. Seventeen special-status species of dicots were identified as having potential to occur in the Reach 4B/ESB Project study area or its vicinity or both. Descriptions of these potentially occurring special-status species are provided below.

Alkali Milk-Vetch (Astragalus tener* var. *tener)

Status: CRPR Rank 1C.2

Alkali milk-vetch is an annual herb of the legume family (Fabaceae) that grows to 2-12 inches tall and occurs on alkaline flats and vernally-moist meadows (Baldwin et al. 2012). This species is also found in playa, valley and foothill grassland, and vernal pool habitats below 180 feet in elevation. Alkali milk-vetch blooms from March to June (CNPS 2017). CNPS records identify the species in the study area and adjacent quadrangles (San Luis Ranch (403A), Arena (422C), Gustine (423C), Stevinson (423D)). There is a high potential for this species to occur within the Reach 4B/ESB Project study

area. Based on the field reconnaissance surveys, there is potentially suitable habitat within the NWRs and the private parcels north of Sandy Mush Road. No alkali milk-vetch plants were observed during botanical surveys conducted in the accessible portion of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not been surveyed.

Heartscale (Atriplex cordulata)

Status: CRPR Rank 1C.2.

Heartscale is an annual herb of the goosefoot family (Chenopodiaceae) that grows 4–20 inches tall (Baldwin et al. 2012). This species lives in moderately alkaline or saline soil in chenopod scrub, desert scrub, or sandy grassland habitats (CNPS 2017). Heartscale blooms from April to October (CNPS 2017). CNPS records identify the species in the study area and adjacent quadrangles (El Nido (401B), Sandy Mush (402A), Turner Ranch (402B), San Luis Ranch (403A), Ingomar (403B), Volta (403C), Los Banos (403D), Arena (422C), Gustine (423C), and Stevinson (423D)). There is a high potential for this species to occur within the Reach 4B/ESB Project study area. Based on the field reconnaissance surveys, there is potentially suitable habitat within the NWRs and the private parcels north of Sandy Mush Road. No heartscale plants were observed during botanical surveys conducted in the accessible portion of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not been surveyed.

Brittlescale (Atriplex depressa)

Status: CRPR Rank 1C.2.

Brittlescale is an annual herb from the goosefoot family (Chenopodiaceae). The species is found in chenopod scrub, playas, and valley foothill grassland habitats on clay or alkaline soils (CNPS 2017). It also occurs in meadows, seeps, and vernal pools below 960 feet in elevation (CNPS 2017). Brittlescale blooms from April to October. CNPS records identify brittlescale in the study area (San Luis Ranch (403A) and Stevinson (423D) quadrangles). There is a medium potential for this species to occur within the Reach 4B/ESB Project study area. Based on the field reconnaissance surveys, there is potentially suitable habitat within the NWRs and the private parcels north of Sandy Mush Road. No brittlescale plants were observed during botanical surveys conducted in the accessible portion of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not been surveyed.

Lesser Saltscale (Atriplex minuscula)

Status: CRPR Rank 1C.1.

Lesser saltscale is an annual herb of the goosefoot family (Chenopodiaceae) (Baldwin et al. 2012). The species has many upright reddish stems that grow up to 16 inches tall, as well as egg-shaped leaves. Lesser saltscale occurs in alkaline soils of chenopod scrub, playa, and grassland habitats. The flowering period of lesser saltscale is May–October

(CNPS 2017). Based on CNPS and CNDDB records, this plant occurs adjacent to the study area (Mendota Dam (381D), Jamesan (359B), Bonita Ranch (380B), Gravelly Ford (380C), Firebaugh NE (381A), and Poso Farm (381B). There is potential for this species to occur within the Reach 4B/ESB Project Area. Based on the field reconnaissance surveys, there is potentially suitable habitat within the NWRs and the private parcels north of Sandy Mush Road. No lesser saltscale plants were observed during botanical surveys conducted in the accessible portion of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not been surveyed.

Vernal Pool Smallscale (Atriplex persistens)
Status: CRPR Rank 1C.2

Vernal pool smallscale is an annual herb of the goosefoot family (Chenopodiaceae). This species is found in chenopod scrub and vernal pool communities. The flowering period of vernal pool smallscale is July–September (CNPS 2017). The species has been recorded by CNPS and CNDDB in the Bonita Ranch (380B), and Gravelly Ford (380C) quadrangles, which are adjacent to the study area quadrangle. There is a medium potential for this species to occur within the Reach 4B/ESB Project Area. Based on the field reconnaissance surveys, there is potentially suitable habitat within the NWRs and the private parcels north of Sandy Mush Road. No vernal pool smallscale plants were observed during botanical surveys conducted in the accessible portion of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not been surveyed.

Subtle Orache (Atriplex subtilis)
Status: CRPR Rank 1C.2

Subtle orache is a short-statured, fine-textured, annual in the goosefoot family that occurs in valley and foothill grasslands. Its blooming period is from June to October. Based on CNPS and CNDDB records, this plant occurs in the study area (Mendota Dam 381D) and the adjacent Jamesan (359B), Bonita Ranch (380B), Gravelly Ford (380C), and Firebaugh NE (381A) quadrangles. There is a high potential for this species to occur within Reach 4B/ESB Project Area. Based on the field reconnaissance surveys, there is potentially suitable habitat within the NWRs and the private parcels north of Sandy Mush Road. No subtle orache plants were observed during botanical surveys conducted in the accessible portion of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not been surveyed.

Hoover's Spurge (Euphorbia hooveri)
Status: Federally Threatened, CRPR Rank 1C.2

Hoover's spurge is an annual herb belonging to the spurge family (Euphorbiaceae). This species occurs in vernal pool habitats at elevations ranging from 75 to 750 feet (CNPS 2017). Hoover's spurge is a California endemic species and blooms from July to October. CNPS records show this plant occurring in one study area quadrangle (Turner Ranch

(402B)) (CNPS 2017); however, there are no CNDDB records of this species occurring within or in the vicinity of the study area. No Hoover's spurge plants were observed during botanical surveys conducted in the accessible portion of the study area. The potential for this species to occur within the NWRs as well as the private parcels to the north of Sandy Mush Road is medium. No Hoover's spurge were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

San Joaquin Spearscale (Etriples joaquiniana)

Status: CRPR Rank 1C.2

San Joaquin spearscale is an annual herb found in Chenopod scrub, meadows and seeps, playas, and valley and foothill grassland. This species blooms April to October from one to 2,750 feet in elevation (CNPS 2017). There are no CNDDB records of this species occurring within or in the vicinity of the study area. No San Joaquin spearscale plants were observed during botanical surveys conducted in the accessible portion of the study area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Hispid Bird's Beak (Chloropyron molle [Cordylanthus mollis] ssp. hispidus)

Status: CRPR Rank 1C.1

Hispid bird's beak is an annual herb in the broom-rape family (Orobanchaceae). Hispid bird's-beak is 10 to 40 cm tall, bristly glandular-hairy, with upright branches from the base. Dense flower-spikes with white flowers that are nearly hidden by leafy bracts, cover the last 2 to 15 cm of each branch (Baldwin 2012). The potential for this species to occur within the NWRs as well as the private parcels to the north of Sandy Mush Road is medium. No hispid bird's beak were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Recurved Larkspur (Delphinium recurvatum)

Status: CRPR Rank 1C.2

Recurved larkspur is a 20 to 85 cm tall, perennial herb in the buttercup family (Ranunculaceae). The basal leaves are much larger than the stem leaves and have from 3 to 11 dentate lobes. Usually one flower-bearing stem (raceme) is produced each year. The light blue sepals are reflexed from the white petals when the flower is fully open. The upper two sepals form a nectar-containing spur, 10 to 18 millimeters (mm) long, opposite the petals (Baldwin 2012). Recurved larkspur grows in alkaline areas, in chenopod scrub, cismontane woodland, and valley and foothill grassland. It blooms March through May, and in the Central Valley its range extends from Merced to Kern County. The potential for this species to occur within the NWRs as well as the private parcels to the north of Sandy Mush Road is medium. No recurved larkspur were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area;

however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Delta Button-Celery (Eryngium racemosum)

Status: State Endangered, CRPR Rank 1C.1

Delta button-celery, a perennial member of the carrot family (Apiaceae), is a slender, prostrate herb with green flower heads. The glabrous, sprawling stems grow from 10 to 50 cm long, and produce roots and juvenile leaves at the nodes. Leaves are narrowly elongate with petioles longer than the 3 to 5 cm serrated or sharply lobed blades. The inconspicuous white to faintly purplish flowers are amassed in round heads subtended by spiny bracts (Baldwin et al. 2012). Delta button-celery occurs on clay soils on sparsely vegetated margins of seasonally flooded flood plains of rivers and large creeks, and in seasonally inundated clay depressions and swales in riparian scrub (Baldwin et al. 2012). This species has also been reported along the margins of reservoirs undergoing seasonal inundation (CDFW 2017). Delta button-celery is currently known from Merced County along the central floodplain of the San Joaquin River, and in Stanislaus County on the eastern shore of Turlock Lake. The plant has most likely been extirpated from San Joaquin and Calaveras counties (CDFW 2017). CNPS records show delta button-celery occurring in the study area in the following quadrangles: Sandy Mush (402A), Turner Ranch (402B), San Luis Ranch (403A), and Stevinson (423D). There are also numerous CNDDB occurrences of this species along the San Joaquin River primarily north of the Mariposa Bypass and along the Mariposa Bypass channel. The potential for this species to occur within the Reach 4B/ESB Project Area is high, suitable habitat is present within the NWRs and the private parcels to the north of Sandy Mush Road; in addition, this species has been observed during previous field reconnaissance surveys.

Coulter's Goldfields (Lasthenia glabrata ssp. coulteri)

Status: CRPR Rank 1C.2

Coulter's goldfields is an annual herb in the sunflower family (Asteraceae). It is characterized by showy yellow flowers born on simple or branched stems growing to 24 inches tall. The leaves are linear or awl-shaped, entire, and glabrous. Coulter's goldfields fruits are covered with rusty or yellow, wart-like papillae (Baldwin et al. 2012). It occurs in marshes and swamps (especially saline conditions), playas, and vernal pools at elevations of 3 to 3660 feet above msl. Coulter's goldfields is currently known from Tulare County to San Diego County and a few counties in northern California (Tehama, Colusa, Yolo, Butte and Merced) (CNPS 2017 and Calflora 2017). CNPS records show Coulter's goldfields occurring in the study area quadrangles (Arena (422C) and Stevinson (423D)) (CNPS 2017). There is one CNDDB occurrence of Coulter's goldfields approximately five miles northwest of the Reach 4B/ESB Project Area (CDFW 2017). The potential for this species to occur within the NWRs as well as the private parcels to the north of Sandy Mush Road is medium. No Coulter's goldfields were observed during botanical surveys conducted in the accessible portions of the study area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Heckard's Pepper-Grass (Lepidium latipes* var. *heckardii)
Status: CRPR Rank 1B.2

Heckard's pepper-grass is an annual herb belonging to the mustard family (Brassicaceae) and is characterized by a compact, cylindrical inflorescence born on hairy stems that grow to six inches tall (Baldwin et al. 2012). The fruit's shape is oblong to ovate with a notch in the center. It grows on valley and foothill grassland habitats (especially alkaline flats) at elevations of 6 to 600 feet. This species is typically found on alkaline soils, vernal pool margins, salt marsh edges, and pastures Heckard's pepper-grass is endemic to California and blooms from March to May. CNPS and Calflora records indicate that Heckard's pepper-grass occurs in Glenn, Merced, Sacramento, Solano, and Yolo Counties. It occurs in one study area quadrangle (Arena (422C)); however, there are no CNDDB records of this species within or in the vicinity of the Reach 4B/ESB Project Area The potential for this species to occur within the NWRs as well as the private parcels to the north of Sandy Mush Road is medium. No Heckard's pepper-grass were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Prostrate Vernal Pool Navarretia (Navarretia prostrata)
Status: CRPR Rank 1C.2

Prostrate navarretia is an annual herb from the phlox family (Polemoniaceae) that is endemic to California. It is characterized by its prostrate growth form and a central head of bracts and flowers. The stem is sparsely to densely hairy; leaves are clustered just below the head (Baldwin et al. 2012). Prostrate vernal pool navarretia grows in mesic conditions of coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pool habitats at elevations of 45 to 3630 feet. CNPS records indicate that this species occurs in several study area quadrangles (Turner Ranch (402B), San Luis Ranch (403A), Arena (422C), and Stevinson (423D)) (CNPS 2017); however, there are no CNDDB records of this species within or in the vicinity of the study area. No prostrate vernal pool navarretia were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Colusa Grass (Neostapfia colusana)
Status: Federal Endangered, California Endangered, CRPR Rank 1B

Colusa grass is an annual herb found in large, deep vernal pools with adobe soil. This species blooms from May to August from 16 to 656 feet in elevation. There are no CNDDB records of this species within or in the vicinity of the study area. No Colusa grass were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

California Alkali Grass (Puccinellia simplex)
Status: CRPR Rank 1C

California alkali grass is an annual herb found in alkaline vernally mesic sinks, flats, and lake margins, chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. This species blooms from March to May from 6 to 3,000 feet elevation. No California alkali grass were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

Wright's Trichocoronis (Trichocoronis wrightii* var. *wrightii)
Status: CRPR Rank 2.1

Wright's trichocoronis is a small annual herb in the sunflower family (Asteraceae) that grows from 5 to 25 cm tall. Multiple stems sprout from the base of the plant, and the sessile (without stalks) leaves are arranged oppositely on the shoots (Baldwin et al. 2012). The plant blooms from May to September. The diminutive flowers fade from maroon to white and are located on small, terminal heads. Plants typically occur on mud flats, shores, and other wet places, including vernal pools. In California, Wright's trichocoronis is limited to seven historical occurrences in Riverside, Merced, San Joaquin, and Colusa counties, all of which are presumed to be extant (CNPS 2017). Only one occurrence is known from Merced County from the Los Banos Wildlife Area (about 3 km north of Los Banos), and the sighting was reported in 1948. One CNDDB occurrence of Wright's trichocoronis was recorded along the Mariposa Bypass in 1997 (CDFW 2017). No Wright's trichocoronis were observed during botanical surveys conducted in the accessible portions of the Reach 4B/ESB Project Area; however, there is the potential for this species to be present within the portions of the Reach 4B/ESB Project Area that have not yet been surveyed.

C6.2.2 Monocots

monocots are one of two major groups of flowering plants. Monocots generally have an embryo with one cotyledon, which give rise to a single seed-leaf. The mature leaves generally have parallel veins, and the flowers generally have three or six parts. Two special-status species of monocots were identified as having potential to occur in the Reach 4B/ESB Project Area or vicinity. Descriptions of these potentially occurring special-status species are provided below.

