

Title

Airborne Pesticides as an Unlikely Cause for Population Declines of Alpine Frogs in the Sierra Nevada, California

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Abstract

Airborne pesticides from the Central Valley of California have been implicated as a cause for population declines of several amphibian species, with the strongest evidence for the mountain yellow-legged frog complex (*Rana muscosa* and *R. sierrae*) in the Sierra Nevada. We measured pesticide concentrations in multiple media at multiple times at 28 sites in the southern Sierra and evaluated the pesticide-decline hypothesis in three ways: (1) we described the temporal variation in concentrations in lake water and compared these values to established critical levels; (2) we tested the hypothesis that pesticide concentrations decrease with distance from the Valley, a pattern that could explain the east-west pattern in population declines; and (3) we tested the hypothesis that pesticide concentrations are correlated with frog population status (i.e., fraction of suitable sites occupied within 2 km of a site). Media represented were air, lake water,

sediment, and tadpoles of a surrogate species (*Pseudacris regilla*); we also measured acetyl cholinesterase activity in *P. regilla* tadpoles. Results do not support the hypothesis for a pesticide effect on frog populations. Concentrations of up to nine pesticides (both currently and historically used forms) were extremely low, on the order of 1 part-per-trillion in lake water, well below critical levels. Evidence for a distance effect in concentrations or cholinesterase activity was very limited. Virtually no association was found between frog population status and any chemical metric. In contrast, two well documented causes for the dramatic and continuing population declines of these frogs are chytridiomycosis and introduced trout. *Notice: This is an abstract of a proposed presentation and does not necessarily reflect US Environmental Protection Agency (EPA) policy. The actual presentation has not been peer reviewed by EPA.*