

CALIFORNIA'S WILDLIFE

VOLUME I

AMPHIBIANS AND REPTILES

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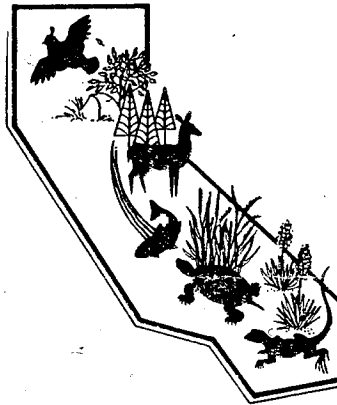
VOLUME I

AMPHIBIANS AND REPTILES

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California Statewide Wildlife Habitat Relationships System

State of California
The Resources Agency
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A001 Tiger Salamander *Ambystoma tigrinum*

Family: Ambystomatidae Order: Caudata Class: Amphibia Date: November 29, 1984

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

In California, the tiger salamander is most commonly found in annual grass habitat, but also occurs in grassy understory of valley-foothill hardwood habitats, and uncommonly along streamcourses. Its range includes the Central Valley from Yolo Co. south to Kern Co., and coastal grasslands from the vicinity of San Francisco Bay south at least to Santa Barbara Co. One isolated population is known to exist at Grass Lake in Siskiyou Co. In California, most populations occur at elevations of less than 305 m (1000 ft), but they have been recorded up to 1370 m (4500 ft).

SPECIFIC HABITAT REQUIREMENTS

Feeding: Postmetamorphic juveniles and adults appear to be "sit and wait" predators (Lindquist and Bachmann 1980) taking earthworms, snails, insects, fish, and even small mammals (Stebbins 1972). Aquatic larvae feed on littoral, benthic, and planktonic arthropods. Small larvae (less than 2 cm) eat almost exclusively zooplankton, while larger individuals consume zooplankton, amphipods, mollusks, and insect larvae (Dodson and Dodson 1971).

Cover: Adults spend most of the year in subterranean refugia, especially ground squirrel burrows and occasionally man-made structures. During breeding migrations individuals are sometimes found under surface objects such as rocks and logs. Postmetamorphic juveniles retreat to mammal burrows after spending a few hours or days in mud cracks near water, or tunnels constructed in soft soil. Aquatic larvae seek cover in turbid water, clumps of vegetation and other submerged debris.

Reproduction: Tiger salamanders breed and lay eggs primarily in vernal pools and other temporary ponds. They sometimes use permanent human-made ponds if predatory fishes are absent. Streams are rarely used for reproduction.

Water: Rainfall is important to the formation and maintenance of breeding ponds. Most surface migrations and other movements by adults are associated with sustained rainfall, especially at night. In some localities, dispersal of postmetamorphic juveniles from breeding ponds is not associated with rainfall. In such cases, desiccation can cause significant mortality. Apparently desiccating individuals aggregate to reduce water loss (Alvarado 1967). This species also conserves water by tolerating high blood urea concentrations (Romspert and McClanahan 1981).

Pattern: Prime habitat in California is annual grass, but seasonal ponds, or vernal pools are crucial to breeding. Permanent ponds or reservoirs sometimes used as well.

SPECIES LIFE HISTORY

Activity Patterns: Adults exist in subterranean refugia most of the year. Before and after breeding, they emerge at night during rains. During breeding, some diurnal activity occurs. In late spring or early summer, postmetamorphic juveniles disperse from breeding sites at night.

Seasonal Movements/Migration: In California, the first rains of November usually initiate adult migration to breeding ponds. They usually stay at the ponds a few days, but some individuals may remain up to several weeks after breeding is completed. Larvae transform during late spring or early summer, usually by the first week of July in central California. They disperse from breeding sites after spending a few hours or days near pond margins.

Home Range: Few movements occur during most of the year. Migrations to and from breeding ponds may occasionally exceed 1000 m (3300 ft).

Territory: Not territorial.

Reproduction: Breeding and egg-laying normally occur from December through early February. Females lay numerous small clusters of eggs, each containing from 50 to over 100 eggs (Stebbins 1972). Individual females may lay well over 1000 eggs. Eggs are deposited on both submerged and emergent vegetation and on submerged debris.

Niche: Larvae may compete with or prey upon other amphibian larvae. Ponds with large populations of *tigrinum* larvae usually contain very few larvae of other amphibian species. Adults are probably not subject to heavy predation by other species due to their secretive behaviors and the brief period of activity at breeding ponds. Long (1964) reported a single adult tiger salamander in the stomach contents of a badger. Large numbers of aquatic larvae are taken by wading birds, particularly herons and egrets. Sometimes garter snakes also prey on larvae.

General Comments: Introduced fishes in breeding ponds can reduce the survival of tiger salamander larvae. Even temporary fish introductions are detrimental, and salamander populations can be eliminated within a few years. Aquatic larvae imported from other states and transported by fishermen for bait. Therefore, any local records should be viewed with caution.

REFERENCES

Stebbins 1951, 1972, Long 1964, Alvarado 1967, Gehlbach 1967, Dodson and Dodson 1971, Lindquist and Bachmann 1980, Romspert and McClanahan 1981.

