

New research confirms continued, unabated and large-scale amphibian declines

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These are American bullfrogs at the Atlanta Botanical Garden, Georgia. Credit: Alan Cressler, USGS

New U.S. Geological Survey-led research suggests that even though amphibians are severely declining worldwide, there is no smoking gun -

and thus no simple solution - to halting or reversing these declines.

"Implementing conservation plans at a local level will be key in stopping amphibian population losses, since global efforts to reduce or lessen threats have been elusive," said Evan Grant, a USGS research wildlife biologist who led the study published in *Scientific Reports* today. "This research changes the way we need to think about amphibian conservation by showing that local action needs to be part of the global response to [amphibian declines](#), despite remaining questions in what is causing local extinctions."

The evidence shows that though every region in the United States suffered declines, threats differed among regions. They include:

- Human influence from the Mississippi River east, including the metropolitan areas of the Northeast and the agricultural-dominated landscapes of the Midwest
- Disease, particularly a chytrid fungus in the Upper Midwest and New England
- Pesticide applications east of the Colorado River
- Climate changes across the Southern U.S. and the West Coast

Amphibian declines are a global phenomenon that this new research demonstrates has continued unabated in the United States since at least the 1960's, and which are occurring even in protected national parks and refuges. Scientists have broadly linked declines to environmental factors like climate, [human influence](#) such as land-use change, and contaminants and disease, but have not been able to use actual scientific data on a large scale to discern causes of the ongoing disappearance of [amphibian populations](#).

The new study is the first to test this linkage at a continental scale, and finds that the presence and intensity of the four main threats - human

influence, disease, pesticide application, and climate change varies substantially across the US. The causes of the declines are more variable - and more locally driven - across the United States than had been assumed.

For example, the research provides evidence that the average [decline](#) in overall amphibian populations is 3.79 percent per year, which supports previous USGS-led research findings from 2013 that showed a similar rate of loss, though the new research finds that the decline rate is more severe in some regions, such as the West Coast and the Rocky Mountains. If this rate remains unchanged, these species would disappear from half of the habitats they occupy in about 20 years.

"Losing 3 or 4 percent of amphibian populations might not sound like a big deal but small losses year in and year out quickly lead to dramatic and consequential declines," said USGS ecologist Michael Adams, a study coauthor and the lead for the USGS Amphibian Research and Monitoring Initiative, which studies amphibian trends and causes of declines.

David Miller, a professor at Penn State University and the lead biometrician in the study, summarized the extent of the effort.

"This study involved a truly comprehensive and collaborative effort to bring together data from researchers across the United States," Miller said. "We combined nearly half a million actual observations of 84 species across 61 study areas to answer questions about the causes of wide-scale [amphibian](#) declines."

More information: Quantitative evidence for the effects of multiple drivers on continental-scale amphibian declines, *Scientific Reports* 6, Article number: 25625 , [DOI: 10.1038/srep25625](https://doi.org/10.1038/srep25625) , www.nature.com/articles/srep25625

Provided by US Geological Survey

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