

Appendix E

RARE AND ENDANGERED SPECIES  
SUSCEPTIBILITY CHART



| Common Name/Scientific Name  | Habitat Requirements        | Occur Within District       | Diet   | Breeding Season   | adulicide | surface films | Bti     | methoprene/diflubenzuron | pyrethroid pyrethins | mosquito fish |
|--|-----------------------------|-----------------------------|--|---|-----------|---------------|---------|--------------------------|----------------------|---------------|
| Green Sturgeon ( <i>Acipenser medirostris</i> )                                | Estuarine, Marine, Riverine | spring summer Resident      | Adult feed on benthic invertebrates including shrimp, mollusks, amphipods, and even small fish juveniles are opportunistic benthic feeders with a diet consisting of various invertebrates and fish  | Adults typically migrate into fresh water beginning in late February; spawning occurs from March-July, with peak activity from April-June   | XXX       |               | XX      | XX / X                   | XXX                  |               |
| Central Valley Steelhead ( <i>Oncorhynchus mykiss</i> )                        | Estuarine, Marine, Riverine | fall winter spring resident | Opportunistic feeder varies its diet according to seasonal availability. In the summer months, it feeds primarily on drifting aquatic invertebrates, terrestrial insects, and active bottom invertebrates. Individual fish, however, do not usually feed on the full range of food available. Larger fish tend to eat larger prey. | Migrate to fresh water after October and before May Spawning in the Sacramento River basin typically occurs from late December through April, with most adults spawning in January through March. Can spawn more than once.                                 | XXX       |               | XX      | XX / X                   | XXX                  |               |
| Chinook Salmon - Central Valley Spring-run ( <i>Oncorhynchus tshawytscha</i> ) | Estuarine, Marine, Riverine | summer resident             | Adults primarily feed on other fishes Juveniles feed on terrestrial and aquatic insects, amphipods, and other crustaceans  | Spring run enter the Sacramento River from late March through September. Spawn in the fall from mid-August through early October. Spring-run juveniles migrate soon after emergence as young-of-the-year, or remain in freshwater and migrate as yearlings. | XXX       |               | XX      | XX / X                   | XXX                  |               |
| Delta Smelt ( <i>Hypomesus transpacificus</i> )                                | Estuarine, Riverine         | No                          | They primarily feed on planktonic copepods, cladocerans, amphipods, and insect larvae. Larvae feed on phytoplankton; juveniles feed on zooplankton.  | Spawning season usually takes place from late March through mid May, although it may occur from late winter (Dec.) to early summer  | XXXX      | XX            | XX<br>X | XXX / XX                 | XXXX                 |               |

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| Sacramento Splittail ( <i>Pogonichthys macrolepidotus</i> )    | Estuarine, Riverine                        | Yes                   | Adults feed on invertebrates and detritus while juveniles feed on zooplankton and small invertebrates  | Adults begin migration towards spawning areas sometime between late November and late January eggs hatch within 3-5 days   | XXX        | XX            | XX      | XX / X                   | XXX                  |               |
| Conservancy Fairy Shrimp ( <i>Branchinecta conservatio</i> )   | Vernal Pool                                | Yes                   | Fairy Shrimp feed on algae, bacteria, protozoa, rotifers and bits of detritus  | Hatching can begin within the same week that a pool starts to fill. Average time to maturity is forty-nine days. I   | XXX        | X             | X       | XX                       | XX                   | XX            |
| Vernal Pool Fairy Shrimp ( <i>Branchinecta lynchi</i> )        | Vernal Pool                                | Yes                   | They are filter and suspension feeders. Their diet mainly consists of unicellular algae, bacteria, and ciliates. They may also scrape algae, diatoms and protists from the surface of rocks, sticks and plant stems.             | They have a life span from December to early May. Can reach sexual maturity in as few as 18 days.  | XX         | X             | X       | XX                       | XX                   | XX            |
| Vernal Pool Tadpole Shrimp ( <i>Lepidurus packardii</i> )      | Vernal Pools                               | Yes                   | Adults are omnivorous, foraging on detritus, vegetation and other aquatic living organisms that they capture, such as fairy shrimp and other invertebrates   | Reaching sexual maturity in as little as three weeks allows the tadpole shrimp to hatch, mature, and produce eggs quickly after the pools refill. Adults are often present and reproductive until the pools dry up in the spring             | XXX        | XX            | XX      | XXX                      | XXX                  | XXX           |
| California Tiger Salamander ( <i>Ambystoma californiense</i> ) | Grassland, Oak Woodland, Coniferous forest | Yes                   | Aquatic Phase: algae, snails, zooplankton, small crustaceans, and aquatic larvae and invertebrates, smaller tadpoles of Pacific tree frogs, CRLF, toads; Terrestrial Phase: terrestrial invertebrates, insects, frogs, and worms | Emerge from burrows and breed: fall and winter rains Eggs: laid in pond Dec. – Feb., hatch: after 10 to 14 days Larval stage: 3-6 months, until the ponds dry out, metamorphose late spring or early summer, migrate to small mammal burrows | XXXXXX     | XXXXX         | XX<br>X | XXXXX / XXX              | XXXXX                | XXXXXX        |