Sanford's Arrowhead (Sagittaria sanfordii)
Status: CRPR Rank 1C.2

Sanford's arrowhead is a perennial rhizomatous herb belonging to the water-plantain family (Alismataceae) and an endemic species to California. It is characterized by linear or lanceolate emergent leaves and flowers that have three showy white petals (Baldwin et al. 2012). Sanford's arrowhead occurs in marshes, swamps, and other shallow freshwater habitats below 1950 feet in elevation. The blooming period for this species is from May to October (CNPS 2017). Its current range extends from Shasta County to Ventura

County. CNPS records show Sanford's arrowhead extirpated in southern California and mostly extirpated from the Central Valley. One CNDDB occurrence of Sanford's arrowhead was recorded near Deep Slough, approximately two miles north of the Mariposa Bypass (CDFW 2017). Although this species has not been observed within the Reach 4B/ESB Project Area during the 2012 field reconnaissance surveys; there is a high potential for the species to occur within the Reach 4B/ESB Project Area based on recorded observations within the CNDDB and the presence of suitable freshwater habitat.

C6.3 Special-Status Wildlife

Based on the results of database searches and review of existing environmental documentation, 27 special-status animal species were identified as having potential to occur in the Reach 4B/ESB Project study area. Descriptions of these potentially occurring special-status animal species are provided below. Species descriptions are derived primarily from information in CNDDB records; existing species accounts available from CDFW, USFWS, and others; recovery plans for special-status species with potential to occur in the Reach 4B/ESB Project Area; and relevant scientific literature.

C6.3.1 Invertebrates

Five invertebrate special-status species were identified as having potential to occur in the Reach 4B/ESB Project Area. Descriptions of these potentially occurring special-status species are provided below.

Conservancy Fairy Shrimp

The Conservancy fairy shrimp (*Branchinecta conservatio*) is a vernal pool crustacean found in California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The Conservancy fairy shrimp is Federally listed as endangered, and critical habitat has been designated for this species.

Distribution

The range of the Conservancy fairy shrimp extends from the northern Sacramento Valley to the San Joaquin Valley. Within this range, Conservancy fairy shrimp occur in vernal pools, swales, and lakes (Helm 1998). Observations also suggest that this species is generally found in pools that are relatively large and turbid (Eriksen and Belk 1999, Helm 1998, King 1996). These pools may be more than several acres in size. Conservancy fairy shrimp is known to occur in suitable habitat in the San Luis NWR complex in Reaches 4B2 and 5 and the Eastside Bypass. Critical habitat for this species is in and adjacent to the Eastside Bypass, the Mariposa Bypass, and Reach 4B2 of the Reach 4B/ESB Project Area (Exhibit C-E).

Natural History

Conservancy fairy shrimp are omnivorous filter feeders that indiscriminately filter particles of the appropriate size from their surroundings, and in turn they are prey to a

wide variety of animals. The diet of Conservancy fairy shrimp consists of bacteria, unicellular algae, protists, and suspended plant and animal particles (Eriksen and Belk 1999). Animals feeding on Conservancy fairy shrimp are birds, fish, amphibians, dragonfly and damsel fly larvae, other insects, and vernal pool tadpole shrimp (Eriksen and Belk 1999, USFWS 2005).

Vernal pool crustaceans reproduce by producing cysts that consist of an embryo within a protective covering (Eriksen and Belk 1999). Cysts may remain viable for a very long and undetermined number of years. During summer and fall months, vernal pool crustacean populations are present only as cysts in the dry pool bottom.

Inundation triggers some of the dormant cysts to hatch; other cysts remain dormant as a cyst bank, analogous to the seed bank of annual plants (USFWS 2005). After hatching, the life span and maturation rate of Conservancy fairy shrimp are similar to those of other fairy shrimp species. Conservancy fairy shrimp can reach maturity in about 6 or 7 weeks, and populations of adults can remain active for more than 4 months (Helm 1998). However, maturation and reproduction rates of vernal pool crustaceans are controlled by water temperature and can vary greatly (Helm 1998).

Threats

The Conservancy fairy shrimp is threatened primarily by the habitat loss and fragmentation resulting from expansion of agricultural and developed land uses. Vernal pool habitat can also be lost or degraded by other activities that damage or puncture the hardpan (i.e., water-restrictive layer underlying the pool) or by activities that destroy or degrade uplands that contribute water to vernal pools. Besides habitat conversion, activities causing such loss or degradation include deep ripping of soils, water diversion or impoundment, and application of pesticides, fertilizers, or livestock wastes.

Additional threats are incompatible grazing practices, replacement of native plants by nonnatives, and introduction of fish to vernal pools (Robins and Vollmar 2002, Marty 2005, Pyke and Marty 2005, USFWS 2005).

Relevant Conservation Efforts and Guidance

The Conservancy fairy shrimp is covered by the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. The species also has been or is proposed to be covered by several regional habitat conservation plans (HCPs).

Longhorn Fairy Shrimp

The longhorn fairy shrimp (*Branchinecta longiantenna*) is a vernal pool crustacean found in California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The longhorn fairy shrimp is Federally listed as endangered, and critical habitat has been designated for this species.

Distribution

The known distribution of the longhorn fairy shrimp extends from Contra Costa and Alameda counties to San Luis Obispo County and also includes Merced County (USFWS 2005, CDFW 2017). Within this geographic range, it is extremely rare in vernal pools and swales. This species is known to occur in suitable habitat in the San Luis NWR complex in Reach 5. Critical habitat for this species is in and adjacent to Reach 4B2 (Exhibit C-E).

Natural History

Longhorn fairy shrimp are omnivorous filter feeders that indiscriminately filter particles of the appropriate size from their surroundings, and in turn they are prey to a wide variety of animals. The diet of the longhorn fairy shrimp consists of bacteria, unicellular algae, protists, and suspended plant and animal particles (Eriksen and Belk 1999). Animals feeding on longhorn fairy shrimp likely include birds, fish, amphibians, dragonfly and damsel fly larvae, other insects, and vernal pool tadpole shrimp (Eriksen and Belk 1999, USFWS 2005).

Vernal pool crustaceans reproduce by producing cysts that consist of an embryo within a protective covering (Eriksen and Belk 1999). Cysts may remain viable for a very long and undetermined number of years. During summer and fall months, vernal pool crustacean populations are present only as cysts in the dry pool bottom.

Inundation triggers some of the dormant cysts to hatch; other cysts remain dormant as a cyst bank, analogous to the seed bank of annual plants (USFWS 2005). After hatching, the life span and maturation rate of longhorn fairy shrimp are similar to those of other fairy shrimp species. The longhorn fairy shrimp can complete its life cycle in 3–7 weeks (Helm 1998). However, maturation and reproduction rates of vernal pool crustaceans are controlled by water temperature and can vary greatly (Helm 1998).

Threats

The longhorn fairy shrimp has likely experienced habitat loss and fragmentation as a result of the expansion of agricultural and developed land uses. However, it is now threatened by habitat loss and disturbance resulting from several site-specific activities at the few locations from which it is known: wind energy development, a water storage project, construction of a dirt access road, and land management activities (USFWS 2005). Additional threats to longhorn fairy shrimp may include incompatible grazing practices and replacement of native plants by nonnatives (Robins and Vollmar 2002, Marty 2005, Pyke and Marty 2005).

Relevant Conservation Efforts and Guidance

Longhorn fairy shrimp is covered by the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery

that is focused on habitat protection and management. In addition, much of the species' known occupied habitat has been partially or fully protected on land managed by the East Bay Regional Parks District, USFWS, and the Carrizo National Monument.

Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp (*Branchinecta lynchi*) is a vernal pool crustacean found in California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The vernal pool fairy shrimp is Federally listed as threatened, and critical habitat has been designated for this species.

Distribution

The vernal pool fairy shrimp is found throughout the Central Valley and west to the central Coast Ranges, at sites 30–4,000 feet in elevation (USFWS 2005). The species has also been reported from the Agate Desert region of Oregon near Medford, and disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside counties.

Within this geographic range, the vernal pool fairy shrimp inhabits primarily vernal pools (Eng, Belk, and Eriksen 1990). It also occurs in other wetlands that provide habitat similar to vernal pools: alkaline rain-pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal swales, and some seasonal wetlands (Helm 1998). Occupied wetland habitats range in size from several square feet to more than 20 acres. This species is not found in riverine or other permanent waters.

The vernal pool fairy shrimp is known to occur in suitable habitat in the San Luis NWR complex in Reaches 4B1, and 4B2, and the Eastside Bypass. Critical habitat for this species is adjacent to the Eastside Bypass, the Mariposa Bypass, and Reach 4B2 (Exhibit C-E).

Natural History

Vernal pool fairy shrimp are omnivorous filter feeders that indiscriminately filter particles of the appropriate size from their surroundings, and in turn they are prey to a wide variety of animals. The diet of vernal pool fairy shrimp consists of bacteria, unicellular algae, protists, and suspended plant and animal particles (Eriksen and Belk 1999). Animals feeding on Conservancy fairy shrimp are birds, fish, amphibians, dragonfly and damsel fly larvae, other insects and vernal pool tadpole shrimp (Eriksen and Belk 1999, USFWS 2005).

Vernal pool crustaceans reproduce by producing cysts that consist of an embryo within a protective covering (Eriksen and Belk 1999). Cysts may remain viable for a very long and undetermined number of years. During summer and fall months, vernal pool crustacean populations are present only as cysts in the dry pool bottom.

Individuals go through the rest of their life cycle while pools are inundated. Inundation triggers some of the dormant cysts to hatch; other cysts remain dormant as a cyst bank, analogous to the seed bank of annual plants (USFWS 2005). After hatching, vernal pool

fairy shrimp develop rapidly into adults, reaching sexual maturity in as little as 18 days, and completing their life cycle within 9 weeks (Helm 1998). However, maturation and reproduction rates can vary greatly with water temperature (Helm 1998). Multiple episodes of cyst hatching may occur within a season if conditions are suitable (Helm 1998, Gallagher 1996). However, populations also often disappear early in the season, long before the vernal pools dry up.

Threats

The vernal pool fairy shrimp is threatened primarily by the habitat loss and fragmentation resulting from expansion of agricultural and developed land uses. Vernal pool habitat can also be lost or degraded by other activities that damage or puncture the hardpan (i.e., water-restrictive layer underlying the pool) or by activities that destroy or degrade uplands that contribute water to vernal pools. Besides habitat conversion, activities causing such loss or degradation include deep ripping of soils, water diversion or impoundment, and application of pesticides, fertilizers, or livestock wastes. Additional threats include incompatible grazing practices, replacement of native plants by nonnatives, and introduction of fish to vernal pools (Robins and Vollmar 2002, Marty 2005, Pyke and Marty 2005, USFWS 2005).

Relevant Conservation Efforts and Guidance

The vernal pool fairy shrimp is covered by the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. The species also has been or is proposed to be covered by several regional HCPs.

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardi*) is a vernal pool crustacean found in California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The vernal pool tadpole shrimp is Federally listed as endangered, and critical habitat has been designated for this species.

Distribution

The vernal pool tadpole shrimp is endemic to the Central Valley with most populations in the Sacramento Valley. This species has also been reported from the Sacramento–San Joaquin River Delta (Delta) to the east side of San Francisco Bay, and from scattered localities in the San Joaquin Valley from San Joaquin County to Madera County (Rogers 2001).

Within this geographic range, vernal pool tadpole shrimp occur in a wide variety of seasonal habitats: vernal pools, ponded clay flats, alkaline pools, ephemeral stock tanks, and roadside ditches (CDFW 2017, Helm 1998, Rogers 2001). Habitats where vernal pool tadpole shrimp have been observed range in size from small, clear, vegetated vernal pools to highly turbid pools to large winter lakes (Helm 1998, Rogers 2001). This species

has not been reported in pools that contain high concentrations of sodium salts, but may occur in pools with high concentrations of calcium salts.

The vernal pool tadpole shrimp is known to occur in suitable habitat in the San Luis NWR complex and at the Great Valley Grasslands State Park in Reaches 4B1, and 4B2, and the Eastside Bypass. Critical habitat for this species is in and adjacent to the Eastside Bypass, the Mariposa Bypass, and Reach 4B2 (Exhibit C-E).

Natural History

Vernal pools and other ephemeral wetlands must dry out and be inundated again for the vernal pool tadpole shrimp cysts to hatch. Vernal pool tadpole shrimp dig in bottom sediments and scramble over objects as they forage. They are omnivores, and in turn they are consumed by a wide variety of animals. Their diet includes plants and various zooplankton, other fairy shrimp, and insect larvae (Eriksen and Belk 1999). Animals feeding on vernal pool tadpole shrimp include birds, fish, amphibians, and dragonfly larvae and other insects (Eriksen and Belk 1999, USFWS 2005).

Vernal pool crustaceans reproduce by producing cysts that consist of an embryo within a protective covering (Eriksen and Belk 1999). Cysts may remain viable for a very long and undetermined number of years. During summer and fall months, vernal pool crustacean populations are present only as cysts in the dry pool bottom.

Individuals go through the rest of their life cycle while pools are inundated. Inundation triggers some of the dormant cysts to hatch, while other cysts remain dormant as a cyst bank, analogous to the seed bank of annual plants (USFWS 2005). After hatching, vernal pool tadpole shrimp hatch from cysts within several days (Ahl 1991). Vernal pool tadpole shrimp may take 3 to 4 weeks to mature, and longer to reproduce (Helm 1998, Ahl 1991, King 1996). (However, maturation and reproduction rates of vernal pool crustaceans are controlled by water temperature and can vary greatly.) Vernal pool tadpole shrimp will continue to grow as long as their vernal pool habitats remain inundated, in some cases for 6 months or longer. They periodically shed their shield-like shells, which often can be found along the edges of vernal pools where vernal pool tadpole shrimp occur.

Threats

The vernal pool tadpole shrimp is threatened primarily by the habitat loss and fragmentation resulting from expansion of agricultural and developed land uses. Vernal pool habitat can also be lost or degraded by other activities that damage or puncture the hardpan (i.e., water-restrictive layer underlying the pool) or by activities that destroy or degrade uplands that contribute water to vernal pools. Besides habitat conversion, activities causing such loss or degradation include deep ripping of soils, water diversion or impoundment, and application of pesticides, fertilizers, or livestock wastes. Additional threats are incompatible grazing practices, replacement of native plants by nonnatives, and introduction of fish to vernal pools (Robins and Vollmar 2002, Marty 2005, Pyke and Marty 2005, USFWS 2005).

