CONSERVATION RESEARCH REPORTS

Mortality in the Only Population of the Critically Endangered Frog, *Xenopus longipes*

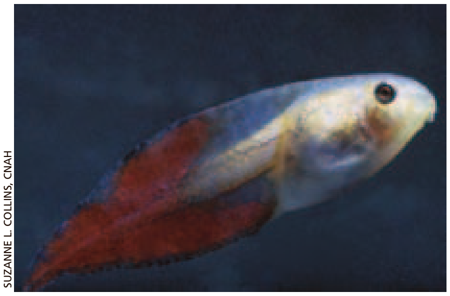
Contemporary global declines and mortality events in amphibian populations have been often attributed to infectious disease and climate change, separately and in combination. **Blackburn et al.** (2010. *African Journal of Herpetology* 59:111–122) reported an enigmatic mortality event in the only known population of the critically endangered Lake Oku Clawed Frog (*Xenopus longipes*). This aquatic and biologically distinctive species is restricted to Lake Oku, a high-elevation crater lake on Mt. Oku in Cameroon. Neither a quantitative PCR-based screen nor histopathological analysis revealed the presence of the chytrid fungus (*Batrachochytrium dendrobatidis*), which is believed to be responsible for many declines and mortality events in amphibian populations around the world. Histopathology revealed widespread epidermal hyperplasia and multifocal saprolegniasis, suggesting that the animals have been exposed to a source of skin irritation. These sources might include acidified surface waters, perhaps derived from inorganic fertilizers or other human-related pollutants, or to local geological processes distinctive of the Cameroonian Volcanic Line. Currently, the causes underlying this mortality event remain obscure.

VÁCLAV GVOŽDÍK

An enigmatic mortality event in the only known population of the critically endangered Lake Oku Clawed Frog (*Xenopus longipes*) is associated with an undiagnosed skin irritation.

Phosphates Have No Effect on Tadpoles

Phosphate pollution has no effect on the tadpoles of Cope's Gray Treefrog (*Hyla chrysoscelis*). A 15-day study by **Earl and Whiteman** (2010. *Journal of Herpetology* 44:201–208) exposed tadpoles to phosphates resulting from agricultural runoff and urban water and discovered that phosphates might not be toxic to this species at levels associated with anthropocentric issues. The authors concluded that high levels of phosphate could even be beneficial to the tadpoles because they enhance the growth of algae, which tadpoles consume.



SUZANNE L. COLLINS, CNAH

Cope's Gray Treefrog (*Hyla chrysoscelis*) tadpoles are not affected negatively by levels of phosphates resulting from agricultural runoff or urban water.

Climate Change Threatens Genetic Variability

The Iberian Emerald Lizard (*Lacerta schreiberi*) is projected to lose strong genetic variability by the year 2080. Suitable habitat for this lizard consists of river or stream margins that are covered with dense vegetation and found near montane areas with cool, humid climates. **Rodder and Schulte** (2010. *Biodiversity Conservation* 19:2651–2666) noted that more genetically diverse populations in the south-central portions of the Iberian Peninsula are more likely to be affected negatively by climate change than the less diverse northwestern populations. The southern populations will be at greater risk of extinction because they are already fragmented, and increasingly hotter climate will decrease humidity, which will result in even less suitable habitat. The more northerly populations live near mountains where conditions are cooler.

ADRIAN198CM

Southern populations of the Iberian Emerald Lizard (*Lacerta schreiberi*) will be at greater risk of extinction than more northerly montane populations because they are already fragmented and increasingly hotter climate will decrease humidity, which will result in even less suitable habitat.

Projected Loss of a Salamander Diversity Hotspot as a Consequence of Global Climate Change

Significant shifts in climate are considered a threat to plants and animals with significant physiological limitations and limited dispersal abilities. The southern Appalachian Mountains are a global hotspot for plethodontid salamander diversity. Plethodontids are lungless ectotherms, so their ecology is strongly governed by temperature and precipitation. Many plethodontid species in southern Appalachia exist in high-elevation habitats that might be at or near their thermal maxima, and might also have limited dispersal abilities across warmer valley bottoms. **Milanovich et al.** (2010. *PLoS One* 5:1–10) used a maximum-entropy approach (program Maxent) to model the suitable climatic habitat of 41 plethodontid salamander species inhabiting the Appalachian Highlands region (33 individual species and eight species included within two species complexes). The authors evaluated the relative change in suitable climatic habitat for these species in the Appalachian Highlands

USGS

Significant loss of habitat is projected for many salamander species, such as this Southern Dusky Salamander (*Desmognathus auriculatus*), that currently occupy the Appalachian Highlands.

from the current climate to the years 2020, 2050, and 2080, using both the HADCM3 and the CGCM3 models, each under low and high CO_2 scenarios, and using two-model threshold levels (relative suitability thresholds for determining suitable/unsuitable range), for a total of eight scenarios per species. Although models differed slightly, every scenario projected significant declines in suitable habitat within the Appalachian Highlands as early as 2020. Species with more southerly ranges and with smaller ranges had larger projected habitat loss. Despite significant differences in projected precipitation changes to the region, projections did not differ significantly between global circulation models. CO_2 emissions scenario and model threshold had small effects on projected habitat loss by 2020, but did not affect longer-term projections. Results of this study indicate that choice of model threshold and CO_2 emissions scenario affect short-term projected shifts in climatic distributions of species; however, these factors and choice of global circulation model have relatively small effects on what is significant projected loss of habitat for many salamander species that currently occupy the Appalachian Highlands.