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| Foothill Yellow-Legged Frog ( <i>Rana boylei</i> )   | Riverine, Shoreline   | No                    | Aquatic-phase : algae, diatoms, detritus<br>Terrestrial-phase: aquatic and terrestrial insects   | Timing of oviposition between late March and early June After oviposition, a minimum of roughly 15 weeks is needed to attain metamorphosis, which typically occurs between July and September | XXX          | X             | XX       | XX                       | XXX                  | XXX           |
| California Red-legged Frog ( <i>Rana draytonii</i> ) | Freshwater Emergent Wetland, Lacustrine, Riverine, Shoreline, Valley-Foothill Riparian, Wet Meadow                          | No                    | Aquatic-phase : algae, freshwater aquatic invertebrates<br>Terrestrial-phase: aquatic and terrestrial invertebrates, small mammals, fish and frogs | Breeding: Nov. to Apr.<br>Tadpoles: Dec. to Mar.<br>Young juveniles: Mar. to Sept.  | XXXX         | XX            | XX<br>X  | XXX                      | XXXX                 | XXXX          |
| Western Spadefoot ( <i>Spea hammondi</i> )           | Annual Grassland, Blue Oak-Foothill Pine, Coastal Scrub, Freshwater Emergent wetland, Mixed Chaparral Riverine, Vernal Pool | Yes                   | Aquatic-phase : algae and organic detritus<br>Terrestrial-phase: crickets (Gryllacrididae), butterflies, beetles, flies, ants, and earthworms      | Western Spadefoot Toads breed from January to May. Oviposition occurs usually between late February and late May  | XXXXX        | XXXX          | XX<br>XX | XXXX / XXX               | XXXXX                | XXXXX         |
| Giant Garter Snake ( <i>Thamnophis gigas</i> )       | Freshwater Emergent Wetland Irrigated Row and Field Crops, Riverine, Shoreline, Valley-Foothill Riparian                    | Yes                   | main diet of fish and frogs  | The breeding season extends through March and April, and females give birth to live young from late July through early September.   | X            | X             | X        | X /                      | X                    |               |

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| Western Pond Turtle ( <i>Emys marmorata</i> )        | Riverine, Lacustrine, Fresh Emergent Wetlands, Vernal Pools, Agricultural ditches, Estuaries | Yes                   | Adults are dietary generalists feeding on slow moving aquatic invertebrates, carrion and aquatic vegetation<br>Juveniles feed on zooplankton       | Mating, typically occurs in late April or early May, but may occur year-round. The young may hatch and overwinter in the nest.                                     | XX        | XX            | XX  | XX / X                   | XX                   |               |
| Tricolored Blackbird ( <i>Agelaius tricolor</i> )    | Annual Grassland, Cropland Freshwater Emergent Wetland, Pasture, Perennial Grassland         | Yes                   | During their breeding season they prey on beetles, grasshoppers, and other insects during the winter more than 88% of their food is plant material | Breeding extends from mid-March through early August Tricolor clutches take about 9 days from hatching until the oldest nestling is willing to jump from the nest. | XXX       | XX            | XX  | XX / X                   | XX                   |               |
| Grasshopper Sparrow ( <i>Ammodramus savannarum</i> ) | Annual Grassland, Pasture, Perennial Grassland   | summer resident       | The year-round diet of the Grasshoppers and plant material   | Breeding season extends from mid-March to August. Incubation can last from 11 to 12 days and the young leave the nest after 9 days.                                | XXX       | X             | X   | X                        | XX                   |               |
| Long-eared Owl ( <i>Asio otus</i> )                  | Grasslands, Montane Chaparral, Riparian, Agriculture, Freshwater Emergent Wetland            | Yes                   | They feed almost exclusively on small mammals primarily in the genera <i>Microtus</i> , <i>Peromyscus</i> , and <i>Dipodomys</i>                   | Breeds from February through July incubation time averages from 25–30 days   | XX        | X             | X   | X                        | X                    |               |