Relevant Conservation Efforts and Guidance

The vernal pool tadpole shrimp is covered by the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. The species also has been or is proposed to be covered by several regional HCPs.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) is a Federally threatened species endemic to the Central Valley. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The VELB is Federally listed as threatened, and critical habitat has been designated for this species. In 2006, USFWS recommended that this species be delisted (USFWS 2006a).

Distribution

The VELB is endemic to the Central Valley. It is found only in association with its host plants, the elderberry shrub (*Sambucus* spp.). In the Central Valley the elderberry shrub is found primarily in riparian vegetation.

The VELB is known to occur in elderberry shrubs present within the riparian woodland in Reach 1A. The species is also expected to occur in suitable habitat in other locations in the Reach 4B/ESB Project Area.

Natural History

Adults feed on the foliage and possibly the flowers of elderberries from March to early June (Barr 1991, USFWS 2006b). During this period the beetles mate, and they lay eggs on the bark of elderberry shrubs. After the eggs hatch, the larvae bore into and feed on the pith of the stems (i.e., the soft tissue at the center of elderberry stems), and also may feed on the wood. The larval stage may last for 1 to 2 years. Immediately before pupating, larvae excavate exit holes in the stems and temporarily fill them. During mid-March to early June, after pupation, the adults emerge.

Threats

The VELB has experienced substantial loss of riparian habitat containing its host plant, and damage and loss of host plants in remaining habitat. However, its greatest current threat may be predation and displacement by the invasive Argentine ant (*Linepithema humile*) (Huxel 2000).

Relevant Conservation Efforts and Guidance

A recovery plan was prepared for this species during the 1980s (USFWS 1984), and regularly implemented conservation measures have included avoidance and minimization of effects on occupied habitat, elderberry transplantation and replacement plantings, and habitat preservation. In part as a result of these measures, extensive areas of habitat have

been preserved (USFWS 2006a). As noted above, the species has been recommended for delisting.

C6.3.2 Amphibians

Two amphibian species were identified as having potential to occur in the Reach 4B/ESB Project study area. Descriptions of these potentially occurring special-status species are

California Tiger Salamander

The California tiger salamander (*Ambystoma californiense*) (Central Population) is a California species of special concern, endemic to California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The California tiger salamander is Federally listed as threatened and is a California species of special concern. The final rule listing this species as threatened includes a special rule exemption for existing routine ranching activities.

Critical habitat for California tiger salamander was designated by USFWS on August 23, 2005 (70 FR 49379–49458, August 23, 2005). As defined in the USFWS critical habitat designation, the primary constituent elements for California tiger salamander are aquatic breeding habitat, upland habitat, and dispersal habitat. Designated critical habitat includes approximately 12,000 acres near Millerton Lake in Units 1a, 1b, and 2. Units 1a and 1b are west of State Route 41 and generally north of the San Joaquin River. The eastern boundary is approximately the western side of Millerton Lake, and the northern boundary is south of Berry Hill along O'Neal Road. Unit 2 is northeast of Fresno, southwest of Millerton Lake, east of Friant Road, and generally west of Academy.

Distribution

The California tiger salamander, endemic to California, ranges across the Central Valley and the eastern foothills of the Sierra Nevada from Yolo County (possibly up to Colusa County) south to Kern County, and coastal grasslands from Sonoma County to Santa Barbara County at elevations ranging from approximately 10 to 3,500 feet above mean sea level (Shaffer and Fisher 1991).

Surveys have detected the presence of this species at the West Bear Creek Unit of the San Luis NWR and at Great Valley Grasslands State Park (JSA et al. 2000). There is no critical habitat for this species in and adjacent to the Reach 4B/ESB Project Area (Exhibit C-E).

Natural History

The California tiger salamander requires vernal pools, ponds (natural or human-made), or semipermanent calm waters (where ponded water is present for a minimum of 3 to 4 months) for breeding and larval maturation. It also requires adjacent upland areas that contain small mammal burrows or other suitable refugia for aestivation.

Adult California tiger salamanders spend most of their lives underground in small mammal burrows, typically those of Beechey's (=California) ground squirrels

(*Spermophilus beecheyi*) (Loredo, Van Vuren, and Morrison 1996). Adults emerge from underground retreats to feed, court, and breed during warm winter rains, typically from November through March. Adults may migrate long distances, up to a half mile or more, to reach pools for breeding and egg laying (Jennings and Hayes 1994). Reproduction may not occur in years with suboptimal conditions.) After hatching in approximately 10–14 days the larvae continue to develop in the pools for several months until they metamorphose, which takes a minimum of 10 weeks. Following metamorphosis, juvenile salamanders seek refugia, typically mammal burrows, traveling distances of about 1 mile or more from their breeding sites (Austin and Shaffer 1992, Orloff 2007), in which they may remain until they emerge during a subsequent breeding season.

Threats

The alteration of either breeding ponds or upland habitat through the introduction of exotic predators (e.g., bullfrogs (*Rana catesbeiana*) and mosquitofish (*Gambusia affinis*)) or the construction of barriers that fragment habitat and reduce connectivity (e.g., roads, berms, and certain types of fences) can be detrimental to the survival of the California tiger salamander (Jennings and Hayes 1994; Trenham, Koenig, and Shaffer 2001). Other threats include vehicular-related mortality, especially during breeding migrations (Barry and Shaffer 1994), and rodent-control programs, which lead to loss of aestivation habitats (Loredo, Van Vuren, and Morrison 1996).

Relevant Conservation Efforts and Guidance

The California tiger salamander is not covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005). However, this recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach focused on habitat protection and management. Thus, the California tiger salamander likely will benefit from many of these recovery actions.

Western Spadefoot

The western spadefoot (*Spea hammondii*) is a relatively smooth-skinned toad found in California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The western spadefoot is a California species of special concern.

Distribution

The western spadefoot inhabits the Central Valley as far north as Redding, adjacent foothills and valleys, and the central and south coastal region of California from Monterey Bay to Baja California (Stebbins 2003, Morey 1985). Since 1990, it has inhabited Alameda, Butte, Calaveras, Fresno, Kern, Kings, Los Angeles, Madera, Merced, Monterey, Orange, Placer, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Stanislaus, Tulare, Ventura, and Yolo counties (USFWS 2007a). The species is found in grasslands, open chaparral, and pine-oak woodland and uses vernal pools and seasonal wetlands for breeding.

This species is known to occur in suitable habitat in the San Luis NWR complex and at the Great Valley Grasslands State Park in Reaches 4B1, and 4B2. Other occurrences have been reported adjacent to the Reach 4B/ESB Project Area in Reach 1A and in suitable habitat in the San Luis NWR complex and at the Great Valley Grasslands State Park in Reach 5.

Natural History

The western spadefoot is a medium-sized toad that feeds on invertebrates. Insects, especially caterpillars and beetles, are the primary components of the adult's diet (Morey and Guinn 1992), although the toad also eats worms, ants, and other invertebrates (Stebbins 2003). Adult forms are entirely terrestrial except during the breeding season and prefer areas of open vegetation and short grasses with sandy or gravelly soils (Stebbins 2003). Generally, adults spend spring and summer in self-constructed burrows in loose soil or in small mammal burrows (Stebbins 2003). Dormancy can last as long as 8–9 months (Jennings and Hayes 1994).

Although they emerge from burrows primarily in late fall to early spring, adults also may be observed outside their burrows during periods of higher rain falls in other months (Morey and Guinn 1992). Vernal pools, seasonal wetlands, or pools in ephemeral stream courses that last longer than 3 weeks are used for breeding (Stebbins 2003, Jennings and Hayes 1994).

Depending on the temperature regime and annual rainfall, egg laying may occur between late February and late May (Stebbins 2003). Females lay their eggs in irregular clusters of eggs attached to plant stems and larger detritus (Stebbins 2003).

Eggs hatch in 0.6 to 6 days, depending on temperature, and larval development can take 3 to 11 weeks. Metamorphosis rates can vary depending on the water depth and volume in the pool to allow advancement of metamorphosis in quickly drying water bodies (Denver 1998; Denver, Mirhadi, and Phillips 1998). After tadpoles metamorphose to adults and spend up to a few days near the pond margin, they disperse or burrow into the adjacent soils (Morey 1985).

Threats

Declines of the western spadefoot throughout its range have been documented (Jennings and Hayes 1994, Drost and Fellers 2005, Fisher and Shaffer 1996). Loss of habitat, primarily in the form of urbanization and intense agriculture, is a primary concern for decreases in population abundance (Davidson, Shaffer, and Jennings 2002), although nonnative predators also have been implicated (Fisher and Shaffer 1996, Adams 1999).

B6.3.3 Reptiles

Three species of reptiles were identified as having potential to occur in the Reach 4B/ESB Project study area. Descriptions of these potentially occurring special-status species are provided below.

Western Pond Turtle

The western pond turtle (*Actinemys* (=*Clemmys*) *marmorata*) is a freshwater turtle native to California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The western pond turtle is a California species of special concern.

Distribution

The western pond turtle is the only freshwater turtle native to California (Stebbins 2003). Western pond turtles are habitat generalists. They have been observed in slow-moving rivers and streams (e.g., in oxbows), lakes, reservoirs, permanent and ephemeral wetlands, stock ponds, and sewage treatment plants.

The range of western pond turtle along the Pacific coast extends from Washington to northern Baja California, Mexico (Jennings and Hayes 1994). Throughout its range, including the San Joaquin Valley, populations are on the decline and recruitment is limited.

This species is known to occur in suitable habitat in the San Luis NWR complex, in the Mendota Wildlife Area, and at Mendota Pool. It is expected to occur in suitable habitat in other locations in the Reach 4B/ESB Project Area.

Natural History

Western pond turtles regularly utilize upland terrestrial habitats, most often during the summer and winter, especially for egg laying (females), overwintering, and overland dispersal (Reese 1996, Holland 1994). Females have been reported ranging as far as 500 meters (1,640 feet) from a watercourse to find suitable nesting habitat (Reese and Welsh 1997). Nest sites are most often situated on south- or west-facing slopes, are sparsely vegetated with short grasses or forbs, and are scraped in sands or hard-packed, dry, silt, or clay soils (Reese and Welsh 1997). Western pond turtles exhibit high site fidelity, returning in sequential years to the same terrestrial site to nest or overwinter (Reese 1996).

Western pond turtles forage in aquatic habitats. They are omnivorous feeders; their diet includes invertebrates, carrion (e.g., dead fish), and even plant matter. They prefer aquatic habitat with refugia such as undercut banks and submerged vegetation (Holland 1994), and they require emergent basking sites such as mud banks, rocks, logs, and root wads to thermoregulate their body temperatures (Holland 1994).

Females lay their eggs between late April and late July, although they lay primarily in June and July. Natural incubation times vary, ranging from 80 to 100 or more days in California. In northern California and Oregon, hatchlings remain in the nest after hatching and overwinter, emerging in the spring. In southern and central California, those that do not overwinter emerge from the nest in the early fall (Holland 1994).

Threats

Threats to the western pond turtle include habitat loss resulting from development, agriculture, dams, diversions, and fire suppression, as well as overexploitation and introduced exotic species.

Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard (*Gambelia sila*) is a large lizard endemic to California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The blunt-nosed leopard lizard is Federally and State listed as endangered, and is a fully protected species under the California Fish and Game Code.

Distribution

The blunt-nosed leopard lizard, historically found throughout the San Joaquin Valley and adjacent foothills from San Joaquin County to eastern San Luis Obispo County, currently occupies isolated and scattered areas of undeveloped habitat on the San Joaquin Valley floor and in the eastern foothills of the Coast Ranges.

Blunt-nosed leopard lizards are found in areas with sandy soils and scattered vegetation and are usually absent from thickly vegetated habitats. On the floor of the San Joaquin Valley, they are usually found in nonnative grassland, valley sink scrub habitats, valley needlegrass grassland, alkali playa, and valley saltbush scrub (USFWS 1998).

No records of this species are known from the Reach 4B/ESB Project Area and despite numerous survey efforts in various portions of the Reach 4B/ESB Project Area, this species has never been observed (ESRP 2009). The SJRRP BO identifies this species as potentially occurring in suitable habitat to the north of the Mariposa Bypass and west of the Lower Eastside Bypass.

Natural History

Blunt-nosed leopard lizards are large, opportunistic predatory lizards, feeding primarily on insects (grasshoppers, crickets and moths) and other small lizards, even their own kind (Germano and Williams 1994).

Blunt-nosed leopard lizards use small rodent burrows for shelter, predator avoidance, and behavioral thermoregulation. These burrows may be either abandoned ground squirrel tunnels or occupied or abandoned kangaroo rat tunnels. Each lizard may use several burrows, avoiding those with predators or other leopard lizards. The average size of home ranges varies from about 0.5 to 4 acres (Tollestrup 1983; Kato, Rose, and O'Farrell 1987b).

Breeding activity of blunt-nosed leopard lizards generally begins within a month after emergence from dormancy, usually the end of April, and continues through the beginning of June, and occasionally to the end of June (USFWS 1998). During adverse conditions, reproduction may be delayed up to 2 months or even forgone for a season. Incubation

lasts about 2 months and young hatch from early July through early August (Tollestrup 1983).

Threats

Habitat disturbance, fragmentation, and loss are the greatest threats to populations of blunt-nosed leopard lizard (USFWS 1998). Cultivation, habitat modification for petroleum and mineral extraction, pesticide applications, use of off-road vehicles, and construction for transportation, communication, and irrigation infrastructure all have been resulting in pervasive habitat disturbance, fragmentation, and loss throughout the San Joaquin Valley (Germano and Williams 1993). These activities present ongoing threats to the survival of blunt-nosed leopard lizards (USFWS 1998).

Relevant Conservation Efforts and Guidance

A recovery plan was first prepared by USFWS in 1980 and revised in 1985 (USFWS 1985b) and 1998 (USFWS 1998). Conservation efforts have included habitat and population surveys, studies of population demographics, habitat management, land acquisition, and development of management plans for public lands (USFWS 1998). Current recovery efforts focus on three important factors: (1) determining appropriate habitat management and compatible land uses for blunt-nosed leopard lizards, (2) protecting additional habitat for the species in key locations of its range, and (3) determining more precisely how populations are affected by environmental variation (USFWS 1998).

Giant Garter Snake

The giant garter snake (*Thamnophis gigas*) is a highly aquatic snake endemic to California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The giant garter snake is Federally and State listed as threatened.

Distribution

The giant garter snake historically occurred throughout the Central Valley of California, but the current range of the giant garter snake is confined to the Sacramento Valley, and isolated sites in the San Joaquin Valley and potentially in the Delta (Hansen and Brode 1980; Stebbins 2003; USFWS 1999a, 1999b). It inhabits sloughs, low-gradient streams, marshes, ponds, agricultural wetlands (e.g., rice fields), irrigation canals and drainage ditches, and adjacent uplands.

