

Category II - Aquatic Ecosystems

Hydrologic regimes, pond morphology and habitat use: predicting the impact of an emerging aquatic pathogen

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Executive summary:

Amphibian populations throughout the world have been declining in recent years. Multiple interacting factors including disease, introduced species, habitat alteration, and climate change are contributing to the declines. *Batrachochytrium dendrobatidis*, a waterborne pathogen, which causes the fatal disease chytridiomycosis in amphibians, has recently appeared in the aquatic habitats of California and throughout the world. In portions of the Sierra Nevada mountains of California, the disease is causing massive die-offs of mountain yellow-legged frogs, *Rana muscosa*, a threatened native frog species. In other areas of the Sierra, infected populations of *R. muscosa* appear to be persisting with the disease. In the proposed study, we will investigate specific hypotheses to explain the different population-level outcomes of this waterborne pathogen in different California watersheds. The primary hypothesis is that differences in the pond morphology and topography of the landscape in the different sites result in differences in the frogs' habitat use, altering their risk of acquiring and succumbing to the disease. Frogs that spend most of their time aggregated in the main lakes and ponds at each site, and in colder temperature habitats, are at greater risk from the disease. Alternative hypotheses are that differences in the transmission, infectivity, and/or virulence of the disease strains, or differences in susceptibility of the frog genotypes at the different types of sites, are leading to the observed population-level impacts of this water-borne pathogen.