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| Burrowing Owl<br>( <i>Athene cunicularia</i> )    | Annual Grassland, Coastal Scrub, Coastal Terrace Prairie, Desert Scrub, Perennial Grassland, Sagebrush                      | Yes                    | broad array of arthropods (centipedes, spiders, beetles, crickets, and grasshoppers), small rodents, birds, amphibians, reptiles, and carrion  | Breeding season is in March to August but can begin as early as February and extend into December<br><i>incubation</i> lasts for 28-30 days            | XX           | X             | X   | X                        | X                    |               |
| Swainson's Hawk<br>( <i>Buteo swainsoni</i> )     | Annual Grassland, Blue Oak Woodland, Cropland, Pasture, Perennial Grassland, Valley Oak Woodland, Valley-Foothill, Riparian | Spring Summer Resident | When breeding they feed on ground squirrels, voles, or other abundant small mammal prey + birds to toads, crayfish and insects when not breeding they feed on insects exclusively especially grasshoppers and crickets | In the Central Valley, Swainson's Hawks arrive in late February and early March their Incubation time is 34-35 days                                    | XXX          | XX            | XX  | XX / X                   | XX                   |               |
| Mountain Plover<br>( <i>Charadrius montanus</i> ) | Alkali Desert Scrub, Annual Grassland, Cropland   | winter resident        | primarily insectivorous  | does not breed in California   | X            |               |     |                          |                      |               |
| Northern Harrier<br>( <i>Circus cyaneus</i> )     | Grassland, Freshwater Emergent Marsh, Agricultural, Riparian  | Yes                    | Voies are the most common prey, but they also feed on waterbirds, primarily American Coots, Western Fence Lizards, blackbirds and sparrows, mostly Brush Rabbits   | Breeding season extends from March through August They nest on the ground, mostly within patches of dense, often tall, vegetation in undisturbed areas | X            |               |     |                          |                      |               |

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| Western Yellow-billed Cuckoo ( <i>Coccyzus americanus occidentalis</i> )     | Desert Riparian, Valley-Foothill Riparian  | spring summer resident | primarily foliage gleaners, catching flying prey such as dragonflies or butterflies or drop to the ground to catch grasshoppers or tree frogs  | Breed in the spring their clutch size two to five eggs incubation period is 11 to 12 days nesting period 5 to 8 days  | XXX          | XX            | XX  | XX / X                   | XX                   |               |
| Yellow Warbler ( <i>Dendroica petechia brewsteri</i> )                       | Montane Riparian, Valley-Foothill Riparian   | summer resident        | Eats primarily insects but occasionally it feeds also on berries. It also consumes spiders. It prefers grubs of small insects and caterpillars.  | Generally nests late May-early June Incubation lasts about 10 to 14 days, by female alone. Chicks fledge at 8 to 12 days old, but parents feed them during two weeks or more. | XXX          | XX            | XX  | XX                       | XX                   |               |
| Marysville California Kangaroo Rat ( <i>Dipodomys californicus eximius</i> ) | Annual Grassland, Mixed Chaparral  | No                     | It is believed that they forage on seeds.  | The kangaroo rats mate several times a year but the main breeding season is in spring.  | XX           | X             | X   | X                        | X                    |               |
| Greater Sandhill Crane ( <i>Grus canadensis tabida</i> )                     | Annual Grassland, Cropland Freshwater Emergent Wetland, Lacustrine, Perennial Grassland Wet Meadow | winter resident        | They are omnivorous and search for subsurface food items by probing with their bill also glean seeds and other foods on the surface. Their diet consists of tubers, seeds, grains (particularly corn and rice), small vertebrates (e.g., mice and snakes) and a variety of invertebrates | Nesting generally begins in April/May and extends through July/August Females . They incubate the eggs for a period of 29 to 32 days young fledge at 67 to 75 days            | X            |               |     |                          |                      |               |

