

WILDLIFE HABITAT

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Unanticipated Predation of California Red-legged Frog at Constructed Wetlands (California)

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The designation of the California red-legged frog (*Rana aurora draytonii*) as a federally threatened species in 1996 has motivated researchers to study the causes of death in managed populations of this species. For example, researchers have reported newts (*Taricha* spp.), bullfrog (*R. catesbeiana*), and great blue heron (*Ardea herodias*) as predators (Rathbun 1998, Jennings and Cook 2001, Fellers and Wood 2004). Here, I report that the barbed-wire fencing commonly used to protect California red-legged frog habitat in created wetlands and managed stock ponds actually contributes to the species' predation by loggerhead shrikes (*Lanius ludovicianus*).

From February 1998 through September 2004, I monitored vegetation and amphibian populations at 22 wetland mitigation ponds and 78 stock ponds that provide aquatic breeding habitat for California red-legged frogs in the upper Kellogg Creek Watershed of Contra Costa County. Each wetland mitigation site was no more than 2.5 acres (1 ha), had an open water pool and planted emergent vegetation, and was surrounded by a protected upland area. All wetland sites were protected from livestock grazing by a five-strand, barbed-wire fence. In addition, barbed-wire fencing had been installed at 15 stock ponds in order to help increase cover and egg-laying microhabitat for California red-legged frogs.

During the six years that I surveyed these sites, I observed several post-metamorphic frogs impaled on the barbed wire fences surrounding four of the wetland mitigation sites and four of the managed stock ponds (Figure 1). (Readers should note that these observations were incidental to mitigation monitoring survey efforts and occurred infrequently.) Upon close inspection, I identified a total of 114 impaled, post-metamorphic California red-legged frogs and about 10 to 15 Pacific treefrogs (*Hyla regilla*). Given the estimated 7,000 to 10,000 California red-legged frogs present in the upper Kellogg Creek watershed (USFWS 2002), 114 may be an insignificant number. However, this level of predation could be detrimental in areas where California red-legged frog populations are in a more fragile stage of recovery.



Figure 1. A loggerhead shrike (*Lanius ludovicianus*) impaled this California red-legged frog (*Rana aurora draytonii*) on the barbed-wire fencing surrounding a created wetland. Photo by Jeff Alvarez

Loggerhead shrikes are common in and around the upper Kellogg Creek watershed, where they appear to use annual grasslands, freshwater marshes, and developed areas for foraging and roosting. Although I did not observe any shrikes impaling California red-legged frogs on barbed wire fences, the predation can be inferred from observations of shrikes impaling other animals adjacent to impaled frogs. Most of the impaled frogs that I encountered were still in an identifiable state, which may indicate a seasonal use of an abundant resource, or may represent adornment display as suggested by Reid and Fulbright (1981). It is difficult to speculate how typical this behavior might be. However, my observations at the study site indicate that the California red-legged frog is one of many species that loggerhead shrikes prey upon.

Attempts to reduce all sources of mortality to threatened amphibians, particularly in and around constructed wetlands, may improve recovery in some areas. Under conditions similar to those in this region, I would suggest building livestock exclusion areas from materials other than barbed-wire, such as solar-electric fencing, high-tensile wire, or woven wire ("hog" wire).

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