

## **The value of Amphibians: What's the fuss about frogs?**

**Dr Jeanne Tarrant, Endangered Wildlife Trust, Threatened Amphibian Programme**

Why care about amphibians? In the light of the extinction crisis now recognised as one of the biggest challenges facing scientists and conservationists, this question is being asked by society. This is because public perception surrounding amphibians has oftentimes been less than positive. Changing such perceptions plays a crucial part in the overall plan to save amphibians. The reasons for conserving amphibians are as many and varied as the Families comprising this fascinating Class of vertebrates. Although amphibians are seldom seen, they are of crucial importance, both in their function within ecosystems, and with regard to their evolutionary significance. In evolutionary terms, modern amphibians are a monophyletic group descended from a common ancestor approximately 315 million years ago and represent the all-important transition of aquatic tetrapods onto land. This transition is reflected today in the vast array of species of amphibians and the distinctive biphasic lifestyle with which most are associated.

*Amphibia* is an extremely diverse Class of vertebrates, comprised of three Orders including approximately 6771 species: *Anura* (frogs and toads), of which there are currently 5,966 known species; *Caudata* (salamanders) 619 species and; *Gymnophiona* (caecilians), 186 species (Frost 2011). The recent rate of new amphibian species descriptions has been extremely high, with an overall 60% increase in the number of recognised species since 1985. Indeed, amphibian species diversity now exceeds that of mammals. Should this trend in descriptions continue, it is estimated that in the next five decades the total number of amphibian species may reach approximately 12,000. Amphibians are distributed globally with particularly high species richness in the tropics. Accordingly, the bulk of new descriptions are being reported from these regions.

### **The role of frogs in nature**

Of prime significance are the integral roles amphibians play in most ecosystems. Despite often going unnoticed, amphibians are often the most abundant vertebrates in terms of wetland and terrestrial vertebrate biomass in temperate and tropical environments. Such abundance is probably linked to the role of both adults and larvae as primary predators in both the terrestrial and aquatic environments. Frogs play an extremely important role in the food-chain, through their role as both predator and prey; they provide food to a wide array of other animals e.g. birds and snakes, while on the other hand, they consume vast numbers of insects. Some species are known to consume 1000s of mosquitoes in a single night. Tadpoles are usually aquatic and eat algae and by doing so, assist in keeping waterways clean.

Frogs inhabit an array of habitats, including wetlands and grasslands, and play an important role in maintaining the balance of these ecosystems. The decline of frogs indicates the loss of these important habitats. Already more than 50% of wetlands in South Africa have been destroyed as demand for land increases. Wetlands have important functions including keeping water clean by acting as filters, flood attenuation and as habitat for many other species.

## **Frogs as Bio-indicators**

Amphibians are also well recognised as important bio-indicators. This is because amphibians have a number of physiological, ecological and life-history characteristics that make them prone to changes in the environment. Most species make use of both the aquatic and terrestrial environments during their lifecycles, and as a result, are sensitive to changes in both systems. Both habitats are also impacted by intense human use. Amphibian declines would thus have negative impacts in both aquatic and terrestrial ecosystems.

Due to their biphasic lifestyle and their sensitive semi-permeable skins, amphibians are considered good indicators of environmental health and the state of the biosphere as a whole. Owing to their low vagility (i.e. they are not able to move away from disturbance as quickly or effectively as say birds), they are particularly sensitive to habitat fragmentation and are vulnerable to the changes brought about through habitat transformation.

## **Threatened Frogs**

Frogs are the most threatened vertebrates on Earth (with 32% listed on the IUCN Red List compared with 12% of birds and 23% of mammals). This is a huge proportion of an entire Class of animal facing extinction, with dire consequences. The Red List includes the threat categories of Vulnerable, Endangered and Critically Endangered depending on the severity of threats facing a particular species and or its rarity. Critically Endangered species are those most at threat of extinction unless proactive intervention is taken to curb threats. Frogs are important indicators of the health of our environment and the fact that a third of all species face extinction should be a clear warning that our global health is in jeopardy. The expected magnitude in the loss of amphibians is significant and will undoubtedly have a multiplier effect, ultimately contributing to declines and extinctions of other species which rely on them. This trend is reflected in South Africa with 30% of our frog species listed as threatened (20 of our 160 species are Red Listed).

## **Public attitudes/perceptions**

In terms of their social, cultural and religious importance, amphibians have been viewed in a variety of roles. Some cultures have held them in the highest regard as keepers of rain or agents of fertility and good luck. Others have persecuted them, regarding them as evil. Either way, amphibians have featured large in much of society's folklore. Amphibians have important aesthetic value and play an important role in education about biodiversity, especially in increasingly urban environments. Their fascinating life-cycle is an often-used educational tool at school level. The medicinal properties derived from amphibians have also long been recognised by humans. In many parts of the world they are important source of protein for people and are also used extensively in traditional medicine for treatments of ailments as varied as warts and heart disease.

More recently, the use of amphibian products for western medicine has gained increased attention. One of the first uses was for pregnancy testing, with the African clawed frog *Xenopus laevis* used extensively for this purpose. Amphibian skin secretions harbour a diversity of defensive biological compounds, which provide immunity against infections, viruses and bacteria. Peptides isolated from

amphibian skin are showing pharmacological promise as antibiotics and analgesics. Current active fields of research include the investigation of frog skin peptides to block HIV transmission and inhibit growth of chytrid zoospores. Loss of species could thus mean the inadvertent loss of potential cures for important diseases. The loss of biodiversity in general does not bode well for human well-being considering our dependence on ecosystem processes and services such as clean water, pollination, food, medicines and material resources.

Despite mixed social attitudes towards amphibians, the general public remain apathetic to the plight of amphibians and their importance in general. This is particularly relevant in South Africa where superstitious beliefs and fears place frogs in a negative light. Overcoming this apathy through education and raised awareness is necessary for improving the support (and hence effectiveness) of amphibian conservation efforts.

### **How can you help?**

Build a frog pond in your garden

Learn more about frogs

Conserve resources

Slow down driving on rainy nights

Turn off the tap

Use environmentally-friendly products at home and in the garden

Don't buy bottled water

Don't keep frogs as pets

Get involved in Leap Day for Frogs, 28 February: [www.LeapDayforFrogs.org.za](http://www.LeapDayforFrogs.org.za)