Climate change threatens extinction for 83% of California native fish

Issue

California’s freshwater habitats have been severely altered by human activities. Now the pace of change is accelerating with climate change. Today, nearly 50 percent of California’s native freshwater fishes are considered at high risk of extinction, even without major climate change. When climate change is added to the fish survival equation, 83 percent of the fishes face extinction in the next 100 years or less. In contrast, the survival of most non-native fishes – better adapted to the warm, low-flow conditions – will be unaffected or improved by warming temperatures.

Competition, predation and disease from non-natives further increases the native fishes’ vulnerability to extinction. Conservation efforts are hindered by limited knowledge of the biology and vulnerability of most native fishes.

Policy Implications

As human demand for freshwater resources continues to increase, strategies are needed to protect all native fish species. This is especially true in the context of the predicted effects of climate change on freshwater habitats. Conservation strategies that account for freshwater needs of both native fishes and humans are needed.

A combination of statewide and regional strategies will be needed to manage vulnerable fish species and prevent widespread extinction. Although the work cited here focuses on freshwater fishes, plants and animals that rely on freshwater habitats are also likely to suffer without a comprehensive conservation strategy in place.

Research Findings

The researchers evaluated the current and future status of each California fish species, native and non-native. They did so by examining factors related to population declines, species distribution and environmental stressors. Future status was determined from changes predicted by climate-change models.
Vulnerability is defined as the likelihood of extinction over the next 100 years. The current vulnerability of native fish species is already high, with nearly 50 percent ranked “critically” or “highly” vulnerable. No native species are likely to benefit from climate change, and 83 percent are either critically or highly vulnerable. Additional population declines, restricted distributions and possible extinction for most native fishes is likely.

By contrast, only 19 percent of non-native species are classified as highly vulnerable to extinction within the next 100 years – and 14 percent are likely to benefit from climate change. Their increased abundance is likely to put additional pressure on vulnerable native species.

![Pie charts showing percentages of native and non-native fish species classified as critically vulnerable, highly vulnerable, less vulnerable, least vulnerable, and likely to benefit from climate change.](image)

**Further Reading**


Additional information on work in the Moyle lab may be found at: [http://wfcb.ucdavis.edu/www/Faculty/Peter/petermoyle/Current_Research_Projects.html](http://wfcb.ucdavis.edu/www/Faculty/Peter/petermoyle/Current_Research_Projects.html)

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