Appendix E

Species Lists

San Joaquin River Exchange Contractors Water Authority, Water Transfer Program, 2014–2038

Final
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Table E-1
Species Potentially Occurring in the Project Area

Name	Status	Habitat	Potential to Occur In Water Development Lands
Alkali milk-vetch *Astragalus tener* var. *tener*	RPR 1B.2	Alkali playa, valley and foothill grassland, vernal pools. low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 1-170 meters.	No habitat in agricultural fields, orchards, or canals.
Heartscale *Atriplex cordulata*	RPR 1B.2	Chenopod scrub, valley and foothill grassland, meadows. alkaline flats and scalds in the Central Valley, sandy soils. 1-150 (600) meters.	No habitat in agricultural fields, orchards, or canals.
Lost Hills crownscale *Atriplex coronata* var. *vallicola*	RPR 1B.2	Chenopod scrub, valley and foothill grassland, vernal pools. In powdery, alkaline soils that are vernally moist with *Frankenia, Atriplex* spp. and *Distichlis*. 0-605 meters.	No habitat in agricultural fields, orchards, or canals.
San Joaquin spearscale *Atriplex joaquiniana*	RPR 1B.2	Chenopod scrub, alkali meadow, valley and foothill grassland. In seasonal alkali wetlands or alkali sink scrub with *Distichlis spicata, Frankenia*, etc. 1-250 meters.	No habitat in agricultural fields, orchards, or canals.
Lesser saltscale *Atriplex minuscula*	RPR 1B.1	Chenopod scrub, playas, valley and foothill grassland. In alkali sink and grassland in sandy, alkaline soils. 20-100 meters.	No habitat in agricultural fields, orchards, or canals.
Vernal pool smallscale *Atriplex persistens*	RPR 1B.2	Vernal pools. Alkaline vernal pools. 10-115 meters.	No habitat in agricultural fields, orchards, or canals.
Subtle orache *Atriplex subtilis*	RPR 1B.2	Valley and foothill grassland. Little information available. 40-100 meters.	No habitat in agricultural fields, orchards, or canals.
Round-leaved filaree *California macrophylla*	RPR 1B.1	Cismontane woodland, valley and foothill grassland. Clay soils. 15-1200 meters.	No habitat in agricultural fields, orchards, or canals.
Hoover's spurge *Chamaesyce hooveri*	FT, RPR 1B.2 CH	Vernal pools, valley and foothill grassland. Vernal pools on volcanic mudflow or clay substrate. 25-130 meters.	No habitat in agricultural fields, orchards, or canals.
Hispid bird's-beak *Chloropyron molle* ssp. *hispidum*	RPR 1B.1	Meadows, playas, valley and foothill grassland. In damp alkaline soils, especially in alkaline meadows and alkali sinks with *Distichlis.* 10-155 meters.	No habitat in agricultural fields, orchards, or canals.
Palmate-bracted bird's-beak *Chloropyron palmatum* (=*Cordylanthus palmatus*)	FE, CE, RPR 1B.1	Chenopod scrub, valley and foothill grassland. Usually on Pescadero silty clay which is alkaline, with *Distichlis, Frankenia*, etc. 5-155 meters.	No habitat in agricultural fields, orchards, or canals.
Recurved larkspur *Delphinium recurvatum*	RPR 1B.2	Chenopod scrub, valley and foothill grassland, cismontane woodland. On alkaline soils; often in valley saltbush or valley chenopod scrub. 3-685 meters.	No habitat in agricultural fields, orchards, or canals.