Although many of the populations of giant garter snake in the northern part of the range from Stockton (San Joaquin County) to Chico (Butte County) are relatively stable, the southernmost populations at the Mendota Wildlife Area (Fresno County) and the Grassland Wetlands (Merced County) are small, fragmented, unstable, and probably decreasing (USFWS 2006c). No sightings of giant garter snakes south of the Mendota Wildlife Area, within the historic range of the species, have occurred since the time of listing (Hansen 2002). This species has been observed at the San Luis, Kesterson, and West Bear Creek units of the San Luis NWR and documented in the Mendota Wildlife

Area (Dickert 2005) and south of the San Joaquin River in Fresno Slough (USFWS 2006c).

Natural History

The giant garter snake is a very aquatic, large snake (up to 5 feet in length). It primarily feeds on small fish, tadpoles, and frogs. Snakes use emergent vegetation and crevasses and burrows in adjacent uplands for cover (USFWS 1999a, 1999b). They also use adjacent uplands for foraging, basking, refuge from flood waters, and hibernation.

Giant garter snakes may hibernate up to 800 feet from water, and along waterways, they may move considerable distances (e.g., up to 2 miles in a single day) (Hansen 1988, USFWS 2006c). Consequently, the size of their home ranges varies widely.

Giant garter snakes are less active or dormant from October until April, when they emerge to breed and forage (Wylie, Casazza, and Daugherty 1997). They give birth to live young from late July through early September (Hansen and Hansen 1990).

Giant garter snakes are vulnerable to predation from both native species (e.g., raccoons, egrets, and herons) and nonnative species (e.g., bullfrogs, feral cats) (58 FR 54053–54065, October 20, 1993; Carpenter, Casazza, and Wylie 2002). Predation may be the reason that giant garter snakes tend to be absent from larger rivers that support predatory fish (Hansen 1980). They are also affected by parasites and contaminants.

Threats

Giant garter snake is threatened primarily by habitat conversion, fragmentation, and degradation resulting from urban development (58 FR 54053–54065, October 20, 1993; Dickert 2005). (Human disturbance contributes to habitat degradation because giant garter snakes are diurnal predators that are disturbed by human activities.) It is also threatened by incompatible agricultural practices such as intensive vegetation control along canal banks and changes in crop composition.

Relevant Conservation Efforts and Guidance

The Reach 4B/ESB Project study area is located within the San Joaquin Valley Recovery Unit, as described in the draft recovery plan for the species (USFWS 1999a, 1999b). Recovery plan recommendations for this area include development and implementation of a management plan benefiting giant garter snake, restoration of wetland habitat for this species, and maintenance of compatible agricultural practices.

Standard avoidance measures have been developed by USFWS, including avoidance of construction activities within 200 feet of the banks of potential aquatic habitat. If ground disturbing activity must occur in potential upland habitat located within 200 feet of potential aquatic habitat, the work should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move above ground and avoid danger.

Visual surveys of bankside vegetation can be conducted either from a boat or on foot along suitable ecotones. Ground surveys are most likely to be effective during the springtime when individuals are still concentrated near overwintering sites. Ground

surveys should be done daily, concurrently with trapping, and should be performed by two people. Trapping surveys are generally conducted using floating funnel traps (modified eelpots) placed in waterways along the edge of bankside vegetation (Casazza, Wylie, and Gregory 2000). These trap lines should consist of at least 50 traps, should be run for 14–30 continuous days from mid-March through June, and should be checked daily (USFWS 1999a, 1999b).

B6.3.4 Birds

Ten species of birds were identified as having potential to occur in the Reach 4B/ESB Project study area. Descriptions of these potentially occurring special-status species are provided below.

Tricolored Blackbird

Tricolored blackbird (*Agelaius tricolor*) is passerine largely endemic to California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

Tricolored blackbird is a California candidate for listing.

Distribution

Tricolored blackbird nests in freshwater marsh, riparian scrub, and other dense shrubs and herbs, foraging in grasslands and agricultural fields. This species is largely endemic to California, and more than 99 percent of the global population occurs in the state, with scattered nesting records outside the state. More than 75 percent of the breeding population is found in the Central Valley, although populations move around from year to year, following food resources (Hamilton 1998, Beedy and Hamilton 1999).

This species is known to nest in suitable habitat in the San Luis NWR complex and other sites in the Reach 4B/ESB Project Area.

Natural History

Tricolored blackbird is a colonial nesting species. Basic requirements affecting blackbirds' selection of breeding colony sites are open, accessible water; a protected nesting substrate (including either flooded or thorny or spiny vegetation); and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Beedy and Hamilton 1999). Insect prey includes beetles, weevils, and grasshoppers; and larvae of caddisflies, moths, butterflies, and, especially in current rice-growing areas, dragonflies.

Most tricolored blackbirds forage within 5 kilometers (3.1 miles) of their colony sites (Orians 1961), but commute distances of up to 15 kilometers (9.3 miles) have been reported (Beedy and Hamilton 1999). Short-distance foraging (i.e., within sight of the colony) for nestling provisioning also is common. Both sexes are known to provision the nestlings (Beedy and Hamilton 1999).

Proximity to suitable foraging habitat appears to be extremely important for the establishment of colony sites, as tricolored blackbirds always forage, at least initially, in the field containing the colony site (Cook 1996). However, usually only a minor fraction of the area within the commuting range of a colony provides suitable foraging habitat. For example, within a 5-kilometer (3-mile) radius there may be low-quality foraging habitats such as cultivated row crops, orchards, vineyards, and heavily grazed rangelands in association with high-quality foraging areas such as irrigated pastures, lightly grazed rangelands, vernal pools, and recently mowed alfalfa fields (Beedy and Hamilton 1999).

Threats

The primary threat affecting tricolored blackbirds in the Central Valley has been habitat loss from urbanization and unsuitable agricultural uses (which include vineyards, orchards, and row crops). Other threats include destruction of tricolored blackbird nesting colonies by agricultural practices (such as harvesting of silage and plowing of weedy fields). Nesting colonies can also be substantially affected by predation by bird and mammal predators.

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is a small owl found in North and South America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

Burrowing owl is a California species of special concern during the breeding season and at some wintering sites.

Distribution

Burrowing owls usually inhabit desert and grassland vegetation, and in some cases, urban and agricultural landscapes. Their habitats are flat, open areas characterized by low stature vegetation (Gervais, Rosenberg, and Comrack 2008). Because burrowing owls require underground burrows or artificial structures for shelter and nesting, they are associated with other burrowing animals such as ground squirrels, badgers, and some smaller canids. These habitat components are required year round. This species breeds throughout North America. In California, the burrowing owl occurs in the Central Valley, the inner and outer coastal regions, portions of the San Francisco Bay Area, the southern California coast, from southern California to the Mexico border, the Imperial Valley, and in portions of the desert and high desert habitats in southeastern and northeastern California.

This species is known to nest in suitable habitat in the San Luis NWR complex. It is expected to nest and forage in other suitable habitat in the Reach 4B/ESB Project Area.

Natural History

Burrowing owls are opportunistic feeders (Gervais, Rosenberg, and Comrack 2008). Large arthropods (e.g., beetles and grasshoppers) and small mammals are important food items. Burrowing owls hover while hunting; after catching their prey they return to perches on fence posts or the ground. Burrowing owls commonly perch on fence posts or

on mounds outside the burrow. They are active day and night, but are usually less active in the peak of the day.

Burrowing owls often form loose colonies, with nest burrows 50–3,000 feet apart. The home range size for this species is not well documented, but published estimates vary from 0.05 to 1.86 square miles (Haug and Oliphant 1990). The breeding season for burrowing owl is March to late August; the season tends to last longer in the northern part of the range (Gervais, Rosenberg, and Comrack 2008). The incubation period is 28–30 days. The female performs all the incubation and brooding and is believed to remain continually in the burrow while the male does all the hunting. The young fledge at 44 days but remain near the burrow and join the adults in foraging flights at dusk.

Burrowing owls tend to be resident where food sources are stable and available year round. They are year-round residents in the San Joaquin Valley (and in winter, the population increases with the addition of individuals that breed in northern portions of the continent) (Gervais, Rosenberg, and Comrack 2008). They disperse or migrate south in areas where food becomes seasonally scarce. In resident populations, nest-site fidelity is common, with many adults renesting each year in their previous year's burrow; young from the previous year often establish nest sites near their natal sites (Gervais, Rosenberg, and Comrack 2008).

Threats

The primary threat to burrowing owl is loss of wintering and breeding habitat as a result of development and other land use changes. Poisoning of ground squirrels has also contributed to population reductions.

Swainson's Hawk

The Swainson's hawk (*Buteo swainsoni*) is found in the Central Valley. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The Swainson's hawk is State listed as a threatened species.

Distribution

The Swainson's hawk breeds in North America and winters in southern South America and parts of Mexico (with the exception of a small population that overwinters in the Delta). It occurs throughout the lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. It nests in riparian forest and woodlands, or in isolated trees, and forages in grassland and agricultural vegetation.

Swainson's hawk is known to occur in suitable habitat in the San Luis NWR complex and other areas along the San Joaquin River. The species has been reported in numerous quadrangles in the Reach 4B/ESB Project Area in the CNDDB (2016).

Natural History

Swainson's hawks arrive at nesting areas in the Central Valley in late February and early March. Their breeding season extends from late March to late July, and then they begin departing for wintering areas in early September.

Swainson's hawks feed primarily on small mammals during the breeding season, but also feed on insects (more so during the nonbreeding season). Swainson's hawk foraging ranges during the breeding season have been estimated at approximately 1,000–7,000 acres (Bechard 1982, Estep 1989, Johnsgard 1990), and Swainson's hawks may forage considerable distances (up to 18 miles) from their nests (Estep 1989).

Prey abundance and accessibility (for capture) are the most important features determining the suitability of hawk foraging habitat. In addition, agricultural operations (e.g., mowing, flood irrigation) have a substantial influence on the accessibility of prey and thus create important foraging opportunities for Swainson's hawk (Estep 1989). Crops that are tall and dense enough to preclude the capture of prey (e.g., corn) do not provide suitable habitat except around field margins, but prey in these habitats is accessible during and immediately after harvest. Other crops (e.g., tomato, sugar beet) are tall and dense enough to inhibit but not to prevent the capture of prey during the growing season, and also provide valuable foraging opportunities during their harvest. Alfalfa, idle cropland, and most ruderal land and grassland have low and or open vegetation that does not impede prey capture, but prey abundance varies among these habitats, as does the frequency of agricultural operations (which are absent from ruderal land and grassland).

Threats

Threats to Swainson's hawk include loss and fragmentation of foraging habitat, loss of nesting habitat, disturbance of nests, and pesticide poisoning in wintering habitat (CDFW 2005a).

Relevant Conservation Efforts

Several HCPs cover Swainson's hawk including the Natomas Basin HCP, the San Joaquin County HCP, and the East Contra Costa County HCP. Recommended conservation measures (focused on minimizing impacts) have been published by CDFW (1994), and the Swainson's hawk is also a focal species in the *Riparian Bird Conservation Plan* (RHJV 2004), which includes recommendations for improving riparian nesting habitat and adjacent agricultural foraging habitat for this species and other riparian obligate bird species.

Standardized survey protocols for Swainson's hawk have been published by the Swainson's Hawk Technical Advisory Committee (2000).

Northern Harrier

The northern harrier (*Circus cyaneus*) is a medium-sized raptor common throughout North America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The northern harrier is a California species of special concern year round.

Distribution

In North America, the northern harrier breeds from northern Alaska and Canada to the mid to lower latitudes of the United States and in northern Baja California (Davis and

Niemela 2008). Populations from the northern portion of this range winter from southern Canada to Central America. The northern harrier forages and nests in open habitat—grassland, agricultural fields, and marshes—throughout California. It is a year-round resident in portions of the Central Valley, where the largest populations in California are found.

The northern harrier is known to occur in suitable habitat in the San Luis NWR complex and other areas along the San Joaquin River.

Natural History

Northern harriers are year-round residents of the San Joaquin Valley (Davis and Niemela 2008). Their breeding season extends from March through August. They nest on the ground in patches of dense vegetation.

In open habitats, northern harriers feed on a variety of small- to medium-sized vertebrates (e.g., voles (*Microtus* spp.), birds, lizards). Based on data from other states, the northern harrier may travel several miles during foraging, and its home range may be hundreds or even a thousand acres in size (Polite 2005b). It uses dense vegetation for cover and roosts on the ground.

Threats

The primary threats to northern harriers are loss and degradation of foraging and breeding habitat (Davis and Niemela 2008). Degradation includes human disturbance, incompatible agricultural practices (e.g., livestock grazing of nesting habitat during the breeding season, viticulture), reduction of prey abundance because of use of rodenticides, and predation by nonnative species (e.g., feral cats).

White-Tailed Kite

The white-tailed kite (*Elanus leucurus*) is a raptor found in western North America and parts of South America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The white-tailed kite is a fully protected species under the California Fish and Game Code.

Distribution

The white-tailed kite is a resident of lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills, to western San Diego County at the Mexico border. Scattered trees in grasslands, oak woodlands, savannas, and riparian scrub provide suitable nesting habitat for this species. Preferred foraging habitats include wetlands and grasslands, particularly herbaceous lowlands with minimal shrub and tree growth.

White-tailed kites have been observed in Lost Lake Park are known to occur in suitable habitat in the San Luis NWR complex and other areas along the San Joaquin River.

Natural History

White-tailed kites forage primarily on small rodents, which have highly variable populations (Dunk 1995). Some large shrubs or trees are required for nesting. The white-tailed kite breeds from February through October. The breeding season peaks between May and August. The female incubates a clutch for 28 days. Young leave the nest after 30 or more days. When eggs or young are in the nest, white-tailed kites mostly forage within a mile of nests. After they are fledged, white-tailed kites disperse widely. Communal night roosts are common in winter.

Threats

The primary threat to the white-tailed kite is habitat loss, fragmentation, and degradation (Dunk 1995). In the Central Valley, loss of nest trees and human disturbance of nest sites have degraded habitat.

Lesser Sandhill Crane

The lesser sandhill crane (*Grus canadensis canadensis*) is a large crane widely distributed North America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The lesser sandhill crane is a California species of special concern, during wintering.

Distribution

Lesser sandhill cranes use wetland, moist grassland, and agricultural vegetation, and are widely distributed in North America from Hudson Bay to Mexico. In California, the lesser sandhill crane winters in the Sacramento Valley, the Delta, the San Joaquin Valley, the Tulare Basin, the Carrizo Plain, and the Imperial Valley (Littlefield 2008).

