

# Study: Triple threat paints grim future for frogs

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This undated handout photo provided by Christian Hof shows a marked *Silverstoneia flotator*. This species is currently not listed on the IUCN Red List of Threatened Species, because it is very common across its distribution which is located in Central America (mainly Costa Rica and Panama). However, according to our analyses the area where it occurs may become strongly affected by several of the major factors threatening amphibians, namely land-use change and the fungal disease chytridiomycosis. Frogs, salamanders and other amphibians have no safe haven left on the globe because of a triple threat of worsening scourges a new study predicts. (AP Photo/Christian Hof)

Frogs, salamanders and other amphibians may eventually have no safe haven left on the globe because of a triple threat of worsening scourges, a new study predicts.

Scientists have long known that amphibians are under attack from a

killer fungus, climate change and shrinking habitat. In the study appearing online Wednesday in the journal *Nature*, computer models project that in about 70 years those three threats will spread, leaving no part of the world immune from one of the problems.

Frogs seem to have the most worrisome outlook, said study lead author Christian Hof of the Biodiversity and Climate Research Center in Frankfurt.

Meanwhile, federal scientists in the United States are meeting in St. Louis this week to monitor the situation and figure out how to reverse it.

Several important U.S. amphibian species - boreal toads in the Rocky Mountains and the mountain yellow legged frog in the Sierra Nevada Mountains - are shrinking in numbers, said zoologist Steve Corn, who is part of the U.S. Geological Survey's Amphibian Research and Monitoring Initiative. The western U.S. has the problem worse than the East.

About one-third of the world's amphibian species are known to be threatened with extinction, and 159 species already have disappeared, a 2008 international study found.

"It's no fun being a frog," said prominent biodiversity conservationist Stuart Pimm of Duke University, who wasn't part of Hof's study or the USGS effort. "They are getting it from all three different factors."

Hof's study was the first to look at projections of the three threats by geography and see if they overlap. While they overlap some, it's not nearly as much as expected. The wide distribution of threats leaves no refuge for amphibians.

The strongest threats seem to be where the most species of amphibians

live, concentrating the potential loss of diversity, said Hof and Ross Alford, an amphibian expert at James Cook University in Australia, who wasn't part of the research.

The biggest threats are seen, mostly from climate change, to frogs and other amphibians in tropical Africa, northern South American and the Andes Mountains, areas which Hof calls "climate losers." In the northern Andes, which have the most number of frog species in the world, more than 160 frog species are at risk, he said.

Alford and other outside scientists said they thought Hof's work might be overly pessimistic. But studying the geographic distribution of amphibian threats in the future is important, they said.

**More information:** Nature: <http://www.nature.com/nature> (DOI: 10.1038/nature10650)

USGS amphibian research initiative: <http://armi.usgs.gov>

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