California Red-Legged Frog
(Rana aurora draytonii)

Photo: Ed Ely (Courtesy of CDFG, Outdoor California Magazine)

Department of Pesticide Regulation
Endangered Species Project

California Department of Fish & Game

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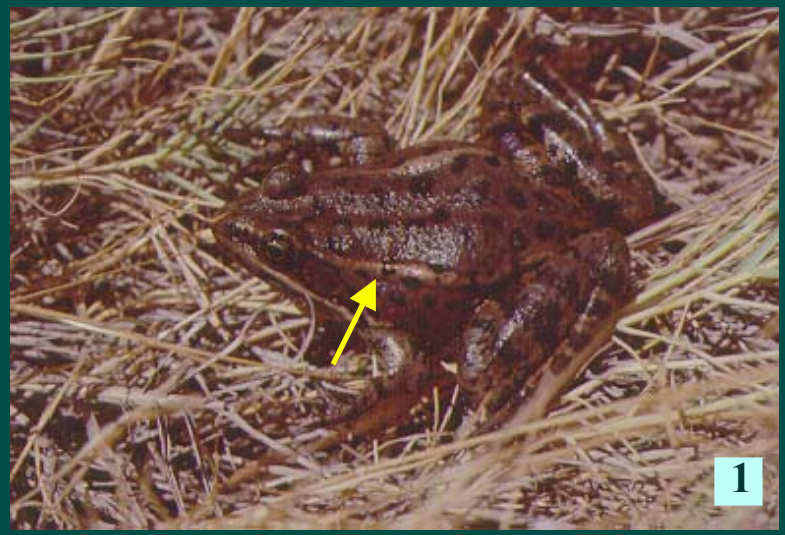
California Red-Legged Frog Characteristics



Photos: John Brode, CDFG

- Largest native frog in the Western U.S.
- 1.5 to 5.1 inches in body length
- Color -brown to reddish brown above with irregular black spots, sometimes with light centers.
- Underside of hind legs and occasionally abdomen are red in adults (photo 2).
- Dorsolateral folds (see arrow in photo 1) are prominent, extending from eye to tail.
- Distinguished from bull frog by lack of green color on back and presence of lateral folds.

California Red-Legged Frog Behavior

- A highly aquatic species with little movement away from streamside habitat during the dry season.
- CRLFs found in coastal drainages are active all year, whereas those found in interior sites might hibernate.
- CRLFs disperse upstream and downstream of their breeding habitat to forage and seek temporary terrestrial retreats. Burrows and other terrestrial retreats are essential for their survival within a watershed.

Photo: Bill Palmer (Courtesy of CDFG Outdoor California)

California Red-Legged Frog Range

Originally found over most of California below 5000 feet and west of the deserts and the Sierra Nevada crest. CRLFs have disappeared from about 75% of their historical range.

Current records of CRLFs in DFG Natural Diversity Data Base can be found for the following counties: Alameda, Amador, Contra Costa, El Dorado, Fresno, Marin, Mendocino, Merced, Monterey, Placer, Plumas Riverside, San Benito, San Bernardino, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus and Tehama.

California Red-Legged Frog Range

- California Red-Legged frogs are known to occur in 243 streams or drainages in the 25 listed counties, primarily in the central coastal region of California. A single occurrence of CRLF is sufficient to designate a drainage as occupied by, or supporting California Red-Legged frogs.
- Monterey (32), San Luis Obispo (36), and Santa Barbara (36) counties support the greatest number of currently occupied drainages.
- In seven counties, CRLFs are known from a single occurrence.
- Only three areas within their entire historic range may currently support more than 350 adults: Pescadero Marsh Nature Preserve (San Mateo County), Point Reyes National Seashore (Marin County), and Rancho San Carlos (Monterey County).

California Red-Legged Frog Habitat

- CRLFs occupy a fairly distinct habitat, combining both specific aquatic and riparian components.
- Adults require dense, shrubby or emergent riparian vegetation closely associated with deep (>2 ft.) still or slow moving water, including farm ponds in isolated areas.
- Largest densities of CRLFs are associated with deep-water pools with dense stands of overhanging Willows (*Salix spp.)* and an inter-mixed fringe of Cattails (*Typha latifolia*).
- Well vegetated terrestrial areas within the riparian corridor may provide shelter during winter.

Photo: George E. Hansen

California Red-Legged Frog
Food

- The diet of California Red-Legged Frogs is highly variable. Larvae probably eat algae.
- Terrestrial invertebrates have been found to be the most common food items of adult frogs.
- Vertebrates, such as Pacific Tree Frogs (*Hyla regilla)* and California Mice (*Peromyscus californicus*) represent over half of the prey mass eaten by larger frogs.
- Feeding activity likely occurs along the shoreline and on the surface of the water.

California Red-legged Frog
Behavior and Habitat selection

- During summer, CRLFs may seek cover in small mammal burrows and moist leaf litter during the day. They have been found up to 100 feet from water in adjacent dense riparian vegetation. Use of this adjacent riparian corridor is most often associated with drying of coastal creeks in mid to late summer.
- Habitat for CRLFs is potentially all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture during the dry season within 300 feet of a riparian area. This could include boulders or rocks and organic debris such as downed trees or logs; industrial debris; and agricultural features, such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks (U.S.F.W.S., 1996)

California Red-Legged Frog
Reproduction

- Breeding takes place from November through March and varies throughout the range, often being effected by weather conditions.
- Egg laying usually occurs during or shortly after large rainfall events in late winter or early spring.
- Females deposit egg masses on emergent vegetation near the surface of the water.
- Spherical shaped egg masses contain 2,000 to 5,000 moderate-sized (0.08 to 0.11 inches in diameter), dark reddish brown eggs.
- Eggs hatch in 6 to 14 days.
- Larvae undergo metamorphosis 3.5 to 7 months after hatching.
- Sexual maturity normally is reached at 3 to 4 years of age.
- California Red-Legged frogs might live 8 to 10 years.