The lesser sandhill crane is known to winter at the Merced NWR within the Reach 4B/ESB Project Area (Littlefield 2008) and is known to occur in suitable habitat in other areas along the San Joaquin River. In fact, most lesser sandhill cranes wintering in California concentrate near the Merced NWR in autumn, but later disperse to the northwest and southwest.

Natural History

This species is a winter resident and migrant in California from mid-September to early April (Littlefield 2008).

Lesser sandhill cranes are omnivores that consume invertebrates, amphibians, reptiles, small mammals, and birds, and a variety of plant parts (Littlefield 2008). Waste grains and other seeds are the primary foods in winter. Lesser sandhill cranes forage in grasslands, pastures, and agricultural fields (particularly grain fields that have been recently disturbed by harvesting, tilling, or discing). The lesser sandhill crane uses pastures, moist grasslands, and shallow wetlands for loafing. It roosts at night in flocks (Littlefield 2008). Roost sites are in a variety of wetlands; water depths at roost sites are shallow (generally less than 6 inches).

Threats

In California, the lesser sandhill crane is threatened primarily by changing agricultural practices that decrease this species' preferred foraging habitats (Littlefield 2008).

Loggerhead Shrike

Loggerhead shrike (*Lanius ludovidianus*) is a predatory passerine found in North America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

Loggerhead shrike is a California species of special concern during the breeding season.

Distribution

Loggerhead shrike breeds from southern Alberta, Saskatchewan, and Manitoba; widely through much of the United States; and south to western Mexico (Humple 2008). They are widely distributed in the San Joaquin Valley. This species forages in grasslands and agricultural fields and nests in scattered shrubs and trees. Habitat features that increase shrike abundance, survival, and reproductive success are hunting perches, low nesting trees and shrubs, thorny vegetation, and/or barbed wire on which to impale their prey.

This species is known to nest in suitable habitat in the San Luis NWR complex, and is expected to nest in other suitable habitat in the Reach 4B/ESB Project Area.

Natural History

Loggerhead shrikes select a variety of prey: insects, reptiles, mammals, and birds. They hunt by perching and scanning their surroundings, taking prey from the ground of from mid-air, and often impaling prey for easier manipulation or storage (Humple 2008).

Shrikes are year-round residents in California. They may breed as early as late January and to as late as July. Loggerhead shrikes will abandon nests if disturbed by humans during egg-laying or early in incubation. Shrikes are generally tolerant of human activity near nests later in the breeding season, however, and nest abandonment is not generally a significant factor in nest failure (Collister 1994).

The territory size of loggerhead shrikes varies with habitat quality, prey abundance and availability, and density of hunting perches; territories can range from several acres to nearly 50 acres (Yosef 1996). Home ranges are somewhat greater than territories and vary seasonally.

Threats

Threats responsible for loggerhead shrike declines in California are not well understood. In the Central Valley, habitat loss and fragmentation is a primary threat (Humple 2008).

American White Pelican

The American white pelican *(Pelecanus erythrorhynchos*) is a large aquatic bird found in North America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status
The American white pelican is a California species of special concern, during the breeding season.

Distribution
The American white pelican breeds primarily in the interior of North America on the prairies of the United States and Canada, and patchily south and west in the intermountain West on lakes and marshes; it no longer breeds in the Central Valley (Shuford 2008a).

However, this species is common throughout the Central Valley during winter. Although there are no records in the CNDDB of American white pelican in the Reach 4B/ESB Project study area, the species commonly winters in the San Luis NWR (USFWS 2001) and is expected to forage in suitable habitat within the Reach 4B/ESB Project Area.

Natural History
The American white pelican feeds on fish. Fish that spawn in shallow waters or are concentrated or stranded by receding water levels are particularly vulnerable to pelican predation (Shuford 2008a). Wintering birds forage in shallow inland waters, including marshes, as well as along lakes or rivers and in shallow coastal marine areas. They often forage cooperatively in flocks. Wintering American white pelicans roost near on ground near the water's edge.

Threats
The primary threats to the American white pelican affect breeding habitat (Shuford 2008a). Because the American white pelican breeds and forages colonially, entire localized populations are vulnerable to alterations in water regime that affect nesting habitat and fish availability, environmental contaminants, and disease.

Bank Swallow
The bank swallow (*Riparia riparia*) is passerine found in North and South America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status
The bank swallow is State listed as threatened.

Distribution
The bank swallow is a neotropical migrant that winters in South America. The species forages over a wide range of land cover types and nests in bluffs or banks, usually adjacent to water.

During the breeding season the species occurs throughout the northern two-thirds of the United States, most of Canada, and into northern Alaska (Garrison 1999). Bank swallow historically occurred along the larger lowland rivers throughout California, with the exception of southern California, where the species occurred principally along the coast and at the mouths of large rivers such as the Los Angeles River. The current breeding range (about 50 percent of the historical range) is primarily confined to parts of the

Sacramento Valley and northeastern California, including the banks of the Sacramento and Feather rivers; a few scattered colonies persist along the central and northern coast. Its main stronghold is along the banks of the Sacramento River and its major tributaries (CDFW 2005). This species has been documented nesting near Mendota Pool, and is expected to occur in the Reach 4B/ESB Project Area.

Natural History

Foraging bank swallows take insects on the wing from over a variety of land cover types (Garrison 1999, CDFW 2005a). They use holes dug in cliffs and river banks for cover. Bank swallows also nest in burrows that they dig in nearly vertical banks/cliff faces. For bank swallows to dig these burrows, they require substrates comprised of soft soils such as fine sandy loam, loam, silt loam, and sand. Suitable banks for nesting also must be more than 3 feet above the ground or water to avoid predators. Colonies of several to more than 3,000 bank swallows nest at these locations. Suitable nest sites are few and are scattered throughout the species' remaining California range; they are most often found at coastal river mouths, large rivers (primarily in the Sacramento Valley), and occasionally in gravel and sand mines that provide and maintain nesting habitat. Bank swallows usually initiate a single breeding attempt in April. They incubate their eggs for about 2 weeks, and then care for their nestlings for another 3 weeks, until they are fledged (Garrison 1999, CDFW 2005a).

Threats

The greatest threat to the bank swallow has been loss of breeding sites along rivers and natural waterways resulting from conversion to concrete-lined flood control channels (in southern California), and the application of riprap to natural riverbanks in the Central Valley (CDFW 2000, 2005a). Other threats come from predators that have access to colonies, changes in gravel and sand mining operations that destroy or no longer create nesting habitat, and high spring floods that can scour out colonies along riverbanks (Garrison 1999).

Relevant Conservation Efforts and Guidance

A State recovery plan for the bank swallow was completed and adopted by the California Fish and Game Commission in 1992. The recovery plan identifies habitat preserves and a return to a natural, meandering riverine ecosystem as the two primary strategies for recovering the bank swallow. Also, California Partners in Flight has written a bird conservation plan that addresses riparian-associated birds, including bank swallow (RHJV 2004).

Yellow-Headed Blackbird

The yellow-headed blackbird (*Xanthocephalus xanthocephalus*) is passerine largely found in western and central North America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The yellow-headed blackbird is a California species of special concern during the breeding season.

Distribution

Yellow-headed blackbird nests in freshwater emergent wetlands with dense vegetation and deep water, often along borders of lakes or ponds. Its range extends as far west as central-interior British Columbia, moving directly south through the central-interior west coast to northeastern Baja California (Jaramillo 2008).

There is a CNDDB record for this species at Dos Palos, in the vicinity of the Reach 4B/ESB Project Area. Potential nesting habitat is present in emergent wetland habitat in the Reach 4B/ESB Project Area.

Natural History

The yellow-headed blackbird occurs in the Central valley primarily as a migrant and summer resident (Jamarillo 2008). It feeds on seeds and insects and uses dense emergent wetland vegetation for roosting and resting cover (Granholm 2005d). Yellow-headed blackbirds breed from mid-April to late July. They usually nest in colonies and may forage 1 mile or further from nest sites.

Threats

Habitat loss is the primary threat affecting the yellow-headed blackbird in California (Jamarillo 2008).

B6.3.5 Mammals

Seven species of mammals were identified as having potential to occur in the Reach 4B/ESB Project study area. Descriptions of these potentially occurring special-status species are provided below.

Townsend's Big-Eared Bat

Townsend's big-eared bat (*Corynorhinus townsendii*) is a bat species found throughout California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

Townsend's big-eared bat is a California species of special concern.

Distribution

Townsend's big-eared bat occurs in a variety of vegetation types throughout California, but it is most commonly associated with desert scrub, mixed conifer forest, pine forest, and pinon-juniper woodlands. Within these vegetation types, the bats are specifically associated with limestone caves, mines, lava tubes, and buildings (Piaggio 2005, CDFW 2005b).

This species occurs from near sea level to well above 3,160 meters (10,367 feet) above sea level (Piaggio 2005, CDFW 2005b). Once considered common throughout its range in California, the Pacific Townsend's big-eared bat is considered to be uncommon and declining (Zeiner et al. 1990b).

No records of this species are known from the Reach 4B/ESB Project Area, although it could forage in suitable riparian habitat in the Reach 4B/ESB Project Area.

Natural History

Townsend's big-eared bat is a medium-sized bat with overtly large ears and characteristic bilateral horseshoe-shaped lumps on the muzzle. Townsend's big-eared bat eats primarily moths. It roosts in caves, mines, buildings, and other structures (e.g., bridges) (Zeiner et al. 1990b). Night roosts of this species often include other bat species. During hibernation, Townsend's big-eared bat typically prefers sites with relatively cold (but above freezing) temperatures in quiet, undisturbed places. Hibernation sites are often in the more interior, thermally stable portions of caves and mines, or in buildings.

Threats

Townsend's big-eared bats are threatened by loss or disturbance of roosting habitat (particularly roosting habitat) by mining and mine reclamation, water impoundments, recreational caving, loss of building roosts, and bridge replacement (Piaggio 2005, CDFW 2005b). This species is highly sensitive to roost disturbance by human activities (Williams 1986). Pesticide contamination may also threaten this species in agricultural areas (Piaggio 2005, CDFW 2005b).

Fresno Kangaroo Rat

The Fresno kangaroo rat (*Dipodomys nitratoides exilis*) is a rodent found in the southern Central Valley. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The Fresno kangaroo rat is Federally and State listed as endangered. Critical habitat has been established in and near the Mendota Wildlife Area, which is south of the Reach 4B/ESB Project study area.

Distribution

The Fresno kangaroo rat has narrow habitat requirements, only occupying alkali desert scrub vegetation at elevations of 200–300 feet (CDFW 1992). The Fresno kangaroo rat, the smallest of California's kangaroo rats, historically occurred in north-central Merced County, southwestern Madera County, and central Fresno County.

This species is believed to exist only in a small area in western Fresno County and is considered by some to be extirpated along the San Joaquin River (Newman et al 2001, and M. Wolfe 2002). They were captured at the Alkali Sink Ecological Reserve and Mendota Wildlife Management Area near the Restoration Area in 1981, 1985, and 1992, but extensive trapping since 1993 in Fresno and Madera counties have not documented additional kangaroo rats (Newman et al 2001, and M. Wolfe 2002). There is no critical habitat for this species in and adjacent to the Reach 4B/ESB Project Area (Exhibit C-E).

Natural History

Fresno kangaroo rats feed primarily on seeds, but they also eat some types of green, herbaceous vegetation, and insects (USFWS 1998). They construct burrows for shelter, and are nocturnal and active year round within home ranges that may vary from less than 0.1 acre to several acres in size.

Breeding probably is initiated in winter after the onset of the rainy season (USFWS 1998). Most females born the previous season probably do not give birth until mid-February or early March. Young remain continuously in the burrow until they are about 11 weeks old.

Threats

The primary threats affecting the Fresno kangaroo rat are habitat loss because of conversion to developed or agricultural land uses, and incompatible grazing practices, and potentially the illegal use of rodenticides (USFWS 1998). Flooding of habitat by the San Joaquin River has also been considered a potential threat.

Relevant Conservation Efforts and Guidance

A recovery strategy for Fresno kangaroo rat has been developed by USFWS and was included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998). This strategy relies on additional preservation, restoration, and enhancement of habitat, and possibly reintroduction of Fresno kangaroo rats to restored but unoccupied habitat. Obtaining additional information on the distribution and abundance of Fresno kangaroo rats is also a component of the recovery strategy, as is developing management prescriptions for the species and continued monitoring of its abundance.

Western Mastiff Bat

Western mastiff bat (*Eumops perotis californicus*) is a bat species found in the southwestern United States and northern Mexico. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

Western mastiff bat is a California species of special concern.

Distribution

The Western mastiff bat is associated with open, semiarid to arid landscapes across the southwestern United States and northern Mexico. Vegetation types providing foraging habitat include open ponderosa pine forest, oak woodlands, chaparral, coastal scrub, grasslands, dry desert washes and river floodplains, and agricultural areas. For roosting, the Western mastiff bat requires high rock faces or a similar feature (e.g., a large building).

In California, the geographic range of the mastiff bat is from the Oregon border to the southern part of the state. Distribution is likely dependent on the availability of suitable roosting habitat, with the species being present only where there are significant rock features (Davis and Schmidly 1994).

This species is known to occur in suitable habitat in the San Joaquin Valley. While there are no CNDDB records for this species in the vicinity of the Reach 4B/ESB Project Area, suitable foraging and roosting habitat for this species is present, but because of the absence of cliff faces, it is not likely to breed there.

Natural History

Western mastiff bat is a large bat that forages over large areas (up to 15 miles from roost sites), and regularly forages at 100–200 feet above the ground, and may forage up to 2,000 feet above the ground (Wilson and Ruff 1999, Siders 2005). Thus, insects carried aloft by thermal currents probably furnish an important portion of their diet. Moths are their primary prey.

The Western mastiff bat roosts in small colonies (typically of fewer than 20 individuals) (Siders 2005). However, maternity colonies may contain up to several hundred females. The Western mastiff bat generally roosts under exfoliating rock slabs (e.g., granite, sandstone or columnar basalt). The roost entrances typically are horizontally oriented, have moderately large openings, and face downward so they can be entered from below.

This species does not enter prolonged hibernation, and is nonmigratory, moving only relatively short distances seasonally (Wilson and Ruff 1999, Siders 2005). It mates in late winter to early spring and gives birth in summer.

Threats

Threats to this species include loss and disturbance of roosting habitat (including by rock climbers), and landscape-scale effects on foraging habitat, including urban expansion and possibly the consequences of widespread pesticide applications (Siders 2005).

Western Red Bat

Western red bat (*Lasiurus blossevillii*) is a bat species found throughout North and South America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

Western red bat is a California species of special concern.

Distribution

Western red bat is widely distributed in North and South America, and is found throughout California west of the crest of the Cascades and Sierra Nevada.