Name	Status	Habitat	Potential to Occur In Water Development Lands
Hoover's eriastrum *Eriastrum hooveri*	FD, RPR 4.2	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodland. On sparsely vegetated alkaline alluvial fans; also in the temblor range on sandy soils. 50-915 meters.	No habitat in agricultural fields, orchards, or canals.
Delta button-celery *Eryngium racemosum*	CE, RPR 1B.1	Riparian scrub. Seasonally inundated floodplain on clay. 3-75 meters.	No habitat in agricultural fields, orchards, or canals.
Coulter's goldfields, orchards, *Lasthenia glabrata* ssp. *coulteri*	RPR 1B.1	Coastal salt marshes, playas, valley and foothill grassland, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1400 meters.	No habitat in agricultural fields, orchards, or canals.
Munz's tidy-tips *Layia munzii*	RPR 1B.2	Chenopod scrub, valley and foothill grassland. Hillsides, in white-grey alkaline clay soils, with grasses and chenopod scrub associates. 45-760 meters.	No habitat in agricultural fields, orchards, or canals.
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	RPR 1B.2	Valley and foothill grassland. White or grey clay lenses on steep slopes; incidental in alluvial fans and washes. Clay and gypsum-rich soils. 65-910 meters.	No habitat in agricultural fields, orchards, or canals.
Prostrate vernal pool navarretia *Navarretia prostrata*	RPR 1B.1	Coastal scrub, valley and foothill grassland, vernal pools. Alkaline soils in grassland, or in vernal pools. mesic, alkaline sites. 15-700 meters.	No habitat in agricultural fields, orchards, or canals.
Colusa grass *Neostapfia colusana*	FT, CE, RPR 1B.1 CH	Vernal pools. Usually in large, or deep vernal pool bottoms; adobe soils. 5-110 meters.	No habitat in agricultural fields, orchards, or canals.
Sanford's arrowhead *Sagittaria sanfordii*	RPR 1B.2	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0-610 meters.	Low. Potential habitat in canals for this species will not be affected by Project.
Chaparral ragwort *Senecio aphanactis*	RPR 2.2	Cismontane woodland, coastal scrub. Drying alkaline flats. 20-575 meters.	No habitat in agricultural fields, orchards, or canals.
Slender-leaved pondweed *Stuckenia filiformis*	RPR 2.2	Marshes and swamps. Shallow, clear water of lakes and drainage channels. 15-2310 meters.	Low. Potential habitat for this species in canals will not be affected by Project.
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	RPR 2.1	Marshes and swamps, riparian forest, meadows and seeps, vernal pools. Mud flats of vernal lakes, drying river beds, alkali meadows. 5-435 meters.	No habitat in agricultural fields, orchards, or canals.
Conservancy fairy shrimp *Branchinecta conservatio*	FE	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	No habitat in agricultural fields, orchards, or canals.

Name	Status	Habitat	Potential to Occur In Water Development Lands
Longhorn fairy shrimp *Branchinecta longiantenna*	FE	Endemic to the eastern margin of the Central Coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	No habitat in agricultural fields, orchards, or canals.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	No habitat in agricultural fields, orchards, or canals.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Prefers to lay eggs in elderberrries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	No CNDDB records in Project quadrangles. No habitat in agricultural fields, orchards, or canals.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools Commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	No habitat in agricultural fields, orchards, or canals.
Green sturgeon *Acipenser medirostris*	FT	Primarily a marine species that spawns in freshwater and feeds in coastal bays. Known to use San Francisco Bay and Delta and the Sacramento River and its tributaries. Not believed to use the San Joaquin River or its tributaries	None. No CNDDB records. Not believed to use the San Joaquin River or its tributaries.
Delta smelt *Hypomesus transpacificus*	FT	Uses the low salinity zone in the Sacramento – San Joaquin Delta and Suisun Bay. Does not use the San Joaquin River above Vernalis.	None. No CNDDB records. Found in the Delta.
Hardhead *Mylopharodon conocephalus*	CSC	Low to mid-elevation streams in the Sacramento-San Joaquin drainage. also present in the Russian River. Not found where exotic centrarchids predominate, not found in valley reaches of the San Joaquin River (Moyle 2002)	Low. Poor habitat and exotic species limit its potential to occur.
Central Valley steelhead *Oncorhynchus mykiss*	FT, CH	Anadromous fish using cold, clear streams and rivers with gravel substrates for spawning and rearing. Valley floor rivers used as migratory corridor and for seasonal rearing. In the San Joaquin River, this species is found in low numbers in the major tributaries to the San Joaquin River.	Moderate. No CNDDB records, but expected to capitalize on SJRRP enhancements to recolonize the San Joaquin River.