A028 Western Spadefoot *Scaphiopus hammondi*

Family: Pelobatidae Order: Anura Class: Amphibia Date: November 29, 1984

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The western spadefoot ranges throughout the Central Valley and adjacent foothills, and is usually quite common where it occurs. In the Coast Ranges it is found from Point Conception, Santa Barbara Co., south to the Mexican border. Elevations of occurrence extend from sea level to 1363 m (4500 ft) in the southern Sierra foothills. This species occurs primarily in grassland situations, but occasional populations also occur in valley-foothill hardwood woodlands. Some populations persist for a few years in orchard-vineyard habitats.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Adults take insects, worms, and other invertebrates (Stebbins 1972). Adults of the very similar species *S. multiplicatus* were found to eat primarily butterfly and moth larvae, ants, termites and beetles (Whitaker *et al.* 1977, Dimmitt and Ruibal 1980). Tadpoles consume planktonic organisms and algae, but are also carnivorous (Bragg 1964) and consume dead aquatic larvae of amphibians, including their own species. *S. bombifrons* tadpoles capture and consume fairy shrimp (Bragg 1962).

Cover: *Scaphiopus* are rarely found on the surface. Most of the year is spent in underground burrows up to 0.9 m (36 in) deep (Stebbins 1972), which they construct themselves. Some individuals also use mammal burrows. Recently metamorphosed juveniles seek refuge in the immediate vicinities of breeding ponds for up to several days after transformation. They hide in drying mud cracks, under boards and other surface objects including decomposing cow dung (Weintraub 1980).

Reproduction: Breeding and egg laying occur almost exclusively in shallow, temporary pools formed by heavy winter rains. Egg masses are attached to plant material, or the upper surfaces of small submerged rocks (Stebbins 1951).

Water: Rainfall is important in the formation and maintenance of breeding ponds. Most surface movements by adults are associated with rains or high humidities at night. During dry periods, the moist soil inside burrows provides water for absorption through the skin (Ruibal *et al.* 1969, Shoemaker *et al.* 1969). Dispersal of postmetamorphic juveniles from breeding ponds often occurs without rainfall.

Pattern: Grasslands with shallow temporary pools are optimal habitats for the western spadefoot.

SPECIES LIFE HISTORY

Activity Patterns: They are active on the surface nocturnally during rains or periods of high humidity.

Seasonal Movements/Migration: Adults remain in underground burrows during most of the year, but the first rains of fall usually initiate surface movements. Breeding activities normally conclude by the end of March. Tadpoles transform during late spring and disperse after spending a few hours or days near the pond margins.

Home Range: Few movements occur during most of the year, but they will travel up to several meters on rainy nights. Movements to and from breeding ponds are rarely extensive.

Territory: The western spadefoot is not territorial during most of the year, but aggressive encounters between calling males at a breeding site suggested a degree of territoriality (Whitford 1967).

Reproduction: Breeding and egg laying normally occur from late winter to the end of March. Chorusing males may be heard during this period, but agricultural irrigation may elicit vocalizations in any month. Females lay numerous small, irregular clusters containing 10 to 42 eggs. They may lay more than 500 eggs in one season (Stebbins 1951). Eggs hatch rapidly, normally within two weeks.

Niche: Tadpoles may compete for food or space with other amphibian larvae. Because of their secretive behavior during most of the year, adults probably avoid predators. Dense populations of tadpoles may be heavily preyed upon by wading birds, or certain species of mammals. Childs (1953) suggested raccoons as probable tadpole predators.

REFERENCES

Stebbins 1951, 1972, Childs 1953, Bragg 1962, 1964, Whitford 1967, Ruibal *et al.* 1969, Shoemaker *et al.* 1969, Whitaker *et al.* 1977, Dimmitt and Ruibal 1980, Weintraub 1980.

California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

FOOTHILL YELLOW-LEGGED FROG

Rana boylei

Family: RANIDAE
A043

Order: ANURA

Class: AMPHIBIA

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DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The foothill yellow-legged frog occurs in the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles Co., in most of northern California west of the Cascade crest, and along the western flank of the Sierra south to Kern Co. Livezey (1963) reported an isolated population in San Joaquin Co. on the floor of the Central Valley. Isolated populations are also known from the mountains of Los Angeles County. Its elevation range extends from near sea level to 1940 m (6370 ft) in the Sierra (Jennings and Hayes 1994). The foothill yellow-legged frog is found in or near rocky streams in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Adults eat both aquatic and terrestrial invertebrates. Adult insects appear to be favored, but snails, and pieces of molted skin have also been found in stomach samples (Fitch 1936). Tadpoles probably graze on algae and diatoms along rocky stream bottoms.

Cover: Adults often bask on exposed rock surfaces near streams. When disturbed, they dive into the water and take refuge under submerged rocks or sediments. During periods of inactivity, especially during cold weather, individuals seek cover under rocks in the streams or on shore within a few meters of water.

Reproduction: Egg clusters are attached to gravel or rocks in moving water near stream margins.

