

M. Richards



F ILOLI

GARDENER'S REFERENCE

On an early morning in late spring or early fall, visitors may find horticulturists in the sunken garden scooping tadpoles and mosquito fish out of the reflecting pool and into buckets. Frogs? In horticulture? It's time to clean the

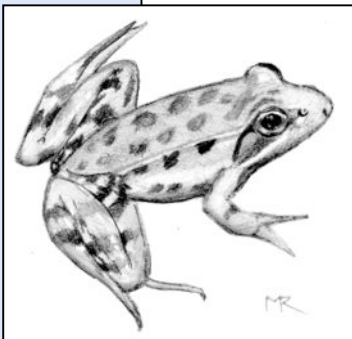
sunken garden pond, both for aesthetic appeal and to maintain a balance of aquatic life in this pool that is central to much of Filoli's wildlife. After cleaning, the ponds will again be a center of activity for frogs, ducks, dragonflies, and myriad other creatures.

POND LIFE

What kinds of wildlife are attracted to Filoli's fountains?

Few realize the diversity of wildlife that enjoys Filoli's formal gardens. Although fenced off from hungry deer, Filoli's visitors and staff occasionally spot raccoons, skunks, foxes and coyotes wandering the garden paths. At the center of all this activity are Filoli's burbling ponds, where those animals may stop for water, and where one can also often find an assortment of birds, including mallards, herons, and hummingbirds. Numerous insect species, including damselflies, dragonflies, whirligig beetles and water striders grace the air as they sweep among the rushes or dimple the water surface. The one insect whose presence we don't support is mosquitos, for which we stock our ponds with mosquito fish. Koi and other ornamental fish are not kept in any of Filoli's shallow pools, where they would become instant prey for raccoons and herons.

Especially exciting is the amphibian activity in our gardens; visitors are often graced with a chorus of chirping frogs as they pass ponds or freshly watered beds. Both pacific tree frogs (*Hyla regilla*) and the endangered red-legged frog (*Rana aurora*), in addition to California newts, have been spotted in the gardens and use our



Rana aurora draytonii

Rana aurora draytonii:

California Red-Legged Frog

The California red-legged frog has been listed as threatened by the Environmental Protection Agency since 1996. Population declines have been attributed to habitat fragmentation, degradation and destruction due to urban encroachment, dam construction and livestock grazing near stream channels. Red-legged frogs also fall prey to an assortment of nonnative fish and bullfrogs.

Red-legged frogs can be distinguished from the more common Pacific tree frog by the larger size of mature adults (to 5" versus 2" in length), and reddish coloration on the abdomen and hind legs of adults. California red-legged frogs also have a pale stripe extending from the shoulder to the upper jaw. Coloration is variable for both species.

Historic range: Shasta County to northern Baja California.

Current Range: Currently occupies 24 of 46 counties within its historic range, or 70% of its historic range. The greatest density of populations is found along the central coast.

Habitat: Cool freshwater ponds and intermittent or permanent streams, with dense vegetative cover in proximity to pools at least 70 cm (28 inches) deep. May inhabit or migrate through upland forest during non-breeding season.

Forage: Algae and invertebrates. Large frogs may eat mice and the smaller pacific tree frog.

Breeding: late November to early April. Females lay eggs on vertical, emergent vegetation.

NOV												
DEC												
JAN												
FEB												
MAR												
APR												
MAY												
JUN												
JUL												
AUG												
SEP												
OCT												

ponds to lay their eggs. At the right time of year, tiny, squiggling tadpoles can be seen amidst darting schools of mosquito fish. Naturally, Filoli’s gardeners are proud of this level of wildlife activity and take an active role in supporting this wildlife through proper pond maintenance.

How are ponds maintained?

Two forms of algae tend to form in Filoli’s warm, shallow pools: filamentous and microscopic algae. Filamentous algae forms the classic mats of “pond scum,” with long strings that attach to the pond’s sides and float to the surface. Microscopic algae decrease the water’s clarity, turning pools a murky brown or green. For their weekly maintenance, the pond surface is skimmed with a pool net, filters are removed and cleaned, and excess algal growth is scrubbed from the pool’s sides. Controlling algae both keeps the pond looking good, and also helps to maintain adequate levels of oxygen in the water for amphibians, fish, aquatic insects, and plants.

Although this weekly cleaning largely keeps algae in check, it is also necessary to drain and thoroughly scrub the pools’ sides at least twice yearly, in spring and fall. Before water is drained, mosquito fish and tadpoles must be scooped into buckets of water and set aside in a safe, shady spot. Because the ponds are sometimes breeding sites for the red-legged frog, in particular, cleaning dates are coordinated around their life cycles. Projected breeding dates are from November to April, so ponds are generally cleaned in September and May. Aquatic plants, such as rushes and water lilies, are groomed during spring cleaning, by pruning or dividing as necessary. Finally, pools are re-filled from spigots that draw from Filoli’s well water. Water purchased from the San Francisco Public Utilities Commission—used throughout the rest of the gardens—contains the disinfectant



Some of Filoli’s wildlife:

Photo: L. Tohmach

- Mountain Lion
- Bobcat
- Coyote
- Red Tailed Fox
- Raccoon
- Skunk
- Oppossum
- Black Tailed Deer
- Red Shouldered Hawk
- Turkey
- Western Bluebird
- Blue Heron
- Pacific Tree Frog
- California Red Legged Frog
- California Newt
- Rough Skinned Newt
- California Slender Salamander
- Fence Lizard
- Pacific Garter Snake
- Banana Slug

chloramine, which is toxic to fish and amphibians.

Image: Jim Salyards holds a red-legged frog in the Sunken Garden.

References & Further Reading:

Davidson, C. and Jennings, M. (1993). *Species Tour of California: Rana aurora – Red-Legged Frog*. Retrieved June 20, 2007 from: <http://ice.ucdavis.edu/CANVD ecliningAmphibians/texthtml/a urora.html>

US Environmental Protection Agency. (1996). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog*. (Federal Register Doc. 96-12901). Retrieved June 20, 2007 from <http://www.epa.gov/EPA-SPECIES/1996/May/Day-23/pr-10153.html>.

Filoli Natural History Field Guide

Filoli Gardener’s Reference sheets are created by garden staff to answer common questions regarding Filoli’s traditional horticultural practices. This sheet may be accessed from the Filoli website.

FILOLI CENTER, 86 CAÑADA ROAD, WOODSIDE, CA 94062
(650) 364-8300 WWW.FILOLI.ORG