Name	Status	Habitat	Potential to Occur In Water Development Lands
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha*	FT	Anadromous fish using cold, clear streams and rivers with gravel substrates for spawning and rearing. Valley floor rivers used as migratory corridor and for seasonal rearing. Currently found in cold, clear tributaries to the Sacramento River. Experimental population proposed for reintroduction to the San Joaquin River.	High. No CNDDB records. Proposed for reintroduction as part of the SJRRP.
Winter-run Chinook salmon, Sacramento River *Oncorhynchus tshawytscha*	FE	Anadromous fish using cold, clear streams and rivers with gravel substrates for spawning and rearing. Valley floor rivers used as migratory corridor and for seasonal rearing. Only extant population is on the upper Sacramento River.	None. Do not use San Joaquin River, but does occur seasonally in Delta.
Sacramento splittail *Pogonichthys macrolepidotus*	CSC	Endemic to the lakes and rivers of the Central Valley, now primarily found in the Delta, Suisun Bay and associated marshes. May be found in San Joaquin River and tributaries in wet years. Prefers slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young.	High. Has been observed in project area in wet years.
California tiger salamander Ambystoma californiense *central population*	FT, CT, CSC	Central Valley DPS federally listed as threatened. Santa Barbara and Sonoma Counties DPS federally listed as endangered. Need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding	No estivation or breeding habitat in Project fields, orchards. May occur in canals and water ways. CNDDB records for refuges.
Northern leopard frog *Lithobates pipiens*	CSC	Native range is east of Sierra Nevada-Cascade crest. Near permanent or semi-permanent water in a variety of habitats. Highly aquatic species. shoreline cover, submerged and emergent aquatic vegetation are important habitat characteristics	Low. Only record is an introduction.
California red-legged frog *Rana draytonii*	FT, CSC CH	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Low. No habitat in Project fields, orchards. Limited habitat in canals. No CNDDB records in Project Area. Only one in project vicinity.
Western spadefoot *Spea hammondii*	CSC	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	No habitat in agricultural fields, orchards, or canals.
Silvery legless lizard *Anniella pulchra pulchra*	CSC	Sandy or loose loamy soils under sparse vegetation. soil moisture is essential. They prefer soils with a high moisture content.	No habitat in agricultural fields, orchards, or canals.

Name	Status	Habitat	Potential to Occur In Water Development Lands
Western pond turtle *Emys marmorata*	CSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, Need basking sites and suitable (sandy banks or grassy open fields, orchards,) upland habitat up to 0.5 km from water for egg-laying.	May occur in Project canals.
Blunt-nosed leopard lizard *Gambelia sila*	FE, CE	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrows.	No habitat in agricultural fields, orchards, or canals.
San Joaquin whipsnake *Masticophis flagellum ruddocki*	CSC	Open, dry habitats with little or no tree cover. Found in valley grassland and saltbush scrub in the San Joaquin Valley. Needs mammal burrows for refuge and oviposition sites.	No habitat in agricultural fields, orchards, or canals.
Giant garter snake *Thamnophis gigas*	FT, CT	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	High. Known to occur in project area and surrounding area, particularly in the wildlife refuges near the project area.
Tricolored blackbird *Agelaius tricolor*	CSC	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	Foraging habitat in Project fields, orchards,. Potential limited nesting habitat in Project canals.
Burrowing owl *Athene cunicularia*	CSC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	No nesting habitat in agricultural fields, orchards, or canals, but fallowed land may provide limited nesting, as well as foraging, habitat.
Swainson's hawk *Buteo swainsoni*	CT	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields, orchards, supporting rodent populations.	No nesting habitat in agricultural fields, orchards, or canals. Project fields, orchards, provide foraging habitat.
Mountain plover *Charadrius montanus*	CSC	Short grasslands, freshly plowed fields, orchards, newly sprouting grain fields, orchards, and sometimes sod farms. Short vegetation, bare ground and flat topography. Prefers grazed areas and areas with burrowing rodents.	Winters in Central Valley. Project fields, orchards, provide foraging habitat.

Name	Status	Habitat	Potential to Occur In Water Development Lands
Northern harrier *Circus cyaneus*	CSC	Coastal salt and fresh-water marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	No nesting habitat in agricultural fields, orchards, or canals. Project fields, orchards, provide foraging habitat.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC, CE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	No habitat in agricultural fields, orchards, or canals.
Yellow rail *Coturnicops noveboracensis*	CSC	Summer resident in eastern Sierra Nevada in Mono County. Fresh-water marshlands.	No habitat in agricultural fields, orchards, or canals.
Bank swallow *Riparia riparia*	CT	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	No habitat in agricultural fields, orchards, or canals.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	CSC	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects such as Odonata are abundant, nesting timed with maximum emergence of aquatic insects.	No habitat in agricultural fields, orchards, or canals.
Nelson's antelope squirrel *Ammospermophilus nelsoni*	CT	Western San Joaquin Valley from 200-1200 feet elevation on dry, sparsely vegetated loam soils. Dig burrows or use k-rat burrows. Need widely scattered shrubs, forbs and grasses in broken terrain with gullies and washes	No habitat in agricultural fields, orchards, or canals.
Pallid bat *Antrozous pallidus*	CSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	No roosting habitat in agricultural fields or orchards.
Giant kangaroo rat *Dipodomys ingens*	FE, CE	Annual grasslands on the western side of the San Joaquin Valley, marginal habitat in alkali scrub. Need level terrain and sandy loam soils for burrowing.	No habitat in agricultural fields, orchards, or canals.
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE, CE	Alkali sink-open grassland habitats in western Fresno County. Bare alkaline clay-based soils subject to seasonal inundation, with more friable soil mounds around shrubs and grasses.	No habitat in agricultural fields, orchards, or canals.

