

## FAQs: Study Confirms U.S. Amphibian Populations Declining at Precipitous Rates

### Study Citation:

The publication, [\*Trends in amphibian occupancy in the United States\*](#), is authored by Adams, M.J., Miller, D.A., Muths, E., Corn, P.S., Campbell Grant, E.H., Bailey, L., Fellers, G.M., Fisher, R.N., Sadinski, W.J., Waddle, H., and Walls, S.C., and is available to the public.

### Photos Associated With This Study:

[http://gallery.usgs.gov/photos/05\\_07\\_2013\\_ae7Hxl3WWr\\_05\\_07\\_2013\\_0](http://gallery.usgs.gov/photos/05_07_2013_ae7Hxl3WWr_05_07_2013_0)

[http://gallery.usgs.gov/photos/05\\_07\\_2013\\_ae7Hxl3WWr\\_05\\_07\\_2013\\_1](http://gallery.usgs.gov/photos/05_07_2013_ae7Hxl3WWr_05_07_2013_1)

[http://gallery.usgs.gov/photos/05\\_07\\_2013\\_ae7Hxl3WWr\\_05\\_07\\_2013\\_2](http://gallery.usgs.gov/photos/05_07_2013_ae7Hxl3WWr_05_07_2013_2)

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### Press Release:

#### Overall Points

1. USGS Amphibian Research and Monitoring Initiative (ARMI) has produced the first estimate of how fast we are losing amphibians from the places where they occur.
2. Even though the declines seem small on the surface, they are not. Small numbers build up to dramatic declines with time.
3. Even the species we thought were faring well – that is, fairly common and widespread – are declining, on average. Fowler’s toads and spring peepers are examples of IUCN (International Union for Conservation of Nature) Least Concern Species for which we found a significant declining trend at the places we monitor.
4. We found a declining trend in every subset of data we examined including frogs versus salamanders, different regions of the United States, and protected areas like National Parks and National Wildlife Refuges.
5. We found evidence that amphibian declines are also taking place in protected areas like National Parks and National Wildlife Refuges.

#### Basic Numbers

Average annual rate of decline for all amphibians we monitored: 3.7 percent  
Average annual decline for IUCN Least Concern species we monitored: 2.7 percent  
Average annual decline for IUCN Red-listed species we monitored: 11.6 percent  
Areas monitored in study: 34  
Time series (species X site combinations): 108  
Number of species studied: 48 including 3 species complexes

## Frequently Asked Questions

What is the USGS ARMI Program?

ARMI – the Amphibian Research and Monitoring Initiative – was chartered in 2000 by a congressional mandate to investigate amphibian declines in the United States. To date, ARMI has produced more than 425 scientific publications on topics ranging from the effect of climate change, non-native predators, fire, diseases, and pesticides on amphibians and their habitats, to developing and testing management actions to restore species and populations. We have conducted research on amphibians across the country from swamps in Louisiana and Florida to southwestern deserts, and from the Sierra Nevada and Rocky Mountains in the West to the Appalachian Mountains in the East.

USGS ARMI website: <http://armi.usgs.gov/>

USGS ARMI published findings: 425 and growing

### **What did we do in this study?**

We provided the first continental-scale estimate of a yearly rate at which the United States is losing amphibian populations and subpopulations. Amphibians are frogs, toads, and salamanders.

### **Why does it matter?**

We knew that individual frogs, toads, and salamander species were having problems, but scientists did not have a good national-scale estimate of how fast amphibians were disappearing from the places they lived. Because we now have this rate of decline, researchers can track and study what is happening in a way that was not possible before. It also gives us an ability to assess how effective any management and policy responses are at reversing these trends.

Additionally, amphibians do important jobs around the world. They control pests, inspire new medicines, feed other animals, and help make ecosystems work. They are inherently valued by people of all ages – watching tadpoles and listening to frog calls are some of the most accessible interactions we have with the natural world.

### **These trends seem small...why do you think they are important?**

Small numbers can lead to dramatic declines. For example, a frog with just a 2.7 percent rate of decline in occupancy would disappear from about half of the habitat they currently occupy in about 26 years if the rate observed is representative and remains unchanged. This was the average rate of decline we observed for the species that an international conservation organization, called the IUCN considers to be doing the best. Species considered threatened at some level by the IUCN would disappear from half of the patches they occupy in about six years if the rate observed (11.6 percent) is representative and remains unchanged.

### **Why do declines seem the worst on National Park lands?**

The important finding is that declines were observed in a variety of protected areas, not just in National Parks. We observed a higher rate of decline on National Park Service lands compared to other types of land we monitored, but we do *not* have enough evidence to say that declines are significantly worse on National Park lands.

The study is a great example of National Parks fulfilling one of their goals – as living laboratories for people to understand environmental change and conservation methods. The fact that amphibian declines are occurring in our most protected areas adds weight to the notion that this is a global phenomenon, which has implications for managers of all landscapes.

### **What is a patch, and what parts of the country did you look at?**

For our USGS amphibian studies, a patch is almost always a pond or lake. Sometimes a stream is broken up into segments, or we superimpose a grid on a large body of water, to divide it into multiple patches. Scientists surveyed many, many patches.

For example, in Yosemite National Park, we monitor approximately 170 ponds, lakes, meadows, or stream segments in 14 small watersheds spread throughout the park.

The patches span a wide variety of habitats where amphibians are expected to occur, from habitats at sea level in San Diego to 11,000 feet in the Rocky Mountains -- home to the boreal toad. We have backpacked to some sites, even snow-shoed into the Sierra Nevada in early spring to have equipment in place when the frogs emerged from the snow-covered ponds to breed. We have also collected data from patches right after wildfires or hurricanes.

### **What is occupancy?**

When occupancy declines, it means that there is a decrease in the overall area inhabited by amphibians. “Occupancy” is the proportion of available habitats where a species occurs. If a toad, for example, occurs in 50 out of 100 ponds in a park, it has 50 percent occupancy.

### **Why do amphibians matter?**

Amphibians do a lot of the important jobs. They control pests, provide medicines, feed other animals, and help make ecosystems work. They are extraordinary, diverse, beautiful animals. They have social value that inspires art and culture, and they are an ancient source of biodiversity. We have fossil records of amphibians going back some 350 million years.

### **Why monitor?**

Monitoring data are also used to help managers and policy makers set priorities, discriminate among and evaluate the effectiveness of management actions, and track the status or recovery of species at risk. They help us evaluate the role of climate change, disease, invasive species or other factors in amphibian declines, and can help to identify other potential causes of population change and the appropriate conservation actions that can be taken to assist species at risk.

**For more information:** Read a USGS blog, [Front-row seats to climate change](#), about three other recent USGS amphibian studies. For more information about USGS amphibian research, visit <http://armi.usgs.gov/>