The western red bat roosts in trees, and is closely associated with cottonwoods in riparian areas at elevations below 6,500 feet. Especially favored roosts are found where leaves form a dense canopy above and branches do not obstruct the bats' flyway below (Zeiner et al. 1990b). Western red bats are also known to roost in orchards, especially in the Sacramento Valley of California. There is a high association with the Sacramento and San Joaquin rivers.

While there are no CNDDB records for this species in the vicinity of the Reach 4B/ESB Project Area, suitable foraging and roosting habitat for this species is present.

Natural History

Western red bat forages in riparian forests, over water between intact riparian forest edges, and over large gravel bars (Bolster 2005). Red bats have been observed foraging

around street and floodlights and will also forage in small clearings. These bats often forage in groups.

Typically solitary roosters (Bolster 2005), western red bats roost primarily in trees, but may also roost under leaf litter or in caves. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas.

The western red bat mates in the fall; females become pregnant in spring and give birth in summer (Bolster 2005). They migrate, moving from the Central Valley toward the coast during winter. Although they hibernate, these bats may arouse from hibernation in winter to forage.

Threats

The western red bat is threatened primarily by the loss of riparian habitat (Bolster 2005). The intensive use of pesticides on agricultural crops may constitute a threat to roosting western red bats and may significantly reduce the amount of insect prey available. In addition, controlled burns or major disturbances of the litter layer (e.g., grading) may be another significant mortality factor for red bats that roost in leaf litter during cool temperatures.

Riparian Brush Rabbit

The riparian brush rabbit (*Sylvilagus bachmani riparius*) is a rodent found in the San Joaquin Valley. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The riparian brush rabbit is Federally and State listed as endangered.

Distribution

The species inhabits riparian vegetation along the lower portions of the San Joaquin and Stanislaus Rivers in the northern San Joaquin Valley, California. Because the subspecies was not described until after it is believed to have been extirpated from most of its historical range, definitive information on its former distribution is lacking. It apparently has been extirpated from the Delta and most of the lower San Joaquin River and its tributaries, the Stanislaus, Tuolumne, and Merced rivers (Williams 1986). The range of the subspecies probably extended farther upstream than the Merced River, assuming that suitable habitat historically occurred along the length of the San Joaquin River system (Williams and Basey 1986).

The riparian brush rabbit is currently restricted to several populations at Caswell Memorial State Park, near Manteca in San Joaquin County, along the Stanislaus River, along Paradise Cut, a channel of the San Joaquin River in the southern part of the Delta, and a recent reintroduction on private lands adjacent to the San Joaquin River NWR (Williams 1993, Williams and Basey 1986). A catastrophic flooding event in winter 1997 greatly reduced the numbers of riparian brush rabbit in Caswell State Memorial Park, spurring the development of a captive breeding and reintroduction program to restored habitat within the San Luis NWR.

Suitable habitat is present in the Reach 4B/ESB Project Area, and this species is likely to occur within the portion of the San Luis NWR that overlaps with the Reach 4B/ESB Project Area.

Natural History

Habitat for the riparian brush rabbit consists of riparian forests with a dense understory shrub layer. Brush rabbits have small home ranges that usually conform to the size of available brushy habitat (Basey 1990). This species rarely moves more than a meter from cover. Riparian brush rabbit will not cross large open areas, which limits their dispersal capabilities (USFWS 1998).

Riparian brush rabbits breed from January to May, a shorter breeding season than other cottontails that breed year round. Riparian brush rabbits also have comparatively lower reproductive rates than other cottontail species. Five out of six rabbits do not survive to the next breeding seasons (USFWS 1998).

Threats

Potential threats to this species are habitat conversion to agriculture, wildfire, disease, predation, flooding, clearing of riparian vegetation, and the use of rodenticides. The species also is at risk from the lack of elevated mounds with protective cover to serve as flood refuges within remaining riparian habitat.

Relevant Conservation Efforts and Guidance

A draft recovery plan has been prepared for upland and riparian species in the San Joaquin Valley, including the riparian brush rabbit (USFWS 1998). The recovery plan includes three actions: establish an emergency plan and monitoring system to provide swift action to save individuals and habitat at Caswell Memorial State Park in the event of flooding, wildfire, or a disease epidemic; develop and implement a cooperative program with landowners; and reevaluate the status of the rabbit within 3 years of recovery plan approval.

American Badger

The American badger (*Taxidea taxus*) is a mustelid found in North America. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The American badger is a California species of special concern.

Distribution

The geographic range of the American badger extends throughout California except for the northwestern forested regions (Larsen 1987). This species is most abundant in drier areas of shrub, forest, and herbaceous habitats, but can be found anywhere with friable soils and a suitable prey base (Orloff 2002). American badgers have decreased substantially in abundance throughout their range since historic times, particularly in the Central Valley and the northern Coast Ranges.

This species has been documented in Reaches 4B2 and 5 and is expected to occur in other suitable habitat within the Reach 4B/ESB Project Area.

Natural History

The American badger is a carnivore that spends much of its time underground, where it preys primarily upon ground squirrels (*Spermophilus* spp.) and pocket gophers (*Thomomys* spp.), although it may also eat other rodents, reptiles, birds, eggs, insects, and carrion (Williams 1986). American badgers may dig extensively within levees, fields, and other areas with high concentrations of fossorial rodents (Jameson and Peeters 2004).

American badgers are active year round, although they tend to have smaller home ranges in winter than in other seasons. Mating takes place in late summer, and young are born in spring within a burrow complex, usually in areas with a sparse cover of vegetation (Jameson and Peeters 2004).

Threats

Threats to the American badger include urban and agricultural development; use of indiscriminate trapping and poisoning to control rodent populations, causing both loss of prey base and secondary pesticide accumulation; and deliberate killing for animal control purposes.

San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*) is a small canid found in California. The legal status, distribution, natural history, and predominant threats to this species are described below.

Legal Status

The San Joaquin kit fox is Federally listed as endangered and State listed as threatened.

Distribution

Although the precise historical range of the San Joaquin kit fox is unknown, it is believed to have extended from Contra Costa and San Joaquin counties in the north to Kern County in the south, and along the coast in Monterey, Santa Clara, and Santa Barbara counties. Within portions of this geographic range, the San Joaquin kit fox still occurs in seasonal wetland, alkali desert scrub, grassland, and valley-foothill hardwood vegetation. A variety of open, level areas with loose-textured soil, scattered shrubby vegetation, and little human disturbance provides suitable habitat for the kit fox.

The San Joaquin kit fox has been observed in and adjacent to the West Bear Creek Unit (JSA et al. 2000). Numerous additional CNDDB records exist for this species within and adjacent to the Reach 4B/ESB Project Area, including records of active dens, although most of these records are more than 20 years old (CDFW 2017). However, this species is likely to be present in suitable habitat within the Reach 4B/ESB Project Area.

Natural History

The San Joaquin kit fox is a carnivore with a varied diet (USFWS 1998). Prey include mice, ground squirrels, hares, cottontails, ground-nesting birds, and insects; these foxes also consume plant matter. The San Joaquin kit fox is active year round and primarily

nocturnal. Its home range may be from 1 to several square miles, and home ranges may overlap among individuals.

Dens are used for cover. Kit foxes either dig their own dens, use those constructed by other animals, or use human-made structures (culverts, abandoned pipelines, or banks in sumps or roadbeds) (USFWS 2007c). Kit foxes often change dens and many dens may be used throughout the year.

Litters are born in February or March (USFWS 1998). Pups emerge from the den after about a month. After 4 to 5 months, usually in August or September, young begin dispersing. Dispersal distances vary from several miles to much greater distances.

Threats

Loss and degradation of habitat by agricultural, industrial, and urban development and associated practices continue, decreasing the carrying capacity of remaining habitat and threatening kit fox survival (USFWS 2007c). Such losses contribute to kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey populations. San Joaquin kit fox is also threatened by rodenticide use, and by competitive displacement or predation by other species, such as the nonnative red fox (*Vulpes vulpes*), coyote (*Canis latrans*), domestic dog (*Canis familiaris*), bobcat (*Felis rufus*), and large raptors.

Relevant Conservation Efforts and Guidance

A recovery strategy for San Joaquin kit fox has been developed by USFWS and was included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998). This strategy relies on enhanced preservation and management of three core populations, and an important component of this preservation and management is sustaining and increasing habitat connectivity. Additional information on the distribution and movement of kit foxes is also a component of the recovery strategy, as is developing restoration and management prescriptions for the species.

USFWS has also developed recommendations for avoidance and minimization measures for implementation during ground-disturbing activities (USFWS 1999c). These measures are to reduce effects on dens used by the San Joaquin kit fox.

C6.4 Nonnative Invasive Plants

Field surveys conducted in 2000 (DWR 2002) identified two invasive species in the Reach 4B/ESB Project Area: salt cedar (*Tamarix* sp.) and castor bean (*Ricinus communis*) (DWR 2002). Additional field surveys conducted in 2012 identified several other species with a high Cal-IPC category rating, including foxtail brome (*Bromus madritensis* ssp. *rubens*), yellow starthistle (*Centaurea solstitialis*), perennial pepperweed (*Lepidium latifolium*), and red Sesbania (*Sesbania punicea*). Descriptions of these nonnative invasive plant species are provided below. Species descriptions are derived primarily from information provided by the Cal-IPC and scientific literature.

Foxtail Brome: Cal-IPC Category – High

Foxtail brome (*Bromus madritensis* ssp. *rubens*) is an annual grass that grows in arid regions. It is characterized by a brush-like inflorescence that becomes a distinctive purplish color at maturity. Foxtail brome grows to 16 inches in height, with inflorescences measuring 3 inches long. The inflorescence is distinctively stiff and erect, dense, ovoid-shaped at the top and wedge-shaped at the base. Young plants are green, but the foliage and inflorescences become purplish at maturity, fading to light tan during the months following senescence (Cal-IPC 2013).

Foxtail brome grows on stony or sandy soils of cultivated fields and rangelands. Areas of foxtail brome infestation can be recognized at a distance by their purplish color. Foxtail brome reproduces by seed only. It is generally considered a winter annual, emerging in early winter following rainfall. Its growth and flowering is stimulated by rainfall and higher temperatures in the spring, until water stress causes the plant to die by the middle of May. Long-distance dispersal of foxtail brome is accomplished by seeds that lodge in animal fur and in loosely woven clothing. Short-distance dispersal is aided by wind, which blows seeds along the ground until they settle in eddies behind shrubs or rocks or in depressions in the ground. During years of low rainfall a high percentage of seedlings die prior to reproducing. Localized populations of foxtail brome can be wiped out following a few years of drought, suggesting that seed dormancy in this species does not last more than two to three years (Cal-IPC 2013).

Foxtail brome alters patterns of wildfire, microhabitat characteristics, and nutrient cycling. It competes for soil nutrients and light, which affects native annual plant populations. Foxtail chess is highly flammable and promotes wildfires in desert plant communities where fires are historically infrequent. Wildfires convert woody perennial scrub habitats into non-native annual grassland, which in turn promotes higher frequencies of wildfire. Wildlife not adapted to rapidly moving fires, such as snakes and desert tortoises, are sometimes killed during wildfire events fueled by foxtail brome. Foxtail brome is sometimes grazed by livestock, but is not considered a species of economic value. Its seeds have become entangled in wool (reducing the value of wool) and lodged in digestive tracks of some livestock, sometimes causing death (Cal-IPC 2013).

Yellow Starthistle: Cal-IPC Category – High; CDFA Rating – C

Yellow starthistle (*Centaurea solstitialis*) is a winter annual widely distributed in the Central Valley and adjacent foothills of California. It is found in full sunlight and deep, well-drained soils where annual rainfall averages between 10-60 inches. Yellow starthistle is characterized by yellow flowers with long sharp spines at the base of the flowerheads. The flowering period begins in late May and continues through September. Yellow starthistle has a very low level of self-fertilization; thus, cross-fertilization insures a high degree of genetic variability within populations (DiTomaso et al 2006).

Yellow starthistle competes well with other species in both stressed conditions and more favorable conditions created by disturbance (Gerlach and Rice 2003). In favorable locations, it can grow more robustly and produce more seeds than competing species. The extended growing season of starthistles allows it to persist within relatively closed grassland vegetation and take advantage of residual soil moisture resources not used by

annual grass species (Gerlach 2000). In a study conducted by Barthell et al. (2001), it was concluded that honey bees affect the average seed head weight of yellow starthistle and that the two species may act as invasive mutualists, increasing the survivorship of each other. Yellow starthistle produces two morphological distinct achenes, one type with a distinct pappus, and the other with a pappus either poorly developed or absent. The pappus-bearing seed are dispersed by wind for a short distance (generally less than 16 feet away from the parent plant) and the non-pappus bearing seeds are retained on the seed head for a considerable period of time, extending into the winter and dropping below the parent plant. The majority of the seeds fall within two feet of the parent plant. However, birds that feed heavily on yellow starthistle seeds (e.g., pheasants, quail, house finches, and gold finches) may facilitate long distance dispersal. Human influences, including vehicles, contaminated crop seed, hay or soil, road maintenance, and moving livestock, can also contribute to the rapid long-distance spread of yellow starthistle seed (DiTomaso et al 2006).

Yellow starthistle is considered one of the most serious rangeland, grassland, and wildland weeds in the northwestern United States. It infests grain fields and other agricultural areas, where its seeds can contaminate grain harvest and lower crop quality and value. In rangelands, yellow starthistle reduces the livestock carrying capacity by 10-15 percent and up to 50 percent in areas with heavier infestations (Connor 2003). The spiny flowerheads are avoided by grazing livestock, thus, increasing the cost of managing livestock. Additionally, yellow starthistle is known to have toxic effects on horses.

In roadsides and recreational areas, yellow starthistle is the most important weed problem in much of central and northern California (Maddox et al. 1985). Its infestation reduces or eliminates access to recreational areas, resulting in an economic impact on both private and public areas. Thus, yellow starthistle can reduce land value and use of recreational areas (DiTomao et al. 1998).

In wildlands, yellow starthistle infestations may reduce or fragment wildlife habitat and forage, displace native plants, and decrease native plant and animal diversity (Sheley and Larson 1994). Invasion of California grasslands by yellow startistle may be caused, in part, by fire suppression and reductions in fire frequency in these ecosystems (Hastings and DiTomaso 1996). Once present, yellow starthistle can alter the fire regime by changing fuel characteristics at a given site (it does not provide sufficient fuel to carry fire when still green). Later in the season, dried skeletons of yellow starthistle can provide fuel for late-summer wildfires. Because yellow starthistle is a major consumer of groundwater, it can reduce water availability for other plant and wildlife species. The depletion of deep soil moisture may cause native species to experience drought conditions even in years with normal rainfall (Benefield et al. 1998). Excessive water use by starthistle could decrease water levels in streams and lakes, reducing water availability for recreational activities and impacting anadromous fish spawning efforts (DiTomaso et al 2006).

