

Foothill yellow-legged frog provides insight on river management

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River flow fluctuations downstream of dams are often out of sync with natural flow patterns and can have significant negative effects on aquatic species, such as native frogs, according to a team of scientists from the USDA Forest Service's Pacific Southwest Research Station, the University of California, Davis and the University of California, Berkeley.

The team examined how altered water flows caused by [hydroelectric dams](#) impact the life cycle of the foothill yellow-legged frog (*Rana boylei*). The frog, which lives in foothill regions from southern California to southern Oregon, completes its life cycle exclusively in riverine environments. The species is well-adapted to predictable [flow](#) patterns that are high during the spring run-off period and low during the summer. Changes to these patterns affect the survival of eggs and tadpoles and consequently are likely to be a primary factor in limiting populations of this declining species, scientists say.

Findings from three recent research projects are published in *Copeia*, *River Research and Applications*, and *Conservation Genetics*. These studies revealed that *R. boylei* tadpoles are not strong swimmers and do not survive the high flow events that can occur during the summer months in many dammed rivers, leading to local population declines. The team tested a habitat modeling tool that is commonly used for fish, with eggs and tadpole data from *R. boylei*, and found that it could provide reliable predictions of habitat changes under different flow scenarios. [Genetic research](#) conducted by the team identified several

isolated and unique populations at the extremes of the geographic range and also demonstrated the important role of river basins in defining relationships among populations. The combined results of this work can guide conservation planning for the species.

Managing water discharge from hydroelectric dams to mirror the environment's natural flow is ideal, but this approach may not meet the needs of human consumption and energy demands.

"To conserve riverine species, one solution may be to restore some of the key characteristics of natural [flow patterns](#), especially the timing of high and low flow periods," says Amy Lind, wildlife biologist at the Pacific Southwest Research Station in Davis, Calif., and co-author of three recent papers on *R. boylei* ecology and genetics.

More information: The team's three research papers can be found at:
www.treesearch.fs.fed.us/pubs/37847 ,
www.treesearch.fs.fed.us/pubs/37848 ,
www.treesearch.fs.fed.us/pubs/37849

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