Name	Status	Habitat	Potential to Occur In Water Development Lands
Western mastiff bat *Eumops perotis californicus*	CSC	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral etc, Roosts in crevices in cliff faces, high buildings, trees and tunnels.	No roosting habitat in agricultural fields. Limited roosting habitat in orchards
Western red bat *Lasiurus blossevillii*	CSC	Roosts primarily in trees, 2-40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	No roosting habitat in agricultural fields. Limited roosting habitat in orchards
American badger *Taxidea taxus*	CSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. digs burrows.	No habitat in agricultural fields, orchards, orchards or canals.
San Joaquin kit fox *Vulpes macrotis mutica*	FE, CT	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	No breeding habitat in Project fields, orchards, and orchards. Limited foraging habitat.

1B = Plants rare or endangered in California and elsewhere
CE = State-listed as Endangered
CH = Critical habitat
CSC = California Species of Special Concern
CT = State-listed as Threatened
FC = federal Candidate for listing
FD = federally delisted
FE = federally listed as Endangered
FT = federally listed as Threatened
RPR = Rare Plant Rank

Table E-2
Fish Species Likely to be Found in the Exchange Contractors Source Areas or Adjacent Water Ways

Family	Species	Common Name	Native*
Atherinidae	*Menidia beryllina*	Inland silverside	I
Catostomidae	*Catostomus occidentalis*	Sacramento sucker	N
Centrarchidae	*Lepomis cyanellus*	Green sunfish	I
	Lepomis gulosus	Warmouth	I
	Lepomis hybrid	Hybrid sunfish	I
	Lepomis macrochirus	Bluegill	I
	Lepomis microlophus	Redear sunfish	I
	Micropterus punctulatus	Spotted bass	I
	Micropterus salmoides	Largemouth bass	I
	Pomoxis annularis	White crappie	I
	Pomoxis nigromaculatus	Black crappie	I
Clupeidae	*Alosa sapidissima*	American shad	I
	Dorosoma petenense	Threadfin shad	I
Cottidae	*Cottus asper*	Prickly sculpin	N
Cyprinidae	*Carassius auratus*	Goldfish	I
	Cyprinella lutrensis	Red shiner	I
	Cyprinus carpio	Common carp	I
	Lavinia exilicauda	Hitch	N
	Mylopharodon conocephalus	Hardhead	N
	Notemigonus crysoleucas	Golden shiner	I
	Orthodon microlepidotus	Sacramento blackfish	N
	Pimephales promelas	Fathead minnow	I
	Pogonichthys macrolepidotus	Sacramento splittail	N
	Ptychocheilus grandis	Sacramento pikeminnow	N
Embiotocidae	*Hysterocarpups traski*	Tule perch	N
Gobiidae	*Tridentiger bifasciatus*	Shimofuri goby	I
Ictaluridae	*Ameiurus catus*	White catfish	I
	Ameiurus melas	Black bullhead	I
	Ictalurus punctatus	Channel catfish	I

Family	Species	Common Name	Native*
Percichthyidae	*Morone saxatilis*	Striped bass	I
Percidae	*Percina macrolepida*	Bigscale logperch	I
Petromyzontidae	*Lampetra tridentata*	Pacific lamprey	N
Poeciliidae	*Gambusia affinis*	Western mosquitofish	I
Salmonidae	*Oncorhynchus tshawytscha*	Chinook salmon	N
	Oncorhynchus mykiss	Steelhead trout	N

Source: Brown and Moyle 1992; Saiki 1984
I = Introduced
N = Native

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