Habitat Preferences and Home-range Size

Effective wildlife conservation plans should consider both the habitat needs and spatial requirements of the species in question. Studies that focus on the correlation between the habitat preferences and movement patterns of wildlife, particularly snakes, are uncommon. **Kapfer et al.** (2010. *Journal of Zoology* 282:13–20) attempted to determine how habitat preferences or quality influenced movement patterns of snakes. To answer this question, the authors created a case model that incorporated habitat preference or avoidance information rigorously obtained for Bullsnakes (*Pituophis catenifer sayi*) from 2003 to 2005 at a site in the upper midwestern US and compared it with minimum convex polygon estimates of home-range size. They employed geographical information systems to model the amount of preferred (open bluff faces) and avoided (agricultural fields and closed canopy forests) habitats within each estimated home range and compared them via multiple linear regression. They also tested the influence of gender, length, and weight on home-range size. Results indicated that home-range size increased primarily as a function of the amount of avoided habitat. Those data supported the hypothesis that habitat quality has an impact on wildlife movement patterns, and the relationship between habitat needs and spatial requirements should be considered when conserving or managing species.

JOSHUA M. KAPFER

A case model that incorporated habitat preference or avoidance information for Bullsnakes (*Pituophis catenifer sayi*) supported the hypothesis that habitat quality has an impact on wildlife movement patterns, and the relationship between habitat needs and spatial requirements should be considered when conserving or managing species.

Conservation Status of the World's Vertebrates

Using data for 25,780 species categorized on the International Union for Conservation of Nature (IUCN) Red List, **Hoffmann et al.** (2010. The Impact of Conservation on the Status of the World's Vertebrates. *Science*, published online 26 October 2010) presented an assessment of the status of the world's vertebrates. One-fifth of species are classified as Threatened, and the authors demonstrated that this figure is increasing. On average, 52 species of mammals, birds, and amphibians move one category closer to extinction each year. However, this overall pattern conceals the impact of conservation successes, and they showed that the rate of deterioration would have been at least one-fifth as much again in the absence of these. Nonetheless, current conservation efforts remain insufficient to offset the main drivers of biodiversity loss in these groups: Agricultural expansion, logging, over-exploitation, and invasive alien species.

Ranavirus Infections in Wild Common Frog Populations

Amphibians are declining worldwide, and one factor is infectious diseases. Mass mortalities caused by a virus or a group of viruses belonging to the genus *Ranavirus* have occurred in wild Common Frogs (*Rana temporaria*) in England since the 1980s, and ranaviral disease is widespread in amphibians in North America, where it can also cause mass die-offs. Although numerous reports of *Ranavirus*-associated mass mortality events have been reported, no study has yet evaluated the long-term impacts of this disease. **Teacher et al.** (2010. *Animal Conservation* 13:514–522) examined archived records of English Common Frog mortalities likely caused by *Ranavirus*. Preliminary indications suggest that Common Frog populations respond differently to the emergence of disease; emergence can be transient, catastrophic, or persistent with recurrent mortality events. The authors subsequently focused on populations that had recurring mortality events (n = 18), and they reported median declines of 81% in the number of adult frogs in those populations from 1996 to 2008. Comparable uninfected populations (n = 16) showed no change in population size over the same time period. Regressions indicated that larger frog populations might be more likely to experience larger declines than smaller populations, and linear models showed that percentage population size change is significantly correlated with disease status, but that habitat age (a possible proxy for environmental quality) had no significant effect on population size change. The results provided the first evidence of long-term localized population declines of an amphibian species that appeared to be best explained by the presence of *Ranavirus* infections.

CARL FARMER

Mass mortalities caused by a virus or a group of viruses belonging to the genus *Ranavirus* have occurred in wild Common Frogs (*Rana temporaria*) in England since the 1980s.

NEWSBRIEFS

Search for Lost Amphibians

Teams of scientists around the world have launched an unprecedented search in the hope of rediscovering 100 species of "lost" amphibians — animals considered potentially extinct but that may be holding on in a few remote places. This search, which is taking place in 14 countries on five continents, is the first ever coordinated effort to find such a large number of "lost" creatures and comes as global amphibian populations are suffering a shocking decline — with more than 30% of all species threatened with extinction. Many of the amphibians that the teams of scientists are looking for have not been seen in several decades, and establishing whether populations have survived or not is vital for scientists looking to understand the recent amphibian extinction crisis.

Amphibians provide many important services to humans such as controlling insects that spread disease and damage crops, and helping to maintain healthy freshwater systems — the chemicals in amphibian skins have also been important in helping to create new drugs with the potential to save lives, including a painkiller 200 times more potent than morphine.

"Amphibians are particularly sensitive to changes in the environment, so they are often an indicator of damage that is being done to ecosystems," explains Conservation International's Dr. Robin Moore, who has organized the search for IUCN's Amphibian Specialist Group. "But this role as the global 'canary in a coal-mine' means that the rapid and profound change to the global

CHARLES H. SMITH

The Golden Toad (*Incilius periglenes*) is perhaps the most famous of the lost amphibians. This Costa Rican endemic was last seen in 1989.