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| Bald Eagle ( <i>Haliaeetus leucocephalus</i> )                       | Riverine, Lacustrine, Marine                        | winter resident       | prey on a variety of small animals, usually fish or waterfowl, and they eat carrion, including salmon, deer, and cattle           | Breeding season lasts from about January through July or August. Eggs laid in late winter or early spring incubation lasts about 35 days Chicks fledge when they are 11 or 12 weeks old | X            |               |         |                          |                      |               |
| California Black Rail ( <i>Laterallus jamaicensis coturniculus</i> ) | Freshwater Emergent Wetland Saline Emergent Wetland | Yes                   | forage on invertebrates, including snails, beetles, earwigs, grasshoppers, and ants, and seeds from bulrushes and cattails        | Nesting occurs from March to June incubate their eggs for 17-20 days  | XXXX         | XXXX          | XX<br>X | XXX / XX                 | XXX                  |               |
| Purple Martin ( <i>Progne subis</i> )                                | Grassland, Riverine, Riparian                       | Yes                   | They are aerial insectivores feeding on houseflies, moths, butterflies of all kinds, grasshoppers and their favorite, dragonflies | Breeds from May (rarely late April) to mid-August   | XXX          | XX            | XX      | XX                       | XX                   |               |
| Bank Swallow ( <i>Riparia riparia</i> )                              | Valley-Foothill Riparian                            | Yes                   | insect composition included Hymenoptera, Diptera, Coleoptera, Hemiptera, Odonata, Lepidoptera, and other insects                  | Breed in California beginning in late march and early April. Incubation periods ranged from 13-15 days Young remain in the nest for 18-22 days before fledging                          | XXXX         | XXX           | XX<br>X | XXX / XX                 | XXX                  |               |
| Pallid Bat ( <i>Antrozous pallidus</i> )                             | Barren, Grassland                                   | Yes                   | forage primarily on large arthropods, caught on the ground or gleaned off vegetation  | Mate in the fall or winter females do not actually become pregnant until the spring They give birth to one or two young in early summer young are not self-sufficient until the fall    | XXX          | XXX           | XX<br>X | XXX                      | XXX                  |               |

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| Western Red Bat ( <i>Lasiurus blossevillei</i> )                               | Blue Oak-Foothill Pine, Jeffrey Pine, Montane Hardwood-Conifer, Montane Riparian, Orchard and Vineyard | Yes                   | moths, flies, beetles, and tiny wasps  | This species mates in the late summer or early fall. Females become pregnant in spring and have a pregnancy of 80-90 days   | XXX          | XXX           | XX<br>X | XXX                      | XXX                  |               |
| Pacific Fisher ( <i>Martes pennanti pacifica</i> DPS)                          | mixed hardwood and conifer forests   | No                    | prey on squirrels, carrion, mice, porcupines, lizards, shrews, voles, birds, fruits, insects   | majority of mating takes place during the months of March and April, but it is nearly a year before the young are born litter size ranges from one to five and averages three litter is born every year |              |               |         |                          |                      |               |
| Valley Elderberry Longhorn Beetle ( <i>Desmocerus californicus dimorphus</i> ) | Blue Oak Woodland, Blue Oak-Foothill Pine, Valley-Foothill Riparian                                    | Yes                   | Obligates with elderberry trees ( <i>Sambucus</i> sp). Adults eat the elderberry foliage until about June when they mate. Upon hatching the larvae tunnel into the tree where they will spend 1-2 years eating the interior wood which is their sole food source | Adults are active from March to June feeding and mating, when the elderberry produces flowers   | XXX          | XX            | XX      | XXX / X                  | XXX                  |               |
| Bees/Pollinators   | Most Habitats with vegetation  | Yes                   | Pollen, Nectar, Honey,   | January -Late Fall  | XX           | X             | X       | XX / X                   | XX                   |               |

This chart assesses risks to Sutter-Yuba listed species as a result of mosquito control. There are 5 categories used to assess risk: toxicity, habitat, diet, size, and activity. All five risk categories were assessed individually for each group of pesticides the district uses. An X is given in each category significant risk occurred. X was given for toxicity if the group of insecticides had a high acute toxicity. X was given for habitat if the species occurred in habitats the District sprays, in this case aquatic and riparian habitats. X was given for diet if the species feeds on insects or aquatic invertebrates, which are the most effected by insecticides. X was given for size if the species is smaller than 6 inches; small species are more susceptible to pesticides. X was given for activity if the species is nocturnal since the District sprays at night and these species run a greater risk of exposure. Each X is color coded to represent the source of the risk assessment; toxicity in red, habitat green, diet orange, size blue, and activity in purple. The more X's a species has the more likely it is affected by the District's practices.