Water: Unlike most other ranid frogs in California, this species is rarely encountered (even on rainy nights) far from permanent water. Tadpoles require water for at least three or four months while completing their aquatic development.

Pattern: Foothill yellow-legged frogs are found in or near rocky streams in a variety of habitats.

SPECIES LIFE HISTORY

Activity Patterns: Terrestrial individuals are primarily diurnal. Frogs may be active all year in the warmest localities, but may become inactive or hibernate in colder areas.

Seasonal Movements/Migration: Significant seasonal movements or migrations from breeding areas have not been reported. Nussbaum et al. (1983) found frogs underground and beneath surface objects more than 50 m (155 ft) from water in April. These frogs

probably spend most of their time in or near streams at all seasons.

Home Range: Normal home ranges are probably less than 10 m (33 ft) in the longest dimension. Occasional long distance movements (up to 50 m) (165 ft) may occur during periods with high water conditions.

Territory: Like most ranid frogs, males of this species probably defend areas around themselves during the breeding season (Martof 1953, Emlen 1968).

Reproduction: In California, breeding and egg laying usually await the end of spring flooding and may commence any time from mid-March to May, depending on local water conditions. The breeding season at any locality is usually about two weeks for most populations. Females deposit eggs in clusters of 200 to 300 (range 100 to 1000). They hatch in about five days. Tadpoles reach maximum sizes of 50 to 55 mm (2.2 in) and transform in three to four months.

Niche: Garter snakes (Fitch 1941) feed heavily on tadpoles and adults. The foothill yellow-legged frog coexists with the Cascades frog and the red-legged frog at some localities, but different microhabitat preferences probably diminish competition. Moyle (1973) implicated the bullfrog in the observed reduction of foothill yellow-legged frog populations in the Sierra. Centrarchid fishes readily eat *Rana* eggs (Werschkul and Christensen 1977), and, where introduced into foothill streams, may also contribute to the elimination of *R. boylei*.

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A043

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

R004 Western Pond Turtle *Clemmys marmorata*

Family: Emydidae Order: Testudines Class: Reptilia Date: January 21, 1985

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

The western pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest. Absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Elevation: sea level to 1830 m (6000 ft). Associated with permanent or nearly permanent water in a wide variety of habitat types.

SPECIFIC HABITAT REQUIREMENTS

Feeding: This species is considered omnivorous. Aquatic plant material, including pond lilies, beetles and a variety of aquatic invertebrates as well as fishes, frogs, and even carrion have been reported among their food (Stebbins 1972, Nussbaum *et al.* 1983).

Cover: Pond turtles require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. Turtles slip from basking sites to underwater retreats at the approach of humans or potential predators. Hibernation in colder areas is passed underwater in bottom mud.

Reproduction: Storer (1930) suggested that two distinct habitats may be used for oviposition. Along large slow-moving streams, eggs are deposited in nests constructed in sandy banks. Along foothill streams, females may climb hillsides, sometimes moving considerable distances to find a suitable nest site. Nussbaum *et al.* (1983) reports a nest in a clover field 100 m (325 ft) from water. Nests have been observed in many soil types from sandy to very hard. Soil must usually be at least 10 cm (4 in) deep for nesting. Nests must have a relatively high internal humidity for eggs to develop and hatch properly.

Water: Individuals normally associate with permanent ponds, lakes, streams, irrigation ditches or permanent pools along intermittent streams. Hatchlings may be subject to rapid death by desiccation if exposed to hot, dry conditions.

Pattern: Associated with permanent or nearly permanent water in a wide variety of habitat types below 1830 m (6000 ft) elevation.

SPECIES LIFE HISTORY

Activity Patterns: Most activity is diurnal but some crepuscular and nocturnal activity has been observed. Individuals are active all year where climates are warm but hibernate during cold periods elsewhere.

Seasonal Movements/Migration: During the spring or early summer, females move overland for up to 100 m (325 ft) to find suitable sites for egg-laying. Other long distance movements may be in response to drying of local bodies of water or other factors.

Home Range: The home range is normally quite restricted (Bury 1970, 1972) except for occasional long distance movements as described above.

Territory: The western pond turtle is not known to be territorial, but aggressive encounters including gesturing and physical combat (Bury and Wolfheim 1973) are common and may function to maintain spacing on basking sites and to settle disputes over preferred spots.

Reproduction: Three to 11 eggs (Ernst and Barbour 1972) are laid from March to August depending on local conditions. The incubation period for eggs maintained in the laboratory at 30° C (Feldman 1982) ranged from 73 to 80 days. Sexual maturity is thought to be attained in about eight years.

Niche: This is the only abundant native turtle in California. Hatchlings and juveniles are preyed upon by a variety of vertebrate predators including certain fishes, bullfrogs, garter snakes, wading birds, and some mammals. Competitive interactions with other species have not been reported.

REFERENCES

Storer 1930, Bury 1970, 1972, Ernst and Barbour 1972, Stebbins 1972, Bury and Wolfheim 1973, Feldman 1982, Nussbaum *et al.* 1983.