California Red-Legged Frog
Mortality Factors

- In Coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity.
- One hundred percent mortality occurs in eggs exposed to salinity levels greater than 4.5 parts per thousand.
- Larvae die when exposed to salinities greater than 7.0 parts per thousand.
- Predation. Bitterns (*Botaurus lentiginosus*) and Black-Crowned Night Herons (*Nycticorax nycticorax*) are likely predators of adult frogs. Juvenile frogs, which are more active diurnally, and less wary than adults, may be more susceptible to predation by diurnal predators, such as the Great Blue Heron (*Ardea herodias*) and several species of garter snakes (*Thamnophis sp.*), including the endangered San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*)

California Red-Legged Frog Pesticide Concerns

- Since they are highly aquatic with little movement away from streamside habitat during the dry season. Some herbicides, insecticides, and fungicides pose hazards to its aquatic life stages.
- Since burrows and other terrestrial retreats are essential for their survival within a watershed. Misuse of burrow fumigants is a concern for this species.

Rodent Control and Protection of Burrowing Non-target Species

- When possible, try baiting first.
- If baiting doesn't work, then try burrow fumigation.
- Before fumigating burrows, make sure you are targeting active Ground Squirrel burrows.

California Red-legged Frog
Burrow Fumigant Use Limitations
(per Interim Measures County Bulletins)

- **Use Limitation Code 5:** "Use shall be supervised by a person (wildlife biologist, county agricultural commissioner, university extension advisor, state or federal official or others) who is trained to distinguish dens and burrows of target species from those of non-target species. Use shall occur only in the active burrows of target species. The person responsible for supervision shall be aware of the conditions at the site of application and be available to direct and control the manner in which applications are made (per Section 6406 of Title 3, California Code of Regulations). Contact your county agricultural commissioner for information on training."

How do we know it is an active Ground Squirrel burrow?

- Often active Ground Squirrel burrows have large deposits of dirt accumulated around their entrance. However, not all burrows show such deposits at the entrance and have to be monitored more closely.
- Look also for debris such as nutshells, fruit rinds, and scat dispersed near the entrance.
- Inactive burrows typically have cobwebs at the entrance.

Photos: Paul Gorenzel, UC Davis

How do we know it is an active Ground Squirrel burrow? TRACKS

Photo: Paul Gorenzel, UC Davis

Look for tracks (see pictures).

If the substrate is hard, try softening up the area around the entrance by wetting it down, thus forming a "mud plate". Track plates made by smoking aluminum or tin sheets can also be used. Chalk can also be spread around the entrance, this creates a "more durable"soft surface where tracks can be observed.

California Red-legged Frog
Use Limitations for some Herbicides
(per Interim Measures County Bulletins)

- Depending on an active ingredient's toxicity to aquatic organisms and its mode of action, it might have additional use limitations.
- **Use Limitation code 11:** "Do not use in currently occupied habitat except: (1) as specified in Habitat Descriptors, (2) in organized habitat recovery programs, or (3) for selective control of invasive exotic plants."

California Red-legged Frog Use Limitations for Insecticides, Herbicides, and Fungicides

(per Interim Measures County Bulletins)

- Some active ingredients are so toxic to aquatic organisms that their use in currently occupied habitat is prohibited altogether.
- **Use Limitation code 10:** "Do not use in currently occupied habitat."

California Red-legged Frog
Use Limitations for some Insecticides, Herbicides, and Fungicides
(per Interim Measures County Bulletins)

- Use Limitation code 15: Provide a 20 foot minimum strip of vegetation (on which pesticides should not be applied) along rivers, creeks, streams, wetlands, vernal pools and stock ponds or on the downhill side of fields where run-off could occur. Prepare land around fields to contain run-off by proper leveling, etc. Contain as much water "on site" as possible. The planting of legumes, or other cover crops for several rows adjacent to off-target water sites is recommended. Mix pesticides in areas not prone to run-off such as concrete mixing/loading pads, disked soil in flat terrain or graveled mix pads, or use a suitable method to contain spills and/or rinsate. Properly empty and triple-rinse pesticide containers at time of use.

California Red-legged Frog
Use Limitations for some Insecticides, Herbicides, and Fungicides
(per Interim Measures County Bulletins)

- Use limitation code 16: Conduct irrigations efficiently to prevent excessive loss of irrigation waters through run-off. Schedule irrigations and pesticide applications to maximize the interval of time between the pesticide application and the first subsequent irrigation. Allow at least 24 hours between application of pesticides listed in this bulletin and any irrigation that results in surface run-off into natural waters. Time applications to allow sprays to dry prior to rain or sprinkler irrigations. Do not make aerial applications while irrigation water is on the field, unless surface run-off is contained for 72 hours following the application.

California Red-legged Frog
Use Limitations for some Insecticides, Herbicides, and Fungicides
(per Interim Measures County Bulletins)

- Use limitation code 17: For spray able or dust formulations: when the air is calm or moving away from habitat, commence applications on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, do not make applications within 200 yards by air or 40 yards by ground upwind from occupied habitat. The county agricultural commissioner may reduce or waive buffer zones following a site inspection, if there is an adequate hedgerow, windbreak, riparian corridor or other physical barrier that substantially reduces the probability of drift.