Strong evidence has suggested that anthropogenic climate change have been reducing biodiversity, endangering entire species and threatening vital ecosystems globally for the last century, but one of the more overlooked groups of organism that may in fact be especially threatened both directly and indirectly by human activities, and may have some of the gravest effects on the biosphere if their decline continues, are the amphibians.

According to the IUCN’s Red List of Threatened Species, approx. 1,900 amphibian species are threatened with extinction[1], and some research suggests that the current extinction rates of these species are 25,000-45,000 times greater than the overall amphibian background extinction rate[2]; such extreme figures are likely to be due to human activity rather than natural phenomena. A study of over 900 amphibian populations, with a wide range of spatial and temporal trends, seemed to confirm that, even despite this variability, amphibian populations have in fact been declining for decades[3].

It is the unique anatomies, physiologies and life histories of amphibians which makes them so vulnerable and sensitive to environmental changes. In fact, this sensitivity to environmental changes is why they are often regarded as “canaries in the coal mine” – good indicators of the overall health of ecosystems and the environment[4].

Most amphibians have a two-staged life cycle, exposing them to both aquatic and terrestrial environmental effects at important developmental and reproductive periods of their lives. Their skins are highly permeable, making them more sensitive to changes in water or air quality as well as other environmental toxins[4].

Other potential extinction factors range from habitat destruction, modification and fragmentation; pollution and chemical contamination, ozone depletion and UV radiation, disease, the introduction of invasive species, and even to increased noise levels[5] and artificial light[6]. Another major factor attributed to amphibian population decline is disease; e.g. Chytridiomycosis in the Americas, Australia and East Africa, which has been linked to droughts caused by global warming[4], or trematode infections exacerbated by eutrophication from the overuse of fertilisers[7].

Additionally, conservation of amphibian populations after they have already become endangered presents further challenges; e.g. protected areas often only work as temporary solutions as they lead to inbreeding, since amphibian populations in particular need to maintain high levels of genetic diversity[8]. Therefore, identifying the factors contributing to their declines the most using population modelling as to pre-emptively eliminate them before further species become endangered is one of the primary goals of our research.

To conclude, we believe that the potentially devastating effects on global ecosystems if an entire class of vertebrates continue disappearing so rapidly over the next few decades makes the conservation of these animals a prime concern, which is why we have chosen to model the populations of 10 amphibian species to investigate the specific factors contributing the most to their declines so we can properly prioritise how to ensure their conservation.

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