Although many aspects of yellow starthistle are detrimental economically and ecologically, the species is regarded as an important honey plant and late-season food

source for bees in California (Edwards 1989). No recent economic estimates have been made for the value of yellow starthistle in honey production (DiTomaso et al 2006).

Perennial Pepperweed: Cal-IPC Category – High; CDFA Rating – B

Perennial pepperweed (*Lepidium latifolium*) is a multi-stemmed herb that grows three to eight feet tall with a heavy, sometimes woody, crown and a spreading underground root system. Stems and leaves are dull gray-green and waxy, sometimes with reddish spots. The tiny white flowers are borne in dense clusters at the tops of the stems. The flowering period for perennial pepperweed is from May to July. Perennial pepperweed produces many small, roundish, light brown fruits. In California the plant typically grows in full sun in heavy, moist soils that are often saline or alkaline, but it also grows in drier sites and on other soil types. Perennial pepperweed reproduces from seed and vegetatively through intact root systems or from pieces of rootstock. Each mature plant has the capacity to produce thousands of seeds annually, most of which have high germination rates (64-100 percent) under a variety of conditions. Seedlings grow rapidly and can produce flowering stems during the first year of development. Plants die back in the fall and winter; however, new shoots resprout from rootstocks in early spring (Cal-IPC 2013).

Perennial pepperweed is an invasive species in brackish to saline or alkaline wetlands throughout California, from the coast to the interior and north and eastward into the Great Basin and Columbia Basin. It also occurs in native (unplanted) hay meadows and agricultural fields where the soil is slightly alkaline or saline. According to observations of wildlife area managers and others, within the last fifteen years perennial pepperweed populations in California have expanded, and the plant has significantly increased its overall range. This aggressive invader of wetlands often form dense monospecific stands that exclude other plants, including native species. Dense infestations of perennial pepperweed can alter microhabitats for plants and wildlife, as well as reducing the value of hay crop by establishing in hay meadows (Cal-IPC 2013).

Red Sesbania: CalIPC Category – High, Red Alert; CDFA Rating – B.

Red sesbania (*Sesbania punicea*) is a woody shrub that grows up to 15 feet in height. It typically grows on channel banks, bars, and islands, low in the riparian zone in areas inundated by spring floods. Although red sesbania infestations are relatively new in California, the range of infestations is rapidly spreading among Central Valley waterways (Hunter and Platenkamp 2003). Red sesbania produces clusters of bright red flowers from late spring through fall and forms distinctive winged seed pods containing a spongy tissue that float for up to 10 days. Its seed pods fall from the branches throughout winter and spring and are dispersed by river flows. The seeds germinate when abraded; seeds that do not germinate can persist in a seed bank until abraded in subsequent years. Early sprouting sesbania plants can mature in one season and begin producing seed pods. The species forms dense thickets and has some degree of shade tolerance. Because red sesbania has the potential to form dormant seed banks and to regenerate in its own shade, red sesbania may be able to maintain its dominance on a site through continual recruitment.

Red sesbania displaces native plants that provide essential food and shelter for a wide variety of wildlife species. Sesbania also contains saponin, a chemical that is poisonous

to both humans and wildlife. Clusters of sesbania are spreading into the waterways, especially along shallower streams. Dense thickets of red sesbania can contribute to bank erosion and increase the chance of flooding through obstruction of the waterway. Additionally, red sesbania can stabilize banks during less than extreme peak-flow events. During these events, red sesbania can cause reduced sediment supply, narrowing and deepening of the river channel, encroachment of side channels, and reduced channel diversity. Thus, red sesbania is a major threat to the biodiversity of native plants in riparian habitats (Hunter and Platenkamp 2003).

Salt Cedar: Cal-IPC Category – High; CDFA Rating – B

Salt cedar (*Tamarix* sp.) is a deciduous, openly branched shrub that grows to a height of 12 to 15 feet. It is highly adapted to disturbed, aquatic landscapes, including riparian forests, wetlands, floodplains, lake perimeters, and irrigation ditches. Generally, habitat infested with salt cedar has been disturbed, or altered, by human activities. Salt cedar thrives well in silty soils and shallow water tables. However, this long-lived species is tolerant of an extensive range of ecological settings and once established, can survive without access to water (Carpenter 1988). Salt cedar infestations occur in the intermountain region of the western United States, California, Texas, and the Great Plains states (Carpenter 1988).

Salt cedar reproduces through sexual and vegetative means. Salt cedar produces an abundant number of flowers that release small, tufted seeds dispersed by either wind or water (Plant Conservation Alliance 2005). The seeds germinate immediately and only remain viable for up to 45 days (Carpenter 1988); the ephemeral nature of seed viability precludes salt cedar from forming a seed bank. Salt cedar seedlings require lengthy periods of saturated soil for successful establishment. Vegetative reproduction occurs through adventitious roots and submerged stems (Plant Conservation Alliance 2005). Buried or submerged stems and stem fragments have the ability to produce roots and shoots. Salt cedar is highly adapted to fire and flooding and has the ability to resprout vigorously after each event. However, salt cedar seedlings grow slowly and may be outcompeted by the rapidly growing native riparian species. Mature specimens do not tolerate shading (Carpenter 1988).

Like most other invasive, nonnative species, salt cedar displaces ecologically valuable native riparian plant species such as willow and cottonwood, especially in landscapes affected by human activity. Salt cedar's role in the replacement of riparian vegetation may lead to the reduction of wildlife habitat value. Areas infested with salt cedar have been documented to support lower bird density and diversity than areas with native stands of vegetation (Carpenter 1988). However, some birds have been documented nesting in the salt cedar shrubs, including blue grosbeak and yellow-billed cuckoo (Riparian Habitat Joint Venture (RHJV) 2004). Salt cedar is also known to affect the natural flood and fire regime in some areas. For example, areas dominated by salt cedar have higher frequencies and intensities of fire and floods (Plant Conservation Alliance 2005). Other adverse effects of salt cedar infestation include increased topsoil salinity, lowered water tables, widened flood plains, increased sediment deposition, incised stream channels, and loss of mycorrhizal fungi for native plant species (Carpenter 1988).

Water Hyacinth: Cal-IPC Category – High, Red Alert; CDFA Rating – C.
Water hyacinth (*Eichhornia crassipes*) is a free-floating aquatic plant that forms dense, interconnected mats. The thick, waxy green leaves are supported above the water surface by bulbous, air-filled stalks. Water hyacinth occurs in a variety of aquatic systems, including ponds, lakes, wetlands, slow-moving waters such as rivers and streams, ditches, irrigation canals, and wastewater treatment facilities (Batcher 2000, Ramey 2001). Occasionally it is found growing in water-logged soils adjacent to water bodies (Godfrey 2000). This species is able to tolerate a number of extreme environmental conditions, including fluctuating water levels and flow velocities, extremes in nutrient concentration, pH, temperatures, and toxic compounds (Batcher 2000).

Water hyacinth is known as one of the most productive plants on earth. The plants begin to vegetatively produce daughter plants by runners in early spring. These runners grow horizontally and can produce new plants every 6 to 18 days (Ramey 2001). Research indicates that one plant is capable of producing enough daughter plants to cover 6,500 square feet in 1 year (Godfrey 2000). By late summer or early fall, these large colonies of water hyacinth are in full bloom. Reproduction by seed is thought to be less important to the expansion of infestations, and seedlings are seldom seen in natural settings. Each flower can produce from 3 to 450 seeds per fruit with seeds remaining viable for up to 20 years (Batcher 2000). The seeds primarily sink to the bottom of the water and remain dormant until a drought (Ramey 2001). The seeds may also be dispersed by flowing water, migratory waterfowl, and humans. Many infestations are the result of deliberate introduction or unintentional dispersal through disposal of excess plants from someone's water garden (Godfrey 2000).

Many sources consider water hyacinth to be the most troublesome aquatic weed in the world. By clogging waterways and displacing native aquatic species, the weed disrupts many natural systems and causes serious economic hardships. Waterfowl and other wildlife habitat may be critically altered by water hyacinth infestations because they displace native aquatic plant communities and obscure water sources. Potential impacts from water hyacinth infestations in aquatic ecosystems include reduced oxygen and light availability, altered invertebrate and vertebrate communities, increased nutrient concentrations, increased temperatures, impeded water flow, clogged intake pumps, decreased power generation, and reduced recreational access (Batcher 2000). The huge mats of hyacinth also provide ideal breeding environments for mosquitoes and other insects that act as vectors for disease (Ramey 2001). Finally, it has been shown that hyacinth infestations significantly increase the loss of water in lakes and rivers due to the high rate of evaporation from their leaves (Godfrey 2000).

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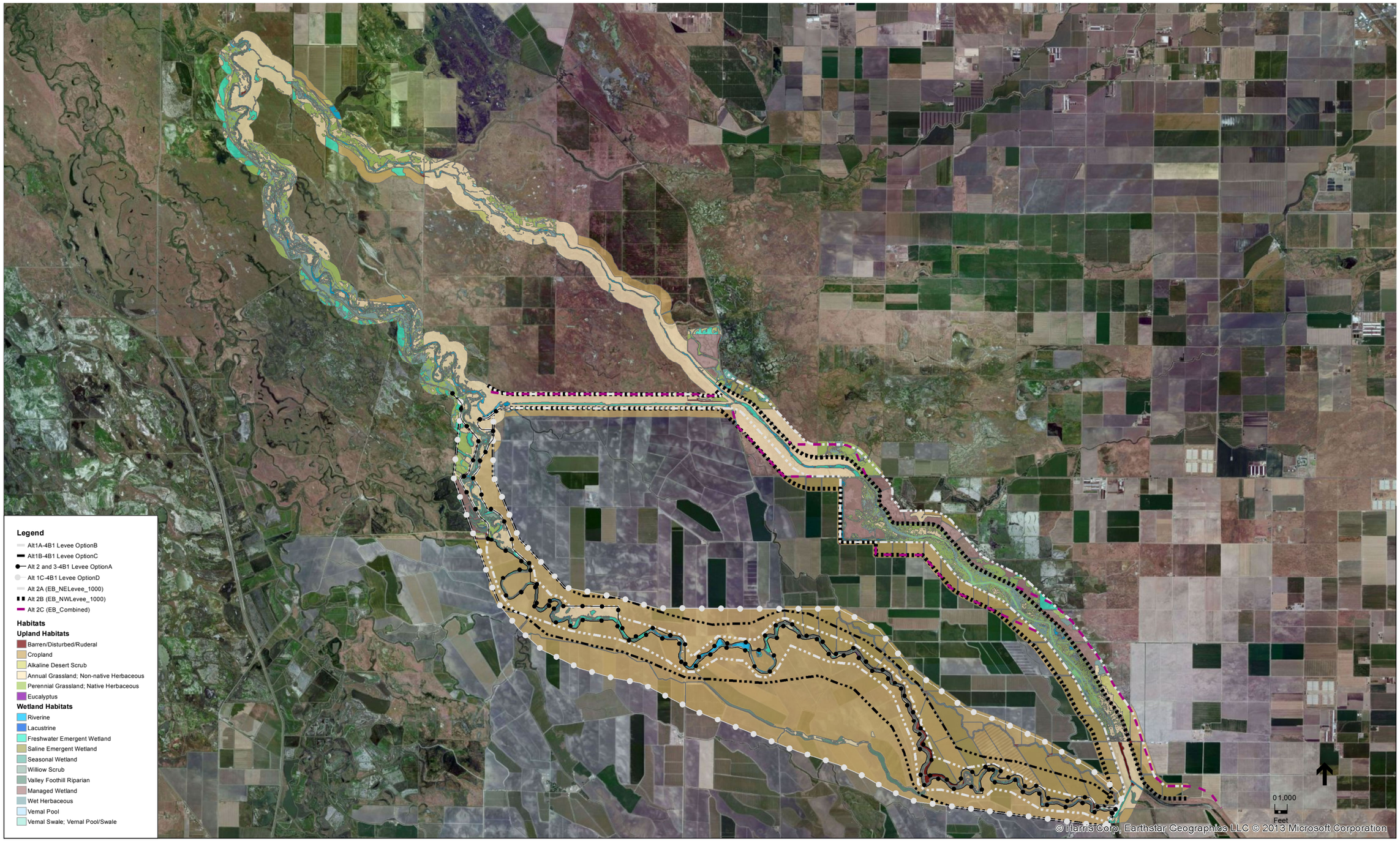
Exhibit C-A

Plant Communities and Land Cover (California Wildlife Habitat Relationship)

Biological Resources Appendix



SOURCE: Reclaimation 2013, USFWS 2008, DWR 2011

Reach 4B/ESB Project
Draft EIS

San Joaquin River Restoration Reach 4B

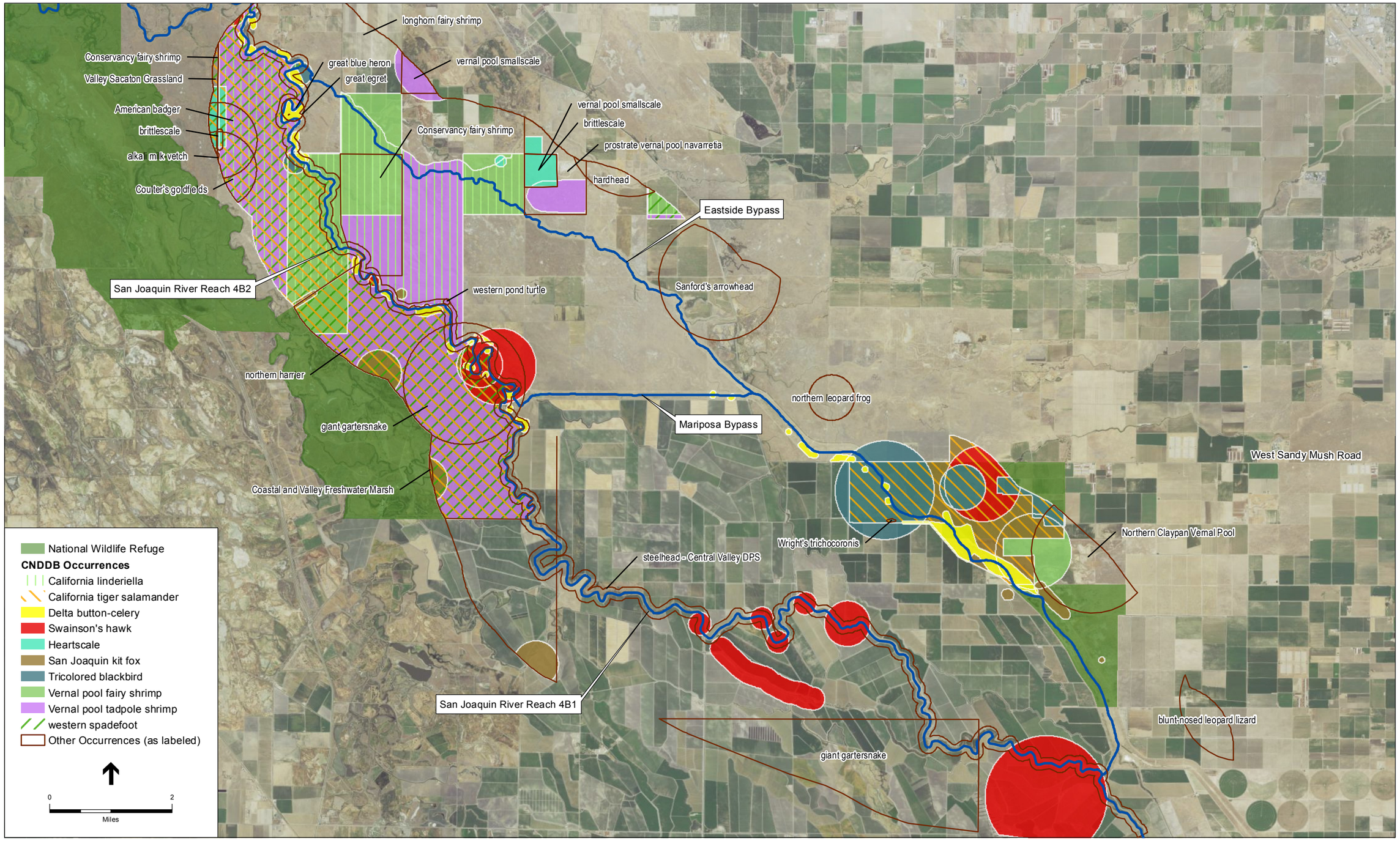
Exhibit C-A

Wildlife Habitats in the Reach 4B Project Area

Exhibit C-B

CNDDB Occurrences in the Project Vicinity

Biological Resources Appendix



SOURCE: USDA, 2014; CNDDB, 2016, ESA, 2016

San Joaquin River Restoration Reach 4B

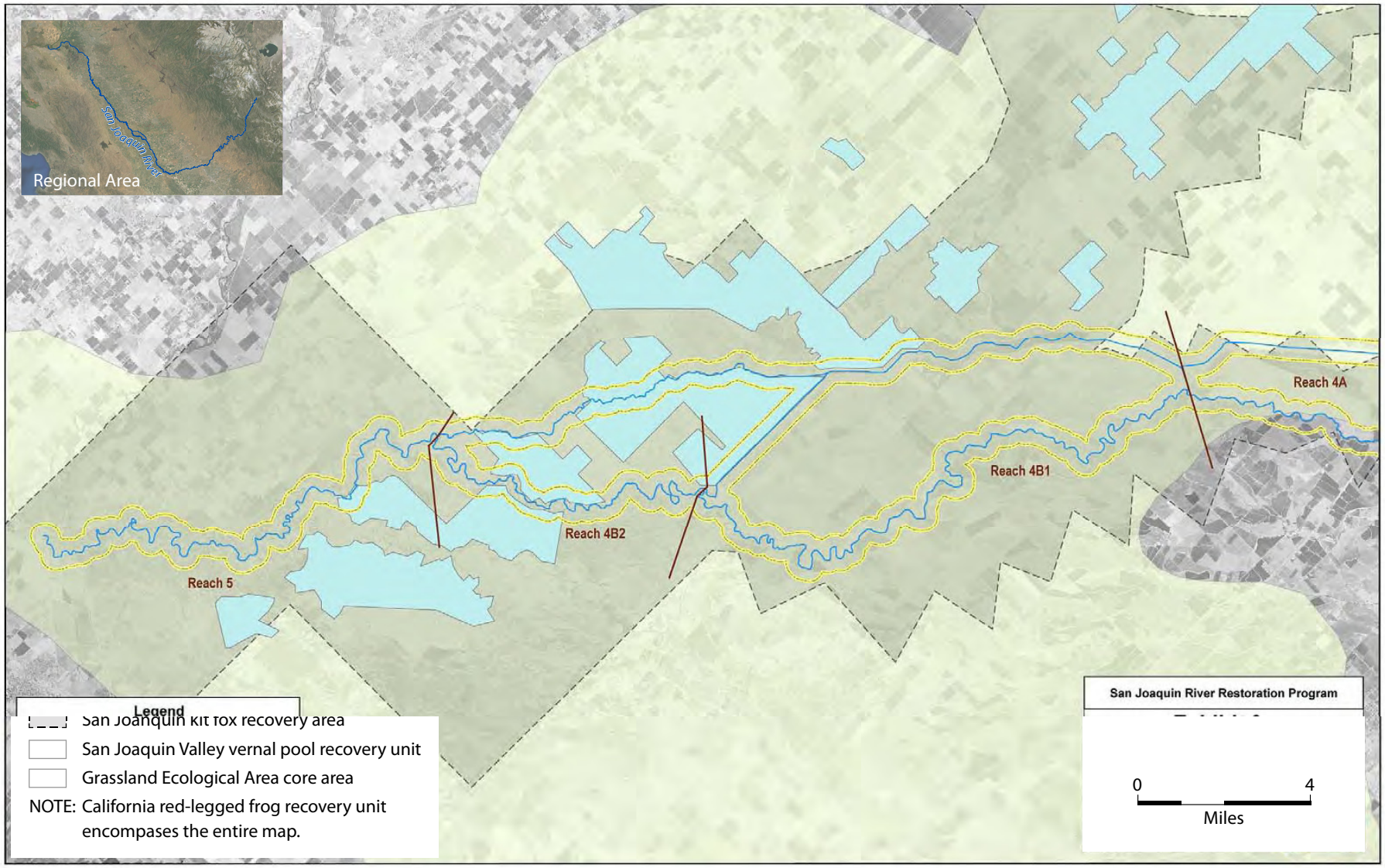
Exhibit C-B

CNDDB Occurrences in the Project Vicinity

Exhibit C-C

USFWS Recovery Areas for Listed Species

Biological Resources Appendix



SOURCE: USFWS, 2008

San Joaquin River Restoration Reach 4B

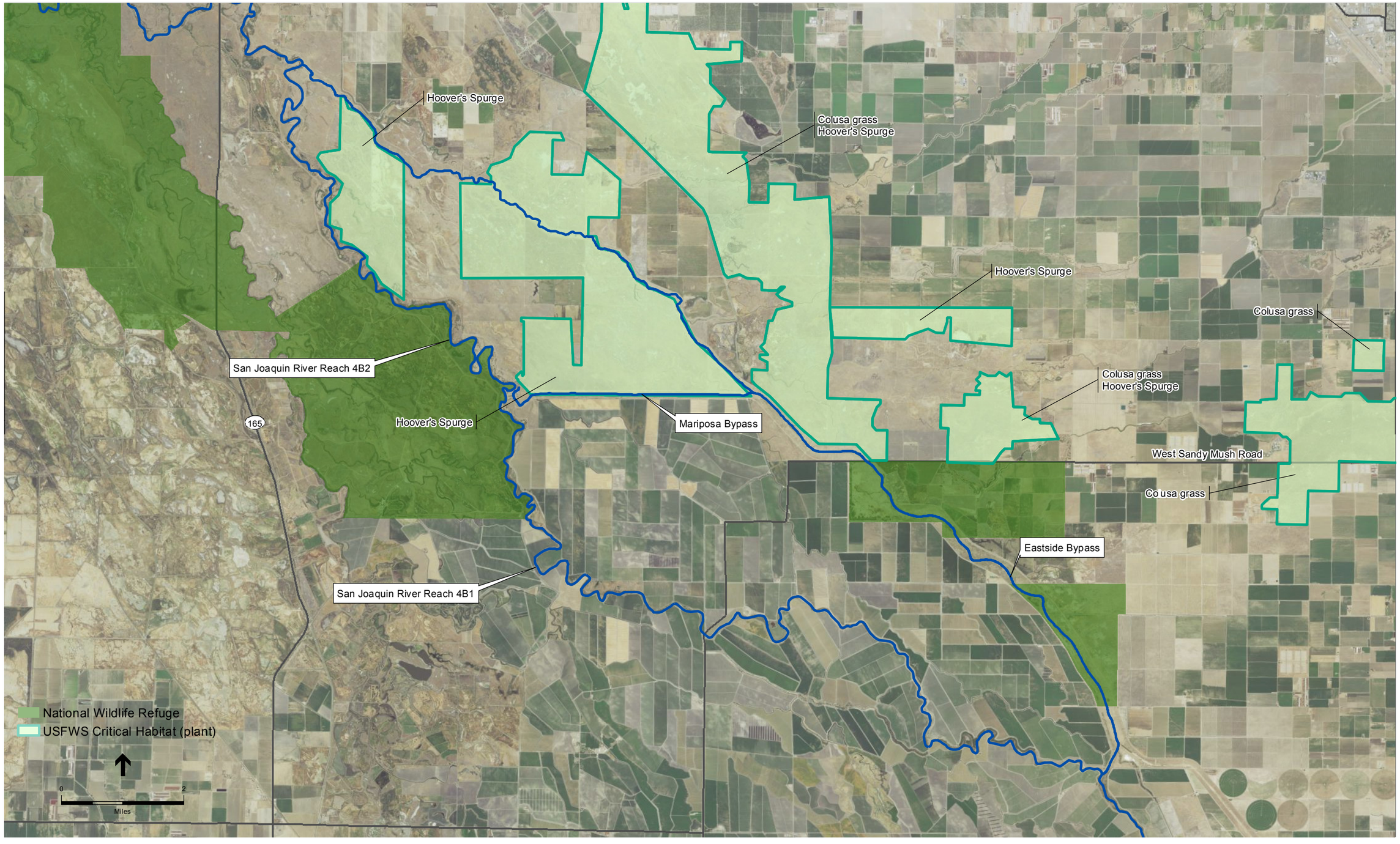
Exhibit C-C

USFWS Recovery Areas for Listed Species

Exhibit C-D

USFWS-Designated Critical Habitat for Listed Plant Species

Biological Resources Appendix



SOURCE: USDA, 2014; USFWS, 2012; ESA, 2016

San Joaquin River Restoration Reach 4B

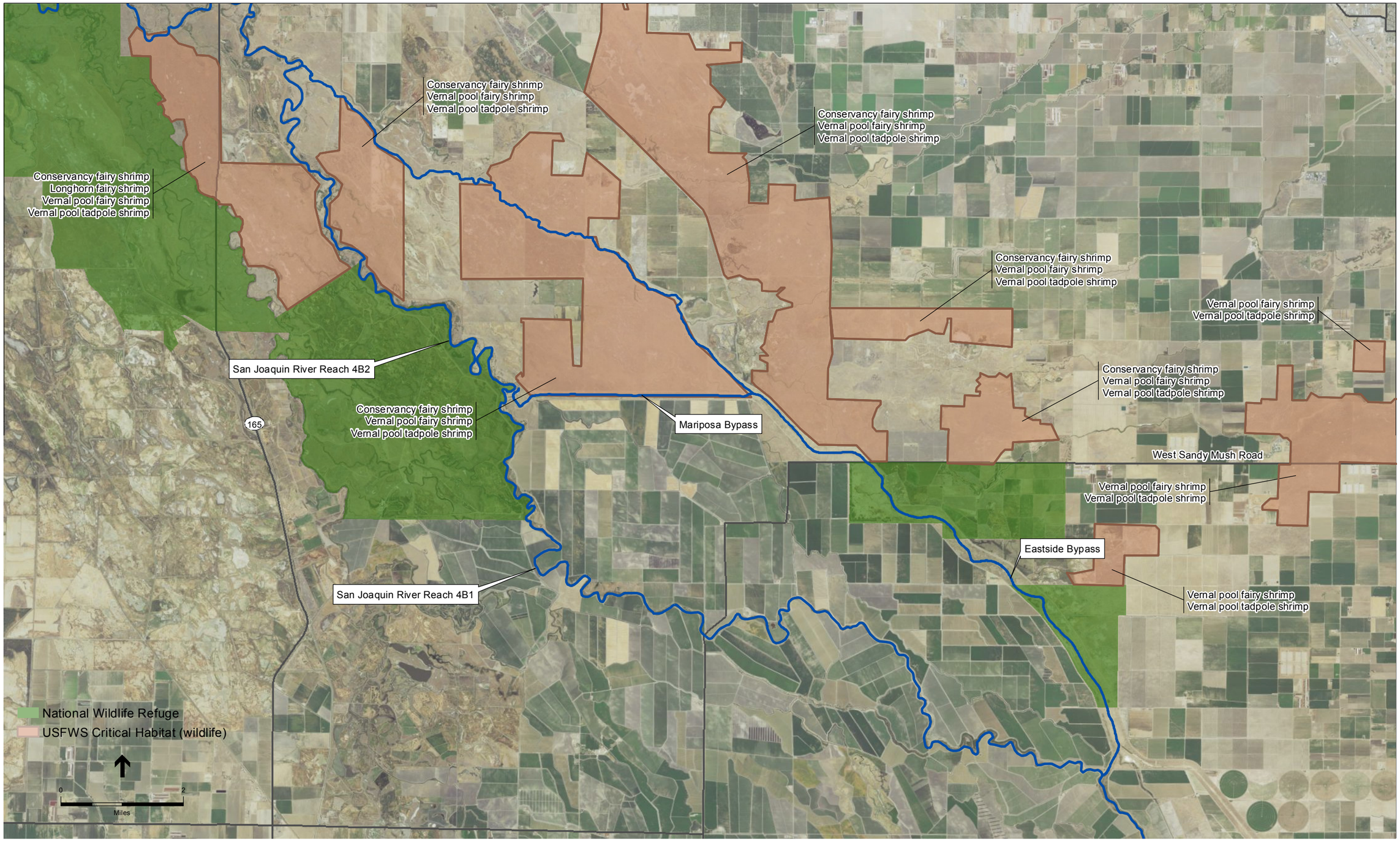
Exhibit C-D

USFWS-Designated Critical Habitat for Listed Plant Species

Exhibit C-E

USFWS-Designated Critical Habitat for Listed Wildlife Species

Biological Resources Appendix



SOURCE: USDA, 2014; USFWS, 2012; ESA, 2016

San Joaquin River Restoration Reach 4B

Exhibit C-E

USFWS-Designated Critical Habitat for Listed Wildlife Species